Some Fundamentals for Successful Weed Control in Forest Crops
Michigan State University Extension Service
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Some Fundamentals for Successful Weed Control in Forest Crops

Douglas O. Lantagne

Millions of trees are planted in Michigan each year. Most are planted on cut-over forest land, or abandoned agricultural fields and pastures. Trees are planted for many purposes, including timber production, windbreaks, soil erosion control, Christmas tree production, wildlife habitat, economic investment, aesthetics and for other purposes intended to meet a variety of landowner objectives.

High seedling survival results from practices such as properly matching species to site, preparing the site adequately, selecting quality nursery stock and handling it correctly, using good planting techniques and providing adequate follow-up care. Many of these practices are discussed in Extension bulletin E- 771, "Tree Planting in Michigan," available at local county Extension offices. Additional aspects of site preparation and care following planting are discussed more fully in this bulletin.

Site preparation and after-planting care are among the most important factors that influence seedling survival and early growth. These practices are designed to minimize weed competition, which can result in high mortality and poor growth, even of healthy tree seedlings that were well planted.

This bulletin provides guidelines for developing and implementing an effective weed control program that will improve seedling survival and growth. It also presents information on weed control methods, weed identification and herbicide action.

■ What is a weed control program?

Successful weed control programs attempt to reduce weed competition to levels that will not cause economic damage to tree crops; they do not necessarily attempt to eradicate all weeds. Low levels of weed competition are generally acceptable and usually do not cause significant economic loss. Weed eradication efforts are often unrealistic and expensive, and they may lead to other problems such as weed resistance, secondary weed outbreaks and environmental contamination.

Knowledge of weed control methods and target weed species is necessary to develop successful weed control programs. Weed control efforts should use methods that are effective, economical, practical and environmentally acceptable. Good weed control programs are planned in advance of the growing season and are flexible enough to respond to changes in weed composition, weather and equipment availability.

Weed control is necessary in all three phases of plantation establishment: site preparation, site maintenance and release.

Site preparation, the control of vegetation before tree planting, is the time of greatest flexibility in weed control methods. It is also the phase most often overlooked by inexperienced tree planters.

Site maintenance, the prevention of weed establishment, can occur during or immediately after planting. The objective is to prepare and plant the site simultaneously or to maintain a previously prepared site free of weed competition. Tree seedlings require several additional growing seasons to reach free-to-grow status if there is vegetative competition. Failure to prepare a site adequately for planting by controlling vegetation at the time of planting, increases the probability of seedling loss.

Release, the selective removal of weeds from an established tree crop, is recommended whenever competition for space, light and soil resources begins to affect the survival and growth of the tree crop. In general, good site preparation and/or site maintenance can reduce or eliminate the need for release. In turn, a good release program may reduce or replace the need for intensive site preparation.

■ Expected benefits from effective weed control programs

The primary benefits of weed control are increased tree survival and growth due to reduction in competition among plants for space, light and soil nutrients.

Weed control has its greatest effect early in a tree's life. Tree seedlings grow most rapidly when they do not have to compete with weeds for the resources necessary for growth. Effective weed control increases survival and growth by reducing the level of weed competition before tree planting and maintaining an effective level of weed control after planting. Complete and total weed control is generally not required on any site.

Weed Types and Characteristics

Simply defined, a weed is any unwanted plant, or a "plant out of place". The definition and management of weeds are related to landowner objectives and judgment.

Several publications on grass and herbaceous plant identification are available. Some suggested references are listed in Table 1. They include diagrams, sketches and/or photographs to aid in plant identification. A written description for each plant and its life cycle is also provided, along with a map showing its geographic range. An excellent reference to identify particular problem weeds in Michigan is MSU Extension bulletin E-791, "Problem Perennial Weeds of Michigan." This bulletin is available locally at county Extension offices.

Most weeds can be grouped into one of three categories: annuals, biennials or perennials. A few weeds, such as white cockle and black medic, fit in more than one category. Common plant species are listed by category in Table 2.

Annual weeds reproduce from seed each year. A complete life cycle, including germination, growth, flowering, and seed production and dispersal occurs during a single growing season.

Biennial weeds reproduce from seed but require two seasons to complete their life cycle. During the first growing season, seeds germinate and establish a root system and a vegetative top. The plant becomes dormant during the winter and initiates growth the following spring. During the second growing season, the plant matures, flowers and produces seeds before dying.

