

Minnesota Department of Natural Resources
Division of Forestry
PESTICIDE USE GUIDELINES

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INTRODUCTION

The Minnesota Department of Natural Resources, Division of Forestry Pesticide Use Guidelines have been developed as required by the Department's Operational Order 59, Pesticides and Pest Control dated October 5, 2004. The Operational Order states as a policy:

"Disciplines...are required to develop and maintain discipline guidelines to accompany this operational order. The guidelines contain procedures specific to each discipline that are necessary to implement this operational order."

This document is organized as follows –

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1.0 GENERAL PESTICIDE POLICIES

Using pesticides on state lands, in the state nurseries, and prescribing pesticides for use on private lands will operate under the following standards -

- [MNDNR Operational Order 59 – Pesticides and Pest Control](#)
- Division of Forestry Pesticide Use Guidelines
- Pesticide Labels
- Safety Data Sheets (SDS) for each pesticide and adjuvant being used or recommended
- [Forest Resources Council Site Level Forest Management Guidelines](#)

The goal of the Division of Forestry's pest management actions and efforts are to implement a safe and effective program to protect and improve Minnesota's forest resources.

Decision to control pests will consider the following three alternatives -

- No control action.
- A control action that does not use a pesticide.
- A control action that does employ a pesticide.

Control actions will be selected based on -

- Public safety.
- Potential adverse impacts to the environment.

- Ability to accomplish the planned objectives.
- Ability to protect the resource.
- Cost to not control the pest.
- Cost of the control action.

The decision to use pesticides must consider the least toxic and narrowest spectrum pesticide, used at the lowest application rate necessary to achieve the desired vegetation management objective.

2.0 PERSONNEL

The following section identifies the responsibilities for implementing the DOFs pesticide program at each of the administrative levels – statewide, region and areas. Nursery responsibilities are covered under [Nursery Operations, 5.0](#).

2.1 Responsibilities All statewide program coordinators or consultants, and region and area program leaders are responsible for pesticide applications within their programs. Unless specified, all program levels assume all level responsibilities. Some position responsibilities are program specific and are listed as such.

2.1.1 Statewide Program Coordinator (SPC)

- Remains current on federal, state, and agency policies that affect the use of pesticides.
- Sees that current guidelines and policies are appropriate, and meet the needs of the Division. If guidelines and policies are not appropriate or up to date, the [Silviculture Program Coordinator](#) coordinates their revision.
- The [Silviculture Program Coordinator](#) secures funding so that pesticide applicator licensing and training requirements are met
- Secure and distribute available funds to accomplish program projects.
- Monitors external training opportunities and informs all personnel of relevant training sessions.
- Prepares any required environmental documents as well as responses to legislative or legal inquiries or actions.
- Prepares and archives the Division annual pesticide use summary by December 31 of each calendar year.
- The [Silviculture Program Coordinator](#) will collect and archive the statewide pesticide application summary for all applications for all programs (silviculture, roads, invasive species and lands.)
- The [Silviculture Program Coordinator](#) will maintain a list of licensed pesticide applicators and track recertification needs.
- Stays current with pesticide issues to be in compliance with pertinent guidelines, legal requirements, and labels.

2.1.2 Aerial Forest Management Coordinator (AFMC)

- Oversees and coordinates the aerial herbicide project.
- Solicits aerial herbicide project proposals from the regions and from other cooperating agencies.
- Provides project originators with the format for the Site Data Summary which details the information required for each site.

- Develops and supervises the aerial herbicide contract.
- Distributes a copy of the contract Site Data Summary to the FMHC and all participating Areas and agencies.
- Prepares Environmental Quality Board (EQB) notice for aerial applications of herbicides, and sends to EQB for publication.
- Approves any sites to be added to the contract, after it is awarded, and initiates any supplemental agreements.
- Organizes the projects into contract periods based on types of projects (site prep or release) and types of herbicides.
- Ensures that a site location map for each contract period is produced and available for route planning.
- Ensures that an electronic file of treatment site GPS coordinates is created and transmitted to the FMHC.
- Coordinates the procurement of herbicides and adjuvants.
- Insures necessary agreements are secured and signed by cooperating agencies.
- Reviews post-application project summary.
- Ensures the contract is paid in full.
- Forwards a copy of the aerial pesticide application records to the Silviculture Program Coordinator.
- Stays current with pesticide issues, guidelines, legal requirements, and labels.

2.1.3 Forest Management Helicopter Coordinator (FMHC)

- Some or all of the duties below may be delegated to the Assistant FMHC.
- Provides technical advice to areas and regions for all aerial pesticide applications, and coordinates aerial pesticide applications.
- Coordinates with Statewide Helicopter Operations Specialist to ensure that personnel and equipment needs are met.
- Specific aerial herbicide contract responsibilities -
- Creates a suggested route for each phase of the aerial herbicide project
- Secures maps of the project areas
- Resource orders all equipment, radios, and supplies for the operation so that the project can be completed safely, efficiently, and effectively
- Conducts a pre-application briefing to all cooperators to ensure that interagency coordination, routes, personnel needs, and contract language are all understood
- Ensures herbicides are delivered to each strategic location so they are readily available for use
- Coordinates production of electronic files for application in the field
- Completes a pre-use inspection of the vendor's records and equipment
- Ensures that electronic files of treatment sites are downloaded into the aircraft's GPS system
- Ensures the [Aerial Herbicide Application Worksheet](#) is completed for each site
- Assembles Log Book (See [Aerial Pesticide Project Aviation Plan](#) for contents.)
- Establishes a plan for movement from site to site for the day, and communicates this plan with the crew and the next two Area/Agency contact persons so they are adequately prepared
- Ensures that adequate fuel, water and herbicides are available and have been obtained
- Tests radios and ensures spare batteries are available

