

**USDA Forest Service
Environmental Assessment**

for the

Gypsy Moth Slow the Spread Project

**George Washington and Jefferson National Forests, Eastern Divide Ranger
District and Mount Rogers National Recreation Area**

and

**adjacent private lands in Bland, Grayson, Smyth and Tazewell Counties,
Virginia**

in cooperation

with the Virginia Department of Agriculture and Consumer Services

2013

For Further Information Contact:
Russ MacFarlane
George Washington & Jefferson National Forests
5162 Valleypointe Pkwy
Roanoke, VA 24019

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I. PURPOSE AND NEED FOR ACTION

Purpose of and Need for Proposal

History of Gypsy Moth Spread and Control Measures: The gypsy moth is an exotic insect, accidentally introduced from Europe into Massachusetts in 1869. Gypsy moth spread has been slow when compared to most invasive pests. This is illustrated by the fact that only about 30% of the susceptible habitat in the U.S. is infested 141 years after the initial establishment occurred. However, accelerating spread rates in the last 4 decades led the USDA to look at how that rate of spread could be reduced. In the past 22 years, gypsy moths have defoliated over 5 million acres of forest in Virginia alone. The USDA Forest Service has a responsibility to protect forests from gypsy moth damage and to protect neighbors by minimizing spread. Following a successful pilot project that concluded in 1998, Congress funded full implementation of the gypsy moth “Slow The Spread” strategy (STS). The STS project demonstrated that the rate of spread of the gypsy moth can be reduced by approximately 60% through comprehensive monitoring and management of recently established populations in the area where gypsy moth populations transition from continuous to isolated (Leonard et al, 1998). The benefits of reducing the rate of spread of the gypsy moth exceed the costs of treatment and monitoring by a ratio greater than 3 to 1 (USDA, 1995, p.II-12). The Forest Service has the lead for cooperatively implementing STS along with state and other federal partners located along the leading edge of gypsy moth populations.

The national strategy for managing the gypsy moth includes suppression in generally infested areas, eradication in the areas that are not yet infested, and STS in the transition areas (Sharov et al, 2002). All of the areas proposed for treatment in this analysis are within the transition area. Typically the populations found in the transition area are recently established and still at low-density. The optimum time to treat these infestations is before they increase, coalesce and spread into non-infested areas. Treatment of these areas is expected to slow the spread of the gypsy moth into non-infested areas to the south and west. Without intervention, these populations will continue to grow and contribute to a faster rate of spread south and west into non-infested areas.

The proposal on where to implement STS is technology-based and data-intensive. Every year about 80,000 pheromone traps are set out across the ten states that encompass the front of the gypsy moth infestation. The current and previous year’s trap data are fed into a model which selects apparent colonies, checks to see if the boundary of the colony is sufficiently delineated, then calculates a priority index for each colony. This index is based on the colony’s location, growth rate, density, and degree of isolation. Infestations with a priority index higher than 2.30 are usually recommended for some type of treatment. Entomologists and a variety of resource specialists review this data along with historical data and past treatment information, and propose a treatment tactic that is appropriate for the site. In 2013, the recommended treatments include congressionally designated Wilderness. The purpose for treating these populations in Wilderness is exactly the same as treating any other area in the transition zone; to slow the rate of spread of the gypsy moth south and west into non-infested areas. However, because of the congressional designation, the establishment of the need to treat in the Wilderness must meet a higher standard. A Minimum Requirements Decision Guide (MRDG) was completed documenting the need for treatment in Wilderness in great detail. Please refer to the MRDG and supporting documentation in Appendix C for an indepth analysis of the need to treat in Wilderness.

Proposed Action

The Proposed Action is to implement the Gypsy Moth Slow the Spread Strategy by treating approximately 34,481 acres (as described in Table 1) using aerial application of chemical pheromones to disrupt mating of the insects.

Treatment Areas:

The areas to be treated are named for the Quadrangle Map (USGS Quad map) on which the majority of the treatment area falls. The names do not imply that the geographic features for which the quadrangle maps are named fall within the treatment area.

The following describes the locations of the two blocks (also see the location maps in Appendix A and table 1):

Garden Mountain - Approximately 24,621 acres of private land and 8,835 acres of National Forest System (NFS) land (total 33,456 acres) in Bland and Tazewell Counties on the Eastern Divide Ranger District would be treated with mating disruption. Approximately 3,048 acres are proposed within the Garden Mountain Wilderness and 3,168 acres are proposed within the Hunting Camp Creek Wilderness. Open roads within the block include State Roads (SR) 42 and 623.

Middle Fox Creek - Approximately 499 acres of private land and 526 acres of NFS land (total 1,025 acres) in Grayson and Smyth Counties on the Mount Rogers National Recreation Area (NRA) would be treated with mating disruption. Open roads within the block include SR's 675 and 772.

TABLE –1

| Treatment Area Name | Treatment | Maximum Proposed Dose (ai/ac.) | Area Size (acres) | Acres by Ownership | | |
|---------------------|-------------------|--------------------------------|-------------------|--------------------|----------------------------|-----------------------|
| | | | | Private | National Forest Wilderness | Other National Forest |
| Garden Mountain | Mating Disruption | 15g | 33,456 | 24,621 | 6,216 | 2,619 |
| Middle Fox Creek | Mating Disruption | 6g | 1,025 | 499 | 0 | 526 |
| Total | | | 34,481 | 25,120 | 6,216 | 3,145 |

Mating Disruption: The following information on mating disruption was provided by the USDA Forest Service, Forest Health Protection office, in Asheville, NC, last modified in 2009. Pheromones are chemicals produced by insects to communicate with one another. In the case of the gypsy moth, the female releases a sex pheromone when she is ready to mate. The pheromone attracts the male moths that follow the scent to its source – the female. A synthetic pheromone much like the real gypsy moth pheromone has been produced in the laboratory. This synthetic pheromone is formulated into controlled release dispensers that are scattered over the forest canopy using aircraft. The dispensers slowly release the pheromone into the environment over a 2-3 month period when gypsy moths would be mating. The males become disoriented because the air is filled with pheromone and they cannot distinguish the real female pheromone from the

pheromone released by the dispensers. This process is called mating disruption and is effective at controlling low-density populations of the gypsy moth. The applications would occur in mid to late June 2013 prior to the emergence of the gypsy moth breeding adults.

- Disparlure (chemical name: cis-7, 8-epoxy-2-methyloctadecane) is the name of the sex pheromone produced by the female gypsy moth to attract the male for mating. Disparlure is also synthesized and used in the cooperative USDA Forest Service STS project to control low-density gypsy moth populations.
- Disrupt II[®] (Hercon Environmental, Emigsville, PA) is the name of a plastic laminate flake formulation that contains disparlure as the active ingredient. It is 17.9% active ingredient (pheromone) by weight and is registered with the Environmental Protection Agency to control low-density populations of gypsy moth (EPA Reg. No. 8730-55). Prior to application the flakes are mixed with a sticker (Gelva Multipolymer Resin Emulsion 2333) to ensure they will stick at all levels in the forest canopy or on foliage where gypsy moths are found. Both Disrupt II and Gelva have been studied and are not believed to pose any risk to humans or the environment.
- SPLAT-GM (ISCA Technologies, Riverside, CA) is the name of a polymer matrix formulation that contains disparlure as the active ingredient. It is 13% active ingredient (pheromone) by weight and is registered with the Environmental Protection Agency for use on low-density gypsy moth populations (EPA Reg. No. 80286-4)
- The products would be applied at a dose of either 15 grams or 6 grams of active ingredient per acre. The 15 gram dose is equivalent to an application rate of about 2/3 cup of Disrupt II flakes or 1 cup SPLAT-GM droplets distributed per acre. Proportionally, the 6 gram rate is less than 1/4 cup of flakes per acre or 1/3 cup of SPLAT-GM droplets distributed per acre.

Field studies and operational use of mating disruption show that it effectively suppresses mating in low-density gypsy moth populations, and therefore controls populations. Its use has been integral in the STS project. Mating disruption is species-specific to gypsy moth with no known effects on other lepidoptera (moth or butterfly) species or any other species.

The public will be notified of the proposed treatment dates and times through local newspapers. Signs about the treatment will also be placed along roads and trails at major entry points to the treatment areas. These signs will inform people of the type of treatment and the time span in which application may occur.

Treatments on National Forest are Consistent with the Forest Plan

Consistency with the Forest Plan: Goal 14 of the Jefferson National Forest Land and Resource Management Plan (Forest Plan, page 2-25) states “Contribute to maintenance or restoration of native tree species whose role in forest ecosystems is threatened by insects and disease. Management activities will reduce the impacts from non-native invasive species.” Specifically for gypsy moth, Forest-wide standards include:

FW-79: Integrated Pest Management is used to protect resources from damage caused by the gypsy moth. (Forest Plan page 2-26)

FW-80: Slow the Spread actions are allowed to slow the gypsy moth's rate of spread from the areas where it is established. (Forest Plan page 2-26)

The proposed treatment area includes portions of two Wildernesses. In general, Wilderness is managed to minimize the impacts of human activities. Treatment of insect outbreaks may be considered when they are necessary to prevent unacceptable damage to resources on adjacent lands or an unnatural loss to the wilderness resource (Forest Plan, Standard 1A-008).

Infestation in the Proposed Treatment Areas: For several years now, locations on the Eastern Divide Ranger District and Mt. Rogers NRA have been intensively monitored with pheromone traps to delineate the extent of the gypsy moth population as described above. Results from monitoring indicate that populations are present and increasing in both density and area for both locations.

The treatment areas (34,481 acres) exceed the priority index threshold of 2.30 and are proposed for treatment using mating disruption. Mating disruption is effective in managing low-density, relatively isolated gypsy moth populations. These proposed treatment blocks fall within several Management Prescription (Rx) areas in the Forest Plan. Each Management Prescription has a title that indicates the primary focus of management. Management Prescription areas included in this proposal are: Rx1A-Designated Wilderness (amendment pending), Rx4A-Appalachian Trail, Rx6A-Old Growth Forest Communities Not Associated With Disturbance, Rx6C-Old Growth Forest Communities Associated With Disturbance, Rx7B-Scenic Corridors, Rx7E1-Dispersed Recreation Areas- Unsuitable, Rx7E2-Dispersed Recreation Areas- Suitable, and Rx8A1-Mix of Successional Habitats in Forested Landscapes.

All of these prescription areas contain standards that allow for the proposed treatments. They are listed here, followed by the page number in the Forest Plan where the standard is located: Rx1A-008 – 010 (page 3-7), Rx4A-004 (page 3-21), Rx6A-006 (page 3-75), Rx6C-005 (page 3-82), Rx7B-006 (page 3-90), Rx7E1-003 (page 3-101), Rx7E2-006 (page 3-104), and Rx8A1-007 (page 3-115).

Scope of Analysis and Decision to Be Made

The scope of this analysis is limited to the proposal for treatment of two blocks totaling 34,481 acres of intermingled NFS and private lands located in southwest Virginia as part of the STS program. It does not relate to other STS, suppression or eradication treatment activities outside the scope of this EA conducted by the FS or VDACS on other public and private Virginia lands. Those activities are covered by other EAs and decisions.

This proposal requires the Regional Forester as the Deciding Official for two reasons. The use of aerially applied pesticides on approximately 6,200 acres of Congressionally Designated Wilderness requires a Regional Forester decision. The authorization for expenditure of Federal funds in the treatment of approximately 25,000 acres of privately held lands also requires a Regional Forester decision.

The decisions to be made are whether or not to treat the areas as proposed. A decision is expected to be issued in March of 2013.

Cooperating Agencies and Authorizing Law

This EA is a cooperative effort between the Virginia Department of Agriculture and Consumer Services (VDACS) and the USDA Forest Service. The Forest Service is the lead agency responsible for the scope and content of this analysis, and the decisions to be made regarding treatment of NFS lands and Federal funding to treat private lands. The VDACS is responsible for gypsy moth intervention activities on private lands within the STS zone in Virginia, which runs across southwest Virginia. The entire STS zone stretches from North Carolina into Minnesota. Authority for Federal and State cooperation in management of forest insects and diseases is provided by the Cooperative Forestry Assistance Act of 1978.

Relationship to other Decisions

This EA is tiered to the 2012 Final Supplemental Environmental Impact Statement (USDA-FSEIS, 2012) on “Gypsy Moth Management in the United States: a cooperative approach”. The FSEIS supplements the 1995 Final Environmental Impact Statement which describes alternatives for managing gypsy moth populations nationwide and includes an analysis of environmental effects and human health risks associated with each alternative and treatments that could be used. The FSEIS also adds new treatment options not available in 1996 providing more flexibility in conducting suppression, eradication, and slow-the-spread projects as well as providing updated information on the analyses of human health and non-target impacts of all the treatment options. The FSEIS ROD calls for implementing a suppression strategy in the generally infested area to reduce damage caused by outbreaks of the insect; implementing an eradication strategy in the uninfested area to prevent establishment of isolated infestations of the insect; and implementing a “Slow the Spread” strategy in the transition area to slow the rate of spread of the insect from the generally infested area. This ROD also adds the chemical Tebufenozide as a gypsy moth treatment option and provides a protocol for incorporating any new treatment options in the future. While the new treatment options provided by the 2013 ROD do not relate to this site-specific analysis, the updated risk assessments for mating disruption are incorporated by reference.

