

WORK AND SAFETY PLAN

This plan is developed to insure that the control project meets its stated objective(s), and the project is conducted in a safe and effective manner. The plan should develop the project organization, responsibilities of personnel, needed safety equipment, preparation and actions to be taken in case of an accident, and emergency contacts. The plan should not become a static document, but should be refined each year to improve the effectiveness and safety of a project.

INTRODUCTION

In this section of the Plan, describe the previous history, why the area will be treated, and what will be used for treatment.

The work plan should include information on the project location, administration organization and their responsibilities, pre-spray and spray activities, monitoring activities, public notification and information, safety guidelines, and accident reporting.

OBJECTIVES

The objective of the project is to suppress the gypsy moth. The project will be considered successful when: [Indicate what you feel will be successful. What as a land manager do you hope to achieve. Often it is to prevent noticeable defoliation, and/or to reduce population levels below a certain threshold.]

SAFETY

The safety goals of this project are to complete the tasks outlined in a safe and efficient manner. The following objectives provide guidelines to meet these goals.

1. Each person involved in the project must know and understand the action plan and adhere to safety practices outlined here and in other supporting documents. [If your agency has additional safety plans such as a Health and Safety Code it should be reference here.]
2. Conduct operations at all times to provide for safety of the crews and equipment.
3. Evaluate any procedure or task for the hazards involved and ensure that completion of the job does not compromise the safety of personnel or equipment.
4. Provide personal protective equipment, monitor its use, and evaluate the success of the project based on the completion of the project without accidents or injury to personnel.

ADMINISTRATION AND ORGANIZATION

Identify the individual who will have overall responsibility for administering the project during the operation. Administrative services will usually be provided by the contracting officers representative.

Staffing for the project can involve a variety of personnel from various agencies if the project is very large and additional temporary personnel may also be needed. Aircraft application needs will be furnished through contracting, which will include the mixing, loading, and application of the insecticides. Duties and responsibilities for positions on the organizational chart (figure 1) are outlined below. The number of persons needed for a project de-

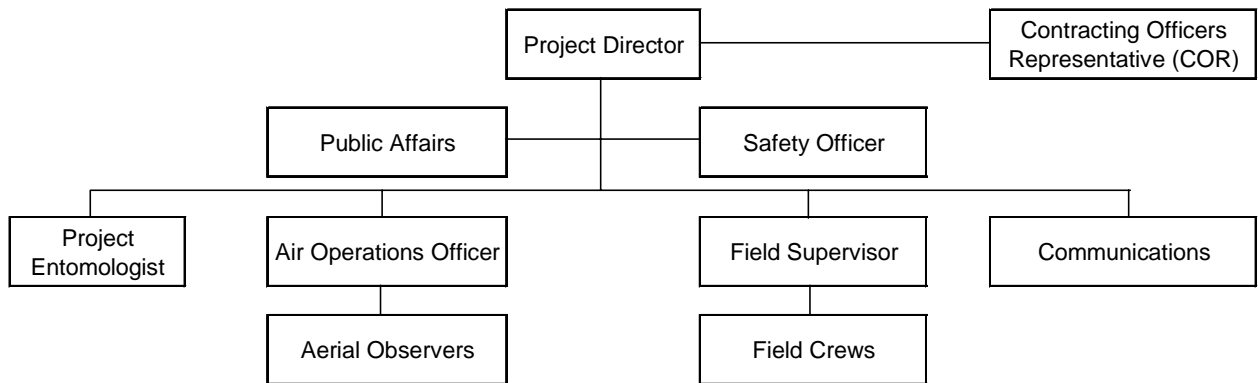


Figure 1. Example of typical organization chart for a gypsy moth suppression project.

pendes on the projects size and complexity. For small projects one person can fill several positions. It is advised that the safety officer be separate from the project director.

Operations headquarters: Project headquarters should be centrally located if the project contains numerous treatment areas. Provide the address, phone number, and directions if necessary.

Project Director: The project director will have overall responsibility for conduct of the entire project. The project director will be responsible for consolidating the opinions of key personnel and current weather forecasts to determine spray schedules.

