AERIAL SEEDING AVIATION PLAN

MINNESOTA DNR FORESTRY

04/17/18

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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 Seeding Program. This plan will familiarize persons with this project. More specific information may be obtained in the Aerial Seeding Contract.

Goal

The goal of this plan is to provide a safe, effective and efficient way to apply tree seed for reforestation purposes with the use of a contract helicopter.

Introduction

The DNR Division of Forestry has used helicopters for applying tree seeds since the early 1970's. Aerial seeding has been used for both upland and lowland conifer reforestation. 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 contract acreage, has proven to be more cost effective for all cooperating agencies.

Aerial seeding in Minnesota occurs in the spring from approximately April 1 thru May 15.

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

A variety of foresters in several geographic locations are quite extensively involved in the implementation of this program. The duties of those who are most involved in the aviation side of this project: the Aerial Forest Management Coordinator (AFMC), the Forest Management Helicopter Coordinator (FMHC), the Local Helicopter Manger, and the Area Silviculture Team, will be listed bel

Aerial Forest Management Coordinator (AFMC):

1. Solicits projects from DNR Forestry Areas and from the other cooperating agencies. Provides project originators with the format for a Site Data Summary spreadsheet (Exhibit A), which details the information required for each site.
2. Distributes a copy of the project summary to the Badoura Nursery Supervisor and all Area Silviculture Program Leaders, Helicopter Managers and Cooperators who are involved in the project.
3. Ensures that an electronic file (shape file) of the latitude and longitude of all treatment sites is created and transmitted to the FMHC.
4. Ensures that shape files of the treatments sites have been obtained and made available to FMHC.
5. Coordinates with the FMHC to determine if and when a briefing for cooperators should be held.
6. Ensures tree seed has been acquired and packaged correctly for the project, and delivered to the appropriate locations.
7. Is available during the operational portion of the contract to make decisions as issues develop.
8. Reviews project summary after project completion.

Forest Management Helicopter Coordinator (FMHC):

1. Ensures that a site location map is produced and available for route planning. Creates a suggested route for each phase of the contract.
2. Conducts pre-operational planning meeting with AFMC, Assistant Forest Management Helicopter Coordinators, Local Helicopter Managers, and the Statewide Helicopter Operations Specialist.
3. Leads discussion at the cooperators briefing, to ensure that interagency coordination, routes, personnel needs and contract language are all understood.
4. Delegates duties to Assistant Forest Management Helicopter Coordinators who will perform all duties of the FMHC in his absence.
5. Ensures Local Helicopter Managers have been identified and assigned.
6. Completes a pre-use inspection of the vendor's records and equipment,
7. Resource orders all equipment, radios and supplies for the operation so the job can be completed safely, efficiently and effectively.
8. Tests radios and ensure spare batteries are available.
9. Ensures that treatment site GPS coordinates and helispot GPS coordinates are downloaded into a handheld GPS unit, which will be used by the contractor for the duration of the contract for navigational purposes.
10. Coordinates contract activation.
11. Converts shapefiles to electronic format for AG Nav Guia.
12. Ensures vendors DGPS is compatible with AG Nav Guia or they have converted data as per the contract.

13. Ensures a Crash Rescue Plan is in place.
14. Travels State wide to administer the aerial seeding contract, or delegates this duty to Assistant FMHC's.
15. Ensures adequate fuel for vehicles and helicopter has been obtained
16. Monitors weather and ensure that flights are approved by the Area/Agency representative prior to take-off.
17. Monitors and communicates contract progress to AFMC, Area Silviculture Program Leaders, Helicopter Managers, Cooperators and appropriate Area Forest Supervisors who are involved in the contract via email.
18. Communicates contract progress to the next Assistant FMHC and/or the next two Local Helicopter Managers by telephone, so that they may be adequately prepared.
19. Ensures that all contracted sites are treated.
20. Creates a treatment log book.
21. Ensures flight following is in place.
22. Completes all required records, to include:
    a. Daily log of projects completed-ensuring agency project identifiers are used (Exhibit F)
    b. Flight and Duty Logs (Exhibit G)

23. Ensures that all records of acres and project sites are accurate, legible, complete, and confirmed with the contractor's records prior to handing off with the next Assistant FMHC.
24. Coordinates the transfer of the supplies, radios and equipment to Assistant FMHC's when moving from one geographic portion of the state to another.
25. Ensures the flight and duty limitations of this contract are adhered to.
26. Is available to solve problems as they arise.
27. Meets with contractor immediately following completion of contract to secure equipment, radios, supplies, and to ensure records are complete.
28. Prepares a project summary and ensures that all documentation is submitted to the AFMC.