Public Involvement

The Forest Service requested comments to help determine the scope of analysis. The Forest Service mailed approximately 730 brief descriptions of the proposal on October 31 and November 13, 2012 to interested and affected agencies, organizations, adjacent land owners and individuals and placed a legal notice in the Roanoke Times on November 2, 2012. Three comments were received from private landowners in or near the proposed treatment blocks. One comment letter was received from the Virginia Department of Game and Inland Fisheries (VDGIF) and one letter from the Department of Conservation and Recreation (DCR). Private landowner concerns centered on the potential health hazards to humans, pets, and livestock. VDGIF expressed concerns for potential impacts of low flying aircraft and application of pesticides to State Threatened and Endangered species including several aquatic organisms and a bald eagle nesting site. DCR identified resources in the vicinity but does not anticipate adverse impacts to these resources.

Issues

From the public participation responses, specific issues related to the proposed action may be evaluated in one of several ways. Project Issues are addressed through the formulation or modification of an alternative, evaluated in the effects analysis, or addressed through mitigation. Non-Project Issues are: 1) outside the scope of the proposed action; 2) already decided by law, regulation, Forest Plan, or

other higher level decision; 3) irrelevant to the decision to be made; or 4) conjectural and not supported by scientific or factual evidence. The Council for Environmental Quality (CEQ) NEPA regulations require this delineation in Sec. 1501.7, “...Identify and eliminate from detailed study the issues which are not significant or which have been covered by prior environmental review (Sec. 1506.3)...” There were no Non-Project issues identified for this analysis. Please refer to Appendix B for a summary of comments received and issue development.

Based on public comments, past environmental documents for the treatment of gypsy moths using mating disruption, the following Project-Issues were identified:

Project Issues resulting in the formulation of an alternative to the proposed action:

1. The impacts of low flying aircraft and application of inert ingredients associated with the proposed mating disruption treatment could negatively affect the untrammelled, natural, and opportunities for solitude wilderness characters within the Wildernesses.

Project Issues evaluated in the effects analysis, or addressed through mitigation:

2. The application of disparlure and the use of low flying aircraft could negatively affect Threatened/Endangered/Sensitive (T/E/S) species as well as any non-target species within the treated areas.
3. Disparlure could have negative effects on human health.
4. Treatments may, or may not be successful in reducing gypsy moth populations and contributing to slowing the spread of this pest under alternatives to the proposed action.

II. ALTERNATIVES INCLUDING THE PROPOSED ACTION

Alternatives Considered in Detail

Alternative 1 – Proposed Action.

In this alternative, the Forest Service would cooperate with State agencies to treat low-density gypsy moth populations on intermixed Federal and private lands to slow the rate of spread of gypsy moth on the two blocks described previously. The original proposal is slightly modified to avoid treatment of the North Fork of the Holston River which contains a state Threatened species of darter identified by the VDGIF. Approximately 596 acres of private lands along the southern edge of the Garden Mountain Block are removed from the proposed treatment. Table 2 provides a summary of the modified proposal analyzed under Alternative 1.

TABLE –2

| Treatment Area Name | Treatment | Maximum Proposed Dose (ai/ac.) | Area Size (acres) | Acres by Ownership | | |
|---------------------|-----------|--------------------------------|-------------------|--------------------|----------------------------|-----------------------|
| | | | | Private | National Forest Wilderness | Other National Forest |

| | | | | | | |
|------------------|-------------------|-----|--------|--------|-------|-------|
| Garden Mountain | Mating Disruption | 15g | 32,860 | 24,025 | 6,216 | 2,619 |
| Middle Fox Creek | Mating Disruption | 6g | 1,025 | 499 | 0 | 526 |
| Total | | | 33,885 | 24,524 | 6,216 | 3,145 |

A private aerial contractor, using low flying aircraft under the direction of USDA-FS and VDACS personnel, would treat approximately 33,885 acres with mating disruptants. These acres include 24,525 acres of private land and 9,361 acres of NFS lands. Treatment of NFS lands includes approximately 6,216 acres of Wilderness. The mating disruption treatment is usually performed in mid-June. The timing of this treatment is after full “leaf-out” and before the emergence of the gypsy moth breeding adults.

Alternative 2 – No Treatment in Wilderness.

In this alternative, no aerial application of disparlure would occur in any congressionally designated Wilderness. This alternative responds to the project issue concerned with the impacts of aerial application of disparlure on Wilderness character.

Garden Mountain – The southern boundary of this treatment block under this alternative would be moved to coincide with the Wilderness boundaries at the crest of Garden Mountain, eliminating the Wilderness and some privately held lands to the south of Garden Mountain. Approximately 20,241 acres of private land and 2,330 acres of NFS land (total 22,571 acres) in Bland and Tazewell Counties would be treated with mating disruption. Open roads within the block include State Road (SR) 42 and 623.

Middle Fox Creek - This treatment block remains unchanged as compared to Alternative 1. Approximately 499 acres of private land and 526 acres of NFS land (total 1,025 acres) in Grayson and Smyth Counties would be treated with mating disruption. Open roads within the block include SRs 675 and 772.

TABLE –3

| Treatment Area Name | Treatment | Maximum Proposed Dose (ai/ac.) | Area Size (acres) | Acres by Ownership | | |
|---------------------|-------------------|--------------------------------|-------------------|--------------------|----------------------------|-----------------------|
| | | | | Private | National Forest Wilderness | Other National Forest |
| Garden Mountain | Mating Disruption | 15g | 22,571 | 20,241 | 0 | 2,330 |
| Middle Fox Creek | Mating Disruption | 6g | 1,025 | 499 | 0 | 526 |
| Total | | | 23,596 | 20,740 | 0 | 2,856 |

Alternative 3 - (No Action) In this alternative, no action would be taken to slow the spread of gypsy moth on the forested areas on the lands administered by the US Forest Service, or adjacent private lands in Virginia.

Treatment design criteria That Apply to Alternatives 1 and 2

The following measures would apply to both action alternatives to enhance the effectiveness of the treatment, and to reduce the risk of off-site impacts. More detailed descriptions and insecticide labels and Material Safety Data Sheets (MSDS) can be obtained at the Forest Supervisor's office in Roanoke, VA and the VDACS office in Christiansburg, VA.

1. Application of the mating disruptants will be discontinued when winds negatively impact deposition, foliage is dripping wet or there is an imminent threat of rain. These measures will minimize drift and insure a uniform distribution on vegetation. Since the mating disruptant products are not affected by temperature and relative humidity, these environmental conditions would not have a direct effect on the application of these products; however, these conditions will be monitored to predict storm patterns and ensure the safety of the pilots. Ground personnel within the project area will monitor application conditions. Application heights will range between 100 and 200 feet above the treetops, depending on aircraft type and terrain.
2. The application pilot and observer aircraft pilot will conduct a pre-treatment flight of all proposed treatment blocks to become familiar with boundaries. Topographical maps will be provided to the application and observer pilots to assist in identifying the area boundaries and any hazards that might be associated with the aerial treatment of the areas. The spray pilot will have radio communication with the airbase, observer aircraft, and personnel in the areas at all times. Ground crews assigned to the areas will monitor the application and provide weather updates. Observer pilot will provide flight following to the airbase for safety.
3. The application aircraft will be equipped with a Differential Global Positioning System (DGPS) that assists the pilot in locating the treatment areas, identifying area boundaries, and insuring even coverage throughout the areas.
4. Disruptants will be applied according to label directions. All label warnings and restrictions will be strictly adhered to by the applicator. None will be applied over open bodies of water.
5. The public will be notified of the proposed treatment dates and times through local newspapers. Signs about the treatment will also be placed along roads and trails at major entry points to the treatment areas. These signs will inform people of the type of treatment and the time span in which application may occur.
6. Security measures will be implemented around all planes, chemicals, spray tanks, and other items associated with the aerial spraying.

7. The reaches of Burkes Garden, and Station Spring Creeks that occur within the Garden Mountain block will be buffered by a 100 foot no treatment zone to protect state Threatened or Endangered aquatic species.
8. Aircraft will not fly lower than 500 feet over a known Bald Eagle nest located within the Garden Mountain block to avoid disturbing nesting eagles.

Alternatives Considered But Eliminated from Detailed Study

Other methods of managing gypsy moth populations were considered but eliminated from detailed study. These methods and the rationale for their elimination are as follows:

- Foregoing Treatment in the Garden Mountain Block entirely – This alternative is a variation of the “no treatment in Wilderness” alternative and would respond to the issue regarding concerns for impacts to Wilderness character. While there are several relatively high trap catches within the Wildernesses, the highest trap catches in this area occur on the private lands north of the Wildernesses in Burkes Garden. This population is located towards the back of the transition area where control is most important for reducing the rate of spread (Johnson and Tobin, 1998). Foregoing treatment in the entire area would lead to much higher spread rates than are expected under Alternative 2; unacceptably high rates of spread considering the overall objective of STS. Therefore, this alternative was eliminated from detailed study.
- Aerial Application of Gypchek® – Gypchek® is the trade name for the Forest Service formulation of the nucleopolyhedrosis virus, a natural occurring gypsy moth-specific pathogen. Gypchek® is produced in limited quantities each year and only made available when there is a demonstrated need. The probability of successfully suppressing low-density populations like those found in the STS area is not well documented. Gypchek® is most effective in moderate-density populations of gypsy moth where adequate numbers of caterpillars are present to transmit the virus among the population. Application of Gypchek® also involves more limiting environmental constraints (e.g. relative humidity and temperature) as compared to mating disruption. This would result in multiple days of application over Wilderness resulting in a greater impact on the solitude quality of Wilderness character. Due to the lack of efficacy data to support the use of Gypchek® in low-density populations, this alternative was eliminated from detailed study.
- Release of Predators and Parasites - Predators and parasites would be released to manage gypsy moth populations throughout the project area. Unfortunately, cost effective technology does not yet exist to develop and propagate these agents for use within the USDA gypsy moth management program (USDA-FSEIS, 2012 Appendix A, A-1), thus, this alternative was not considered in detail. It is important to recognize, however, that within any ecosystem, specific

and non-specific predators and parasites of gypsy moth may contribute to the long-term biological control of the gypsy moth.

- Aerial Application of *Bacillus thuringiensis kurstaki* (Btk) on all treatment blocks - Two aerial applications of the biological insecticide, *Btk*, would be applied on the proposed treatment blocks. *Btk* is a lepidoptera (butterfly family) specific insecticide and is very effective when used as part of the STS strategy to reduce or eradicate low-density populations of the gypsy moth. However, the STS project is committed to using the most environmentally sensitive tactic that will meet project objectives. In this case, entomologists believe that the project objectives can be met using a gypsy moth specific tactic (mating disruption) on the treatment blocks. *Btk* would affect a wider range of moth and butterfly species than mating disruption. Therefore the use of *Btk* was not considered in detail. (Reardon et al., 1994 and Sample et al., 1993b).
- Mass Trapping - Mass trapping would be done to manage the gypsy moth population. Theoretically mass trapping works by capturing all the males in pheromone traps before they have a chance to mate. However, data to support the efficacy of this tactic is very limited and prior use on the Forest was not successful. To be effective, mass trapping requires about 9 traps per acre, which means a total of 305,000 traps would have to be deployed. Deployment and retrieval of traps would require a minimum of 12,700 person days in the remote steep terrain within the project area, and would cost an estimated \$1.6 million to implement. Because the efficacy has not been adequately demonstrated and the cost is so high, the use of mass trapping was not considered in detail.

Monitoring

Treatment effectiveness of the mating disruption treatments will be monitored for two years post-treatment using pheromone baited traps. Traps deployed in the year of treatment are not expected to effectively trap male moths because the air will be saturated with synthetic pheromone from the treatment. Traps deployed the year after the treatment (2014) would be used to evaluate treatment efficacy and to determine whether follow-up treatments would be required in 2015. The project would be considered successful if:

- a. Male moth captures in the second year post-treatment are no higher than surrounding areas.
- b. No follow-up treatments would be required in the area in 2015.

III. ENVIRONMENTAL EFFECTS OF THE ALTERNATIVES

General Description of the Area

The treatment blocks comprise primarily forested lands, but include open lands and rural residential areas. There are some moderate to steep side slopes that drain into the streams and drainages. See the table below for some of the major streams involved. Vegetation on the national forest consists of a strong component of upland hardwoods with lesser amounts of white pine and yellow pine. The

understory species are primarily mountain laurel, huckleberry, hardwood seedlings, white pine seedlings, and rhododendron. Forests on the adjacent private lands are similar but tend to have a stronger component of yellow poplar, sycamore, and other lowland species. Table 2 displays additional, site-specific information for each of the two areas. See also the treatment block descriptions found on page 2 of this EA.

TABLE – 4 Site Specific Information

| Block | State and Private Land acres | National Forest acres | National Forest Management Prescriptions* | Elevation Range, in feet | Main Roads | Major Streams |
|------------------|-------------------------------------|------------------------------|--|---------------------------------|---------------------------------------|--|
| Garden Mountain | 24,621 | 8,835 | 1A, 4A, 6A, 6C, 8A1, 7E1 | 2,400 to 4,100 | State Highway 42. State Route 623. | Wolf Creek and several headwater creeks. Headwaters of Holston River. |
| Middle Fox Creek | 499 | 526 | 6C, 7B, 7E2 | 3,100 to 4,200 | State Routes 675 and 772. | Middle Fox Creek |

* See page 3 for full title of the National Forest Management Prescriptions

Approximately one-quarter of the Middle Fox Creek block was treated with mating disruption tactics in 2011. The 2011 Cedar Springs Treatment block overlapped the northeastern portion of the proposed Middle Fox Creek block. This past activity will be considered in the analysis of cumulative effects as appropriate.