Perennial weeds live for more than two growing seasons. They are usually very competitive and difficult to control. Though perennial weeds may be established from seed, many common weeds reproduce and expand using vegetative structures. The most common vegetative structures are rhizomes, stolons, fleshy roots, tubers and bulbs. Effective control of many perennial weeds depends upon controlling the root system. Weeds characterized by rhizomes, stolons and tubers are typically the most difficult to control.

Rhizomes are underground stems that are often mistaken for part of the plant's roots. Rhizomes are the principal means by which some plants propagate themselves and extend their area of influence. As the underground stems (rhizomes) grow outward, new plants grow vertically from them, thereby increasing the size of the entire plant. In many cases, individual pieces of a disturbed rhizome can initiate new plants. Quackgrass, Johnsongrass and common milkweed are examples of perennial weeds with rhizomes.

Stolons are aboveground stems that grow horizontally along the soil surface. As with rhizomes, new vegetation grows vertically from the stems, increasing the area covered by the plant. Stolons are characteristic of white clover and orange hawkweed.

Fleshy roots can be classified as either widespreading or taprooted. Examples of perennial weeds with widespread fibrous roots are field bindweed, Canada thistle and perennial sowthistle. Examples of perennial weeds with taproots include dandelion, curly dock and hoary allysum.

Tubers and *bulbs* are fleshy underground stems. Their primary function is food storage. Tubers are associated with yellow nutsedge, and bulbs with such species as wild garlic and wild onion.

The ability of various root systems to regenerate an entire plant from a single piece of root makes it very difficult to eradicate or, in some cases, effectively control them. Multiple treatments with the same method or a combination of control methods is often required to satisfactorily control such plants.

Herbicide types and characteristics

Herbicides kill plants by direct contact with living tissue or through absorption and subsequent disruption of internal plant growth processes. Contact herbicides control only the parts of the plant to which they are applied. Systemic herbicides enter through the leaves, stems or roots and kill treated plants by disrupting normal growth processes in various parts of the plant. Systemic herbicides offer the greatest potential for controlling deep-rooted perennials.

Herbicides can also be classified as preemergent or postemergent chemicals. Contact and systemic herbi-

cides can be of either type. Preemergent herbicides are applied before weed growth begins and act on germinating seeds; postemergent chemicals are applied after weeds have begun to grow and act on established plants.

Postemergent systemic and contact herbicides are primarily applied to the leaves (foliar applied). Leaf tissue of grasses, herbaceous plants and woody perennials is the normal application target. The leaf tissue must be actively growing to effectively absorb and translocate systemic herbicides. Some postemergent herbicides can also be used to control individual stems of woody plants. The chemicals are injected directly into the stem tissue or applied to the bark and/or to freshly cut stumps.

Numerous factors affect the performance of foliar-applied herbicides. They include environmental factors such as rainfall, temperature and relative humidity; site factors such as soil type and past use; and managerial factors such as rate of application and application method.

A small group of postemergent products are classified as systemic residual herbicides. They are particularly effective because they control established vegetation and also act as preemmergent herbicides to maintain a site free of weeds for a period of time. The duration of control depends on the herbicides used, the application rate, the soil texture and environmental factors. Residual herbicides, unlike foliar- applied products, are directed at the soil surface. The primary means of uptake is absorption by the root systems of susceptible plants. Several also provide some contact control of existing vegetation.

Preemergent systemic or contact herbicides are typically applied to a soil surface free of vegetation. The majority of preemergent herbicides provide no control of existing vegetation. Preemergent chemicals remain active in the soil for several weeks to several months. They kill germinating weed seeds through direct contact and/or absorption. Preemergent herbicides do not control root systems, rhizomes, stolons or tubers of established perennial weeds.

Soil texture (sand, silt, clay), organic matter content and pH all influence the effectiveness of soil-applied herbicides. In general, soils high in clay and/or organic matter require more herbicide than loamy or sandy soils for adequate weed control. Conversely, application rates in sandy soils must be reduced to avoid injury to desirable trees and prevent contamination of surface and/or groundwater.

Growers using either preemergent or postemergent herbicides must adjust application rates based on the herbicide, the weed species, the stage of weed growth and site conditions. Herbicide labels offer a range of application rates. The applicator is responsible for selecting the appropriate rate. Consult your local county Extension agent for help in selecting a proper application rate.

