

**Environmental Assessment  
Chapters 1 and 2  
2009 Gypsy Moth Suppression Project**

Monongahela National Forest  
State of West Virginia

Prepared December 2008

Gypsy Moth Treatments proposed on the Marlinton/White Sulphur Ranger District  
in Greenbrier and Pocahontas Counties

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## CHAPTER 1 - PURPOSE OF AND NEED FOR ACTION

### 1.1 Proposed Action

The Forest Service proposes to treat an estimated 13,245 acres of National Forest System lands in 13 separate treatment blocks for the control of gypsy moth (Table 2.1). These suppression treatments would consist of the following: one aerial application of the bacterial insecticide *Bacillus thuringiensis* var. *kurstaki* (*Btk*) on 5,329 acres; two applications of *Btk* on 7,634 acres; and two applications of Gypchek, the gypsy moth specific biological insecticide, on 282 acres. Treatments would be applied using a host of mitigation measures and environmental constraints that are described in Chapter 2 of this Environmental Assessment (EA). The proposed treatment area is located on the Marlinton/White Sulphur Ranger District of the Monongahela National Forest, in Greenbrier and Pocahontas Counties. Treatments would occur during a two-week period in the spring of 2009. The exact dates would depend on the progress of leaf growth and gypsy moth larval development. The public would be notified when the spraying would take place through multiple methods, including news media, website posting, and on-site signing. A detailed map of the proposed treatment areas is in Chapter 2. For more detailed information, please see the description of Alternative 2, the Proposed Action, in Chapter 2 of this EA.

### 1.2 Need for Action

#### 1.2.1 Background of the Gypsy Moth

The gypsy moth, *Lymantria dispar* (Linnaeus) is a non-native defoliator of forest, shade and ornamental trees throughout the northeastern United States. Since its intentional importation and accidental release in eastern Massachusetts in 1869, the gypsy moth has steadily expanded its range. Despite many attempts to halt its spread westward from the northeastern United States, West Virginia experienced its first gypsy moth defoliation in 1985. Since that time, the gypsy moth has defoliated millions of acres nationwide.

The gypsy moth produces one generation per year. Larvae begin hatching from egg masses in late April and early May when tree buds begin to open. At this time, larvae go through an obligatory dispersal period where they leave the vicinity of the egg, moving upward and spinning a thread of silk as they go (Leonard 1981). Eventually the wind catches the larvae and disperses them. Airborne larvae are carried and deposited some distance downwind from the source with the following results: 1) larvae will land on or crawl onto acceptable host plants and begin feeding; 2) larvae will land on either acceptable or unacceptable host plants and re-disperse; 3) larvae will be deposited into areas unacceptable for survival and re-dispersal where they will die (Mason and McManus 1981). The larvae feed for two to three months, completing their development by late June and early July, and seek sheltered areas in which to pupate. The pupal period lasts anywhere from 10 days to two weeks. After emerging from the pupal case the females, which cannot fly, crawl a short distance and emit a pheromone scent to attract males. After mating, the female lays a single egg mass that contains from 75 to 1,000 eggs, which she covers with hairs from her abdomen giving the egg mass a fuzzy brown texture and color. The egg masses over winter and hatch the following spring.

The number of host trees and shrubs fed on by the gypsy moth exceeds 300 species, with species of oaks (*Quercus* spp.) ranked among the most favored (Leonard 1981). Gypsy moth is an outbreak species whose populations can remain at low levels for several years, then undergo large population increases in a matter of one or two years. After populations

have increased to an outbreak density they can remain high for one to five years. Outbreaks decline suddenly to low densities where it is difficult to find any life stage (Liebhold et al. 2000). The main effects of gypsy moth feeding on individual trees involves the depletion of root carbohydrate food resources leading to a reduction in growth, reproduction, and increased vulnerability to secondary agents of mortality. Heavy defoliation forces re-foliation that occurs when about 60 percent of the foliage is lost (Liebhold et al. 1994). This re-foliation uses carbohydrate reserves in trees and can increase their vulnerability to other environmental stresses such as drought, fire, acid deposition, and other insects and diseases. This defoliation and subsequent tree mortality can alter wildlife habitats, change water quality and temperature, increase forest floor temperatures and light levels and reduce aesthetic, recreational, and property values of forests and urban environments.

