AERIAL PESTICIDE AVIATION PLAN

MINNESOTA DNR FORESTRY

Revised 04/18/2018

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Purpose

This plan was developed to document the coordination, operational procedures, equipment standards, and staffing needs and duties that are required annually for the implementation of the Aerial Herbicide Program. This plan should familiarize persons with this project. More specific information may be obtained in the Pesticide Use Guidelines and the aerial herbicide contract.

Goal

The goal of this plan is to provide a safe, effective and efficient way to apply herbicides with the use of a contract helicopter.

Introduction

The DNR, Division of Forestry, has utilized helicopters for applying herbicide since the 1960's. Aerial spraying has been utilized for both site preparation and release of conifer trees from vegetative competition. The majority of the spraying has occurred in the northern 1/3 of the state. The NE Region has historically accounted for 80% of the contracted areas.

Each year, projects are submitted to the Aerial Forest Management Coordinator from the field. These projects, along with projects that are submitted from cooperating agencies, are advertised for bids to qualifying helicopter vendors. Coordinating with other land management agencies has enabled us to be more efficient since we have co-mingled ownership and often times utilize the same helispot for two or more projects. This efficiency, along with the increase in acres on this contract, has proven to be more cost effective for all cooperating agencies.

Aerial spraying in Minnesota occurs in the summer (mid-July) for site preparation and in late August and early September for the conifer release projects. Dividing the workload into 1 to 3 treatment periods, depending on the type of project and the herbicide being used, allows us to accomplish all of the work in a timely manner. It is imperative that all of the release projects are completed during a window of opportunity, which occurs between the time conifer leaders harden off and prior to the first killing frost.

Policies and/or procedures that should be adhered to while implementing this operation are DNR Operational Order #59, the Division of Forestry Pesticide Use Guidelines, and all herbicide label and material safety data sheet information (SDS)

Program Management

This program is managed under the State Land Management Section, based in St. Paul. The contract with the helicopter vendor is written, awarded and administered by MN DNR Forestry.

Organization & Personnel Standards

A variety of foresters and personnel from several geographic locations are extensively involved in the implementation of this program. The duties of those who are most involved in the aviation side of this project are listed below for the following positions:

- Aerial Forest Management Coordinator(AFMC)
- Helicopter Operations Specialist(HOS)
- Forest Management Helicopter Coordinator(FMHC)
- Area Silviculture Team / Agency Representative

A summary of these and other duties are also outlined in the Pesticide Use Guidelines, on pages 5-9.

Aerial Forest Management Coordinator (AFMC):

1. The AFMC oversees and coordinates the aerial herbicide (and aerial seeding) program(s).
2. Solicits aerial herbicide projects from the Regions and from the other cooperating agencies.
3. Organizes the projects into contract periods based on types of projects (site prep or release) and types of herbicides.
4. Provides project originators with the format for a Site Data Summary (Pesticide Use Guidelines, Appendix 6.2.6), which details the information required for each site.
5. Distributes a copy of the contract Site Data Summary to the FMHC and all participating Areas and agencies.
6. Prepares Environmental Quality Board Notice for aerial applications of herbicides, and sends to EQB for publication: EQB.Monitor@state.mn.us
7. Ensures that a point and polygon electronic shape file of treatment site GPS coordinates is created and transmitted to the FMHC.
8. Coordinates the procurement of herbicides and adjuvants.
9. Ensures necessary agreements are secured and signed by cooperating agencies prior to the awarding the contract (e.g., Memorandum of Understanding).
10. Approves any sites to be added or removed to the contract, after it is awarded.
11. Reviews post-application project summary (Application worksheets and Spray Data).
12. Stays current with pesticide issues to be in compliance with pertinent guidelines, legal requirements, and labels. Maintain non-commercial pesticide applicators license.

Forest Management Helicopter Coordinator (FMHC)

Some or all of the duties below may be delegated to the Assistant FMHC.