Assistant Forest Management Helicopter Coordinators

These individuals have been identified to assist the FMHC in performing all duties that may be assigned in order to ensure safe, efficient and effective field operations and conducted.

Local Helicopter Manager

Typically, there are 5 - 6 Local Helicopter Managers who are assigned to this duty. Efficiency of the field operations and project coordination is enhanced with the least amount of turnover of people who function in this position. Each Local Helicopter Manager must be an inter-agency qualified Helicopter Manager or Trainee. The Local Helicopter Manager must be available to work for 12-16 hours per day for up to one week and must be ready to respond within one day of notification.

The Local Helicopter Manager determines efficient site-to-site treatment within certain assigned geographic boundaries. Assigned sites are identified at the annual pre-operational planning meeting.

1. Attends pre-operational planning meeting.
2. Coordinates with Area Silviculture Team Leader or participating Agency Forester:
    a. Project Proposal/map for sites
    b. Identification of Agency Representative (For efficiency purposes it is recommended that the Local Helicopter Manager act as the Local Agency Representative during operations)
    c. Seed Pickup and Delivery
    d. Field Operations
3. Secures large scale maps of assigned geographic area.
4. Establishes a plan for movement from site to site for the day. (Exhibit B

and or Exhibit C)

5. Locates helispots and ensure they are field checked by a qualified helicopter crew member for compliance with construction standards.
6. Bags and labels seed, as appropriate for the route.
7. Completes a 3-ring binder to include:
    a. Project Proposal for each site
    b. Aerial photo for each site
    c. Flight Leg Form (Exhibit D)
8. Ensures an effective emergency response system is in place.
9. Ensures a safety briefing is provided for those working on the helispot.
10. Ensures that loads do not exceed allowable payload of the helicopter, as determined by an interagency load calculation form.
11. Ensures pilot has been given a thorough briefing for each project.
12. Ensures Pilot's handheld radio has been tested, set in the correct group for the working area, and that radio batteries are fresh.
13. Controls access to, and all movement around, the helispot.
14. Suggests / coordinates overnight accommodations for the helicopter crew.

Area Silviculture Leader/Agency Representative

The duties described below are often shared among different team members. The Local Helicopter Manager will often times select and improve the helispots. Often times Participating Agencies and Development Team Leaders will delegate operational tasks to the Local Helicopter Manager. Personnel involved in seeding operations must be ready to respond within one day of notification. It is the responsibility of the Area Silviculture Leader or Agency Representative to ensure all of the following items are completed.

15. Complete the Site Data Summary spreadsheet for all Area/Agency sites, and email to the AFMC. Required information includes GPS coordinates (in degrees and decimal minutes) for all sites and helispots.
16. Provide the AFMC with a project map of each site, with landmarks and adjacent cover types identified.
17. Obtain land use agreements for helispots.
18. Coordinate with the assigned Local Helicopter Manager with the following:
    a. Project Proposal/map for sites
    b. Identification of Agency Representative (For efficiency purposes it is recommended that the Local Helicopter Manager act as the Local Agency Representative during operations)
    c. Seed Pickup and Delivery
    d. Field Operations
19. Attend the cooperators meeting.

20. Provide storage and transportation of seed to each helispot.
21. Provide dust abatement equipment and personnel.
22. Give final approval for all flights.
23. Navigate for the contractor's service truck to each site.
24. Suggest overnight accommodations for the helicopter crew.

Seeding Personnel Roster

Title	Name	Position	Location
State Land Programs Supervisor	Dave Schuller	State Land Programs Supervisor	St. Paul
Aerial Forest Management Coordinator	Paul Dubuque	Statewide Silviculture Program Coordinator	St. Paul
MN DNR HOS	Rob Johnson	Helicopter Operations Specialist (acting)	Grand Rapids
Forest Management Helicopter Coordinator	Dustin Nelson	Fire / Aviation Technician	Hibbing
Assistant Forest Mangement Helicopter Coordinator	Bennett Nelson	Fire / Aviation Technician	Brainerd
Assistant Forest Mangement Helicopter Coordinator	Shawn Olsen	Forestry Technician	Wannaska
Local Helicopter Manager	Dan Hertle	Forestry Technician	Deer River
Local Helicopter Manager	Scott Bergloff	Forestry Technician	Northome
Local Helicopter Manager	Terry Bergstrom	Forestry Technician	Cook
Local Helicopter Manager Trainee/Crewmember	Laura Murphy	Forestry Technician	Two Harbors
Local Helicopter Manager			