Contracting Officer's Representative (COR): The COR has the responsibility of assisting the contracting officer to ensure that the contractor complies with all contract specifications. The COR will be responsible for assuring that the Contractor's equipment, facilities, and personnel are inspected prior to performance under the contract. This includes any renewal period(s). Duties will include: assuring that each technical requirement of the contract is satisfied prior to performance under the contract; scheduling and performing inspections, documenting deficiencies as they are found, scheduling and performing follow up inspections to see that deficiencies have been corrected; and any other duties as designated by the Contracting Officer.

Public Affairs Officer: The public affairs officer will be the primary contact for all outside agencies, companies, groups, or individuals. The public affairs officer is also responsible for informing the public on the progress of the project and arranging for public notification of spray dates.

Safety Officer: The safety officer is directly responsible for the project's safety program, which includes the directives outlined in this plan. Prior to the start of the project, the safety officer will inform appropriate agencies (e.g., local hospitals, fire departments) of the project and supply them with necessary documents (insecticide labels and Material Safety Data

Sheets (MSDS)). The safety officer will ensure that all phases of the project are conducted in the safest manner possible. This person will periodically inspect project operation to check compliance with the safety plan and serve on the investigation team for any accidents. The safety officer will also conduct safety training for project personnel.

The Safety Officer can stop the project at any time if in their opinion there are unsafe conditions that need to be corrected. Once corrected, the project director can restart the project.

Project Entomologists: The project entomologist will be responsible for spray system characterization and calibration, and for the proper biological timing of treatments for each block.

Ground Crews: Ground crew personnel will mark block corners and monitor temperature, wind speed, and relative humidity within the block; and will set and retrieve spray deposit cards as needed. Ground crews will also assist in any needed environmental monitoring operations.

Air Operations Officer: The air operations officers will coordinate all aircraft activities. People designated as contract inspectors will assist the COR in maintaining records of aircraft use and flight hours for each pilot. They are directly responsible for helicopter operations and compliance with the work and safety plan. They load and unload passengers, perform weight calculations to insure safe loads, and provide for a safe operation area.

Aerial Observers: The aerial observers will assist the project director in maintaining records of application, record missed areas, and monitor for excessive spray drift.

PROJECT AREA AND SPRAY BLOCKS

Identify the treatment area on attached maps. Show various block location, road network and identify block corners. Access roads, bridges with weight limitations, and any areas of special concern (threatened or endangered species, towers, powerlines, schools, etc.) should be identified.

PRE-SPRAY ACTIVITIES

Field monitoring of foliage expansion will be used to further determine the appropriate time to spray and to modify spray block boundaries when necessary (useful in areas with elevational change).

Insect and Foliage Development Monitoring

For single application suppression projects larval development will be the primary factor used to release each block for spraying. Fifty percent of the gypsy moth larvae will be in the second instar. Leaf development is also important. White oak leaves should be 30 to 40 percent expanded at time of application.

For multiple application eradication projects, where life stages may be few or difficult to find, application should begin when sufficient host foliage has expanded for the insecticide to be deposited on. Oak leaves should be 25 percent expanded.

Aircraft Calibration

Prior to the actual application, the aircraft will be calibrated and characterized for the insecticides that will be applied. The aircraft will be calibrated to apply [rate: liters] of spray mix per hectare, with the majority of droplet sizes approximately 200 microns in size. Calibration and characterization will be approved by the project entomologist.

Training

There will be a pre-spray training meeting for all project personnel to identify their roles in the chain of command, their authority, emergency procedures, and safety. The Safety Officer will conduct training to assure compliance with safety regulations relating to project activities. Air operations safety will be conducted by the Air Operations Officer.

Supplies and Equipment Needs

The following is a list of supplies and equipment, other than that provided through contracts (aerial application of insecticides and the insecticides), which will be needed to complete the suppression project as it is outlined in this work plan and other supporting documents.

Boundary marking: balloons, helium, kite string/fishing line, flagging.