1. Provides input to Areas and Regions for all aerial pesticide applications, and coordinates aerial pesticide applications.
2. Coordinates with Statewide Helicopter Operations Specialist (HOS) to ensure that personnel and equipment needs are met.
3. Confirm helispots locations are correct and usable
4. Review Application worksheets
5. Specific aerial herbicide contract responsibilities:
    - Creates a suggested route for each phase of the aerial herbicide contract
    - Secures maps of the project area
    - Ensures that a site location map for each contract period is produced and available for route planning.
    - Resource orders all equipment, radios, and supplies for the operation so that the job can be completed safely, efficiently, and effectively
    - Provides 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, then coordinates contract activation
    - 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 DOF Pesticide Aviation Plan, Appendix 6.1.1.1, 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.

6. Provides technical assistance for aerial applications of pesticides involving Department of Forestry personnel, projects, and lands
7. Stays current with pesticide issues to be in compliance with pertinent guidelines, legal requirements, and product labels.
8. Maintains the Aerial Pesticide Aviation Plan and ensures that it is updated as necessary

Helicopter Operations Specialist (HOS):

1. Ensure emergency response elements of the Project Aviation Safety Plan (PASP) and Aviation Mishap Response Guide are complete prior to commencing operations.
2. Provide logistical support to the Forest Management Helicopter Coordinator (FMHC) by ensuring all equipment required for operations per this plan are made available to the FMHC.
3. Coordinate a pre-contract meeting with the vendor FMHC & AFMC to ensure all items contained within this plan and the contract are understood prior to commencing operations.
4. Point of contact for contract questions prior to awarding and during implementation.
5. Ensure vendor pilot, aircraft and equipment meet all requirements of the contract. A pre-use inspection of all vendor equipment will be conducted by the HOS or his designee prior to commencing operations.
6. Oversee the day to day operational phase of the project and be available to provide assistance if requested by the AFMC or FMHC.

Area Silviculture Team/Agency Representative

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 warranted. 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:

1. Participate in daily pre-spray meeting. At that meeting:
   - Inform pilot of any flight hazards and special considerations for each site.
   - Review Application worksheet with FMHC and vender to ensure that the proper products and rates are use and that label instructions are followed.
   - Review emergency response plan and provides input to the FMHC

2. 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.
3. Provide AFMC with a project map of each site, with landmarks and adjacent cover types identified.
4. Provide electronic copy of project proposal to the AFMC. Required information includes GPS coordinates (in degrees and decimal minutes) for all sites and helispots.
5. Complete Herbicide Project Checklist.
   a. Arrange for water supply for nurse truck (2,400 gallons). Coordinate with FMHC
   b. Notify neighboring landowners of the proposed herbicide project prior to the application. See example letter format in the Pesticide Use Guidelines.
   c. Prepares local newspaper notification. Coordinate with region staff.
6. Locate helispots and ensures they are field checked by a qualified helicopter Manager and FMCH for compliance with helispot construction standards.
7. Obtain land use agreements for helispots.
8. 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
9. Provide storage and handling of herbicide in accordance with Department policy. Ensure leftover herbicide is returned to the region storage.
10. Give final approval for all flights based on site factors (e.g., weather conditions, site sensitivity, etc.)
11. Provide dust abatement equipment and personnel for helispot maintenance.
12. Provide driving direction for the contractor's service truck for each site.
    - Provide the necessary personnel required to transfer the chase truck to/from neighboring Areas.

13. Suggests and coordinates with FMHC on overnight accommodations for the helicopter crew.
14. Provides communication link with County Dispatch for emergencies when local Forestry office is not staffed. Refer to emergency situation plan below.
15. Stays current with pesticide issues to be in compliance with pertinent guidelines, legal requirements. Maintain non-commercial pesticide applicator license