### **1.2.3 Current Situation and Purpose and Need for Action**

During the summer of 2008, aerial surveys performed by the Forest Service and the State of West Virginia identified 23,419 acres of forest defoliated by the gypsy moth within the Monongahela National Forest proclamation boundary. This is a dramatic increase from the 7,811 and 724 acres mapped in 2007 and 2006, respectively. Many of the areas defoliated in 2008 also experienced some level of defoliation in 2007. In a hardwood forest, about 30 percent of the leaves must be eaten for the defoliation to become noticeable during an aerial survey (primary detection technique). Studies of defoliation impacts have shown that growth loss begins when defoliation reaches about 40 percent and re-foliation at about 60 percent (Liebhold et al. 1994). High gypsy moth populations in the proposed treatment areas, in combination with dry spring conditions, might result in another defoliation event that could lead to reductions in tree growth, reproduction (flowering and seed production), or tree mortality, all of which could conflict with existing resource management objectives. Results of tree mortality were documented in a gypsy moth mortality study conducted in 2005 by the West Virginia Department of Agriculture (WVDA). An estimated 56,602 acres were heavily defoliated 2 of 3 years between 2000 and 2002. The estimated value for timber killed on the 56,602 acres is \$18.8 million for both sawtimber and pulpwood. The actual dollar value of the timber killed was much greater because significant mortality was documented in stands defoliated only once during the 3-year period. Thus, the need for this action is generated from recent gypsy moth population increases and the impacts those populations could have on Forest resources if not controlled.

The purpose for the proposed action is to prevent gypsy moth defoliation in order to reduce the aesthetic, economic, and environmental impacts caused by gypsy moth caterpillars feeding in these specific areas, while minimizing any adverse impacts of the treatments on the environment. Personnel from the Forest Service would select a treatment time to coincide with the most susceptible caterpillar stages of the gypsy moth. An aerial contractor under the supervision of the Forest Service and WVDA personnel would apply the insecticide.

## **1.3 Objectives of the Proposed Action**

The objectives for the proposed 2009 gypsy moth suppression project are:

1. To reduce gypsy moth populations to avoid third year defoliation in the project area in order to avoid large-scale tree mortality; which would reduce wildlife habitat quality including hard mast production.
2. To reduce threats of gypsy moth defoliation to recreational opportunities and values in the project area.

3. To reduce the impacts of gypsy moth defoliation on non-target species (species other than gypsy moth that may potentially be affected by proposed treatments).
4. By implementing the proposed action, we expect to limit individual crown defoliation to 30 percent or less with the use of Gypchek and/or *Btk* and to reduce gypsy moth populations so that treatment will not be needed the following year. These treatment objectives would be evaluated by aerial defoliation surveys and post-treatment egg mass surveys, respectively.

## 1.4 Relationship to Other Decisions

This EA is associated with other environmental impact statements and environmental assessments. To understand the significance of this EA, it is necessary to review this relationship. When considered together, these documents provide for an understanding of cumulative environmental impacts.

### 1.4.1 Final Environmental Impact Statement

In late 1995, the USDA issued a new programmatic Final Environmental Impact Statement (FEIS) entitled, "Gypsy Moth Management in the United States: a Cooperative Approach" (USDA, 1995). Pursuant to the National Environmental Policy Act (NEPA), a Record of Decision (ROD) was signed in January of 1996. The alternative selected in the ROD included all three of the gypsy moth management strategies analyzed in the FEIS--suppression, eradication, and slow the spread. NEPA demands that implementation of this alternative be preceded by a site-specific analysis (the environmental assessment) that addresses local issues. This EA provides the site-specific analysis as required by the ROD, and it is tiered to the programmatic FEIS.

The purpose of tiering is to eliminate repetitive discussions of the issues addressed in the FEIS (40 CFR, 1502.20 and 1508.28 in Council on Environmental Quality 1992). Throughout this EA, many references to material in the FEIS may be used. This tiering allows the EA to focus on issues specific to the action proposed by the Forest Service.

The FEIS allows federally funded suppression projects to use the integrated pest management (IPM) approach, if site-specific analysis indicates the need to do so. IPM includes such possible activities as spraying with chemical and biological insecticides, releasing gypsy moth predators and parasites, trapping gypsy moths using attractant chemicals, and changing forest stand composition.