Calibration and characterization: red dye, stakes, Kromekote cards, measuring rope, oculars/comparators (to measure droplet size), calculator, stopwatches, calibrated plastic containers to measure nozzle discharge, pressure gauges, smoke bombs, ziploc bags, and markers

Communications: Identify what type radios will be used for ground to air communication and ground to ground. Specify all radio frequencies used in the project, including those in the aircraft.

Monitoring: sling psychrometer (to measure relative humidity), Beaufort Windspeed Scale to estimate wind speed, and spray cards or other collecting devices to record deposition of the spray within the treatment block.

Insecticide mixing: Ear protection, eye protection, disposable surgical gloves, rubber gloves, detergent, water for washing, cloth or paper towels, shovels, absorbent material for small insecticide spills (eg. kitty litter), garbage can and garbage bags.

General: first aid kit, binoculars coolers/cups/paper towels/ drinking water coolers

SPRAY ACTIVITIES

The starting date of the project is usually given as an estimate. The exact dates will be primarily dependent upon insect development, foliage expansion, and weather conditions. Application will begin when gypsy moth larvae are in their second instar, foliage expansion on white oaks is approximately 30 to 40 percent, and weather conditions permit treatment.

Communications

Communication between ground crews will be through the use of portable radios. The radios have channels operating on assigned frequencies. Communication between the air operations and/or project director and the application pilots will through the use of high range VHF frequencies.

Insecticide Transportation/Storage

The transportation and storage of concentrated insecticide has the greatest potential for environmental damage for the entire project. Under a full service contract the contractor will be responsible for transportation and storage but the safety aspect for this phase of the project should still be addressed.

Vehicular transportation of insecticides will be in a compartment or location that is completely separated from the passenger compartment and complies with label restrictions. Containers will be secured by ropes or other means in the truck bed to prevent tipping or excessive jarring during transit. Containers will be protected from direct sunlight with a tarpaulin, if they are not placed in an enclosed compartment. Periodic checks of containers will be made in route to the project in order to ensure no spillage has occurred. Vehicles transporting insecticides will not be left unattended at any point along the route of travel unless insecticide containers are in a locked compartment.

Only enough insecticide will be transported from the storage area for one day's operation. Any left over insecticide will be returned to the storage area at the end of the day. Insecticides will not be left unattended at the work site. Insecticides will be stored in a secure, cool, well ventilated, locked area away from feed stuffs, fertilizers, herbicides, or seeds.

In the event an accident with a resulting spill of insecticide occurs, the first step will be to care for any injured or contaminated person. The appropriate emergency response agencies (Hazardous Material Response Team, Fire Department, Police, etc.) will be informed. The spill will be controlled by diking, flow diversion, or by using absorbent material such as soil or kitty litter. A shovel and a minimum of 45 kgs of kitty litter will be carried on the truck carrying insecticides at all times. The spill will not be flushed into a ditch, sewer, drain, or off the road, since this serves to further spread the chemical.

Mixing and Loading Insecticide

Potential exposure is greatest for those involved in the actual mixing and loading of the insecticide. The insecticide being used in gypsy moth projects, are nontoxic to humans. Therefore, the hazards normally encountered when chemical insecticides are used or handled do not exist in this case. Still, precautions should be taken to avoid unnecessary spillage of insecticide mixtures. Likewise, caution should be exercised during mixing and loading of insecticides and other materials and in the fueling of aircraft. The aerial applicator's ground personnel will mix and load the insecticide into the aircraft. Personnel doing this work will be provided with the necessary safety equipment. All label precautions and instructions will be followed when handling the insecticides.

Used insecticide containers will be rinsed three times with water and the washings poured into the mixing tank. Containers will not be rinsed onto the ground at the loading area. Empty containers will be properly disposed of.

Any unused insecticide remaining in the spray system of the aircraft, and rinsates will be disposed of by spraying on the treatment area. After the contents of the mixing tank have been emptied into the aircraft tanks, the mixing tank will be filled with 375 liters of water. This rinse water will be pumped into the aircraft spray tank and sprayed out over the treatment area. There will be sufficient water on hand to rinse the tanks and empty containers.