Personnel Roster

Title	Name	Position	Location
State Land Programs Supervisor	Dave Schuller	State Land Programs Supervisor	St. Paul
Aerial Forest Management Coordinator	Mike Reinikainen	Silviculture Program Coordinator	St. Paul
Helicopter Operations Specialist	Rob Johnson	State Helicopter Operations Specialist	Grand Rapids
Forest Management Helicopter Coordinator	Dustin Nelson	Fire/Aviation Technician	Hibbing
Assistant Forest Management Helicopter Coordinator	Bennett Nelson	Fire/ Aviation Technician	Brainerd
Assistant Forest Management Helicopter Coordinator	Shawn Olsen	Forest Technician	Wannaska
Local Helicopter Manager	Dan Hertle	Forest Technician	Deer River
Local Helicopter Manager	Scott Bergloff	Forest Technician	Northome
Local Helicopter Manager	Terry Bergstrom	Forest Technician	Cook
Local Helicopter Manager	Laura Murphy	Forester	Two Harbors

Equipment, Supplies and Radios

The Forest Management Helicopter Coordinator should ensure the following items are available:

Communication Hardware

Item	Qty.	Source
King GPH Radio	2	Resource Order—MIFC Radio shop
King GMH Radio w/Antenna	1	Resource Order—MIFC Radio shop
Handheld Portable VHF-AM radio	1	Resource Order—MIFC Radio shop
Handheld Portable Armer (800MHz) radio	2	Resource Order—MIFC Radio shop
Hard Hat w/earphones & push-to-talk adapter	2	Forestry Management Equipment Pallet
Bag Phone w/ remote antenna	1	
Laptop Computer w/ application GPS software	1	Resource Order—MIFC
Portable Printer	1	
Spot Locator	1	

Field Gear

Item	Qty.	Source
Belt Weather Kit	1	Resource Order from MIFC Fire Cache
Kestrel Weather Meter	1	Forestry Management Equipment Pallet
Chest Cooler	1	Resource Order from MIFC Fire Cache

Item	Qty.	Source
5 gallon Water cooler	1	Resource Order from MIFC Fire Cache
20 lb. B/C Fire Extinguisher	1	Resource Order from MIFC Fire Cache
Crash Rescue Kit	1	Resource Order from MIFC Fire Cache
Wind Sock	1	Resource Order from MIFC Fire Cache
Shovel	1	Resource Order from MIFC Fire Cache
Chainsaw Kit	1	Resource Order from MIFC Fire Cache
20 Person first-aid kit	1	Resource Order from MIFC Fire Cache
MRE (1 – box of 12)	1	Resource Order from MIFC Fire Cache
Handheld anemometer w/ R.H. capability	1	Forestry Management Equipment Pallet
Garmin Map 76 CS GPS unit w/transfer cable	1	
Garmin 12 GPS unit w/unit-unit transfer cable	1	
Hazardous Material Spill Kit	1	Forestry Management Equipment Pallet
Garbage bags		Resource Order from MIFC Fire Cache

Vehicles

1-Extended cab 4 x 4 pick-up with topper for chase truck, provided by DNR

Logbook

- Division of Forestry Telephone Directory
- Co-operating Agency Contact Phone Numbers
- Management of Hazardous Material Spills (S.T.A.R.R. Document)
- Site and Route Summary
- Aerial Herbicide Application Worksheets for all sites to be treated
- Daily Log of Projects Completed
- Flight and Duty Log Sheets
- Project Summary
- Copy of Contract
- Crash Rescue Plan
- Aviation Plan
- Minnesota Airport Directory
- Pesticide Use Guidelines
- Pesticide Helispot Standards
- Current Herbicide Labels and SDS sheets for appropriate herbicides
- Blank Forms

Landing Areas

Well-located and maintained helispots are necessary for efficient and safe aerial herbicide applications. Proper planning should minimize the potential for equipment damage or pesticide spills. Design and maintenance of helispots need to include the following considerations:

- Helispots should be located on state land whenever practical.

- Helispots may be located on other public ownerships or on private industrial lands only when a helispot cannot be safely and feasibly located on state land. A letter documenting permission to locate a helispot on other public ownerships or on private industrial land must be obtained and should be filed at the Area level.

- Under no circumstances will a helispot be located on nonindustrial private forestlands. However, private gravel pits can be used if permission is obtained in writing ahead of time.

- Helispots will not be located where a possibility of direct contamination of open water exists, nor so located that the takeoff or approach pattern crosses over rivers or lakes in the immediate takeoff area.