Herbicides are generally labeled for use in site preparation and/or release of specific tree crops. Herbicides registered for use in site preparation may be non-selective chemicals that can severely damage or kill most plants. Herbicides registered for use in release are selective chemicals — *when properly applied*, they do not cause significant damage to the tree crop.

Herbicides are designed to control grasses, herbaceous broadleaf weeds, woody plants or some combination of plant types. No single herbicide controls all weed species. The repeated use of one herbicide on the same site can result in the establishment of a resistant weed community that is difficult to control. When multiple applications are needed to control weeds on a site, it is prudent to change herbicides to avoid the development of weed resistance.

Though hundreds of herbicides are sold in the United States, only about 50 brand names are registered for use in either forestry or Christmas tree production. Of these 50 brand names, many are combinations of the same 20 or so active ingredients (Table 3).

Careful herbicide selection is necessary to control the wide range of weed species encountered. To help ensure the success of a chemical weed control program, remember the following points:

- No herbicide controls all weeds.
- Read the herbicide label pertaining to your intended use.
- Be sure the herbicide is labeled for the weed and crop you want to use it on.
- Single applications do not usually last for an entire rotation.

Weed control methods

Weed control methods can be classified as **cultural**, **biological** or **chemical**.

Cultural methods are mechanical techniques designed to create optimal growing conditions for the crop and/or unfavorable conditions for weeds. Examples of common cultural methods are scalping and cultivation.

Scalping is plowing a furrow 18 to 24 inches wide and 3 to 10 inches deep for each row on the planting site. Seedlings are planted in the weed-free subsoil that is exposed. Furrows remain free of weeds for 1 to 2 years.

Cultivation (plowing and/or disking) destroys the tops and roots of existing annual and biennial weeds. In addition, cultivation can improve soil tilth, water infiltration capacity and nutrient availability, and it makes tree planting easier.

Biological methods focus on reducing the competitive ability of weeds. Examples of biological control include mowing, planting nurse crops and mulching. Mowing reduces competition between weeds and crops and prevents flowering of annual or biennial weeds. Nurse crops, such as ryegrass or vetch, are seeded between rows in established plantations to restrict the establishment and growth of more competitive weeds. Mulching - with plastic, sawdust and other materials - physically prevents weed growth around each tree.

Chemical control is the use of herbicides to kill weeds and/or prevent the germination and growth of weed seeds. Herbicides are classified as either site preparation or release chemicals. The safe and effective use of herbicides requires a knowledge of the chemical to be used, the application methods available and the plant to be controlled.

All weed control methods have some disadvantages. Mowing requires multiple trips over the same area during each growing season and cannot remove weeds immediately around trees. Cultivation will not effectively control all perennials and can disturb tree roots. Cultivation can also result in increased populations of perennial weeds because it spreads regenerating root and stem segments. Scalping creates furrows, which physically interfere with other operations such as harvesting, weed control or shearing in Christmas tree plantations. It also removes organic matter, which holds soil nutrients and moisture better than the exposed subsoil. Herbicide use requires knowledge of herbicide effects, weed identification and application equipment. Herbicides can also damage the environment and cause personal health risks if used improperly. To ensure safe and effective weed control, you should consider the consequences of alternative treatments before selecting a weed control method or combination of methods.

Prescribing Weed Control

The prescription process is an outline. Following it will ensure that the most appropriate method of weed control is selected, implemented and evaluated. A good prescription incorporates a knowledge of weed control methods and site factors that affect treatment effectiveness. Repeated success depends on using both weed type and site variability information in forming a prescription. Steps in the outline include: weed detection and identification, site selection, site analysis, control method selection and treatment evaluation.

Weed detection and identification. Tree seedlings planted in the early spring on prepared sites rarely have noticeable weed competition. On unprepared sites, however, seedlings often suffer from intensive weed competition, and high levels of tree seedling mortality occur by midsummer. Proposed planting sites should be evaluated for weed competition the year before tree planting.

Site preparation does not guarantee that weed competition will not recur. Site maintenance or release is often necessary. The application of appropriate weed control treatments requires timely site visits. The frequency of visits required depends on the level of weed control desired and the weed control method used. Methods such as mowing may require weekly checks; others, such as cultivation, may require monthly checks. Still others, such as chemical treatments, may require only one or two checks per season. The goal of weed detection is to identify sites with potential weed problems before they cause significant economic damage to the crop.