Ground Vehicles

The operator of any vehicle has primary responsibility for the safe maintenance and operation of that vehicle. Equipment will not be hauled in the passenger compartment of any vehicle. All portable helium tanks will be secured firmly to the vehicle to prevent accidental discharge of the tank's contents. All vehicle operators must have a valid operator's license. They will observe all State, local, and Federal driving regulations.

Insecticide Safety

Caution is advised in handling the insecticides. Contact with skin, eyes, or clothing should be avoided. Handling, storage, and disposal instructions appearing on product label will be strictly adhered to.

In the event mixed or concentrated insecticide is accidentally spilled on these personnel, first aid will be given and the person taken to the closest hospital for treatment, if necessary. Clothing contaminated by accidental spills should be removed immediately and replaced. A supply of clean water, detergent, towels, and clean clothing will be on hand for personal decontamination in the event spillage should occur.

If any personnel become contaminated or ill and/or show symptoms of pesticide poisoning, the local hospital or treatment center will be contacted for advice and instructions.

TECHNICAL DATA

In this section or the Work and Safety Plan provide information about the insecticide(s) that will be used. In the event of an accident this information will be needed by the attending physician, hospital, and Poison Control Center. Most of this information can be obtained from the product's material safety data sheet (MSDS), available upon request from the manufacturer.

Insecticide: [provide technical name and trade name]

Registration number: [this will be on product labels]

Active Ingredient: [For gypsy moth control these are the two most widely used]

diflubenzuron - N-[(4-chlorophenyl) amino] carbonyl - 2, 2difluorobenzamide

Bacillus thuringiensis var.*kurstaki* (48 Billion International Units (BIU's)

Manufacturer(s): [Name of manufacturer]

Distributed By [Name and address of distributor, may be the same as manufacture]

Formulation: [eg. flowable concentrate or Aqueous formulation]

Cautions: [list any precautions from label and MSDS]

AIR OPERATIONS

The project will entail the use of aircraft. Most phases of the project having to do with aircraft and air operations will be conducted by personnel under Government contract. All personnel so involved must be aware of particular hazards and be prepared to exercise necessary caution.

Though these operations must be viewed as hazardous by their very nature, most accidents involving aircraft are the result of human error. Such accidents are usually preventable. By practicing safety, serious accidents will be avoided.

Application Constraints

Application of insecticides will be made when wind speeds are less than 15 kph and temperatures are less than 24°C, but warm enough for the insecticide to flow. Foliage must be dry, with no threat of rain for 4 hours following application of *Btk* and 1 hour following application of diflubenzuron. Application of aqueous formulations will not be made if thermal inversion conditions, which cause the spray to rise, are present or where relative humidity is below 50%. These conditions will be continually monitored by aerial observers in the observation aircraft and the ground crew.

Aircraft air speed will be determined at the time of calibration and must stay within allowable air speed limits of the aircraft.

Application heights will be 15 meters over tree tops. Effective swath width will be determined at calibration.

The spray blocks will be marked by natural geographic features as much as possible. Where additional marking is necessary, flagging or balloons will be placed in the canopy at strategic points to assist the pilot in locating spray areas. The application contractor will be made aware of spray block boundaries and flagged points through a pre-treatment flight of the project area. A topographic map or aerial photos will be used to mark spray blocks using geographic and man-made features to assist the spray pilot in proper application.

To assure proper application of the insecticides, the spray pilot will have radio communication with the observation aircraft pilot, project director and helispot manager. The observation aircraft will maintain communications between ground personnel and the spray pilot, and will inform the pilot of any conditions which will stop application, such as inversions.

Spray Application Monitoring

Primary monitoring of the spray application will be through the aerial observer. Aerial observers will specifically look for swath overlap, drift and complete coverage of the treatment area with the insecticide. Ground monitoring during the aerial application may include the placement of spray deposit cards inside and outside the treatment area to monitor spray dispersal and possible drift.

Weather measurements including temperature, wind speed, and relative humidity will be taken in the spray blocks during application. When temperatures exceed 24°C, wind speed exceeds 15 kph, or relative humidity drops below 50%, scheduled spraying will halt.