Equipment, Supplies and Radios

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

1. Communication Hardware
   a. 1 Mobile portable radio kit with antenna—resource ordered from MIFC Radio Shop
   b. 1 Cell (digital bag)phone with remote antenna
   c. 1 24-pack of AA batteries—resource ordered from Fire Cache
   d. 2 Programmable Handheld King radios—resource ordered from MIFC Radio Shop
   e. 800MHz Radio

2. Field Gear
   a. 1 Handheld anemometer
   b. 1 Garmin MAP 76S GPS and 1 Garmin 12 GPS with 1 unit-to-unit data transfer cable and 1 unit-to-computer data transfer cable
   c. Digital Scale
   d. Digital Calipers

3. Vehicles-- 1 Pick-up chase truck with mobile radio for FMHC

Logbook

a. DNR Forestry telephone directory
b. Cooperating agency telephone numbers
c. Daily Log (20 blank copies) of projects completed forms
d. Flight and Duty Log (2 blank copies)
e. Aviation Plan for Aerial Seeding Program
f. Helispot Construction Standards Diagram
g. MSDS Sheets
h. Copy of the contract
i. Crash/Rescue Emergency Checklist
j. Aerial Seeding Project Summary
k. MN Airport Directory
l. Blank Flight Leg Forms

Landing Areas

All landing areas (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.

Depending on how the projects are dispersed, often times the pilot can take a load of seed and treat 2 or more sites from a helispot. This may require the pilot to land at an off-site landing area and load seed into the hopper. These areas are often located on a logging landing at the actual seeding site. The pilot will select these landing sites. While in the planning phase of this project, Local Helicopter Managers can utilize this "leap frog" approach to save valuable flight time and helispot construction/improvement energy.

Helispots should all have wind indicators and pad markers, since often times the pilot will fly to the site using GPS coordinates and there will 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. Minimum helispot specifications are as follows (Exhibit E):

a. 75' safety circle and approach/departure path width.
b. 150' approach and 300' departure path length.
c. 8:1 slopes for departure path (150' from pad to first 20' obstacle).
d. Landing pad to have a minimum 40' diameter level surface with a maximum of 6" grass to prevent the helicopter's seed application equipment from being damaged.
e. 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.

The Local Helicopter Manager has the authority to disallow or discontinue the use of a helispot or off-site landing area, if in their opinion the site is an unsafe environment for the operation.

In some areas which have a history of a large silviculture program 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 the designated DNR Air-Ground frequency. Since aerial seeding occurs during the busy spring fire system, MNICS Air-Ground 1 and 2 are backup frequencies and should be utilized to reduce conflicts with initial attack fire activity. The FMHC or chase truck driver will maintain radio communication with the helicopter pilot and will know the general flight path, destinations and the estimated time of arrivals for each flight. Contact will 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.

Frequency List:

Designator	Rx	Rx Tone	Tx	Tx Tone	N/W
DNR Air/Ground	151.3400	110.9	151.3400	110.9	N
MNICS Air/Ground 1	167.9500	--	167.9500	--	N
MNICS Air/Ground 2	170.0000	--	170.0000	--	N
MIFC Air Net	151.3700	136.5	151.3700	136.5	N
MIFC Air Net—Central Rptr.	151.3700	136.5	156.1350	110.9	N
MIFC Air Net—Northeast Rptr.	151.3700	136.5	156.1350	103.5	N
MIFC Air Net—North Central Rptr.	151.3700	136.5	156.1350	127.3	N
MIFC Air Net—South Rptr.	151.3700	136.5	156.1350	136.5	N

Helispot Operations

All agency personnel who may be at a helispot without a qualified helicopter manager will stay at least 100' back from the helicopter unless directed to approach by the pilot. Always approach from the front, down slope, and in full view of the pilot. All personnel must be given an adequate briefing prior to loading seed into the hoppers. All personnel must stay clear of the landing area when the helicopter is approaching or departing.
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.

Since this helicopter is operating in the "restricted" category, passengers are not allowed in the helicopter. Providing a briefing for the pilot is essential for a successful operation and should be conducted by the local helicopter manager.

Flights should not be initiated before sunrise or after sunset.

Personal Protective Equipment (PPE)

All agency personnel within 100' of the helicopter, regardless of agency, **will wear**:

1. Hard hat
2. Eye protection
3. Ear protection
4. Natural fiber or Nomex clothing
5. Leather gloves and boots

Emergency Situations

If an emergency or unplanned landing occurs, the FMHC will follow the steps that are outlined in the Crash/Rescue Emergency Checklist.