- Ensures that a safety briefing is provided for all those working on the helispot; controls access to and all movement around the helispot
- Ensures that loads do not exceed allowable payload of the helicopter, as determined by an interagency load calculation form
- Monitors weather and ensures that flights are approved by the Area/Agency representative prior to take-offs
- Ensures that the flight and duty limitations of the contract are adhered to
- Ensures an effective emergency response system is in place
- Ensures that flight data from helicopter GPS system is downloaded at the end of each day.
- Reviews electronic spray data from helicopter to ensure helicopter GPS is functioning properly, and that herbicide application on each site is accurate and complete, and advises contractor of any changes to be made
- Ensures that all contracted sites are treated
- Monitors and communicates the progress of the contract and is available to solve problems as they arise
- Meets with contractor immediately following completion of contract to secure equipment, radios, supplies, and to ensure records are accurate, legible, and complete
- Distributes application records to Areas/Agencies
- Completes all required records and provides completed records to the AFMC including [Daily Log](#) of projects completed, [Flight and Duty Log](#), and [Aerial Herbicide Application Worksheets](#)
- Provides vendor with completed copies of [Aerial Herbicide Application Worksheet](#).
- Stays current with pesticide issues to be in compliance with pertinent guidelines, legal requirements, and product labels.
- Maintains the [Aerial Pesticide Aviation Plan](#) and ensures that it is updated as necessary

2.1.4 Region Program Leader (RPL)

- Ensures that the area program leaders have prepared the necessary project proposals.
- Checks and approves pesticide proposals submitted by the areas, which may include field reviews.
- Ensures that the areas have completed the Natural Heritage Data Base review as described in [section 3.2](#), and the review is signed off on the project proposal forms.
- When necessary, assists the Areas in determining appropriate project parameters when the Natural Heritage Database review reveals a potential impact to a sensitive species.
- Develops and administers regional ground herbicide application contracts.
- Coordinates the procurement of herbicides and surfactants when contracts specify that the State will supply them.
- Coordinates the acquisition of aerial photography when called for; this is used for post treatment monitoring.
- Coordinates cooperative projects with other Region disciplines.
- Coordinates contracted work with the Area Program Leaders.
- Provides approved signs to area program leaders.
- Provides guidance and technical assistance as requested.
- Provides standard format for news release. See [Appendix 6.3](#).
- Insures that pesticide use information on Forestry-administered lands in the region has been entered into the appropriate program database.

- Stays current with pesticide issues to be in compliance with pertinent guidelines, legal requirements, and labels.
- Check to make sure that prescription pesticides are not on the [FSC/SFI highly hazardous pesticide list](#).
- Coordinate pesticide use reporting among all areas and submits the summary to the Silviculture Program Coordinator by December 1 of each year.

2.1.5 Area Team (AT)

- Initiates all projects.
- Identifies vegetation management needs (regeneration sites, rights of way, noxious or invasive weeds, etc). Silvicultural projects will require documentation on the [DOF regeneration survey form](#).
- Makes treatments that are silviculturally sound and that are in compliance with pertinent guidelines, legal requirements, and labels.
- Examines alternative treatments.
- Collects GPS traverse and creates shapefile of each site to be treated.
- Makes all site-specific arrangements for completion of the project. (See Appendix 6, [Herbicide Project Checklist](#)) These include -
 - marking boundaries and buffer strips
 - monitoring vegetation conditions
 - showing contractors the location and boundaries of sites as necessary
 - signing and timely removal of signs
- Completes all pesticide application project effectiveness assessments (post treatment monitoring). See [Section 3.6.3](#).
- Stays current with pesticide issues to be in compliance with pertinent guidelines, legal requirements, and labels.

Aerial Applications - The duties described below are often shared among different team members. The local helicopter manager or helicopter crew member will often times select and improve the helispots. Team members will often share the duties of marking the boundaries of the sites, if it is necessary. Personnel involved in herbicide application operations should be ready to respond within one day of notification. It is the responsibility of the Area Silviculture Program Leader to ensure all of the following items are completed:

- Attend cooperator's briefing
- Provide AFMC with shapefile of all sites including leave areas. Shapefiles on state land should be generated by a GPS traverse and projected in NAD 83 UTM zone 15.
- Provide AFMC with a project map of each site, with landmarks and adjacent cover types identified.
- Complete the Site Data Summary spreadsheet for all Area/Agency sites, and provides electronic copy to the AFMC. Required information includes GPS coordinates (in degrees and decimal minutes) for all sites and helispots.
- Complete [Herbicide Project Checklist](#)
- Locates helispots and ensures they are field checked by a qualified helicopter crewmember for compliance with helispot construction standards.
- Obtain land use agreements for helispots when necessary.
- Obtain any needed buffer strip waiver agreements, in writing, from adjacent landowners.

- Notify neighboring landowners of the proposed herbicide project prior to the application.
- Prepares local newspaper notification.
- Makes all site-specific arrangements for completion of the project. These include -
- locating and maintaining helispots
- marking boundaries and buffer strips, if needed
- monitoring vegetation conditions
- posting and timely removal of signs
- Arrange for water supply for nurse truck (2,400 gallons)
- Provide storage and handling of herbicides in accordance with Department guidelines and policy.
- Informs pilot of any flight hazards and special considerations for each site.
- Monitors the mixing of the pesticide solution on all aerial applications to ensure that the proper products and rates are used and that label instructions are followed.
- Give final approval for all flights.
- Provide dust abatement equipment and personnel.
- Navigate for the contractor's service truck for each site.
- Provide the necessary personnel required to transfer the chase truck to/from neighboring Areas.
- Suggests and coordinates overnight accommodations for the helicopter crew.
- Reviews emergency response plan and provides input to the FMHC
- Provides communication link with County Dispatch for emergencies when local Forestry office is not staffed.
- Stays current with pesticide issues to be in compliance with pertinent guidelines, legal requirements and product labels.

Ground Applications

- On most ground applications, AT members need not be present on the site at all times. However, full-time, on-site supervision is required for sensitive sites and rights-of-way applications.
- AT members must provide adequate time to supervise the contract.
- AT members must monitor weather conditions.
- AT members must ensure that proper application records are completed by the contractor or by DNR applicators for sites not contracted.