Identifying the types of weed present is important because the biology and growth habits of a particular weed species determine what control measures will be most effective. One goal of weed identification is to classify invading weeds according to difficulty of control. Other important information includes the quantity and distribution of the various weed types. Table 4 illustrates the type of information to collect on each site.

Site selection. Criteria for selecting sites for weed control are the severity of the problem, the potential

for economic loss, the management objectives vs. the intended final product, the available weed control budget and time constraints.

For example, red pine plantations established for pulpwood or sawtimber may receive only one weed control treatment during a 40-year rotation. In contrast, Christmas tree plantations are generally planted in site-prepared areas and are often released from weed competition yearly. Selecting which sites should receive weed control in any one year depends upon the intensity of management practiced by the owners.

Site analysis. Site analysis is the first step in selecting a weed control treatment. Information on vegetative distribution, composition and amount, soil characteristics, topography, water table depth and location of sensitive areas is important. If the weed problem is localized, control may be localized to minimize cost. Various vegetative compositions may require the use of either mechanical or chemical control methods. For example, perennial weed species such as quackgrass or unwanted tree species are best controlled with herbicides.

Soil texture and percent organic matter influence application rates for soil-applied herbicides. Soils high in organic matter or clay content require higher application rates than sandy or sandy loam soils. Soil texture also affects the ability of equipment to traverse the site in any season of the year. Combining soil texture and topographic information provides insight into the potential for soil erosion. Steep slopes and wet areas may preclude the use of machinery in one or all seasons.

Sensitive areas include water sources (wells, lakes, streams, ponds), field or ornamental crops sensitive to herbicides, dwellings and animal pastures adjacent to the site. Selecting weed control methods compatible with sensitive areas prevents off-site or non-target impacts.

If a crop species is present, it is also important to evaluate its condition and vigor. Tree crops under stress from drought or insect or disease damage are typically more susceptible to injury from herbicides than vigorous, unstressed trees.

Make on-site visits to collect information on soil texture, drainage, erosion potential, trafficability by season, slopes and locations of sensitive areas. Table 5 is a site analysis data sheet for collecting information during an on-site visit.

Control method selection. Selecting a weed control method entails being familiar with the available biological, cultural and chemical control options and evaluating impacts, costs and efficacy for all available control alternatives against site and management factors. Site conditions must be balanced against preferred methods to avoid expensive and needless mistakes. The method(s) selected should be both economical and environmentally sound.

Examples of common landowner mistakes are presented in three cases:

Case 1. A grower cultivates a field to minimize weed competition before planting tree seedlings. But the grower fails to consider the large number of perennial weed species on the site before cultivating. Cultivation distributes regenerating root segments of the perennials over a greater area. **Result**: bigger weed problem exists after cultivation.

Case 2. Tree seedlings are planted without site preparation. The grower expects to use a broadcast application of herbicide to control weeds after planting is completed. The tree species planted, however, are sensitive to all labelled release herbicides. The landowner resorts to treating individual trees or waits until fall to chemically control weeds. **Result**: increased time and money spent for individual tree treatments or loss of seedling numbers and growth during the first growing season.

Case 3. A field of alfalfa is treated with a herbicide commonly used in a landowner's weed control program. The herbicide label was not consulted to determine its effectiveness on alfalfa. After trees are planted, the grower discovers that the herbicide does not control alfalfa. Chemical release treatments are not available to control the alfalfa until the end of the first growing season. **Result**: increased time and money spent for individual mechanical tree treatments or loss of seedling numbers and growth during the first growing season.

Evaluate weed control methods against the site analysis data and make a written prescription. Table 6 presents a form for recording the weed control prescription.

Treatment evaluation. Weed control programs require a set of evaluative procedures to assess results. Evaluations can be helpful in developing later pre-

scriptions. A written record of successes and failures is also important to obtain long-term consistency in a weed control program. Table 7 presents a treatment evaluation form.

Summary

Weed control is important to increase survival and growth of planted trees. Weed control programs should be planned in advance of the growing season but remain flexible enough to react to changes in weed populations, weather and equipment availability. Weed control programs should be designed to reduce weed competition to levels that do not economically damage tree crops. They should not attempt to eradicate all weeds.

Weed control programs can use cultural, biological, chemical or a combination of methods to control weeds. Select methods based on a knowledge of weed species distribution, composition and quantity, and site factors such as soil texture, topography and sensitive areas. Weed control prescriptions should be written and evaluated for effectiveness after application for future reference.