Planning Chart

The following estimates can be used for planning your routes and helispots. It is still necessary to identify a helispot for each project since it may be used in case of emergency or equipment malfunction.

Planning Chart

Seeding		
10 - 20 acres	-	0.1 hours
20 - 40 acres	-	0.2 hours
40 - 80 acres	-	0.3 hours

Ferry

10 miles per 0.1 hours

example:

ferry - 80 miles	=	0.8
2 - 35 acre sites	=	0.4
1 - 70 acre site	=	0.3
2 - 15 acre sites	=	0.2

Total for this leg is: 1.7 hours - within 2 hours fuel limit

EXHIBIT A: Aerial Seeding Summary Sheet

AERIAL SEEDING - SITE DATA SUMMARY

		SITE LOCATION						HELISPOT LOCATION			
PROJECT	ACRES	COUNTY	SEC	TWN	RNG	S LAT	S LON	40-S-T-R	H LAT	H LON	STATUS

NOTES

1. Lat/Lon information must be in degrees and decimal minutes. Format should be DD(space)MM.mm
   Use zeros if necessary so that each entry has 6 digits and one decimal point.
2. 40-S-T-R = legal description of the helispot. List the forty first, then section, twp, and range
3. Status: Completed, Tentative, or In Progress
4. Project number should be a maximum of 8 characters, including spaces or dashes.