Wilderness

This discussion of wilderness impacts addresses the project issue regarding concern for the impact of low flying aircraft and application of inert ingredients associated with the proposed mating disruption treatment on the untrammelled, natural, and opportunities for solitude wilderness qualities (Landres et al. 2008).

The Forest Plan identified the Garden Mountain and Hunting Camp Creek Recommended Wilderness Study Areas. These areas have been subsequently Congressionally Designated as Wilderness through the Virginia Ridge and Valley Act of 2009.

The Wilderness Act of 1964 defines wildernesses as areas untrammelled by people that offer outstanding opportunities for solitude. It directs agencies to manage wilderness to preserve natural ecological conditions with certain exceptions. The Act permits mining on valid claims, access to private lands, fire control, insect and disease control, grazing, water resource structures, and visitor use.

While the proposed control action is not required, successful implementation of the STS program is a management priority. The proposal is within the latitude of Section 4(d)(1) of the Wilderness Act, allowing insect and disease control and aircraft operations. FSM 2324.04b provides for Regional Forester approval of such control provided: a) There is an immediate threat of unacceptable damage to

resources outside the wilderness boundary or of unnatural loss of the wilderness resource due to exotic pests; and b) The threat cannot reasonably be abated by control actions taken outside the wilderness boundary. A Minimum Requirements Decision Guide (MRDG) and analysis was performed addressing the need to treat within Wilderness. The MRDG and supporting documentation can be found in Appendix C. Further, the Forest Plan contains three standards regarding insect and disease control in wilderness areas (1A-008, 1A-009, 1A-010, page 3-7). The Forest Plan states that when control measures are taken, use those that have the least adverse impact on the wilderness resource and favor biological control methods. Step 2 of the MRDG and analysis addresses the minimum activity required to achieve the purpose and need within Wilderness.

Direct, Indirect and Cumulative Effects

Alternative 1

Trammeling would occur on 6,216 acres in two Wildernesses. The application of disparlure constitutes human influence or control over natural processes.

Impacts to the natural character on 6,216 acres of Wilderness would be mixed. On one hand the treatments would protect the natural character of the two Wildernesses. The gypsy moth is an introduced non-native insect pest and is not naturally occurring in the areas to be treated. Treatment under alternative 1 is expected to reduce, and possibly eliminate, the infestation of non-native gypsy moths in these Wildernesses. This project would also contribute to slowing the spread of the non-native gypsy moth into as many as 8 Wildernesses downrange over the next 10 years. Disparlure is species specific and would have no impact on any other species within the treated areas. In this way the natural character of these Wildernesses is maintained by the treatment.

On the other hand the formulation of the disparlure to be applied includes inert ingredients. The purpose of the inert ingredients is to insure a slow and steady release of the active ingredient over the period when adult gypsy moths are active, usually about two months. These inert ingredients are not naturally occurring in the Wildernesses and would negatively impact the natural character of the Wildernesses.

Low flying aircraft above the Wildernesses and nearby lands on the day of treatment would be noticeable (primarily sound) and would negatively impact visitor's sense of solitude and their primitive recreation experience and the feeling of remoteness. This activity would occur during the relatively higher use period (although still a small number of users) when A.T. thru-hikers are expected to frequent the area. It is possible to hear the products hit the canopy as they fall, a sound similar to a light rain shower. Due to the small size of the Disrupt II plastic flakes or SPLAT-GM droplets, they are extremely difficult to see, even to the trained eye looking for them. Impacts would be short-term (most likely one day) and would likely affect few people. The area will be well signed prior to treatment to inform visitors of the potential impacts.

Alternative 2

No trammeling of Wilderness would occur since no control of natural processes would occur.

Likewise, no impact to the natural character of Wilderness would occur as a result of mating disruption treatments. However, populations of the non-native gypsy moth would be allowed to expand and are expected to eventually reach damaging levels. Severe defoliation of oaks and other preferred tree species can be expected for two or more years. Subsequent tree mortality is difficult to predict and

depends upon many factors such as tree vigor and drought conditions. However, some level of mortality is likely and widespread severe mortality is certainly a possibility. All of these indirect effects are considered un-natural since the gypsy moth is an introduced pest and not a naturally occurring insect in these ecosystems.

Furthermore, eliminating treatment in the Wilderness would likely create pockets of infestation, which in turn, would expand the leading edge and create an unacceptable rate of spread. By not treating with mating disruption this year, there is a strong likelihood that a more intrusive treatment would be needed within a few years at these same locations in order to control spread. Such was the case in the Kimberling Creek Wilderness in 2003 through 2006. The initial strategy to manage the infestation in the Kimberling Creek Wilderness without treating the Wilderness itself was not successful. The decision to leave the Wilderness untreated in 2003 and 2004 despite the recommendations to the contrary allowed the populations within the Wilderness to persist and grow. The piecemeal approach using a patchwork of mating disruption blocks around the edges of the Wilderness rather than addressing the entire infestation as recommended in 2002 backfired in the end. The infestation persisted and increased in density but this increase in density was not reflected in the trap captures until 2006 due to a masking effect of mating disruption treatments just outside the Wilderness. By 2006, the pheromone had cleared and the traps reflected a dense population where Btk, a broader spectrum insecticide compared to the mating disruption pheromone, was required for control. (Please refer to the MRDG, Step 1, Section A. Options Outside of Wilderness for a complete discussion of the history of infestation and treatment of Kimberling Creek Wilderness). If future treatment with Btk were the result of foregoing treatment in the Wildernesses now, then alternative 2 would ultimately have a greater cumulative impact on wilderness character than alternative 1. No other cumulative impacts are identified.

Foregoing treatment of the infestation in the Wildernesses now or in the future is expected to result in indirect impacts on 8 additional Wildernesses downrange over the next 10 years.

Alternative 2 is expected to have some minor impact on opportunities for solitude. While aircraft and mating disruption flakes or droplets would not occur within the Wilderness, low flying aircraft nearby could still be heard from within the Wildernesses on the day of treatment. These impacts are expected to be much less severe than Alternative 1.

Alternative 3

No direct or indirect impact would result on any Wilderness due to treatment of the gypsy moth.

However, similar to Alternative 2 above, indirect impacts on Hunting Camp Creek and Garden Mountain Wildernesses can be expected. Non-native gypsy moth populations would be allowed to expand likely resulting in severe defoliation over multiple years. Subsequent mortality of at least some individual oaks is expected and could possibly become severe with entire stands of oak dying. These impacts would not be natural since the gypsy moth was introduced by man and is not a native pest to these ecosystems.

Also similar to Alternative 2, indirect impacts to Wilderness character can be expected to occur within 8 Wildernesses located downrange within 10 years due to the unchecked spread of this non-native pest.

Non-target Species

The following discussion addresses the potential effects on non-target species, particularly pets, livestock, other caterpillars and wildlife species in general.

The Forest Plan has identified Management Indicator Species (MIS) which may be considered for site-specific projects on page 2-12. Of these species, the Peaks of Otter Salamander is eliminated from consideration because none of the proposed treatment areas occur within the range of this species. MIS to be considered in this analysis include pileated woodpecker, ovenbird, chestnut-sided warbler, Acadian flycatcher, hooded warbler, scarlet tanager, pine warbler, eastern towhee, eastern wild turkey, black bear, and white tail deer.

Direct, Indirect and Cumulative Effects

Alternatives 1 and 2

The mating disruption pheromones are species specific to the gypsy moth with no known or expected impacts to any other species (USDA-FSEIS, 2012, pp.4-19 & 20, Volume II) including dogs, cats, and domestic livestock. Likewise, no direct impact is expected on MIS such as the pileated woodpecker, ovenbird, chestnut-sided warbler, Acadian flycatcher, hooded warbler, scarlet tanager, pine warbler, eastern towhee, wild trout, eastern wild turkey, black bear, and deer. The pheromone simply disrupts the males' ability to find females and mate by saturating the air with the sex pheromone (a sex attractant scent females release when they are ready to mate). It is applied just before the moths emerge from their pupal cases (e.g. "cocoons").

Indirect effects are related to the loss of insect food items. A reduction in gypsy moth populations may indirectly impact animals dependent on these kinds of organisms for food. For example, insectivorous birds and/or bats may exhibit shifts in diet as these species switch to other available food sources. They may have to increase their territories and spend greater time foraging for food. Therefore, birds and bats needing these prey sources should be able to move to adjacent untreated forested areas with little effect on foraging time or fat reserves. However, none of the MIS birds listed above could have become dependent upon these insects since they are non-native and population levels still remain quite low.

Indirect impacts on MIS of pileated woodpecker, eastern wild turkey, black bear, and deer are not expected.

There would be no permanent or noticeable effects to non-target species, and thus no likelihood of cumulative effects from the treatments combined with any other factors, including past treatments, that may affect non-target species (USDA-FSEIS, 2012, pp. 4-20, Volume II.)

Alternative 3

No impacts to pets or livestock are expected under this alternative. No direct impacts to wildlife or MIS species are expected under this alternative.

Indirectly, the expected eventual gypsy moth defoliation, without action, may affect the abundance and distribution of wildlife due to changes in vegetation and habitat structure (USDA-FSEIS, 2012, p 4-5 to 4-9; Volume II). Some species may respond favorably while others are negatively impacted. For

example, defoliation causes a loss of cover, which for certain nesting bird species such as the ovenbird and worm-eating warbler may increase predation risk. A reduction in the abundance of other leaf-feeding insects can be expected as well, reducing food availability for some birds including the chestnut sided warbler, Acadian flycatcher, hooded warbler, scarlet tanager, and pine warbler. However, some wildlife species may thrive in response to the abundant gypsy moth caterpillar as a food source itself, if they are able to adapt and recognize this caterpillar as a food source. Tree mortality due to defoliation stress may also provide additional habitat for pileated woodpeckers and other species through the increase in standing snags and large woody debris. Increased understory growth due to forest openings may provide additional habitat and food sources for some wildlife such as deer and soft mast species for black bear. Decreased acorn production will reduce hard mast in certain areas and may in turn adversely impact some wildlife populations such as deer, black bear, and eastern wild turkey. As tree mortality intensifies, a more open canopy develops, which stimulates growth of a variety of soft mast species. This increase in soft mast may help offset the loss of hard mast to a certain extent. Gray squirrel populations, in particular, are negatively impacted by a reduction in hard mast.

In summary, in the long term the no action alternative is ultimately expected to adversely impact species that prefer mature, undisturbed, closed canopy forests, such as the ovenbird, worm-eating warbler, pileated woodpecker, and cave dwelling bats. Species like wild turkey and gray squirrel would be adversely impacted due to reduction in hard mast production. Conversely, species like white-tailed deer, common flicker, and to a lesser extent black bear, may benefit under this alternative. In any case, there is no species impacted to the point that population viability is a concern.

Threatened, Endangered, Sensitive (T/E/S) and Locally Rare (LR) Species

The following discussion addresses the effects to T/E/S and LR species that might be in the areas or the indirect effects on species that may depend on them as a food source. VDGIF identified concerns for impacts to the freshwater mussel, Tennessee heelsplitter; and two fish, Tennessee dace, and longhead darter in either Wolf, Burkes Garden, Station Spring, and/or Lick Creeks and the North Fork of the Holston River. The North Fork of the Holston River was removed from the original proposal by moving the spray block boundary north and VDGIF has concurred with a 100 foot buffer on Burkes Garden and Station Spring Creeks to protect the aquatic resources located there. Lick Creek is entirely canopy covered and therefore open water is not exposed to the aerial application. The reach of Wolf Creek containing the Tennessee heelsplitter is not located within the proposed treatment area.

VDGIF stated that their records indicated that Virginia big-eared bats had been documented from the project area, but based on the scope of the project and the pesticides proposed for use they do not anticipate the project will result in any adverse impacts to the bats.

VDGIF also expressed a concern for disturbance of a known bald eagle nest within the Garden Mountain treatment block. VDGIF has concurred with a 500 vertical foot no-fly-zone over the nest as adequate mitigation to avoid disturbing this nest.

Coordination with the U.S. Fish & Wildlife Service (USFWS) was done by using their on-line review process found on the USFWS-Virginia Ecological Services website. Upon completion of this process all T&E species considered and reviewed were determined to be either not affected or unlikely to be affected by project implementation. Results of this review process were forwarded to the Virginia and Southwest Virginia Field Offices of the USFWS.

Direct, Indirect and Cumulative Effects

Alternatives 1 and 2

A Biological Evaluation / Biological Analysis (BE/BA) has been prepared and is on file at the George Washington and Jefferson National Forests' Supervisors Office.

The BE/BA identified 37 species known to or having the potential to occur within the analysis area, including all of the species identified by VDGIF, and those which are Forest Service sensitive species. Across all blocks proposed for mating disruption, given the mitigation measures and species-specific nature of the product that disrupts mating activities only on gypsy moths, the project is not likely to effect to any federally listed plant or animal species. There will be no impact on any sensitive species, including the Tennessee heelsplitter, Tennessee dace, and longhead darters. Likewise, mitigations to be implemented are expected to avoid adverse impacts to any nesting bald eagles at the known nest location. Because there are no direct or indirect effects, there can be no cumulative effects.

Across all blocks proposed for mating disruption, given the species-specific nature of the product that disrupts mating activities only on gypsy moths, no impact to any Forest Service identified Locally Rare species is expected.

Alternative 3

This alternative would not create a direct impact upon any T/E/S species. Indirectly, gypsy moth outbreaks can lead to a reduction in abundance of some insects but an increase in the gypsy moth as a food source would probably offset this impact. Additionally, indirect impacts to aquatic systems may occur in the form of increased stream temperature and/or changes to water chemistry due to defoliation and caterpillar frass (see the Aquatics section elsewhere in this document). These changes could impact T/E/S and LR species identified in this analysis.