2.1.6 Area Program Leader (APL)

- Checks and approves all pesticide proposals at the Area level. This includes the Natural Heritage Database review and signature authority. See procedures for Natural Heritage Database review in [section 3.2](#).
- Collects appropriate application records, maintains copies at the Area level, and furnishes copies (except for aerial applications) to the RPL as required.
- Ensures that all required data for pesticide applications on Forestry-administered lands in the Area have been entered into the appropriate program database. Data entry for the calendar year's applications must be completed by November 15 of the calendar year.
- Ensures that the AT tasks listed under AT responsibilities are completed.
- Notifies adjacent residents and landowners as necessary. See [section 3.4](#).
- Ensures that timely news releases are distributed. See appendix 6.4 for [news release example](#).

- Ensures all treated sites, both ground and aerial application, are signed as outlined in [section 3.4.3](#).
- Notifies the RPL as soon as APL has knowledge of an incident or misapplication.
- Ensures that soil texture and organic matter are determined and documented for sites where soil mobile herbicides are prescribed. See [section 3.6.5](#).
- Stays current with pesticide issues to be in compliance with pertinent guidelines, legal requirements, and labels.
- Provides AFMC with shapefiles for all aerially applied sites including leave areas. See [Shapefile Standards](#) (Appendix 6.2.5)
- Provides AFMC with a project proposal, including a project map of each site, with landmarks and adjacent cover types identified.
- Check to make sure that prescription pesticides are not on the [FSC/SFI highly hazardous pesticide list](#).
- Area Lands Program Leader will compile all pesticide uses reports from agricultural lessees and rights of way and easement vendors and submit the report to the RPL by November 15.

2.1.7 Area Forest Supervisor

- Ensures that the appropriate personnel who prescribe or apply herbicides have a pesticide applicator license in the appropriate categories.

2.2 Training and Licensing

To help insure pesticides are used effectively and safely, there will be at least one licensed applicator in each area. The region program leaders will work with the area supervisors to determine the area staff that will be licensed. Additional personnel may be licensed at the discretion and direction of the area supervisors.

Any DNR staff applying pesticides needs to be under direct supervision of a licensed applicator, or be a licensed applicator. The licensed applicator has to be on the application site during the application if the applicator isn't licensed.

Training and licensing costs will be covered by central office. Training and licensing costs for nursery positions will be covered by the nursery program.

It is recommended that personnel that are not licensed but are involved in pesticide applications and decision making under the oversight of licensed personnel also attend pesticide education sessions periodically.

3.0 PESTICIDE USE PLANNING

3.1 Pesticide Use

3.1.1 Pesticide Use Approval

Before any pesticide is applied a pesticide use approval form must be completed and submitted to appropriate region staff for approval. Use form [NA038180-03 Herbicide Use](#)

[Proposal/Approval](#) for reforestation projects. Use form [NA00092-04 Pesticide Use Approval](#) for all other projects, such as right-of-way treatment, etc. Region program staff will review all proposals for accuracy and appropriateness for the project objectives. Region staff will notify the proposal submitter to acknowledge receipt of the proposal and whether or not the proposal is approved. See [Nursery Operations, 5.2](#) for an exception to individual Pesticide Use Approval forms.

Pesticide use approval information should be archived by storing a copy of the paper form in the originating Area, and archiving project information in the appropriate program database.

3.1.2 FSC Prohibited Pesticides

The Forest Stewardship Council (FSC) and the Sustainable Forestry Initiative (SFI) prohibit the use of certain pesticides on FSC- or SFI-certified lands. The [prohibited pesticides](#) are listed on the Silviculture Program Webpage, Program Policies. The prohibited pesticides list must be checked for each Herbicide Use Proposal/Approval and Pesticide Use Approval form submitted. The prohibited pesticide list is reviewed and updated periodically so it is important to check the list for each proposal submitted. It is the responsibility of the area program leader, and the region program leader to insure that the list has been checked.

3.2 Natural Heritage Database Review

3.2.1 Policy

All pesticide use including ground and aerial herbicide, gopher control, and insect and fungi control projects will be reviewed at the area level for potential impacts to rare species and rare plant community occurrences as tracked in the Natural Heritage Rare Features database. It is the responsibility of the area program leader (APL) to insure that the review is done prior to the project leaving the Area.

Possible outcomes may include: determination of no impact and project proceeds; modification of application (e.g. timing, location) to avoid impact; or determination that no application/no project is possible on the site.

Area roads, invasive species and lands programs leaders should work with the area silviculture program leader to review the Natural Heritage Database for their program projects.

Natural Heritage Database review prior to pesticide applications on current and former state nursery sites - Badoura and General Andrews - is not required. Natural Heritage Database review is required on tree improvement sites not located on either of the current or former state nursery sites; this review will be coordinated with the tree improvement program coordinator and the area supervisor of the area hosting the tree improvement site.

3.2.2 Procedures

Review will be carried out by comparing the site locations with locations of rare species and rare plant communities from the Natural Heritage Rare Features database. The areas will be responsible for using a current version (less than 1 year old) of the Natural Heritage Rare Features data for their work area to do this review. Ecological Resources staff may be contacted to discuss the formats in which data can be received and the steps the areas should take to have access to current data.

The APL will sign the Herbicide Use Proposal/Approval or Pesticide Use Approval form verifying that a review was completed. If the area review determines that there is a rare species or rare plant community occurring on or immediately adjacent to the pesticide application site, i.e., when viewed in FIM, the polygon associated with the Heritage element overlaps the treatment area, the APL should consult with the RPL and appropriate Regional Ecological Resources staff to discuss concerns and appropriate actions to take.

After discussion with appropriate regional staff, the rare species or plant community polygon should be noted on the project proposal and drawn on the project map along with any changes in the project due to the occurrence of the rare feature.

3.3 Buffer Strips

3.3.1 Requirements

The provisions of this section apply to all pesticide broadcast applications, both ground and aerial. Buffer strips are generally not required for localized, directed spraying such as spot spraying, cut stem, or basal spray applications. However, buffer strips must be considered when a potential exists for transfer of a herbicide through the root system (flashback).