Weather monitoring will also include communication with the regional weather service (if available) to ensure that proper conditions are expected for the application. Prior to the spray project the weather service should be contacted to inform them that you will be requesting daily spot weather forecasts during the anticipate time frame of the project. Be prepared to give the following information when you contact them: (this pertains to the entire treatment area) distance from nearest town, elevation, aspect, latitude, and longitude.

PUBLIC NOTIFICATION

A portion of the treatment area or areas adjacent may be inhabited. If practical, contact property owners by letter of the approximate treatment time. In addition, for residents within and persons outside the project area, information should be available through local newspapers the week prior to expected spraying and over the local radio 24 hours prior to spraying. If campgrounds or recreation areas are involved notices should be posted at the entry points and at shelters near the treatment area.

ACCIDENT PREVENTION

The following preventive measures will be followed during the project to reduce the probability of an accident or lessen its severity should one occur.

1. The general public will be made aware of application schedules. While no human health risks from Btk or diflubenzuron exist, safety precautions dictate that where possible the treatment area will be closed during the project.
2. No spectators will be allowed in the loading and fueling area. Spectators will be prohibited within 30 meters of the Operations Area (loading and fueling areas.)
3. Smoking will not be permitted within 15 meters of any fueling or loading operations.
4. All personnel will be familiar with the Job Hazard Analyses for their job. These documents describe potential hazards related to various types of work and the actions necessary to eliminate the hazards.
5. Operations Area for the aircraft will have a first-aid kit, a clean water source, fire extinguisher, fire tools, stretcher, helicopter crash and rescue kit, and a vehicle equipped with a two-way radio. This vehicle will also serve as an ambulance should the need arise.
6. All loose gear in the area of the helispot susceptible to rotor downwash shall be secured or removed.
7. Approach or leave helicopter from the front and only when authorized by pilot or authorized personnel. When approaching or leaving the helicopter, remain in full view of the pilot and keep in a crouched position. Approach and leave of fixed wing aircraft from the rear, away from the propeller.
8. Only those personnel authorized by the Air Operations Officer will be in the Operations Area. Ear and eye protection will be used.
9. Operations Area will be cordoned off and signed "Authorized Personnel Only" and "No Smoking."
10. Prior to any refueling operations, all aircraft engines will be shut down, rotors stopped and all passengers off-loaded.
11. All landing approaches and departure routes will be kept clear of vehicles and personnel.

12. Provisions will be made to apply calcium chloride or water for dust reduction at helispot area.
13. Wind indicator (wind sock) is required.
14. Static grounds will be provided for both the loading and refueling operations.
15. The operator of any vehicle has primary responsibility for the safe maintenance and operation of that vehicle. All vehicle operators must have a valid state operator's license for that type of vehicle.
16. The operator and all passengers will travel with safety belts fastened at all times. No vehicle will carry more passengers than the number of safety belts provided that are operational.
17. Local area hospital or treatment center will be notified immediately following any incident or accident involving pesticides and will be supplied with names, labels, and safety data sheets of any chemical being used.

EMERGENCY ASSISTANCE

In the preparation of the work and safety plan, get the current phone numbers for local emergency units. It is a good idea to call each of these numbers to insure the phone number is correct and to notify these agencies that an aerial application projects will be occurring on or about a particular date. Low flying aircraft generate a lot of public concern, which will generate many calls to local fire and police agencies. Notification will be of great help.

In the event of an accident or and emergency, who are you going to call? Be prepared, you will not have time to look up the number. It is also a good idea to call the number and inform the agency that you will be conducting a treatment project and if any special information would be needed. Post these numbers at the base of operations.

Hospital -	Phone number
Area Poison Center -	Phone number
National Response Center -	Phone number
Fire Department -	Phone number
Rescue Squad -	Phone number
State Police -	Phone number
Local Sheriff Department -	Phone number

ACCIDENT REPORTING

All accidents and serious injuries will be reported to the Project Safety Officer, and other persons within your agency who would need this information immediately. The safety plan should be reviewed, signed, and dated by agency safety officer or facility supervisor.