Water Quality and Aquatic Organisms

The expected impacts on the MIS wild trout, as well as aquatic organisms in general, are summarized below. Wolf and Hunting Camp creeks located within the Garden Mountain treatment area have been identified as wild trout streams by VDGIF.

Direct, Indirect and Cumulative Effects

Alternatives 1 and 2

Wetlands, floodplains, and aquatic species exist within the area. Although disparlure, the active ingredient in Disrupt II, does not directly affect water quality, it will not be applied over open water in compliance with the product label and project design criteria. During application, most of the controlled-release dispensers will be intercepted by and adhere to vegetation, where they remain until leaf fall. At this point the product will have released at least 60% of its disparlure, the active ingredient. The risk of the remaining disparlure leaching into surface or groundwater via translocation after leaf fall is minimal because disparlure is insoluble in water. In laboratory experiments Disrupt II was submerged in water and vigorously agitated for 48 hours. Under these conditions less than 0.04% of the active ingredient (disparlure) contained in the Disrupt II leached into water. Therefore, the proposed mating disruption treatments are not likely to cause changes in water quality. (Internal

communication with Priscilla MacLean of Hercon Environmental). Therefore, no adverse impacts are expected on wild trout or other aquatic organisms as a result of the proposed treatments. There are no other reasonably foreseeable treatments for the next two years that could leach any additional amounts of disparlure. Likewise, the past treatment of a small portion of the Middle Fox Creek block occurred two years ago. Any residual presence of disparlure in this area, which includes the extreme headwaters of Comers Rock Creek, North Branch Elk Creek, and Crigger Creek, is expected to be practically immeasurable. Therefore, no cumulative impact is expected on aquatic ecosystems due to the overlap of the past and proposed treatments.

Alternative 3

No direct impacts to water quality or aquatic species are expected under this alternative.

Indirectly, as gypsy moth populations grow and defoliation ultimately occurs, stream temperatures may eventually increase in severely defoliated riparian zones. For marginal cold water habitats, these temperature increases may adversely affect wild trout or other cold water species; however this is dependent upon stream flow volume, hydraulic gradient, ground water discharge, and the degree and duration of defoliation (USDA-FSEIS, 2012, p 4-6 & 7).

Defoliation due to gypsy moth reduces acid neutralizing capacity, increases nitrate mobility, and lowers pH (USDA-FSEIS, 2012, Chapter 4- Pages 6 & 7). The cumulative effects of these factors coupled with atmospheric deposition of nitrogen and sulfur may lead to a shift in aquatic species composition and adverse impacts on some aquatic organisms (USDA-FEIS, 1995, p 2-33-38; Appendix G).

Human Health

Direct, Indirect and Cumulative Effects

Alternatives 1 and 2

Mating disruption has no known or expected impacts to any species beyond gypsy moth. Results of acute exposure studies for oral, dermal, ocular, and inhalation exposure to disparlure reveal no adverse effects. Based on the results of studies on disparlure itself (i.e., the active ingredient), acute exposure to disparlure exhibits very low toxicity to mammals. Thus there are no expected impacts to human health (USDA-FSEIS, 2012, Chapter 4 – Page 29; Appendix H, Disparlure Risk Assessment, Section 3.4). Because there are no direct or indirect effects, there can be no cumulative effects.

Alternative 3

No direct impacts to human health are expected under this alternative.

Indirectly as gypsy moth populations eventually increase to outbreak levels, some people may experience skin irritation caused by an allergic reaction to gypsy moth hairs caused by gypsy moth caterpillars falling on their clothing and crawling on them, if they walk in an area with a dense population. In such areas, it is common to have numerous caterpillars on your clothing when you leave the area. Irritations to eyes and to the respiratory tract are also possible. These possible health effects do not suggest that exposure to the gypsy moth poses a public health concern; effects generally would be short-lived and mild (USDA-FSEIS, 2012, Chapter 4 – Page 7).

Climate Change

Direct, Indirect and Cumulative Effects

Alternatives 1 and 2

When analyzed at very large scales (regional or national) climate change has been proposed as a potential cause of range expansion or increased intensity of outbreaks of some forest pests. Likewise improving forest health through control of forest pests at the regional or national scale may have an effect on climate change. The proposed actions would contribute minor amounts of greenhouse gasses through the use of energy to produce and transport the pheromone flakes and through the use of fuel to power the spray aircraft. The proposed actions would also help reduce greenhouse gasses by helping retain carbon capture and storage on from 23,586 to 33,885 acres. Treatments are ultimately expected to reduce defoliation by gypsy moths and contribute to maintaining tree health, which will allow for greater absorption of carbon dioxide and other pollutants. The scope of the proposal is limited and effects are essentially imperceptible at the scale of global carbon balance and climate change.

Alternative 3

No direct impacts to climate change are expected under this alternative.

Indirectly, gypsy moth populations are expected to eventually increase to defoliating levels. While difficult to predict, repeated severe defoliation would be expected to result in tree mortality ranging from 30% to as much as 90% in isolated pockets. Dead trees would no longer serve as a carbon sink. Assuming a vast majority of the trees are not salvaged, the trees would slowly decay and release their stored carbon into the atmosphere providing a minor increase in greenhouse gas. Newly regenerated and vigorously growing trees that may regenerate in the gaps created by the mortality may be expected to offset this release of carbon. However the degree of that offset is greatly dependent upon the number and vigor of new growth, which is impossible to predict at this time.

Likelihood of Success

Direct, Indirect and Cumulative Effects

Alternative 1

Alternative one follows the treatment recommendations by entomologists working as part of an interagency team in the STS program nation-wide. Through years of fine tuning in the 1990's, they have been able to exceed the goals of the STS program as discussed in the "History of Gypsy Moth Spread and Control Measures" earlier in this EA. Implementing the treatments as recommended, incorporates the most effective and efficient strategies as they have been developed over time under the STS program (Sharov et. al., 1998). Based on this track record, alternative 1 is expected to succeed by the measures described earlier in this document.

Alternative 2

Alternative two does not fully follow the treatment recommendations of the STS program. Treatments in the Garden Mountain block under this alternative modify the STS recommendations in an effort to avoid treating Wilderness and thus avoid impacting Wilderness characteristics. While the treatment as

designed under this alternative does encompass the highest trap catches in this area, they do not include approximately 17 traps that caught 10 or more moths. A few of these traps caught more than 50 moths per trap. The treatment as designed under Alternative 2 would not treat building gypsy moth populations along and southeast of the Garden Mountain ridgeline. The Garden Mountain block is located toward the back, or the proximal portion, of the STS barrier zone. Modeling has indicated that this proximal portion of the barrier zone, the portion closest to population front of expansion, is critically important in efficiently and effectively reducing the rate of spread of the gypsy moth (Sharov et. al., 1998). The failure to treat all of the populations in the Garden Mountain area located relatively close to the expanding population front is likely to result in a dramatic spread of the gypsy moth due to its location within the barrier zone.

It is likely that male moths would successfully mate and these populations would continue to increase. Ultimately, the spread of the gypsy moth south and west along Garden Mountain would increase and the project would not be expected to succeed. Indirectly, disparlure applied adjacent to populations along and southeast of the Garden Mountain ridge may drift down into that untreated area and provide high enough concentrations of the pheromone that would interfere with trapping efforts there in the future. Traps set there in 2013 may trap relatively low numbers of male moths due to the drifting pheromone and lead us to believe that they are low, when in fact they are increasing.

A very similar situation in the area around Kimberling Creek Wilderness (approximately 12-14 miles to the northeast of the Garden Mountain block) occurred in 2003 and serves as a powerful case study. Based on past experience with an infestation in the Kimberling Creek Wilderness, it is highly unlikely that control actions in the Garden Mountain block, taken only outside of the Garden Mountain and Hunting Camp Creek Wildernesses would successfully reduce the population within the Wildernesses. The initial strategy to manage the infestation in the Kimberling Creek Wilderness without treating the Wilderness itself was not successful. The decision to leave the Wilderness untreated in 2003 and 2004 despite the recommendations to the contrary allowed the populations within the Wilderness to persist and grow. The piecemeal approach using a patchwork of mating disruption blocks around the edges of the Wilderness rather than addressing the entire infestation as recommended in 2002 backfired in the end. The infestation persisted and increased in density but this increase in density was not reflected in the trap captures until 2006 due to a masking effect of mating disruption treatments just outside the Wilderness. By 2006, the pheromone had cleared and the traps reflected a dense population where Btk, a broader spectrum insecticide compared to the mating disruption pheromone, was required for control.

One probable lesson from the Kimberling Creek scenario is that in a situation where treatment of a Wilderness is under consideration, it is preferable to use specific tactics if they are available and will work. Treating early when the moth populations are still at very low levels often allows the effective use of a gypsy moth specific tactic such as mating disruption. Under alternative 2, delaying treatment in an attempt to abate the problem by treating only outside of the Wilderness may allow the population to increase to the point where other treatment tactics such as Btk must be used for control. Further, the use of mating disruption outside of but adjoining a Wilderness under alternative 2 may result in suppressed trap captures in the Wilderness in the year(s) following treatment and allow an undetected population to persist and grow.

Alternative 3

Alternative three does not implement the STS program at all. Only natural events would control the

gypsy moth spread under this alternative. Existing predators, parasites, virus and pathogenic fungus would be biological control factors for gypsy moth. Populations would be expected to increase and spread to uninfested areas and/or add to the size of the infested areas. If only implemented for this year, it is likely that next year several additional treatment areas and/or larger acreages would be proposed for treatment. It is also likely that more treatment blocks would require use of more aggressive treatments, like *Btk*. Further, it is likely that if this alternative would continue to be implemented in the future, the spread rates would quickly climb back up to their historic rates of more than 21 kilometers per year. This may be especially true of the populations in the Garden Mountain area for those reasons relating to the proximal portion of the barrier zone explained under Alternative 2 above. Alternative 3 would not be expected to succeed in reducing gypsy moth populations or slowing the spread of this insect pest.

Irreversible and Irretrievable Commitment of Resources

Some resources must be committed to the operation of any control project. The primary irretrievable resources would be the human resources (people's time), fossil fuel, and dollars. All of these resources would be available for alternative projects if they were not used for this project.

IV. AGENCIES AND PERSONS CONSULTED

During the analysis process for the 2012 STS gypsy moth project, the following agencies were contacted/consulted:

Virginia Department of Agriculture and Consumer Services
Virginia Department of Conservation and Recreation
Virginia Department of Game & Inland Fisheries
Virginia Division of Natural Heritage
Virginia Division of Consumer Protection, Office of Plant and Pest Services
Bland County Administrator
Carroll County Administrator
Grayson County Administrator
Smyth County Administrator
Washington County Administrator

V. LIST OF PREPARERS/REVIEWERS

Larry Bradfield, Virginia Department of Agriculture and Consumer Services

Steve Croy, Forest Ecologist and Biologist, George Washington and Jefferson National Forests

Don Duerr, Forest Health Protection, Southern Region, Atlanta, GA

Jimmy Gaudry, Wilderness & Wild and Scenic Program Leader, Southern Region, Atlanta, GA

Dave Harris, NEPA Specialist, Southern Region, Atlanta, GA

Peter Irvine, Dispersed Recreation, George Washington and Jefferson National Forest

Donna Leonard, Entomologist, Forest Health Protection, Southern Region, Asheville, NC

Russ MacFarlane, Forest Silviculturist, George Washington and Jefferson National Forests