- Helispots must be accessible by a road suitable for a heavy, long wheelbase tank truck for delivery of materials. The helispot and access roads should be inspected for condition and obstructions shortly before spraying begins. Any large overhanging limbs (14’ and lower) along the access road should trimmed due to the height of the helicopter on the trailer. Sites for alternate helispots should also be considered.

- Avoid helispot sites with loose soil or sand, rocks or stumps, trees or brush in the takeoff area, or other site conditions that can damage equipment or increase the possibility of spills. When these conditions are encountered, alternate helispots should be considered.

- There should be no tall brush or trees growing up to the edge of the takeoff pad. The takeoff path should meet minimum specifications for obstacles.

- Minimum helispot specifications are as follows:
    - 75' safety circle and approach/departure path width.
    - 150' approach and 300' departure path length.
    - 8:1 slopes for departure path (160' from pad to first 20' obstacle).
    - Landing pad to have a minimum 40' diameter level surface with a maximum of 6" grass to prevent the helicopter’s spray boom system from being damaged.
    - The area must also be large enough to accommodate a 1 ton truck with helicopter on a trailer - (100' x 75' minimum is required).
    - A space large enough for the nurse truck to maneuver (40 ft. minimum is required).
    - Plan for a two-way helispot. Ensure that both the approach and departure flight paths are clear of all aerial hazards. Note any hazards that cannot be mitigated.)

- If the site is not covered with grass, dust abatement may be required. This may require an additional person and a truck with water tank to work directly ahead of the operation.

- Helispots should be located as close to the project as possible. Reasons for an extended ferry flight are poor roads or because there is no available landing site due to the vegetation and/or topography on the site. Every effort should be made to limit the ferry to 3 miles or less, especially on sites greater than 10 acres in size. In certain situations, this is not possible due to land ownership and the lack of openings in these forested parts of the State.

- Helispots should all have wind indicators and pad markers, since often times the pilot flies to the site using GPS coordinates and there may not be anyone at the site. These areas should all be field checked within 2 weeks of the project to ensure the roads are clear and the wind indicator and pad markers are in place.

- Each landing area must have adequate room to land the helicopter both on the ground and on top of the nurse truck. The site and the access road must have the load bearing capacity to support the weight of a 60,000 lb. truck.

- When roads bisect or border a pesticide treatment area, traffic control will be maintained by the FMHC/AFMHC or their designee.

- The FMHC has the authority to disallow or discontinue the use of a helispot, if in their opinion the site is an unsafe environment for the operation.

- In some areas, which have a history of a large forest development workload, it may be prudent to develop a permanent helispot. If these helispots are strategically located, they can be utilized on a regular basis. These helispots can then be kept on record at the local forestry office with the general name, legal description, and GPS coordinates for future use. Helicopter managers and helicopter crewmembers are an excellent resource to aid in helispot selection and development.

Flight Following

Flight following is accomplished with the VHF/FM radio on the local area frequency or designated Air-Ground frequency, 151.340. DNR Air/Ground 2 or MNICS Air/Ground 1 and 2 are back up frequencies should DNR Air/Ground be utilized for fire purposes. The FRST A/G talkgroup on the Armer (800MHz) system may also be utilized if an Aux FM is available in contract helicopter. The FMHC or chase truck driver should maintain radio communication with the helicopter pilot and should know the general flight path, destinations and the estimated time of arrivals for each flight. Contact should be made at least every 15 minutes.

If radio problems prevent flight following, they must be corrected before operations continue. If there is an extended ferry flight, the pilot can flight follow with a local forestry office or on the MIFC Air Net Frequency 151.370. A DeLorme GPS electronic tracking device should be utilized in conjunction with the positive radio contact.