Study information related to weed identification and herbicides to ensure the proper use of weed control treatments. Only with an understanding of both weed control methods and weed characteristics can a grower put together a weed control program that will be consistently effective over time.

TABLES

Table 1: Selected references for weed identification.

Weeds of the North Central States. 1981. *Bulletin 772.*
University of Illinois Agriculture Experiment Station
Urbana- Champaign
Ill. 303 pp.

Weeds of the United States and Their Control. 1987.
Authors: J.H. Lorenz and L.S. Jeffery.
Van Nostrand Reinhold Company. 115 Fifth Avenue
New York, NY. 335 pp.

Ontario Weeds. *Publication 505*
Authors: F.H. Montgomery and C.M. Switzer. Ontario
Department of Agriculture and Food Parliament Buildings
Toronto, Canada.
141 pp.

Problem Perennial Weeds of Michigan. 1986. *Bulletin E-791.*
Authors: R.P. Rice, Jr. and A.R. Putnam.
Michigan State University
Cooperative Extension Service
East Lansing, MI
20 pp.

Table 2: Common non-woody weed species found in Michigan.

Annuals	Biennials	Perennials
Grasses:		
bluegrass		quackgrass
barnyard grass		bromegrass
green foxtail		slenderrush
fall panicum		nimbleweed
Herbaceous:		
lambsquarters	yellow rocket	dandelion
pigweed	white cockle	white clover
smartweed	rough cinquefoil	goldenrod
purslane	black medic	milkweed
wild buckwheat	hoary alyssum	Canada thistle
ragweed		

Table 3: Herbicides registered for use in forestry and/or Christmas tree production in Michigan.

Active ingredients	Trade names	Manufacturers
2,4-D	Numerous	Various
2,4-DP	Numerous	Various
atrazine	Numerous	Various
dicamba	Banvel	Sandoz
dichlobenil	Casoron	Uniroyal
fluazifop-butyl	Fusilade	ICI
fosamine ammonium	Krenite	DuPont
glyphosate	Roundup, Accord	Monsanto
hexazinone	Velpar, Pronone	DuPont
imazapyr	Arsenal, Chopper	Amer. Cyanamid
linuron	Lorox	DuPont
oryzalin	Surflan	Elanco
oxyfluorfen	Goal	Rohm and Haas
picloram	Tordon, Access, Passage	Dow
pronamide	Kerb	Rohm and Haas
sethoxydim	Poast	BASF
simazine	Princep	Ciba-Geigy
sulfometuron methyl	Oust	DuPont
triclopyr	Garlon, Access Crossbow	Dow

Table 4: Data sheet for evaluating weed competition on tree planting sites.

Observation date: _____ County: _____

Site location: _____

Site ID: _____ Plantation size (acres) _____

Objective: *Site preparation* *Site maintenance* *Release*

Crop species: _____ _____ _____

_____ _____ _____

Site History

Previous crop: _____

Date harvested: _____

Time since harvest: _____

Vegetation

	Herbaceous		*Woody*		
Weed species (composition)	% cover	Distribution	No. per acre	Height (ft)	Distribution

Distribution: ☐ uniform ☐ local ☐ spotty

Draw the location of vegetative competition found in the plantation.

Scale: _____

Sketch of plantation

Candidate for weed control: ☐ **YES** ☐ **NO**

Table 5: Data sheet used to evaluate site conditions.

Observation date: _____ County: _____

Site location: _____

Site ID: _____ Plantation size (acres) _____

Objective: Site preparation Site maintenance Release

Crop species: _____ _____ _____

_____ _____ _____

Soil characteristics

Soil series: _____ _____ _____

Soil texture: ☐ clay ☐ sandy clay ☐ loam ☐ sandyclay loam ☐ sand ☐ loamy sand ☐ sandy loam

% organic matter: _____(soil test) Topsoil thickness: _____

Good drainage: ☐ YES ☐ NO Water table depth: _____

Erosion potential: _____

Other site factors

Trafficability: Spring: ☐ poor ☐ good Fall: ☐ poor ☐ good

Summer: ☐ poor ☐ good Winter: ☐ poor ☐ good

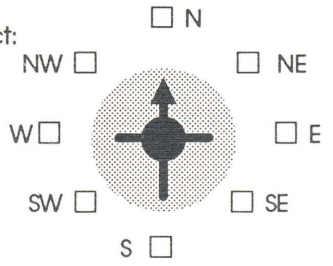
Slopes: ☐ level ☐ gentle slopes ☐ steep slopes ☐ very steep slopes