On sites determined to be sensitive by area and region personnel due to human presence and activity, consideration should be given to increasing buffer strip widths.

3.3.2 Buffer Strips Adjacent to Other Ownerships for Broadcast Applications

Buffer strips will be used to separate treatment areas from other land ownerships, residences, and other sensitive areas.

A 300-foot buffer strip must be maintained next to an occupied permanent dwelling, unless a lesser distance is approved in writing by the property owner. This does not apply to right-of-way applications. The standard buffer strip width for all other forestland applications is 100 feet. Exceptions are as follows -

- When label directions exceed the 100-foot minimum.
- For other public ownerships and for private industrial lands, no buffer strip is required if the plan to treat up to the property line is approved by the owners or their representatives, in writing, prior to the application. The written approval must be kept on file at the Area level.
- For all non-industrial private lands, no buffer strip is required if the plan to treat up to the property line is approved by the landowner or his/her representative in writing and is also approved by the Region on a case by case basis, not by Region policy. The landowner's

written approval must be kept on file at the Area level. A copy of the letter must be a part of the archived project records.

For rights-of-way applications, buffers to other land ownerships are not required. If the property owner requests that the state not spray their property, the DOF shall identify and post the property boundaries as a no-spray area.

3.3.3 Buffer Strips Adjacent to Surface Water

Buffer strips adjacent to surface water will be a minimum of 100 feet on broadcast applications, unless the label or the site-level guidelines specify greater distances. Surface water is considered to be open water, including [Types 3, 4, or 5 wetlands](#). This requirement does not apply to aquatic and/or ditch bank labeled herbicides.

3.3.4 Terrain

On steep slopes, use judgment in determining the potential for movement of herbicides through overland flow and/or soil erosion. Where necessary, expand buffer strips or consider alternative treatments.

3.4 Notification Requirements

3.4.1 Public Notification

3.4.1.1 Local Public Notification of Pesticide Treatments

Public notification is required for all broadcast pesticide applications (except rights-of-way treatments) and should occur no earlier than 1 month prior to the start of the pesticide treatment window. Notifications should be made by publishing articles or paid notices in local newspapers, which cover the area where application(s) will occur. Areas may send joint releases or notices to papers that cover more than one Area. See news release and paid notice formats in [Appendix 6.3](#).

Notification is not required for application of deer repellants, or for directed, hand applications of herbicides such as cut stump treatment, injections, basal bark applications, and spot gun applications.

3.4.1.2 Environmental Quality Board Notification

An EQB Notification should be prepared for any aerial application of pesticides. Publication should occur at least 2 months prior to the anticipated application start date. See EQB website (www.eqb.state.mn.us/monitor.html) for schedule and contact information.

- AFMC prepares a Notice for the aerial herbicide contract.
- Region Forest Health Specialist prepares a notice for insect and disease treatments.

3.4.2 Notification of Adjacent Residents and Landowners

Residents and/or landowners within ¼ mile of treatment areas must be contacted in writing prior to all pesticide treatments. This notification requirement also applies to any right-of-way treatment. See example letter format in [Appendix 6.3.3](#).

3.4.3 Signing of Treatment Areas

All sites treated with pesticides must be signed. Only properly filled out [DOF-approved signs](#) are to be used. All signing must be done by DNR employees. Signs should be left in place until the end of the re-entry interval (REI) as directed on the pesticide label.

All applications EXCEPT rights-of-way -

- Sites within 1/4 mile of any summer access routes (any road, trail or route open to motorized travel during non-frozen periods of the year) must be posted at the boundary of the treatment area. The boundary will be posted at all points of access by summer access routes.
- Where the site borders a summer access route, signs should be placed often enough so that a sign is visible from any point on the adjacent road or trail.
- On sites more than 1/4 mile from any summer access routes, postings can occur at trails or winter roads accessing the treatment sites rather than boundary posting. Postings on trails and roads should show the approximate distance and direction to the project area. Additional posting requirements are at the discretion of the APL.
- Regardless of distance from summer access routes, additional signing should be considered in areas of high public use, such as berry picking areas in season, and any other types of sensitive sites.

For rights-of-way applications, minimum signing will include:

- The beginning and ending points.
- Intersections with other summer access routes. See definition above.
- Intersections with non-motorized summer-use trails can also be considered for posting at the discretion of APL.

3.5 Cooperative Projects

3.5.1 Cooperative Projects with Other DNR Divisions and Other Public Agencies

Cooperative projects with other agencies or disciplines are encouraged because costs are reduced through the economy of scale. However, cooperative projects should be planned so that they do not affect the timely completion of the Division's sites.

Ground applications - Requests for participation in ground application contracts should be referred to the Regional Program Leader for herbicide projects, or Regional Forest Health Specialist for pesticide projects not involving herbicides, who will evaluate the feasibility and handle the specifics of the cooperative agreement.

Aerial applications - Requests for participation in all aerial contracts to apply pesticides should be referred to the Aerial Forest Management Coordinator (AFMC.)

Each agency or discipline is responsible for direct payment of its portion of the contract. Projects will be subject to the pesticide use guidelines of the land-administering discipline. Other divisions are encouraged to incorporate the DOF guidelines into their projects. Helicopter operations will be under the direction and control of the DOF, and cooperating

agencies are expected to follow DOF helicopter safety and operations guidelines. DOF personnel will provide assistance but not on-site supervision, and do not have approval authority for the practices of other agencies' projects.

A Joint Powers Agreement should be developed prior to cooperative projects with public agencies, i.e., counties.

A Memorandum of Agreement should be developed prior to cooperative projects with tribal entities.

3.5.2 Cooperative Projects with Private Landowners

Cooperative projects with industrial private landowners or non-industrial private landowners may be accomplished by the state contractor at the same time as state contract work. The State can facilitate such work. However, these sites will not become part of the DNR contract, and DNR personnel will take no direct responsibility. DNR personnel will not apply pesticides on non-DNR administered lands.