Karen Overcash, Forest Planner, George Washington and Jefferson National Forest

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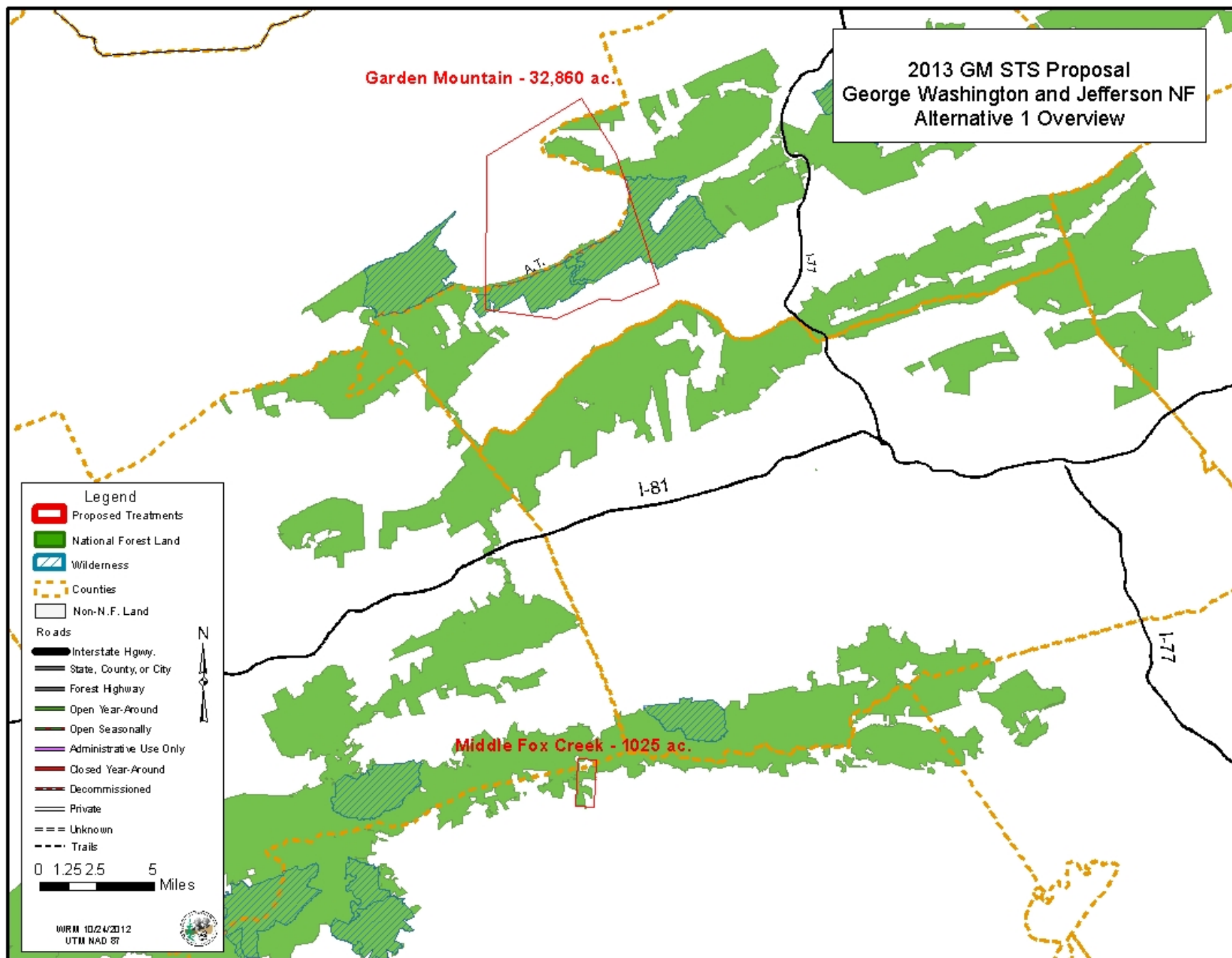
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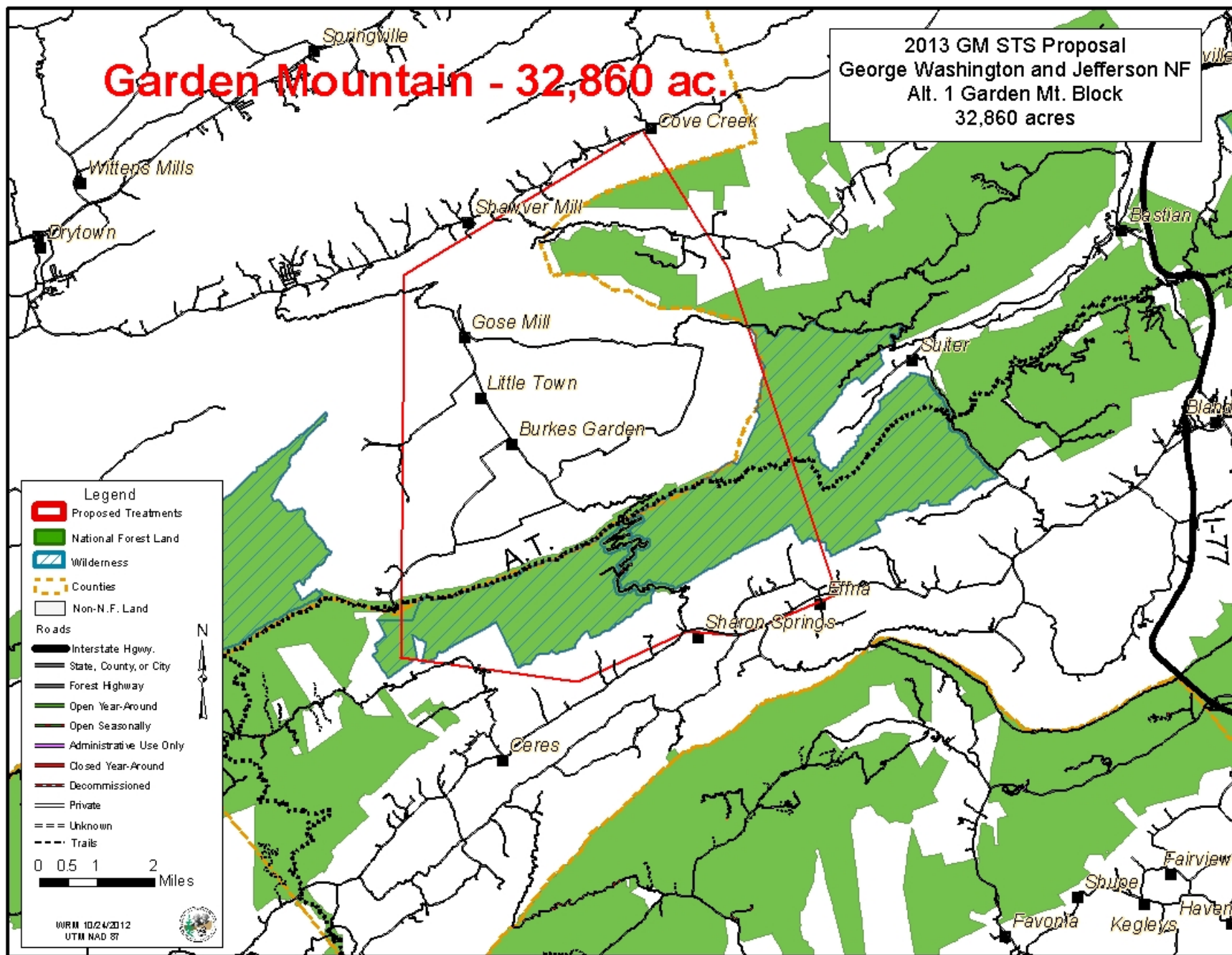
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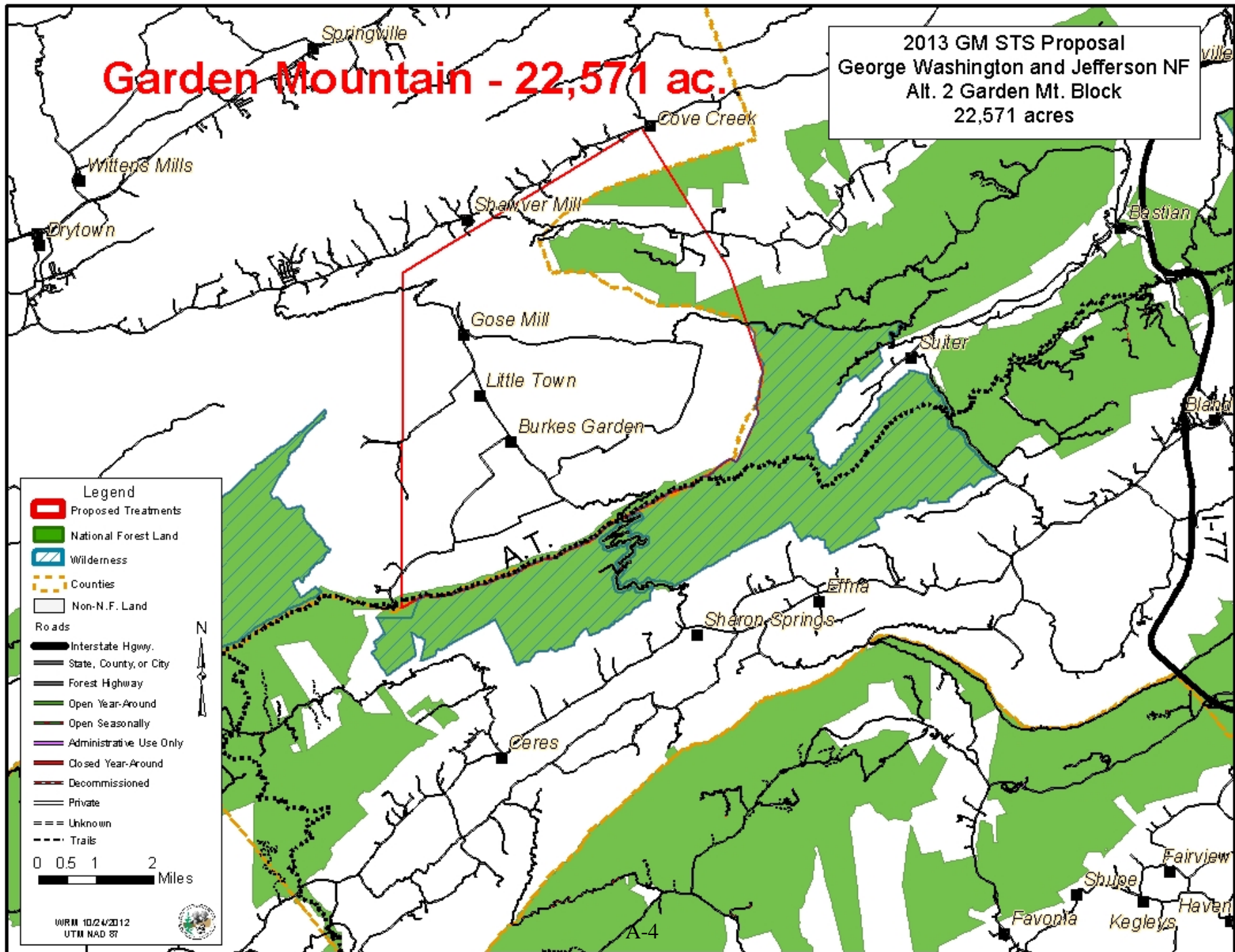
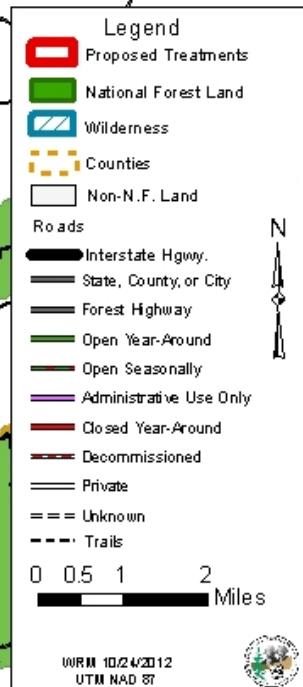
APPENDIX A - PROJECT MAPS

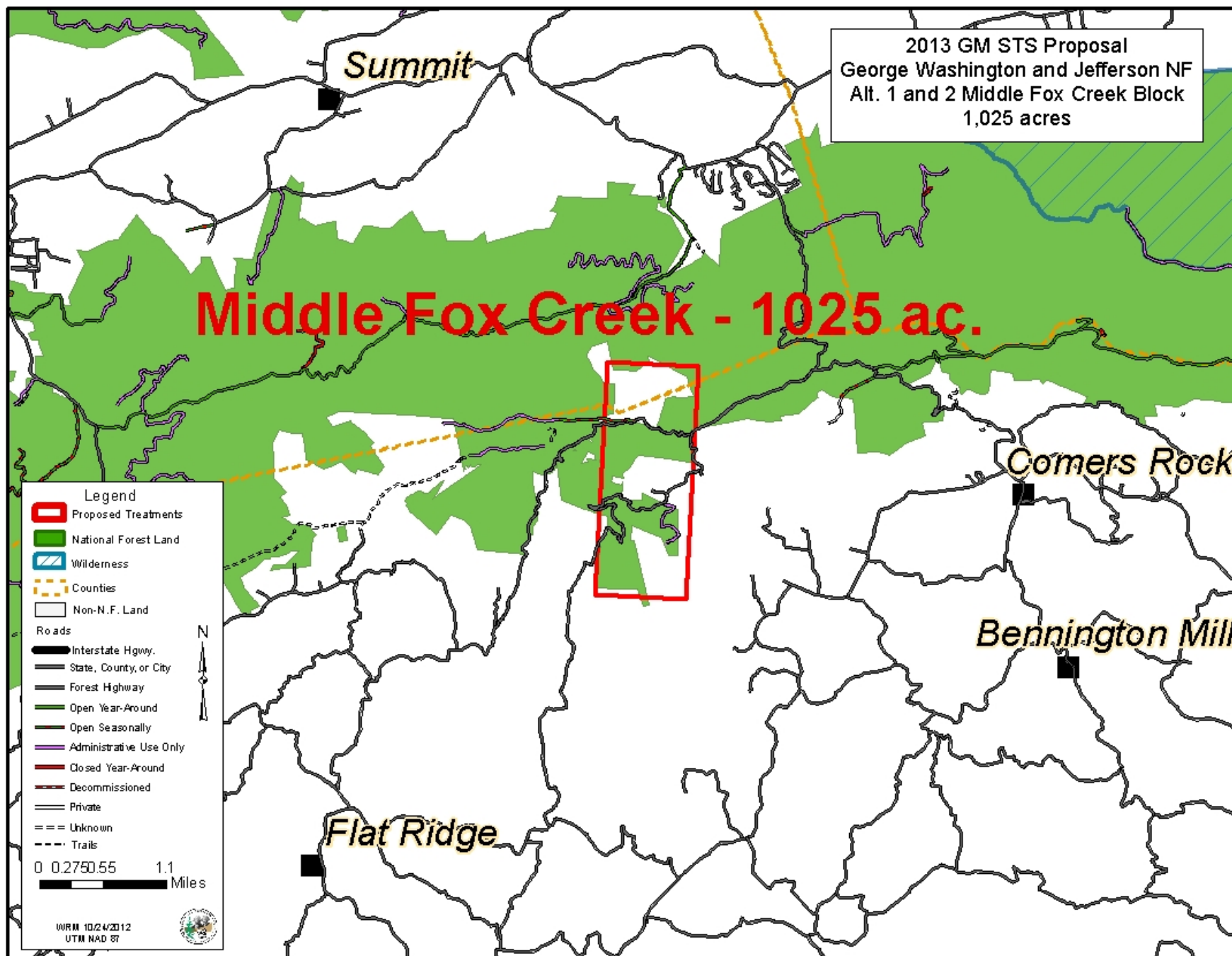




Garden Mountain - 22,571 ac.