The Forest Service has chosen not to consider the non-insecticidal components of IPM in the preparation of this EA. These methods are not an effective means to suppress high insect populations such as those documented in the proposed treatment areas, and would therefore not meet project objectives. As stated in this EA, the Forest Service proposes the use of *Btk* and Gypchek to suppress gypsy moth in the proposed treatment area.

The FEIS also provides (1) standard operating procedures for spray projects and associated public involvement activities, and (2) an analysis of potential environmental and human health-related effects. A copy of the FEIS is available upon request from the Forest Service office listed on the title page of this EA.

This EA fulfills the site-specific planning necessary for the proposed 2009 suppression project and provides the Forest Service with the necessary project-level information for making a decision on the proposed action.

### **1.4.2 2006 Monongahela National Forest Land and Resource Management Plan (Forest Plan)**

This EA is also tiered to, and consistent with the 2006 Forest Plan, specifically Forest-wide management direction for treatment of non-native pests found on page II-20, and Management Prescription (MP) area Guidelines 5135 (p. III-30) and 8004 (p. III-49), and Standard 6202 (p. III-43), which allow treatments to help control insect or disease outbreaks in areas that do not typically feature vegetation management.

All MP areas included in this proposal allow for treatment of non-native pests. The Spice Run area, south of Calvin Price State Forest, is listed as an MP 6.2 area. Currently there is a proposal to designate this area as Wilderness, MP 5.0. Congressional action is needed to make this change. If this change is made, treatment for non-native pests is allowed in Wilderness according to Guideline 5037 and Standard 5038 on page III-32 of the Forest Plan.

## **1.5 Decision to Be Made**

The Forest Supervisor will make a decision based on this EA and supporting documentation. He will decide whether or not action is warranted. If it is, he will decide whether to implement the proposed action to suppress gypsy moth populations or some alternative to this proposed action.

The responsible official will make these decisions on or about February 19, 2009 to ensure timely funding for an effective gypsy moth suppression project that meets the Forest Service's objectives. The responsible official is:

Clyde Thompson, Forest Supervisor  
Monongahela National Forest  
200 Sycamore St.  
Elkins, WV 26241

## **1.6 Public Involvement and Issues**

NEPA requires public involvement and notification for all projects utilizing Federal funds (40 CFR, 1506.6 in Council on Environmental Quality 1992). Procedures outlined in this section address the Forest's compliance with those requirements.

### **1.6.1 Summary of Public Involvement and Notification Process**

A variety of individuals and organizations were contacted to determine the scope of the issues and concerns related to the proposed action. On September 9, 2008, a letter describing the proposed action was mailed to 77 local landowners, interested citizens, organizations, government agencies and media sources. Recipients of the letter were asked to provide comment specific to the proposal by October 10, 2008. Two other people were contacted by e-mail, as per their request. A news release regarding this proposal was sent to the Pocahontas Times, Beckley Register Herald, and Charleston Gazette on September 11, 2008. Initial comments were received from 8 sources (3 individuals, 2 organizations, and 3 state agencies). The initial scoping effort and public responses are documented in the 2009 Gypsy Moth Suppression Project File.

### 1.6.2 Issues Considered in Detail

Public and internal comments were analyzed to identify the significant issues related to the proposal (see project file). The identification of significant issues was done with careful consideration to the scope of the proposed action, and to the extent, duration and intensity of the issue. Significant issues were defined as those directly or indirectly caused by implementing or not implementing the proposed action. The issues listed below guide the analysis in the Environmental Consequences section of this EA.

**Issue 1** – Effects of gypsy moth defoliation on timber resources

Changes in tree species diversity, age class distribution, and general health and vigor are affected by gypsy moth defoliation. Heavy feeding causes defoliation, which weakens trees and increases their vulnerability to other insects and diseases that may kill them. After two successive years of defoliation, hardwood tree mortality may be expected, especially if combined with drought conditions during the summer months.

**Issue 2** - Effects of *Btk* applications on non-target organisms

Concerns under this issue are effects on (1) threatened, endangered or sensitive species, and (2) other moths and butterflies.