The APL, FMHS, and AFMC should be made aware of this work to facilitate planning and the timely completion of State work.

In the case of an insect or disease outbreak when the Commissioner has declared a zone of infestation, [M.S. §89.53](#), assistance may be provided to NIPF landowners as permitted by [M.S. §89.55](#).

3.5.3 Good Neighbor Policy

Division of Forestry's "good neighbor policy" will allow the spraying of *Bacillus thuringiensis* (Bt) to control forest tent caterpillar on state forest lands bordering private lands. See [Appendix 6.4](#) for additional details of this policy.

3.6 Pesticide Application Considerations

3.6.1 Herbicide Project Proposals

In most cases for silviculture program treatments a regeneration survey is to be completed before the project proposal is developed. A copy of the most recent survey must be attached to the project proposal when it is submitted to the region silviculture program leader.

For site preparation, preference should be given to treatment the second growing season after harvesting. This delay provides more time for target vegetation to sprout leading to more effective and long-term control.

If treatment is required during the growing season immediately following harvesting, a project proposal should be prepared and submitted. The regeneration survey then must be completed by the AT and reviewed by the APL and RPL at least two weeks before the start of the herbicide treatment window. The RPL reserves the right to drop the project from the contract if the survey is not completed in time or if there is a question of need to treat the

site based on the survey data.

3.6.2 Application Methods

Pesticide applications can be made either by aerial or by ground methods. Aerial application has a number of advantages: it is usually more cost effective, faster, and provides more uniform coverage. Aerial application may be the only practical option on large areas, sites with poor access, or where ground conditions limit mobility.

Ground applications should be considered for specific management concerns, such as treating areas with high public sensitivity, small (< 5 acres) and/or irregular sites, retention of live overstories, and to avoid small potholes, wildlife islands, and similar sensitive areas. Ground applications can either be contracted or done by Division of Forestry personnel. However, using a contractor is strongly preferred.

Wherever practical, mechanized application equipment (ground or aerial) should be used. Even under controlled conditions it is difficult to apply the proper rate of chemicals using backpack sprayers, centrifugal spreaders, spot guns, etc.

All DOF employees involved with pesticides must have received employee-right-to-know (ERTK) training prior to handling and applying any pesticide.

All personal protection equipment (PPE) specified on the product label will be provided and must be used.

Pesticides cannot be applied by anyone under the age of 18.

3.6.3 Post Treatment Monitoring

3.6.3.1 Herbicides

Spring herbicide applications will be checked during the late summer of the same year of treatment. Summer and fall herbicide applications will be checked during the summer of the following year.

For silviculture program treatments survey results should be documented using the standard [Regeneration Survey form](#). For this purpose, the only parts of the form that need to be completed are to update the map, to record whether or not the crop trees are free to grow, and to recommend the next action on the site. The survey results should be entered in SRM.

Survey intensity is up to the forester, but must be sufficient so that the forester can map any parts of the site where target species were not successfully controlled. If post-treatment aerial photography is available, it should be used to help refine the map.

The standard for an acceptable level of treatment on an individual site is that target species are effectively controlled on 90% of the acres prescribed for treatment.

All monitoring surveys will be completed by September 1st, annually, and be submitted to the APL. The APL will summarize the surveys and report the results to the RPL by October

1st, annually. This report should include the total number of acres treated, the total number of acres where treatment was not successful, the total number of sites treated, and the number of sites not meeting the 90% standard.

The results of the surveys of all aerially applied sites should be shared with the AFMC and the FMHC. Survey results can be used to identify aerial application issues. The RPL should use the ground survey results to evaluate the regional ground application program and make adjustments as appropriate.

3.6.3.2 Pesticides Other Than Herbicides

Unlike herbicide applications, the use of insecticides, pheromones, repellants (other than deer repellants) or fungicides is an uncommon occurrence and is usually tailor-made for the site and current circumstances. Acceptable levels of management/control will vary by purpose, so each proposal will need to have custom-made documentation, and custom-made monitoring and evaluation processes. Consequently, there are only a few generalities that can be made about monitoring such treatments.

Each pesticide project proposal (other than herbicides and deer repellants) that is initiated by the Division should indicate its own -

1. Purpose/ objectives including why a pesticide was selected (eradication of pest, pest population reduction, host damage prevention, repel pest population, mating disruption, etc).
2. Treatment schedule and timing.
3. Monitoring schedule: This can vary from a few weeks (Bt spray) to 2 years (mating disruption).
4. Evaluation method: Appropriate for pesticide, pest, host and management timeline.
5. Annual report of pesticide use is due to the APL, RPL and RFHS by December 1st of each year.
6. Final evaluation is due 6 weeks after the end of the monitoring schedule. Reporting is the same as above.

3.6.4 Labeled and Tank-Mix Applications

In situations where one herbicide does not meet all the vegetation management goals on a site, tank mixes can be more effective. Many tank mixes are listed on the product labels and may be used where appropriate.

An applicator can sometimes effectively apply different herbicides or tank mixes on separate portions of a single site, although the site size and application method can affect the feasibility and cost.

Tank mixes are allowed unless specifically forbidden on the label, as long as each individual herbicide is labeled for the specific use (e.g. forestry, release, rights-of-way, etc.) and the maximum rate of each herbicide is not exceeded. Similarly, crop tree species can be treated with herbicides, even if not listed on the label, as long as the specific use is on the label for other species. In both cases, the applicator assumes the risk for any damage

or poor efficacy that may occur. Chemical companies are not responsible for off-label applications. Off-label applications should not be recommended to private landowners.

3.6.5 Use of Certain Soil Mobile Herbicides

Soil mobile herbicides can be broadcast on a site only if -

- at least 75 percent of the treatment area contains soil having loamy sand or finer texture; and
- a minimum of two percent organic matter is incorporated in the top six inches of soil, excluding the litter layer.