2013 GM STS Proposal
George Washington and Jefferson NF
Alt. 2 Garden Mt. Block
22,571 acres





2013 STS Environmental Assessment

Appendix B – Response to Comments

The Forest Service requested comments to help determine the scope of analysis for STS treatments in 2013. The Forest Service mailed approximately 730 brief descriptions of the proposal on October 31 and November 13, 2012 to interested and affected agencies, organizations, adjacent land owners and individuals and placed a legal notice in the Roanoke Times on November 2, 2012. A more detailed description of the proposal and project maps were made available on the Forest's public website. The following comments were received as a result of scoping.

Comments received regarding the proposed Slow the Spread Treatments on or near NFS lands in Virginia are responded to in one of three ways. Comments may contribute to the development of Project Issues that result in the formulation of an alternative to the proposed action. Comments may also contribute to the development of Project Issue that are evaluated in the analysis or addressed through mitigation. Finally, comments may be considered Non-Project Issues and are briefly addressed in this appendix.

The following describe Project Issues that result in the formulation of an alternative to the proposed action:

Wilderness Character

The Agency is concerned with the potential for the proposed action to adversely impact several wilderness characteristics. This Project Issue will be addressed through development of an action alternative that avoids treating in Wilderness.

Project Issue: 1. The impacts of low flying aircraft and application of inert ingredients associated with the proposed mating disruption treatment could negatively affect the untrammeled, natural, and opportunities for solitude wilderness characters within the Wildernesses.

The following describes Project Issues that are addressed through analysis of impacts and/or development of design criteria that mitigate a potential impact.

Non-Target Impacts

Marvin Sonner 11/1/2012: Telephone. Expressed a concern for human and pet (dog) health impacts from the proposed treatments.

Lenden Thompson 11/20/2012: Telephone. Expressed a concern for livestock health impacts from the proposed treatments.

Virginia Department of Game and Inland Fisheries 11/30/2012: Letter.

- Endangered Virginia Big Eared Bat habitat known in the Garden Mountain block, however due to the scope of the project and proposed pesticides, no impact is expected to this species.
- Wolf Creek, Hunting Camp Creek, Middle Fox Creek, and Elk Creek are designated wild trout waters, however due to the scope of the project and proposed pesticides, no impact is expected to this species.
- A concern for the impact of aerially applied pesticides on several aquatic species in the Garden Mountain block: Wolf Creek, Burkes Garden Creek, and Station Spring Creek are designated Threatened and Endangered Species waters due to the presence of the State Endangered

Tennessee heelsplitters. Subsequent communication indicated that the reach of Wolf Creek containing this species was not within the treatment area. Lick Creek is a designated Threatened and Endangered Species waters due to the presence of the Tennessee daces. The North Fork of the Holston River is a designated Threatened and Endangered Species waters due to the presence of the longhead darters.

- A concern for the disturbance of nesting bald eagles due to the presence of low flying aircraft during aerial application of disparlure. The State Threatened Bald Eagle is known to occupy nests at specific locations within the Garden Mountain block. VDGIF recommends no aircraft fly within 1000 vertical feet of the nest locations from December 15 through July 15.

In response to the concerns expressed by VDGIF, project issue 2 was developed identifying a potential adverse impact to TES species. The analysis and Biological Evaluation will address effects to TES species and respond to this issue. Additionally, the action alternatives were modified slightly to address these concerns. The North Fork of the Holston River was eliminated from the treatment area. Station Spring and Burkes Garden creeks would be buffered by a 100 foot no treatment zone. Aircraft will not fly lower than 500 vertical feet over the bald eagle nest location. Subsequent communication indicated that VDGIF concurred with these mitigations to the original proposal.

Marvin Sonner 11/1/2012: Telephone. Expressed a concern pet (dog) health impacts from the proposed treatments.

Lenden Thompson 11/20/2012: Telephone. Expressed a concern for livestock health impacts from the proposed treatments.

Department of Conservation and Recreation (DCR), Division of Natural Heritage, 1/24/2013: Documents the presence of natural heritage resources in the project area. However, due to the scope of the activity and the distance to resources, no adverse impacts from this project are anticipated.

Project Issue: 2. The application of disparlure and the use of low flying aircraft could negatively affect Threatened/Endangered/Sensitive (T/E/S) species as well as any non-target species within the treated areas.

Human Health Impacts

Marvin Sonner 11/1/2012: Telephone. Expressed a concern for human health impacts from the proposed treatments.

Project Issue: 3. Disparlure could have negative effects on human health.

Success of the Program

Patricia Bevil 11/6/2012: Telephone. Expressed a concern for impacts of gypsy moth on forest health and visual quality. She wants us to successfully control the gypsy moth.

Project Issue: 4. Treatments may, or may not be successful in reducing gypsy moth populations and contributing to slowing the spread of this pest under alternatives to the proposed action.

APPENDIX C – MINIMUM REQUIRMENTS DECISION GUIDE

ARTHUR CARHART NATIONAL WILDERNESS TRAINING CENTER

MINIMUM REQUIREMENTS DECISION GUIDE

WORKSHEETS

“ . . . except as necessary to meet minimum requirements for the administration of the area for the purpose of this Act...”
– the Wilderness Act, 1964

Proposal Title: **Gypsy Moth Slow the Spread Treatment in the Garden Mountain and Hunting Camp Creek Wildernesses.**

Step 1: Determine if any administrative action is necessary.

Description: Briefly describe the situation that may prompt action.

The population of non-native Gypsy Moths in portions of southwest Virginia may require treatment using insecticide application as part a national integrated forest pest management program. Based on data collected in the last several years through the use of pheromone traps, two blocks that include National Forest System (NFS) lands in southwest Virginia have been proposed for treatment in 2013 as part of with the national cooperative program to slow the spread of gypsy moth (STS). One proposed treatment block, the Garden Mountain block totaling 33,456 acres, includes approximately 6,200 acres of two Wildernesses. Table 1 below indicates the number of acres that would be treated in each ownership category in the Garden Mountain block.

Table 1. Land ownership in the Garden Mountain block proposed for treatment in 2013.

| Ownership in Garden Mountain Block | Acres |
|------------------------------------|--------|
| Private lands | 24,621 |
| Jefferson National Forest | |
| Garden Mountain Wilderness | 3,048 |
| Hunting Camp Creek Wilderness | 3,168 |
| Other Jefferson National Forest | 2,619 |
| Total | 33,456 |

The proposal is to treat this area with a single application of mating disruption (MD) treatment, as a part of the overall 2013 STS program. The treatment would be applied aerially likely by fixed-wing aircraft, and would consist of one of two available products, either:

- Disrupt II. Plastic laminated flakes manufactured by Hercon, applied at a rate of 85 grams/acre. (approximately 2/3 cup of product per acre), or
- SPLAT GM. Flowable product manufactured by ISCA Technologies, applied at a rate of 117 grams/acre. (Approximately 1 cup of product per acre).

Both products contain the active ingredient “disparlure”, the gypsy moth pheromone, and are efficacious in disrupting mating through the slow, steady release of the pheromone over several months. Timeframe for application of the treatment is the latter half of June 2013.

The application would take several hours of flight time, applied by aircraft flying at a height of less than 200 feet above canopy level.

The STS program is the most advanced integrated pest management project in the world (Sharov and Liebhold 1998, Sharov et al 1998, Sharov et al 2002, Johnson 2006). The current operational program encompasses approximately 50 million acres distributed across 10 states. Economic assessments of this management strategy document at least a 3:1 benefit to cost ratio (Leuschner et al. 1996, Mayo et al. 2003). Over the past 12 years it has reduced spread of gypsy moth populations by more than 60% from the historical rate of 13 miles per year and prevented infestation of more than 110 million acres.

Each year about 60,000 pheromone traps are deployed in systematic grids across the 10-state STS program area. Moth capture data from these traps are used to run a model called the Decision Algorithm (DA) which:

- Measures the yearly rate of spread (Sharov et al, 1995, Sharov et al 1996a, Sharov et al 1996b, Sharov et al 1997, Tobin et al. 2006),
- Recommends changes in the boundaries of the action zone based on the proximity of the advancing front of gypsy moth populations and
- Identifies, analyzes and prioritizes potential problem areas (PPA) located within the action zone where the moth captures indicate a potential infestation and recommends action(s) for each (Tobin et al 2004).

Intuitively one would think that the importance of controlling detected colonies would increase with increasing distance from the infested area. However, Sharov et al (1998) found that control and monitoring activities should be most intense in the proximal portion of the action zone. Furthermore, a paper recently accepted in the prestigious scientific journal Nature (Johnson et al. 2006) validated this approach to the management of gypsy moth. Specifically Johnson found that suppressing peaks or hot spots located just at the advancing front of gypsy moth (i.e. the proximal portion of the STS action zone) have a significant effect on its rate of spread into un-infested areas. The Garden Mountain block is located precisely in this proximal zone just at the advancing front.

In calculating a priority index for each PPA, the DA uses the degree of isolation, growth rate and density of each infestation and its distance from the back of the action zone. PPAs with a priority index greater than 2.3 are recommended for some type of immediate action. The higher the priority index the more important it is to take action regardless of the distance to the back of the action zone. In determining the appropriate action to recommend, the DA also evaluates how well each infestation has been delineated with traps (delimit index must be > 1.2). The success of STS in reducing the spread of gypsy moth by more than 60 percent is based upon the consistent implementation of these scientifically based recommendations across all jurisdictional and administrative boundaries within the action zone.

The current infestation located on the Garden Mountain quad in Bland and Tazewell counties was highlighted by the DA in 2011 when several adjacent traps caught more than 100 moths each. Although the priority was high at 4.51, the delimit index was only 0.51 in 2011. Therefore the DA recommended that the infestation be delineated with a more intensive grid of traps in 2012. The recommendation was implemented in 2012 when a grid of 52 traps

spaced at 1 km was deployed. Results from the 2012 trapping grid delineated a large area with a high priority for treatment (6.61 priority index).

In 2012, 96,000 acres on the border of West Virginia and Virginia were treated at the tip of the bulge as well as several scattered populations just to the west of the bulge in the advancing front. The successful control of these populations means that areas further back into the bulge are now identified as high priorities for treatment 2013. In 2012, the DA identified 500 potential problem areas across the 10-state program area where the moth catch data indicated there might be an infestation requiring action in 2013. DA recommendations for the 500 sites are:

- Do nothing on 265 sites because the priority index was less than 2.3.
- More intensive trapping on 180 sites because the infestation was not well delineated with traps.
- Treatment on 55 sites because each site was well delineated with traps (delimit index >1.2) and priority indices were above 2.8. The Garden Mountain site ranks 9th out of 55 from the top in terms of its priority for treatment.

To determine if administrative action is necessary, answer the questions listed in A - F on the following pages by answering Yes or No, and providing an explanation.

A. Options Outside of Wilderness

Is action necessary within wilderness?

Yes: ☒ No: ☐

Explain:

Application of the MD treatment to the entire 33,500-acre Garden Mountain block, including 6,200 acres within Garden Mountain and Hunting Camp Creek Wildernesses is needed to reduce identified gypsy moth populations, and the overall success of the 2013 STS multistate effort. Limiting the treatment to only the areas within the block outside of Wilderness would result in ineffective treatment, with high likelihood of increased and expanded moth populations in future years, and a need to treat more intensively (with Btk or other pesticides) in the Wildernesses in future years. A very similar situation in the area around Kimberling Creek Wilderness (approximately 12-14 miles to the northeast) occurred in 2003 and serves as a powerful case study.

A review of gypsy moth population dynamics and Wilderness considerations in the Kimberling Creek Wilderness from 2001 to 2007 illustrates the adverse impacts that have occurred when treatment of an infestation in a Wilderness is avoided in favor of treating just outside of the Wilderness. Based on past experience with an infestation in the Kimberling Creek Wilderness, it is highly unlikely that control actions in the Garden Mountain block, taken only outside of the Garden Mountain and Hunting Camp Creek Wildernesses would successfully reduce the population within the Wildernesses. Although the highest moth captures associated with the Garden Mountain block were recovered from traps on non-wilderness lands, there are numerous traps located within the Wildernesses that caught more than 20 moths each. If left untreated this population would persist through time and continue to contribute to accelerated spread.

The initial strategy to manage the infestation in the Kimberling Creek Wilderness without treating the Wilderness itself was not successful. The decision to leave the Wilderness untreated in 2003 and 2004 despite the DA recommendations to the contrary allowed the populations within the Wilderness to persist and grow. The piecemeal approach using a patchwork of mating disruption blocks around the edges of the Wilderness rather than addressing the entire infestation as recommended by the DA in 2002 backfired in the end. The infestation persisted and increased in density but this increase in density was not reflected in the trap captures until 2006 due to a masking effect of MD treatments just outside the Wilderness. By 2006, the pheromone had cleared and the traps reflected a dense population where Btk, a broader spectrum insecticide compared to the mating disruption pheromone, was required for control.