Frequency List:

Designator	Rx	Rx Tone	Tx	Tx Tone	N/W
DNR Air/Ground	151.340	110.9	151.340	110.9	N
DNR Air/Ground 2	159.300	110.9	159.300	110.9	N
MNICS Air/Ground 1	167.950	--	167.950	--	N
MNICS Air/Ground 2	170.000	--	170.000	--	N
MIFC Air Net	151.370	136.5	151.370	136.5	N
MIFC Air Net—Quadna Rptr.	151.370	136.5	156.135	110.9	N
MIFC Air Net— Eveleth Rptr.	151.370	136.5	156.135	103.5	N
MIFC Air Net—Northome Rptr.	151.370	136.5	156.135	127.3	N
MIFC Air Net—Buffalo Rptr.	151.370	100.0	156.135	136.5	N

Operational Safety

Helispot Operations

All agency personnel who may be at a helispot without a qualified helicopter manager should stay at least 100' back from the helicopter unless directed to approach by the pilot. Personnel should always approach from the front, down slope, and in full view of the pilot. Whenever the helicopter is on top of the nurse truck with rotors turning or is approaching/departing the site, all agency personnel should stay back at least 100'.

All loose items at the helispot must be controlled, such as cans, bags, paper and pick-up box debris. These items can become a hazard when the operation is active. Division personnel may not ride in the helicopter at any time. Flights should not be initiated before sunrise or after sunset.

Personal Protective Equipment (PPE)

The vender (Mixmaster) should wear a hardhat with radio headset (provided by the State) while mixing and loading herbicide. Eye protection and rubber gloves must be worn along with any other PPE requirements on the product label. All agency personnel within 100' of the helicopter, regardless of agency, **should wear**:

- Hard hat
- Eye protection
- Natural fiber or Nomex clothing
- Leather gloves and boots
- If assisting with herbicide mixing, rubber gloves must be worn.

Hazardous materials and spills

Contractor must report and clean up spills as required by Minnesota Statute Section 115.061 – *Duty to Notify and Avoid Water Pollution.* Any pesticide or petroleum spill of more than 5 gallons must be reported to the Minnesota Duty Officer by calling 651-649-5451 or 1-800-422-0798 and the Contract Supervisor. Contractor must take immediate action in the event of a spill by containing the spill and taking all measures necessary to properly clean up the site.

- Herbicide Spill - The FMHC should follow the steps that are outlined in the S.T.A.R.R. document.

Emergency Situations

- Emergency or Unplanned Landing - The FMHC will contact the appropriate authorities. If there is a need for medical assistance, the FMHC should use the cell phone to call 911. In the event of poor cell phone coverage, the local Agency Representative should contact the County Dispatcher via radio. The FMHC will likely coordinate search and rescue operations with the County Sheriff's Office and should secure the scene.
- All elements of the emergency response plan will be covered in the pre-operational briefing.

Environmental conditions

Invasive Species

Before entering and leaving any application site or helispot, check clothing, gear, vehicle and equipment and remove caked mud, dirt clods, and reproductive plant parts (e.g., seeds, berries, fruit, cones, flower or seed stalks, and roots). While effective, the use of a power washer is NOT required unless specified elsewhere in this document. Follow other actions as directed by the Forest Management Helicopter Coordinator to minimize the introduction and/or spread of invasive species.

Pollinator Best Management Practices

Habitat restorations and enhancements conducted on DNR lands and prairie restorations on state lands or on any lands using state funds are subject to pollinator best management practices and habitat restoration guidelines pursuant to Minnesota Statutes, section 84.973, found at https://www.revisor.mn.gov/statutes/?id=84.973.

Practices and guidelines ensure an appropriate diversity of native species to provide habitat for pollinators through the growing season. Current specific practices and guidelines to be followed for contract and grant work can be found here.

Forms, Plans, Checklists, Worksheets and Standards

Aerial herbicide application documentation is available on the Silviculture Program – Forms intranet page or the website.

- Herbicide Site Data Summary Workbook
- Herbicide Volume Mixing Chart
- Aerial Herbicide Application Worksheet
- Pesticide Helispot Standards
- Helicopter Crash Rescue Plan
- Management of Hazmat Spills (S.T.A.R.R.)
- Daily Log of Projects Completed
- Aerial Spray Summary
- Aerial Spray Flight Duty Record
- Herbicide Project Checklist