Any precautions on the label, such as soil moisture, soil saturation, depth to water table, soil conditions, etc., should also be used to govern the use of soil active herbicides. No soil mobile herbicides will be broadcast applied unless the above two criteria and any label restrictions are followed.

See [Collecting Composite Soil Samples](#).

4.0 OPERATIONS

4.1 Weather Specifications

4.1.1 General Specifications

Because weather conditions have the potential to adversely affect pesticide coverage, placement, and efficacy, the following weather guidelines should be followed. When label specifications are more restrictive than these guidelines, **THE LABEL SPECIFICATIONS WILL TAKE PRECEDENCE** over these guidelines **IN EVERY CASE**. Be certain that you are in compliance with the label.

Not meeting any one weather factor will be cause for suspension of the pesticide application until all weather factors are within the guideline limits.

No applications will be conducted when the soil is frozen or snow is on the ground. The exception to this is cut surface treatments and basal bark applications.

No application of soil-active herbicides will be conducted when surface puddling or runoff is anticipated prior to treatment.

4.1.2 Aerial Broadcast of Liquid Pesticides

Wind Constant wind velocity cannot exceed 5 mph at the spray treatment site or at the helispot if the spray treatment site is inaccessible. When gusting wind conditions occur, the average gust should not exceed 5 mph, and the maximum gust should not exceed 10 mph. Project supervisors should exercise good judgment and extreme caution when variable wind conditions exist. Wind speeds should be measured as close to the height of pesticide release as possible.

Temperature The temperature shall not be less than 35F or more than 90F, when appropriate to the pesticide being used.

Humidity Relative humidity less than 40% should raise a caution, and the project supervisor may consider temporarily halting the operation until the humidity rises above 50%. Under low humidity conditions, some of the pesticide solution may evaporate, and effectiveness may be reduced. Because the action of a helicopter's rotor blades can influence wet bulb readings, relative humidity readings should be made where or when rotor wash is not a factor.

Fog and Rain Spraying should be terminated if foggy weather is forecast within 2 hours or rain is forecast within 4 hours except when chemical activity is accentuated by moisture, for example, soil-active herbicides.

Turbulence When air turbulence occurs, spray patterns can be adversely affected. Turbulence indicates an unstable air mass, and occurs when there are gusty winds, thermals, or downdrafts associated with a cumulus buildup. One indicator of an unstable air mass is the presence of "dust devils." Under these conditions, the application supervisor should exercise caution.

Inversions Inversion conditions may exist when wind speeds are less than 2 mph. Inversions can be recognized by observing a column of smoke. If the smoke appears to hit a "ceiling," and moves downwind without mixing vertically, inversion conditions are present. If inversion conditions occur, spraying should be suspended.

Dew Heavy dew on target vegetation may lead to less control than desired. This is especially true for glyphosate herbicides. The application supervisor should exercise caution when heavy dew is present. A delay in application until the dew lessens may be warranted.

Drought Prolonged drought can cause target species to go dormant and reduce treatment success. Herbicides should be applied during conditions that promote active plant growth.

4.1.3 Ground Broadcast Applications with Motorized Equipment

Liquid applications using motorized equipment with boom or cluster nozzles, will meet aerial weather restrictions except as modified below -

- When appropriate drift retardants are used with cluster nozzles, constant wind speed at nozzle height will not exceed 8 mph and gusts will not exceed 10 mph.
- When a low drift nozzle system such as a Radiarc® or similar system is used, maximum wind speed at nozzle height will be 10 mph.
- For spray systems with booms and nozzles oriented towards the ground and located within 4 feet of the ground, maximum wind speed at nozzle height will be 10 mph.

4.1.4 Ground Broadcast Applications with Backpack Sprayers

When a backpack sprayer is used to broadcast apply pesticides, maximum wind speed will be 10 mph at the height of application. Environmental conditions appropriate to ground applications listed in 4.1.2 will be followed.

4.1.5 Ground Directed Treatments & Granular Applications

Environmental conditions appropriate to ground applications listed in 4.1.2 will be followed for directed liquid treatments from backpack sprayers, spotguns, wicks, cut and dab, hack and squirt, and similar systems; and for granular applications. However, applications must comply with all label restrictions.

4.2 Aerial Operations

4.2.1 General Aerial Application Requirements

Helicopter flights over population centers should be avoided. Division personnel may not be in the helicopter at any time.

Under no circumstances will a helispot be located on nonindustrial private forestlands. However, private gravel pits can be used if written permission is obtained from the landowner ahead of time.

Snags and residual trees may be a hazard because they are sometimes hard for the pilot to see. In addition, they cause the helicopter to fly higher, thereby increasing the potential for drift.

Residual trees may intercept enough of the spray solution so that treatment effectiveness is reduced, or they may be damaged or even killed by the herbicide application.

Sites having large numbers of snags and/or residual trees may be more effectively treated with a ground application. This determination should be made during the APL and RPL project review and approval.

The FMHC and the pilot have the final say as to whether or not a site is treated.

4.2.2 Pesticide Aviation Plan

See the [DOF Pesticide Aviation Plan](#) for specific operational and logistical procedures for aerial herbicide applications.

4.3 GPS Traverse Requirement

A GPS traverse is required for all aerial or skidder-mounted pesticide applications. For most of these applications the resulting electronic file will be sufficient to mark project boundaries. In some cases white plastic bags may be used in addition to the GPS traverse.

5.0 Nursery Operations

5.1 Nursery Responsibilities

5.1.1 Nursery Supervisor

- Develops the annual pesticide use plan for the nurseries.
- Approves pesticide use in the nursery.
- Ensures employees applying pesticides have proper licensing, training, and protective clothing.
- Ensures a summary of pesticides used for each calendar year is completed and submitted to the Silviculture Program Coordinator by December 1.
- Approves all pesticide projects and ensures records are maintained for each application.
- Sees that label changes on all pesticides used on the nursery are kept up-to-date.
- Provides employee-right-to-know training (ERTK) for all nursery employees.
- Ensures all pesticide records are archived.
- Stays current with pesticide issues to be in compliance with pertinent guidelines, legal requirements and product labels.