With the benefit of hindsight, it appears that treating the entire Wilderness in 2003 when the DA first recommended treatment may have provided a better outcome. At that point, prior to a mating disruption treatment adjoining the Wilderness, the trap captures in the Wilderness were accurately reflecting a very low population density and the gypsy moth specific mating disruption treatment in the Wilderness would most likely have been effective. However, our efforts to control the infestation without treating the Wilderness not only failed, they allowed the population to increase to the point where Btk was required for effective control.

One probable lesson from the Kimberling Creek scenario is that in a situation where treatment of a Wilderness is under consideration, it is preferable to use specific tactics if they are available and will work. Treating early when the moth populations are still at very low levels (i.e. when initially recommended by the DA) often allows the effective use of a gypsy moth specific tactic such as mating disruption. Delaying treatment in an attempt to abate the problem by treating only outside of the Wilderness may allow the population to increase to the point where other treatment tactics such as Btk must be used for control. Further, use of mating disruption outside of but adjoining a Wilderness may result in suppressed trap captures in the Wilderness in the year(s) following treatment and allow an undetected population to persist and grow.

The current situation in the Garden Mountain area is similar to the Kimberling Creek situation. A bulge in gypsy moth populations in the advancing front is currently evident similar to that witnessed in the Kimberling Creek area in 2002 and 2003. Areas of high trap catches were successfully treated outside of Garden Mountain Wilderness in 2012 similar to treatments just north of Kimberling Creek Wilderness in 2002. The DA is now recommending MD treatment in and adjacent to Garden Mountain Wilderness and Hunting Camp Creek Wilderness, just as it did in Kimberling Creek Wilderness in 2003. In the Kimberling Creek situation, a decision was made to avoid treating Wilderness in an attempt to manage the expanding gypsy moth population outside of the Wilderness. The attempt failed, ultimately resulting in the need for both MD and Btk treatment in Kimberling Creek Wilderness in 2007. The history in Kimberling Creek demonstrates the need to treat the expanding populations in the Wilderness and the potential pitfalls of attempts to treat only on the edges of Wilderness.

See the attached document (Rationale for Proposed Treatments in Wildernesses on the Jefferson National Forest as Part of the STS Program October 2012) for a more detailed discussion and maps of trap capture data and history for each of the areas.

B. Valid Existing Rights or Special Provisions of Wilderness Legislation

Is action necessary to satisfy valid existing rights or a special provision in wilderness legislation (the Wilderness Act of 1964 or subsequent wilderness laws) that allows or requires consideration of the Section 4(c) prohibited uses? Cite law and section.

Yes: ☐ No: ☒

Explain:

The proposed action is a discretionary management action to slow the spread of gypsy moth - an invasive, non-native pest.

C. Requirements of Other Legislation

Is action necessary to meet the requirements of other laws? Cite law and section.

Yes: ☐ No: ☒

Explain:

This action is not required by other legislation. However, successful implementation of the STS program is a management priority of national significance.

D. Other Guidance

Is action necessary to conform to direction contained in agency policy, unit and wilderness management plans, species recovery plans, or agreements with tribal, state and local governments or other federal agencies?

Yes: ☒ No: ☐

Explain:

The proposed action is necessary to conform to the Record of Decision (ROD) for Gypsy Moth Management in the United States, signed by Deputy Chief of State and Private Forestry and the Deputy Administrator for the Animal Plant and Health Inspection Service (APHIS) in January of 1996. The ROD selected Alternative 6 which "best meets the USDA goal to reduce the adverse effects of the gypsy moth on the nation's forests and trees...". Alternative 6 includes STS as one of the 3 primary tactics used to manage gypsy moth infestations. This action is also necessary to fulfill Forest Service responsibilities as outlined in a Memorandum of Understanding (MOU) with APHIS executed in July of 2009. Forest Service responsibilities under this MOU include conducting eradication, suppression and slow the spread activities in cooperation with State and Federal agencies to reduce the rate of spread of the gypsy moth.

The proposal is within the latitude of Section 4(d)(1) of the Wilderness Act, allowing insect and disease control and aircraft. FSM 2324.04b provides for Regional Forester approval of such control provided: a) There is an immediate threat of unacceptable damage to resources outside the wilderness boundary or of unnatural loss of the wilderness resource due to exotic

pests, and b) The threat cannot reasonably be abated by control actions taken outside the wilderness boundary.

With no management within Wilderness, spread rates will increase. The need for treatment that falls within a Wilderness carries the same importance for achieving the objectives of STS as treatments on any other land ownership or designation. Foregoing any recommended treatment in STS priority areas runs counter to the significant science behind this extremely effective program and would lead to unacceptable damage to resources outside the wilderness boundary. Ultimately it would reduce the effectiveness of the program, especially in the South. The biggest risk in the immediate future is spread down the southern Appalachians, which includes a chain of Wildernesses into and through western North Carolina and eastern Tennessee. The risk of not treating the proposed Garden Mountain block, including the 6,216 acres of Garden Mountain and Hunting Camp Creek Wildernesses, is not damage to the Wildernesses themselves, but an increase in the rate of spread into uninfested areas in the states of North Carolina and Tennessee, including 8 additional Wildernesses within the next 10 years (refer to the attached document "Rationale for Proposed Treatments in Wildernesses on the Jefferson National Forest as Part of the STS Program October 2012" for a more detailed discussion of threats downrange).

Given the almost certain accelerated expansion of gypsy moth infestations that are expected to result in the absence of treatment, the Garden Mountain block that is proposed for treatment in 2013 meets the first criteria of FSM 2324.04b. Discussion under Section A above addresses treatment options outside of Wilderness.

Further, the Jefferson National Forest Land and Resource Management Plan (Forest Plan, 2004) contains three standards regarding insect and disease control in Wilderness (1A-008, 1A-009, 1A-010, page 3-7). The Forest Plan states that when control measures are taken, use those that have the least adverse impact on the wilderness resource and favor biological control methods.

By design, the gypsy moth STS program provides the most benefit to areas not yet infested by the gypsy moth. The immediate threat is an unacceptable rate of spread into previously uninfested areas – in this case the states of North Carolina and Tennessee. The purpose of the proposed treatment is not to protect the Wildernesses from infestation by the gypsy moth but to slow the range expansion of gypsy moth.

E. Wilderness Character

Is action necessary to preserve one or more of the qualities of wilderness character including: Untrammeled, Undeveloped, Natural, Outstanding Opportunities for Solitude or Primitive and Unconfined Recreation, or Unique Attributes or Other Features that reflect the character of this wilderness area?

Untrammeled: **Yes:** ☐ **No:** ☒

Explain: As an insect control measure within Wilderness, this proposal would be a "trammeling" since it involves exerting human influence or control over nature. However, this

action would defer, or possibly avoid, trammeling of as many as 8 Wildernesses located to the south and west for the next 10 years.

Undeveloped: Yes: ☐ No: ☒

Explain: The proposed project does not change this quality, as no development or permanent improvements will occur as a result of the project.

Natural: Yes: ☒ No: ☐

Explain: This project will protect the natural condition of the Garden Mountain and Hunting Camp Creek Wildernesses by reducing, and possibly eliminating, the infestation of non-native gypsy moths in these Wildernesses. This project would also contribute to slowing the spread of the non-native gypsy moth into as many as 8 Wildernesses downrange over the next 10 years.

However, the proposed mating disruption treatment methods may have the potential to impact the natural quality of the Garden Mountain and Hunting Camp Creek Wildernesses. Mating disruption is specific to the gypsy moth and thus would have no adverse impact on non-target species in the Wildernesses. Disparlure, the sex pheromone produced by the female gypsy moth to attract the male for mating, is synthesized and used as the active ingredient in both Disrupt II and SPLAT-GM. It is a natural component of any area that is infested with gypsy moth; however, it would be applied in higher concentrations than would occur naturally. The pheromone would dissipate over the summer following the application.

The impact on the “natural” quality of Wilderness associated with a mating disruption treatment occurs as a result of the inert ingredients that “carry” the pheromone. The purpose of the inert ingredients is to insure a slow and steady release of the active ingredient over the period when adult gypsy moths are active, usually about two months. The inert ingredients differ between the two products and are summarized below.

Disrupt II: Disrupt II® contains the active ingredient disparlure (17.9% by weight) and inert ingredients consisting of diatomaceous earth (also natural), polyvinyl chloride films (also called PVC polymer), polyvinyl chloride resin and a plasticizer (to make the PVC pliable). About 21% of the weight of the formulation is either pheromone or diatomaceous earth, both of which degrade quickly. The other 79% is PVC polymer, resins, or plasticizers. PVC breaks down 10 to 15 years after entering the environment. It breaks down into hydrogen, carbon, and chloride. In general, the speed of deterioration is dependent upon the amount of ultraviolet light that hits the polymer and, to a lesser degree, the amount of freezing and thawing of the polymer. The plasticizer breaks down much faster in the environment than PVC does.

The proposed dose of 15.2 g ai/ac equates to an application rate of 85 g Disrupt II per acre or about 2/3 cup of flakes distributed across an acre with deposits of about 2 flakes per square foot.

SPLAT-GM: SPLAT-GM contains the active ingredient disparlure (13% by weight) and

inert ingredients consisting of waxes, water, emulsifiers, oils, and preservatives. About 50% of the weight of the formulation is either pheromone or water both of which are natural components of Wilderness. The other 50% is mostly wax with smaller amounts of emulsifiers or preservatives.

The proposed dose of 15.2 g ai/ac equates to an application rate of 117 g SPLAT-GM per acre or about 1 cup of SPLAT-GM droplets distributed across an acre with deposits of about 3 to 4 droplets per square foot.

Outstanding Opportunities for Solitude or Primitive and Unconfined Recreation:

Yes: ☐ No: ☒

Explain: Use of Garden Mountain and Hunting Camp Creek Wildernesses is primarily light hunting use and use by Appalachian Trail hikers. These areas receive relatively little day-use of trails or other non-trail use. Most A.T. thru-hikers are traversing these areas from mid-May through early-to-mid-June annually so there is an overlap with the proposed treatment period (mid-to-late-June). Low flying aircraft above the Wildernesses and nearby lands on the day of treatment would be noticeable (primarily sound) and would negatively impact visitor's sense of solitude and their primitive recreation experience and the feeling of remoteness. It is possible to hear the products hit the canopy as they fall, a sound similar to a light rain shower. Due to the small size of the Disrupt II plastic flakes or SPLAT-GM droplets, they are extremely difficult to see, even to the trained eye looking for them. Impacts would be short-term and would likely affect few people. The area will be well signed prior to treatment to inform visitors of the potential impacts.

Unique Attributes or Other Features that reflect the character of this wilderness:

Yes: ☐ No: ☒

Explain: There are no unique components of either Wilderness detailed in the enabling legislation, or subsequently identified, beyond the four universal qualities of wilderness character.

F. Public Purposes

Is action necessary to protect one or more of the public purposes for wilderness (as stated in Section 4(b) of the Wilderness Act) of recreational, scenic, scientific, educational, conservation, and historical use?

Recreational: Yes: ☐ No: ☒

Explain: The purpose of this project is to prevent an unacceptable rate of spread of gypsy moth onto adjacent public and private lands. It is not designed to protect or enhance the recreational use public purpose of wilderness.

Scenic: Yes: ☐ No: ☒

Explain: The purpose of this project is to prevent an unacceptable rate of spread of

gypsy moth onto adjacent public and private lands. It is not designed to protect or enhance the scenic use public purpose of wilderness.

Scientific: Yes: ☒ No: ☐

Explain: While the purpose of this project is to prevent an unacceptable rate of spread of gypsy moth onto adjacent public and private lands, STS in general continues to refine state of the art strategy and tactics in abating the impacts of non-native insects. To that degree, the treatments proposed in the Garden Mountain and Hunting Camp Creek Wildernesses contribute to a larger context of scientific validation and investigation.

Educational: Yes: ☐ No: ☒

Explain: The purpose of this project is to prevent an unacceptable rate of spread of gypsy moth onto adjacent public and private lands. It is not designed to protect or enhance the educational use public purpose of wilderness.

Conservation: Yes: ☒ No: ☐

Explain: By preventing the spread of non-native gypsy moth downrange, this project contributes to the prolonged conservation of public and private lands threatened by rapidly advancing infestations in the future. This reduction in spread not only contributes to forested land in general, but would slow the spread of the non-native gypsy moth into as many as 8 additional Wildernesses in the next 10 years. The natural character in those Wildernesses down range would be conserved for a longer period of time by the proposed action in the Garden Mountain and Hunting Camp Creek Wildernesses.

Historical: Yes: ☐ No: ☒

Explain: The purpose of this project is to prevent an unacceptable rate of spread of gypsy moth onto adjacent public and private lands. It is not designed to protect or enhance the historical use public purpose of wilderness.

| |
|---|
| <p>Step 1 Decision: Is any administrative action <u>necessary</u> in</p> |
|---|

In reviewing the Step 1 questions in A - F above, note that not all answers have equal weight in the Step 1 Decision: A - C and E have first priority; F has second priority; D has third priority. See [Instructions](#) for details.

Yes: ☒ No: ☐

Explain: Treatment of the known non-native Gypsy Moth population within Garden Mountain Wilderness and Hunting Camp Creek Wilderness is necessary as a part of the larger Slow The Spread (STS) gypsy moth integrated pest management program. The goal and purpose of the STS program is to hold the rate of spread of gypsy moth populations to a minimal level; the target is for a rate no higher than 8 km/year. Gypsy moth spread in the mountains of Virginia and West Virginia had an historic rate of more than 21 km per year prior to STS. Through consistent implementation of management actions recommended by the STS decision algorithm, the Forest Service and our state partners have reduced the rate of spread by more than 60%. The STS program is a barrier zone program and as such it is only as strong as the weakest link. If one jurisdiction does not comply with recommendations (e.g. the Forest Service within Wilderness), it significantly impacts the effectiveness of the entire program, no matter how diligently the 10 states and numerous other federal landowners are working to hold the line. The gate is opened for aggressive spread of the moth and the success of the STS program is jeopardized. The success of STS in reducing the spread of gypsy moth by more than 60% is based upon the consistent implementation of these scientifically based recommendations across all jurisdictional and administrative boundaries within the action zone.