**Issue 3** – Effects of gypsy moth defoliation on soil and water resources

The potential impacts to soil characteristics and water quality from defoliation are of concern.

**Issue 4** – Effects of gypsy moth defoliation on recreation and scenic resources

Impacts to visual quality and recreation opportunities from defoliation and tree mortality are a concern, particularly along travel corridors such as roads, recreation trails, and overlooks.

### 1.6.3 Issues not Considered in Detail

The following issues were raised during scoping for this EA. They are summarized here, with an explanation of how they have been addressed.

**Issue: Human health risks associated with the aerial spraying of *Btk* and Gypchek**

***Btk*** - This issue was eliminated from detailed study because an extensive analysis, available in the Human Health Risk Assessment of the FEIS, has determined that BtK is nontoxic to humans and it is highly unlikely to pose a hazard to human health when properly applied (USDA, 1995, Vol. III, pp. 4-1 to 4-21). *Btk* is a naturally-occurring bacterium that has insecticidal activity against gypsy moth and other Lepidoptera (moths and butterflies).

Persons handling and loading the insecticide would be the most likely to experience any effects, which could consist of minor irritation of the skin, eyes or respiratory tract. Persons loading and handling concentrated *Btk* are required to read and follow all label precautions. Public and handler exposure would be minimized by adherence to standard human health precautions (p. 8). Based on the available epidemiological studies and the long history of its use, there is no evidence that the application of *Btk* formulations causes adverse effects in the general public (USDA 1995, Vol. III, p. 4-15).

***Gypchek*** - This issue was eliminated from detailed study because Gypchek is a naturally-occurring virus that has insecticidal activity against only the gypsy moth.



As with *Btk*, it is nontoxic to humans and it is highly unlikely to pose a hazard to human health when properly applied (USDA 1995, Vol. III. Pp. 5-1 to 5-12).

Irritation of the eyes, skin, and respiratory tract is possible from the exposure to Gypchek. Because Gypchek contains gypsy moth parts, irritant effects might be similar to those caused by the gypsy moth itself. Individuals with allergies may be at greater risk of developing irritation. Workers would be more likely affected than the general public because their exposure would be higher (USDA 1995, Vol. 1, p. 21).

**Issue: Use of Diflubenzuron (Dimilin)**

Dimilin is an effective treatment for all population densities of gypsy moth but it can have impacts on non-target species (i.e., aquatic organisms and other insects). Because other treatments that have fewer non-target impacts would meet the project objectives, the use of Dimilin was not considered for this proposal.

## CHAPTER 2 - ALTERNATIVES INCLUDING THE PROPOSED ACTION

The Forest Service considered different alternatives within the suppression management strategy, including no action, for meeting the 2009 suppression project objectives. These alternatives were considered to address the issues and concerns described in Chapter 1.

### 2.1 Alternatives Not Analyzed In Detail

One additional action alternative was considered to meet the objectives of this project. Although this alternative contributed to the reasonable range of alternatives considered for this project, it was not analyzed in detail for the reasons explained below.

#### 2.1.1. Large-scale use of Gypchek

Gypchek is a naturally occurring virus that has insecticidal activity against only the gypsy moth and does not affect any other organisms. Exclusive use of this control strategy is not operationally feasible for a large suppression project such as the one being proposed. Gypchek is difficult and time-consuming to produce, and there is currently only one manufacturer (the Forest Service). Therefore, only a small quantity of Gypchek is produced each year, enough for about 10,000 acres of application on gypsy moth projects nationwide. Additional gypsy moth spraying is being planned for West Virginia and Virginia in 2009, and other states may have a need for Gypchek as well. There is simply not enough supply of this insecticide to meet the nationwide demand. Therefore, the use of Gypchek in this project will likely be limited to the most sensitive areas of application, such as habitat for rare moth or butterfly species that may be affected by BtK.