5.1.2 Nursery Staff

- Maintain training and/or attend workshops biannually if licensed as a non-commercial applicator.
- Carry out projects assigned by the supervisor. Read pesticide labels and wear appropriate protective clothing/equipment.
- Record product used, date, location of application and product used. Record temperature, relative humidity, and windspeed. Forward this information to the supervisor.
- Restricted use pesticides must be applied by a licensed non-commercial applicator.
- Nursery staff required to use a respirator for soil fumigation must have an annual respirator fit test administered by trained personnel prior to pesticide application.

5.2 Policies

An annual pesticide use plan specifying pests to be controlled, control thresholds, pesticides required, and an estimate of pesticides needed should be completed in lieu of the Pesticide Use Proposal/Approval Form. This annual Pesticide Use Plan should be reviewed and approved by the Nursery Supervisor and the plan should be archived at the nursery.

Stockpiling of pesticides based on historic use or anticipated needs should not occur. Only pesticides needed during the growing season should be purchased. Whenever possible, unopened surplus pesticides should be returned to the dealer.

5.3 Procedures

5.3.1 Notification Requirements

Notification of adjacent landowners prior to applying pesticides at current and former state nursery sites - Badoura and General Andrews - is not required.

Sign sites within the nurseries (Badoura and General Andrews) when applying products with a restricted entry interval (REI).

Inform field crews to stay a minimum of 250 feet from the sprayed area during pesticide application unless the label requires a greater distance.

5.3.2 Record Keeping

An annual pesticide use plan will be completed each year. See [5.2 Policies](#).

Completion of a detailed work order is required for each project. The work order lists the product to be applied, the application rate, the treatment area, and any special instructions. The applicator records required information on this form (i.e. temperature, relative humidity, wind speed, date project was completed, and the amount of product used). This work order serves as official documentation of the application.

Completion of a pesticide use summary is required at the end of each growing season. A copy of the summary is submitted to the [Silviculture Program Coordinator](#), and kept on file at the nurseries.

Completion of a pesticide inventory is required each December. Copies are submitted to the region MR office, kept on file at the nurseries, and included in the Nursery Incident Response Guide.

5.3.3 Pesticide Applications at the Nurseries

The nurseries routinely use a variety of pesticides including herbicides, insecticides, fungicides, rodenticides, and fumigants (soil sterilants).

Follow weather specification for applications as found in all of section 4.1. Pay particular attention to sections [4.1.3 Ground Broadcast Applications with Motorized Equipment](#) and section [4.1.4 Ground Broadcast Applications with Backpack Sprayers](#).

5.3.4 Pesticide Application at Tree Improvement Sites

Tree improvements sites include all seed orchards, experimental sites, and the greenhouse and shade house at General Andrews Nursery. Tree improvement sites that are not located on either of the current or former state nursery sites will follow all pesticide use guidelines. Management of tree improvement sites will be coordinated with the tree improvement program coordinator and the area supervisor of the area hosting the tree improvement site.

6.0 APPENDIX

The actual documents cited are not included here. Consult the listed sources for each form to obtain copies. Any forms that are required Department-wide and not listed in the Appendix are listed in Operational Order #59.

6.1 Policies & Procedures

6.1.1 [Pesticide Aviation Plan](#) Includes complete information for all personnel involved in aerial spraying operations. The Pesticide Aviation Plan is made available to the contractor and is part of the contract specifications. The plan should be reviewed each season before applications begin.

6.2 Pesticide Program Forms & Worksheets

6.2.1 [Herbicide Use Proposal/Approval NA-038180-03](#)

This form should be used for site preparation and release, for project approval and to archive pre- treatment information.

6.2.2 [Regeneration Survey](#) (also available in SRM)

This form, designed to record crop tree and competition species inventory data, provides information for completing the Division of Forestry Herbicide Use Proposal/Approval form and should accompany that form when it is submitted for Area and Region review.

6.2.3 [Notice of Herbicide Use](#)

A poster used to sign sites that have been treated with pesticides. Contact the RSPL to obtain posters.

6.2.4 [Herbicide Project Checklist](#)

To be used by Area personnel to insure that all preparations, operations, and post-operations steps are completed.

6.2.5 [Shapefile Standards](#)

Instructions on electronic (GPS) file preparation and naming conventions for aerial treatment sites

6.2.6 [Site Data Summary](#)

A spreadsheet format for recording the legal descriptions and GPS coordinates of aerial application projects and helispots. **This workbook is coordinated by and available from the Silviculture Program Coordinator.**

6.2.7 [Aerial Herbicide Application Worksheet](#)

A multi-use form which has the information needed to fulfill the requirements for a Pesticide Application Report

6.2.8 [Aerial Seeding/Herbicide Personnel Directory](#)

A form used by the FMHC, and updated as necessary, for recording names and contact numbers of personnel involved with the current season's applications. **This directory is coordinated by and available from the Forest Management Helicopter Manager.**

6.2.9 Daily Log of Projects Completed

A form used by the FMHC to log projects completed

6.2.10 Aerial Spray/Seed Project Summary

A form used by the FMHC to summarize project completion

6.2.11 Helispot Standards

A diagram that illustrates construction standards for helispots that will be used by Type III helicopters

6.2.12 Aerial Seed/Spray Flight Duty Limitations

A form used by the FMHC to track daily flight and duty hours of the pilot and the support truck driver

6.2.13 Herbicide Volume Mixing Chart

To be used by Area personnel to insure that the proper amount of herbicides and surfactant are mixed and loaded as per application rate and project acres. **This chart is coordinated by and available from the Forest Management Helicopter Manager.**

6.2.14 Management of Hazardous Material Spills (STARR Document)

A summary of what to do in the event of a spill, including contact phone numbers

6.2.15 Collecting Composite Soil Samples

Instructions on how to collect soil samples and submit them for testing to determine organic matter content

6.2.16 Pesticide Use Approval NA-00092-04

All projects involving the use of any kind of pesticide EXCEPT for projects involving regeneration (site prep and release) should use this form for approval and for archiving pre-treatment information. Examples of projects requiring this form include right-of-way spraying, insect control, gopher control, noxious weed control and wildlife habitat maintenance projects. A map of the application site location should also be submitted with the Pesticide Use Approval form.