Slope position: _____

Frost pockets: _____

Prevailing winds: _____

Aspect:



Sensitive areas

	Location	Crop (s)	Buffer zone needed?
Lakes/ponds			
Wells			
Streams			
Dwellings			
Schools			
Churches			
Agric. crops			
Ornamentals			
Gardens			
Orchards			
Nurseries			
Other:			

Release

Crop (species)	Spacing (feet)	Height (feet)	Age (years)	Condition/vigor (insect/disease damage, drought)

Table 6: Data sheet for recording selected weed control prescriptions.

Observation date: _____ County: _____

Site location: _____

Site ID: _____ Plantation size (acres): _____

Objective: Site preparation Site maintenance Release

Crop species: _____ _____ _____

_____ _____ _____

Mechanical

Objective: Grasses Broadleaf weeds Woody brush

Weed species: _____ _____ _____

_____ _____ _____

_____ _____ _____

Method: _____

Timing: _____

Frequency: _____

Comments: _____

Chemical

Objective: Grasses Broadleaf weeds Woody brush

Weed species: _____ _____ _____

_____ _____ _____

_____ _____ _____

Herbicide: _____ Formulation: _____

Rate/acre: _____ Spray volume/acre: _____

Carrier: _____ Adjuvants: _____

Application technique: ☐ band (_____ inches) ☐ broadcast individual stem

Application equipment: _____

Timing: _____

Frequency: _____

Comments: _____

_____

Table 7: Data sheet for evaluating weed control prescriptions.

Observation date: _____ County: _____

Site location: _____

Site ID: _____ Plantation size (acres): _____

Objective: Site preparation Site maintenance Release

Crop species: _____ _____ _____

_____ _____ _____

Weed species: % control

_____ _____

_____ _____

_____ _____

_____ _____

_____ _____

_____ _____

Date of application: _____

Timing of application: _____

Rainfall after treatment: _____

Crop species: % damage

_____ _____

_____ _____

General comments: _____

_____

_____

_____

_____

_____

_____

_____

_____

_____

PESTICIDE EMERGENCY INFORMATION

(Please post in an appropriate place)

For any type of emergency involving a pesticide, the following Emergency Information Centers should be contacted immediately for assistance.

Current as of August 1989

HUMAN PESTICIDE POISONING

Eastern Half of Michigan

within the Detroit city proper:
***(313) 745-5711**

within the 313 area code:
***1-800-462-6642**

Poison Control Center

Children's Hospital of Michigan
3901 Beaubien
Detroit, MI 48201

Western Half of Michigan

within the Grand Rapids city proper:
***(616) 774-7854**

Statewide
***1-800-632-2727**

Blodgett Regional Poison Center

Blodgett Memorial Medical Center
1840 Wealthy, S.E.
Grand Rapids, MI 49506

Upper Peninsula of Michigan

within the Marquette city proper:
***(906) 225-3497**

Upper Peninsula only:
***1-800-562-9781**

U.P. Poison Control Center

Marquette General Hospital
420 West Magnetic Street
Marquette, MI 48955

Cooperative Extension Service
Michigan State University
Extension Bulletin **AM-37**

PESTICIDE EMERGENCY INFORMATION:
Revised by Larry G. Olsen, *Pesticide Education Coordinator, Michigan State University.*
Current as of August 1989—***(Revised-destroy previous editions)***

SPECIAL PESTICIDE EMERGENCIES

Animal Poisoning

Your personal veterinarian:

and/or

Animal Health Diagnostic Laboratory, Michigan State University:
(517) 353-1683

Pesticide Fire

Local fire department:

and

Fire Marshal Division, Michigan State Police:
(517) 322-1924

Traffic Accident

Local police department or sheriff's department:

and

Operations Division, Michigan State Police:
***(517) 337-6102**

Environmental Pollution

Pollution Emergency Alerting System (PEAS), Michigan Department of Natural Resources:
***1-800-292-4706**
(Toll free for environmental emergencies)

For information on pesticide disposal and local pick-up days:

Michigan Department of Natural Resources,
Waste Management Division:
(517) 373-2730

* ***Telephone Number Operated 24 Hours***

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1M-5:90-TCM-UP-Price $1.25, For sale only. O-18682 File 27.2 (Forestry and Forest Management)