### 2.2 Alternatives Analyzed In Detail

This EA analyzes two alternatives in detail:

1. No Action by the Forest Service to treat gypsy moth
2. Proposed Action - The Forest Service would suppress gypsy moth populations using *Btk* and Gypchek

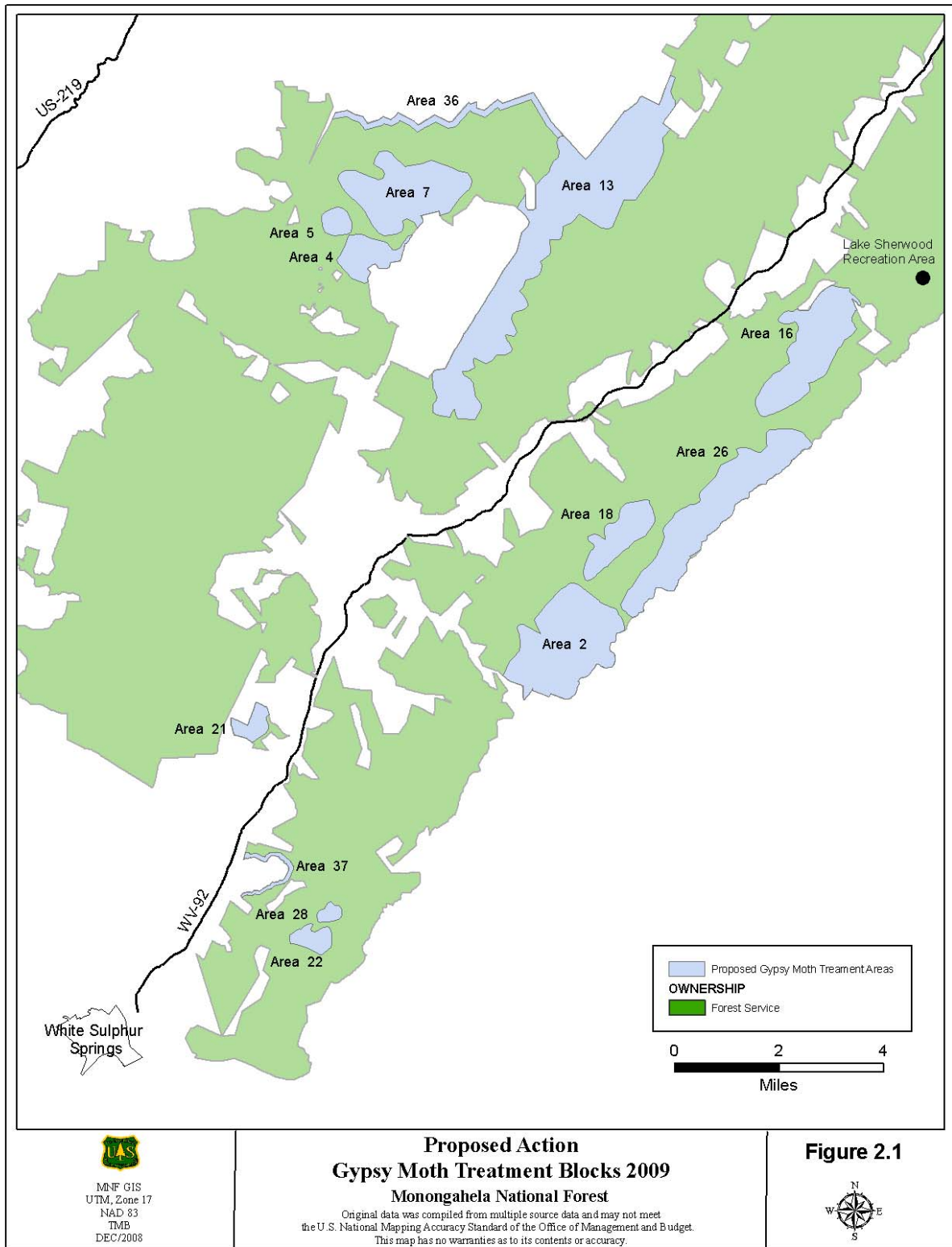
#### 2.2.1 Alternative 1 - No Action by the Forest Service

In this alternative the Forest Service would not treat gypsy moth populations in the proposed areas. Because no treatments would occur, no mitigation measures or human health precautions related to gypsy moth treatment (see measures described below under the Proposed Action) would occur either.