6.2.17 Pesticide Application Report NA-00081-01

To be used during applications to meet requirements of M.S. 18B.37, subd. 2 and to archive application conditions in case follow up evaluations need to be conducted.

The Aerial Herbicide Application Worksheet may also be used for this purpose.

6.2.18 Annual Pesticide Application Summary NA 00080-02

To be completed and archived by the Silviculture, Lands, and Roads Program Supervisor

or the Division's Pesticide Coordinator by February 1 of each year.

6.3 Notification Examples

6.3.1 News Release Format

DNR NEWS - FOR IMMEDIATE RELEASE Month Day, Year

Media contacts: *Forester Name, Forester Title, phone number, email address*

Application of herbicide to help reforestation efforts in (State Forest Name or Area)

The Minnesota Department of Natural Resources will begin herbicide applications on select state lands in the (name of area) area as a way to improve reforestation efforts. Applications will begin around (date) and continue through approximately (date) to (#) acres on (#) sites in the (name of state forest).

“Herbicides will be sprayed on the ground to reduce competing woody vegetation,” said (name of forester), (forester title). “This allows the tree seedlings a better chance to grow and survive.”

The herbicides being used are non-toxic to insects. Herbicides will not be applied within 100 feet of any water body, following DNR herbicide application guidelines.

Signs will be posted on all herbicide treatment sites. Adjacent landowners within a quarter mile of the treatment sites have already been notified.

The DNR plants trees on state lands to reforest harvested areas, provide wildlife habitat, protect watersheds and maintain healthy state forests. Part of the reforestation process involves applying herbicides to the harvested areas prior to or following tree planting. DNR foresters determine the right tree species for the site and private contractors do the actual planting.

Statewide, more than (#) acres of state forest lands are planted and (#) acres are seeded each year. This past spring in the (Name of Area) Area, the Division of Forestry planted (#) seedlings on (#) acres to a mixture of (name of species planted), and aerial seeded (#) acres to (name of species seeded).

More information about the DNR’s Forestry Division can be found on the DNR website at www.mndnr.gov/forestry.

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6.3.2 Paid Public Notice Format

Each year the Minnesota Department of Natural Resources, Division of Forestry reforests thousands of acres of forestland. A small percentage of the sites managed each year are treated with herbicide to control competing vegetation, either to prepare sites for subsequent tree planting or seeding, or to release young seedlings from overtopping trees and brush.

The (LOCAL) Area will be doing (#) acres of aerial and (#) acres of ground applied herbicide vegetation control to help establish new forests.

Herbicide applications will begin approximately _____ and end on approximately _____. All sites treated with herbicides will be signed so that the public will know when they are on a treated site.

6.3.3 Adjacent Landowner Letter Format

MINNESOTA DEPARTMENT OF NATURAL RESOURCES

Division of
Forestry
[Address]
[Phone Number]

[Name]
[Address]

Dear Neighbor:

Each year the Minnesota Department of Natural Resources, Division of Forestry reforests thousands of acres of forestland. To successfully accomplish this, a variety of techniques and treatments are applied, often over a period of several years. A small percentage of the sites we manage each year are treated with herbicides to control competing vegetation, either to prepare sites for subsequent tree planting or seeding, or to release young seedlings from overtopping trees and brush.

We want to let you know that a site near your property will be treated with (a) herbicide(s) between the following dates:_____. The site is located at the following legal description:____. The treatment will be done using the following equipment:

_____.
A 100' untreated buffer strip will be maintained along our common property boundary [Delete previous sentence if not applicable.] I have enclosed a project map for your reference.

If you have questions or concerns about the prescribed treatment please feel free to contact the _____ Area office at [phone number] or your local DNR Forestry office for more information. Please refer to Project #__. Thank you.

Sincerely,

Ima Forester
Area Program Leader

6.4 Good Neighbor Policy

The Minnesota DNR - Division of Forestry's "good neighbor policy" will allow the spraying of Bt to control forest insects on state forest land bordering private lands. Spraying will only be done where private homes, buildings and high-use recreation areas are situated in such a way that spraying of only the private lands would not be effective in controlling the insect outbreak. Below are guidelines to implement the policy.

All proposals will be reviewed for compliance to these guidelines and the ability to prevent reinvasion of private lands from state or other adjacent land ownerships. Treatments under this policy must be well planned and structured for effectiveness to be approved.

This policy is applicable only on Division of Forestry administered lands.

GUIDELINES

1. Landowners must submit a written request to the local Area to allow spraying of state forestland bordering private land. List bid cost per acre, the number of state acres to be sprayed, and the total cost to the state. The Area will review the request and decide whether or not to grant permission to spray. If the Area approves, the State will pay for one application of Bt on State land not to exceed \$35.00 per acre.
2. Landowners must provide a plat book map showing private land to be sprayed, the 100 foot strip of state land, and the acreage. The state will only pay for a 100-foot strip. The landowners may be allowed to spray an additional 200 feet of state land at their expense.
3. Only Bt will be allowed to be used on state lands. Bt may not be sprayed directly to water or wetlands (swamps, bogs, marshes and potholes). Aerial application over such sites is permissible only if covered by a forest canopy. State land being sprayed must be predominantly hardwood covertype.
4. An unsprayed 100-foot buffer of state land will be left bordering any private land, which is not being sprayed.
5. Blocks of land to be sprayed must be a minimum of 25 contiguous acres. The amount of state land being sprayed must be less than half of the total acres being sprayed.
6. The state will not pay for the spraying of state lease lots.
7. The state will not pay for spraying of state lands after the average FTC is over one inch long.
8. The applicator must submit copies of all application and weather records to the Area.
9. The Area will submit the spraying invoices to the Region.