EXHIBIT B: Helispot Worksheet With Project Information

RESOURCE MANAGEMENT HELISPOT WORKSHEET WITH PROJECT SITE INFORMATION

_____ Seeding _____ Aerial Herbicide Site Prep _____ Aerial Herbicide Release

HELISPOT INFORMATION

NAME	FORTY	SEC	TWP	RANGE	LAT	LONG

SITE #_______

PROJECT #	ACRES	BLOCKS	SEED SPECIES/ CHEMICAL	QTS/OZ/AC RATE/AC	GALS/LBS TOTAL
LAT	LONG				

SITE #_______

PROJECT #	ACRES	BLOCKS	SEED SPECIES/ CHEMICAL	QTS/OZ/AC RATE/AC	GALS/LBS TOTAL
LAT	LONG				

SITE #_______

PROJECT #	ACRES	BLOCKS	SEED SPECIES/ CHEMICAL	QTS/OZ/AC RATE/AC	GALS/LBS TOTAL
LAT	LONG				

SITE #_______

PROJECT #	ACRES	BLOCKS	SEED SPECIES/ CHEMICAL	QTS/OZ/AC RATE/AC	GALS/LBS TOTAL
LAT	LONG				

SITE #_______

PROJECT #	ACRES	BLOCKS	SEED SPECIES/ CHEMICAL	QTS/OZ/AC RATE/AC	GALS/LBS TOTAL
LAT	LONG				

Prepare 1 sheet for each helispot

EXHIBIT C: Flight Leg Form

Bearing / AGNAV /Helispot	Distance	Blocks	Acres

EXHIBIT D: Helispot Construction Standards

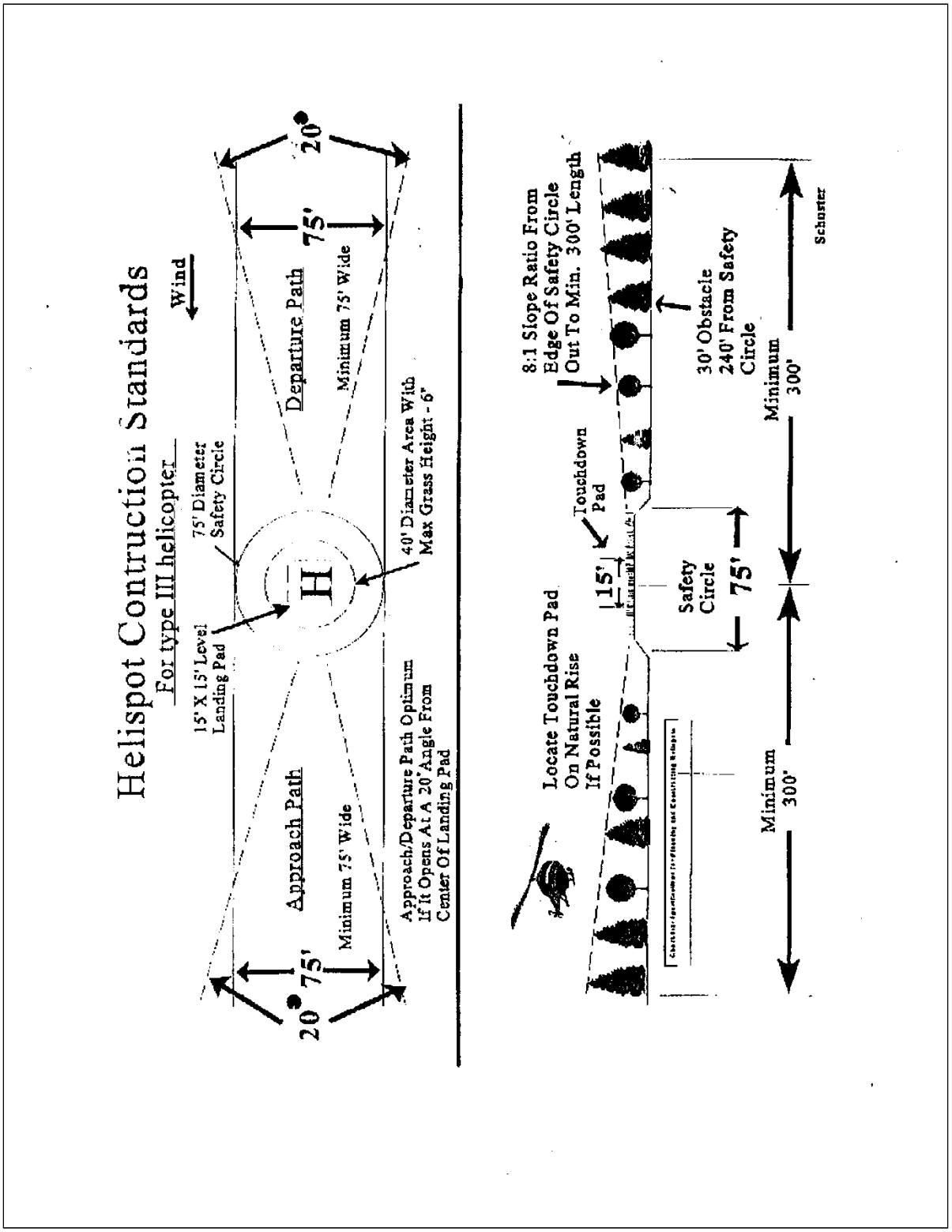

EXHIBIT E: Project Daily Log

AERIAL SPRAY/SEEDING
FLIGHT DUTY LIMITATIONS

CONTRACTOR	MAKE & MODEL	FAA REG. #	TYPE OF USE	
			SPRAY	SEEDING

PILOT - 8 FLIGHT HOURS MAXIMUM PER DAY
PILOT & DRIVER - MINIMUM OF 24 HRS REST IN ANY 72 HOUR PERIOD
MID-DAY REST PERIODS TO BE MINIMUM OF 4 HOURS IN LENGTH
OVERNIGHT REST PERIODS TO BE MINIMUM OF 6 HOURS IN LENGTH
MINIMUM OF 1 REST PERIOD OF AT LEAST 18 HOUR LENGTH EVERY 7 DAYS

PILOT NAME: _____ DRIVER NAME: _____

DATE										
DUTY TIME ON/OFF										
TOTAL DUTY HRS										
TOTAL REST HRS										
FLIGHT HRS										
ACRES COMP.										
# SITE COMP										

CONTRACTOR	MAKE & MODEL	FAA REG. #	TYPE OF USE	
			SPRAY	SEEDING

PILOT - 8 FLIGHT HOURS MAXIMUM PER DAY
PILOT & DRIVER - MINIMUM OF 24 HRS REST IN ANY 72 HOUR PERIOD
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PILOT NAME: _____ DRIVER NAME: _____

DATE										
DUTY TIME ON/OFF										
TOTAL DUTY HRS										
TOTAL REST HRS										
FLIGHT HRS										
ACRES COMP.										
# SITE COMP										

*Rest periods of at least 4 hours should be entered in a separate column for the day (some days may have 2 entries for mid-day breaks.

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EXHIBIT F: Flight and Duty Log

AERIAL SEEDING/SPRAYING

DAILY LOG OF PROJECTS COMPLETED

DATE_____ HOBBS START_____.____

PILOT DUTY DAY START*_____ HOBBS END_____.____

STOP_____ TOTAL FLIGHT TIME_____.____

MID-DAY BREAK _____HOURS

PROJECT #	AREA/AGENCY	ACRES	TIME*	AREA/AGENCY REP.
	DAILY TOTAL			

*USE 24 HOUR CLOCK PAGE____ OF _____