#### 2.2.2 Alternative 2 - The Forest Service would suppress gypsy moth populations using *Btk* and Gypchek. (Proposed Action)

In this alternative an estimated 13,245 acres are planned for treatment during the spring of 2009. The proposed treatments would consist of a single application of *Btk* on approximately 5,329 acres; two applications of *Btk* on 7,634 acres; and two applications of Gypchek on 282 acres (see Figure 2.1 and Table 2.1).

Figure 2.1 Gypsy Moth Treatment Blocks for the Proposed Action



**Table 2.1 Gypsy Moth Treatment Blocks and Acreages for the Proposed Action**

Treatment Area	Acres	Insecticide (Applications)
2	1971.59	<i>B.t.k</i> <sup>1</sup> (double)
4	445.79	<i>B.t.k</i> <sup>1</sup> (single)
5	160.22	<i>B.t.k</i> <sup>1</sup> (single)
7	1482.27	<i>B.t.k</i> <sup>1</sup> (double)
13	4219.80	<i>B.t.k</i> <sup>1</sup> (single)
16	1425.09	<i>B.t.k</i> <sup>1</sup> (double)
18	598.01	<i>B.t.k</i> <sup>1</sup> (double)
21	189.63	<i>B.t.k</i> <sup>1</sup> (double)
22	198.18	<i>Gypchek</i> (double)
26	1967.57	<i>B.t.k</i> <sup>1</sup> (double)
28	83.15	<i>Gypchek</i> (double)
36	397.97	<i>B.t.k</i> <sup>1</sup> (single)
37	105.27	<i>B.t.k</i> <sup>1</sup> (single)
<b>Total</b>	<b>13,245</b>	

<sup>1</sup> *B.t.k* (*Bacillus thuringiensis* variety *kurstaki*)

## 2.3 Mitigation Measures for the Proposed Action

Mitigation measures are designed to reduce adverse environmental effects that might result from conducting the treatment activities. They include the application constraints, environmental constraints, and human health precautions described below. Additional safety procedures and guidelines related to aerial application of the insecticides are presented in an Aviation Management Plan. Copies of the Aviation Management Plan are available from the address found on the cover page of this EA.

### 2.3.1 Application Constraints

By establishing operational and environmental parameters for aerial application, a safe, consistent, and effective spraying project can be developed which minimizes adverse non-target effects and still gives the desired results. To achieve a safe, consistent, and effective spraying project, the following would be done:

- A private aerial contractor under the supervision of WVDA and Forest Service personnel would conduct pesticide spraying.
- Personnel from the Forest Service would select a treatment time to coincide with the most vulnerable larval stages of the gypsy moth.
- Forest Service personnel would ensure that application equipment is carefully checked and calibrated prior to treatment.
- Field personnel would be present in spray blocks during treatment for on-site monitoring and data collection.
- Field personnel would have radio contact with airport operations to advise the project supervisor on block conditions including spray status, weather, foliage expansion, and caterpillar development.

- Several environmental parameters have been set to help ensure proper spray conditions exist within each spray site when the insecticide is applied:
  1. Wind speeds must be 7 mph or less when measured in an open area within or near the spray block.
  2. Inversion conditions that produce ground fog or suspended spray must not be present.
  3. Air temperature should not exceed 80 degrees, and humidity should not fall to a point where evaporation of the insecticide would occur before it reaches the target area. This would normally occur when relative humidity drops below 50 percent for undiluted *Btk* and *Gypchek*.
  4. Foliage must not be dripping wet.
  5. No rain must be expected within 4 hours of spraying.
  6. Spraying must be confined to daylight hours beginning at dawn only when other operational conditions are acceptable.
- All treatment areas would be delineated on 7-1/2 minute USGS topographic quadrangle maps to give up-to-date information about forest cover, elevation contours, bodies of water, and man-made structures such as roads, buildings and power lines.
- Hazards to aircraft operations at spraying altitude would be identified and clearly marked on maps.
- A reconnaissance flight would be made of every site before spraying commences.
- All spray blocks would be digitized for the contractor to make use of DGPS, ensuring the most accurate application as possible.
- Communications would be maintained among the loading site, pilot and field crews at the spray sites with mobile and portable AM & FM two-way radios and cellular phones.

### 2.3.2 Environmental Constraints

- Application would be done over forested areas only.
- No applications would be made over large open bodies of water, such as lakes or rivers.
- Pilots would be instructed not to fly over large bodies of water if they can be safely avoided.
- Consultation with the US Fish and Wildlife Service would be done to determine if the proposed treatments would affect any known federally listed threatened and endangered species within or near the treatment areas.

### 2.3.3 Human Health Precautions

Several precautions are used in the program to minimize exposure to the people working on the program and those in the treatment areas. Whenever possible, areas would be sprayed early in the morning to minimize human exposure.

- In cooperation with WVDA, the Forest Service would provide preliminary public notification about the proposed treatment through radio and television news releases.
- News releases would be made 30 days prior to the tentative treatment start date.
- Local radio and television stations and other news media would be asked to release this information one week prior to treatment date.
- At the time of treatment, daily notification would be given to the media and police. Information supplied would include areas to be sprayed, the approximate time spraying would take place, and the number and type of aircraft in each area.
- A telephone system would be set up at operation headquarters with the number released to the public.
- Signs would be posted at campgrounds, and trailheads to alert visitors of spraying activity.
- At the loading site, standard pesticide mixing and handling precautions would be followed as specified for the material being used. Loading would be by means of hose lines equipped with instantaneous shutoff valves to reduce the risk of spillage.

Procedures for containing and cleaning insecticide spills and handling aircraft and vehicle accidents are covered in the Aviation Management Plan. A copy of the Plan would be at the loading site and copies are given to all field crews.

## 2.4 Comparison of Alternatives

No treatment activities would occur under Alternative 1, No Action. In comparison, an estimated 13,245 acres of high-priority areas would be treated under Alternative 2, the Proposed Action.

Table 2.2 summarizes the potential effects that Alternatives 1 and 2 would have on the issues described in Chapter 1.

**Table 2.2 Comparative Summary of Each Alternative and the Consequences**

<b>Issue</b>	<b>Alternative 1 No Action</b>	<b>Alternative 2 <i>Btk</i> and <i>Gypchek</i> Treatments</b>
<p>Issue 1 Effects of gypsy moth defoliation on timber resources</p>	<p>Untreated lands may receive excessive tree defoliation, causing additional tree stress with a high potential for growth loss and tree mortality. Consequently, populations may spread to uninfested areas where defoliation could be light, moderate or heavy, depending on the availability of gypsy moth preferred tree species.</p>	<p>Implementation of this alternative would reduce the likelihood of gypsy moth defoliation on treated lands and would reduce the potential for gypsy moth to spread into the uninfested areas. The treatment blocks and surrounding areas should see a corresponding reduction in risk to timber from defoliation-related growth loss and mortality.</p>
<p>Issue 2 Effects of <i>Btk</i> applications on nontarget organisms, specifically threatened and endangered (T&amp;E) species, and nontarget moth and butterfly species</p>	<p>No insecticides would be used, resulting in no direct effect of treatment on nontarget organisms.</p>	<p><i>Btk</i> may impact some nontarget moth and butterfly species in the treatment areas, which may slightly reduce the forage species available for Indiana bats in the short term. However, Indiana bats have not been found in the treatment areas, and if they do occur there, they have the ability to move to other areas to forage. Other T&amp;E wildlife species should not be affected, and T&amp;E plant species should not be affected.</p>
<p>Issue 3 Effects of gypsy moth defoliation on soil and water resources</p>	<p>This alternative would result in continued defoliation of the host types within the project area. The potential for impacts to soil and water (erosion, sedimentation) would increase as the level of gypsy moth defoliation increases.</p>	<p>Treatments should result in no risk or impact to soil productivity or water quality.</p>
<p>Issue 4 Effects of gypsy moth defoliation on recreation and scenic resources</p>	<p>Nuisance from gypsy moth caterpillars can reduce recreation days due to loss in quality of the recreational experience. Tree defoliation and mortality would reduce visual quality.</p>	<p>Aerial applications of <i>Btk</i> and <i>Gypchek</i> could temporarily affect recreational use by dissuading visitors from using the treatment areas during spray operations. Excessive defoliation would be averted and nuisance from caterpillars feeding would be reduced and would not interfere with recreational activities. Proposed treatments would help maintain visual quality in the area.</p>

## 2.5 The Preferred Alternative

The preferred alternative for this project is Alternative 2, the Proposed Action.