As discussed in Section A above, the proposed action is necessary within Wilderness. Previous experience in Kimberling Creek Wilderness indicates that attempts to treat only those populations outside of Wilderness are likely to fail. To treat only outside of the Wilderness would not only allow existing infestations to spread at unacceptable rates, the “masking effect” of adjacent treatments would likely allow gypsy moth populations to build without being detected by trapping. The need to treat with non-species specific pesticides, such as *Btk*, would likely result. This was the lesson learned from avoidance of treatment in Kimberling Creek Wilderness several years ago.

Even though there is precedent for such treatments in Wilderness, we will continue to evaluate each proposal for treatment in Wilderness on its own merits. As mentioned, Kimberling Creek was treated in the past. Additionally in 2008 over 11,500 acres were treated in the Beartown and Lewis Fork Wildernesses in similar circumstances. Additionally, more than 6,000 acres were treated in 5 wilderness study areas or proposed additions to wilderness, including the Garden Mountain addition.

STS treatments have occurred on both Wilderness and non-wilderness lands of the George Washington and Jefferson National Forests as shown in Table 2.

Table 2. Gypsy Moth Slow The Spread Treatments on GWJeffNFs. *All are MD Pheromone unless noted.*

| <u>Year</u> | <u>#Blocks</u> | <u>Total Ac</u> | <u>Ttl NF Ac</u> | <u>Wz Ac</u> | <u># Wz</u> | <u>Notes</u> |
|-------------|----------------|-----------------|----------------------|--------------|-------------|---------------|
| 2000 | 0 | 0 | 0 | 0 | 0 | na |
| 2001 | 1 | 3,462 | 2,770 | 0 | 0 | na |
| 2002 | 1 | 54,000 | 34,300 | 0 | 0 | na |
| 2003 | 4 | 62,276 | 24,715 | 0 | 0 | KCWz Excluded |
| 2004 | 5 | 53,754 | 16,966 | 0 | 0 | na |

| | | | | | | |
|-------|----|---------|--------|--------|---|---|
| 2005 | 12 | 35,652 | 10,573 | 2,638 | 2 | NRV. 4 counties. KCWz, BrtnWZ, 2+RWSAs. |
| 2006 | 3 | 13,234 | 6,905 | 0 | 0 | na |
| 2007* | 7 | 39,502 | 28,423 | 5,698 | 2 | ED,MR. 5 counties. KCWz, LDRWz |
| 2007* | 2 | 3,395 | 1,405 | 864 | 1 | ED, MR. <i>Btk</i> Treatment. KCWz. |
| 2008 | 8 | 105,054 | 67,225 | 11,607 | 2 | ED, MR, 5 counties. BrtnWz,LFWz,6RWSAs |
| 2009 | 2 | 36,177 | 9,895 | 0 | 0 | na |
| 2010 | 2 | 5,507 | 3,378 | 0 | 0 | na |
| 2011 | 5 | 8,789 | 5,256 | 0 | 0 | na |
| 2012 | 2 | 18,884 | 549 | 0 | 0 | na |

For this treatment to be viable under agency direction, the unabated rates of spread are considered an immediate threat of unacceptable damage to resources outside the Wilderness boundaries. Given the number and locations of Wildernesses throughout the band where STS is implemented, some Wildernesses will require treatment to insure the STS program is successful. Eliminating treatment in all Wildernesses would likely create pockets of infestation, which in turn, would expand the leading edge and create an unacceptable rate of spread. Each proposal involving Wilderness must be carefully reviewed with a site-specific assessment of that particular situation to determine the potential for acceptable control without treatment in Wilderness. In this case, the data and our policies support treating the proposed areas, including portions of both Garden Mountain and hunting Camp Creek Wildernesses.

In summary, treatment of gypsy moth populations in the Garden Mountain and Hunting Camp Creek Wildernesses is necessary to reduce the immediate threat of the spread of non-native gypsy moth to adjacent public and private lands, including as many as 8 additional Wildernesses, within 10 years. These actions will reduce unacceptable damage to resources outside the Wilderness boundary. The proposed actions are necessary inside Wilderness because past experience has proven that attempts to only treat populations adjacent to Wilderness are likely to fail.

If action is necessary, proceed to Step 2 to determine the minimum activity.

Step 2: Determine the minimum activity.

Please refer to the accompanying MRDG [Instructions](#) for information on identifying alternatives and an explanation of the effects criteria displayed below.

Description of Alternatives

This determination is based on two alternatives:

Alternative A: Aerial Application of Gypsy Moth Mating Disruption (MD) Treatment.

Alternative B: Aerial Application of Gypchek Biological Insecticide Treatment.

For each alternative, describe what the action is, when the activity will take place, where the activity will take place, and what methods and techniques will be used. Detail the impacts to the qualities of wilderness character and other comparison criteria, including safety. Where mitigation is possible, include mitigation measures. In addition to describing the effects of the alternative, it may be useful to break down each alternative into its component parts and list in tabular form the impacts to each comparison criterion.

| |
|--|
| Alternative # <u>A</u>: Aerial Application of Gypsy Moth Mating |
|--|

Description: Treat the identified 33,456 acre Garden Mountain Treatment Block with a single application of mating disruption (MD) treatment, as a part of the overall 2013 STS program. The Garden Mountain Block is 33,456 acres of public and private lands, including 6,216 acres of two Wildernesses – Garden Mountain Wilderness (3,048 acres) and Hunting Camp Creek Wilderness (3,168 acres). The treatment would be applied aurally likely by fixed-wing aircraft, and would consist of one of two available products, either:

- **Disrupt II.** Plastic laminated flakes manufactured by Hercon, applied at a rate of 85 grams/acre. (approximately 2/3 cup of product per acre), or
- **SPLAT GM.** Flowable product manufactured by ISCA Technologies, applied at a rate of 117 grams/acre. (approximately 1 cup of product per acre).

Alternative A is the proposed action by the Forest Service scientists and other experts of the ongoing national Slow The Spread integrated forest pest management program.

The need for treatment is based on the results of repeated annual moth trap captures by STS program personnel. The timeframe for application is the latter half of June 2013. The single application covering both Wildernesses (6,216 acres) will take several hours of flight time, and be applied by aircraft flying at a height of less than 200 feet above canopy level. Application to the Wildernesses will occur as a part of the overall application to the entire 33,456-acre STS Garden Mountain block, one of nine treatment blocks in FY2013. All transportation, mixing, and loading of materials will occur outside of Wilderness. No landing of aircraft, use of motorized vehicles, or use of mechanical equipment will occur within Wilderness.

Both products contain the active ingredient “disparlure”, the gypsy moth pheromone. Pheromones are chemicals produced by insects to communicate with one another. In the

case of the gypsy moth, the female releases a sex pheromone when she is ready to mate. The pheromone attracts the male moths that follow the scent to its source – the female. A synthetic pheromone much like the real gypsy moth pheromone has been produced in the laboratory. This synthetic pheromone is formulated into controlled release dispensers that are scattered over the forest canopy using aircraft. The dispensers slowly release the pheromone into the environment over a 2-3 month period when gypsy moths would be mating. The males become disoriented because the air is filled with pheromone and they cannot distinguish the real female pheromone from the pheromone released by the dispensers. This process is called mating disruption and is effective at controlling low-density populations of the gypsy moth. Mating disruption is species specific to gypsy moth with no known effects on other lepidoptera (moth or butterfly) species or any other species.

Table 3. Land ownership in the Garden Mountain block under Alternative A.

| Ownership in Garden Mountain Block | Acres |
|------------------------------------|---------------|
| Private lands | 24,621 |
| Jefferson National Forest | |
| Garden Mountain Wilderness | 3,048 |
| Hunting Camp Creek Wilderness | 3,168 |
| Other Jefferson National Forest | 2,619 |
| Total | 33,456 |

The treatment area includes 93% of Garden Mountain Wilderness and 37% of Hunting Camp Creek Wilderness. Additional information and a map are available in the 2013 Environmental Assessment for the Gypsy Moth Slow the Spread Project.

Impacts to Wilderness Character:

Untrammelled

Trammeling would occur on 6,216 acres in two Wildernesses. The application of disparlure constitutes human influence or control over natural processes.

Undeveloped

No development would occur. There would be no impact to the undeveloped quality of wilderness character in either Wilderness.

Natural

Impacts on the natural quality on 6,216 acres of Wilderness will be mixed. On the positive side, the treatment will protect or maintain the natural quality by reducing, and possibly eliminating, the infestation of gypsy moths in the two Wildernesses. Gypsy moth is an introduced, invasive, non-native insect pest. This project will also contribute to slowing the spread of gypsy moth into as many as eight additional downrange Wildernesses over

the next ten years. The treatment chemical (disparlure) is species-specific and would have no impact on any other species in the treatment area.

On the negative side, the formulation of the treatment includes inert ingredients which are needed to ensure the slow, steady release of the active ingredient over the 2-3 month time period when adult gypsy moths are actively mating. These inert ingredients do not occur naturally in the Wildernesses and would negatively impact the natural quality. The inert ingredients differ between the two products and are summarized below:

Disrupt II: Disrupt II® contains the active ingredient disparlure (17.9% by weight) and inert ingredients consisting of diatomaceous earth (natural), polyvinyl chloride films (also called PVC polymer), polyvinyl chloride resin and a plasticizer (to make the PVC pliable). Approximately 21% of the weight of the formulation is either pheromone or diatomaceous earth, which degrade quickly. Seventy-nine percent of the product is PVC polymer, resins, or plasticizers. PVC breaks down 10-15 years after entering the environment, into hydrogen, carbon, and chloride. The speed of deterioration is dependent upon the amount of ultraviolet light that hits the polymer and, the amount of freezing and thawing of the polymer. The plasticizer breaks down much faster in the environment than the PVC does.

The proposed dose of 15.2 grams of active ingredient per acre (g ai/ac) equates to an application rate of 85 grams of Disrupt II per acre or about 2/3 cup of flakes distributed across an acre with deposits of about 2 flakes per square foot.

SPLAT-GM: SPLAT-GM contains the active ingredient disparlure (13% by weight) and inert ingredients consisting of waxes, water, emulsifiers, oils, and preservatives. Approximately 50% of the overall product by weight is either pheromone or water, both of which are natural components. The other 50% is primarily wax with smaller amounts of emulsifiers and preservatives.

The proposed dose of 15.2 grams of active ingredient per acre (g ai/ac) equates to an application rate of 117 grams of SPLAT-GM per acre or approximately one cup of SPLAT-GM droplets distributed across one acre with deposits of about 3 to 4 droplets per square foot.

Solitude or Primitive and Unconfined Recreation

On the day(s) of treatment, low-flying aircraft above the two Wildernesses and nearby lands would be noticeable, primarily aurally (sound), and would negatively impact visitors' sense of solitude, their primitive recreation experience, and their feeling of remoteness. Treatment is planned during the relatively higher use period of the year for the two Wildernesses, although the total number of users is relatively low overall in this area.

The primary recreational uses of these Wildernesses are hiking the Appalachian National Scenic Trail (A.T., Forest Trail #1) in Hunting Camp Creek Wilderness and adjacent to Garden Mountain Wilderness, and hunting. Hiking on this portion of the A.T. is primarily long distance hiking, with relatively low casual day hiking. The timeframe for most northbound A.T. thru-hikers is mid-May to

early June. The timeframes for most hunters is October through early January (fall deer, bear and turkey seasons) and mid-April through mid-May (spring turkey season).

It is possible to hear the product itself hit the canopy as it falls, a sound similar to a light rain shower. Due to the small size of the Disrupt II plastic flakes or SPLAT-GM droplets, they are extremely difficult to see, even to the trained eye actively looking for them.

The impacts of both the aircraft and that product itself will be short-term (most likely one day) and would likely affect few people. The area will be well signed prior to treatment to inform visitors of the planned activity and the potential impacts.

Unique Attributes or Other Features

No “unique attributes or other features” are identified for either Garden Mountain Wilderness or Hunting Camp Creek Wilderness, either explicitly in their enabling legislation, or through subsequent analyses, including the 2011 forest wide Wilderness Information Needs Assessment.

Impacts To Other Criteria:

Maintaining Traditional Skills

No effects or impacts on maintaining traditional skills are expected from this activity.

Special Provisions

This proposed action is consistent with Section 4(d)(1) of the Wilderness Act, allowing insect and disease control and aircraft. FSM 2324.04b provides for Regional Forester approval of such control provided: a) There is an immediate threat of unacceptable damage to resources outside the wilderness boundary or of unnatural loss of the wilderness resource due to exotic pests, and b) The threat cannot reasonably be abated by control actions taken outside the wilderness boundary.

If no treatment in Wilderness occurs, spread rates will increase and unacceptable damage to resources outside of Wilderness are likely to occur. The overall effectiveness of the STS program would be reduced. The biggest risk in the near future is spread down the southern Appalachians, into and through western North Carolina and eastern Tennessee. Given the almost certain accelerated expansion of gypsy moth infestations that are expected to result in the absence of treatment, the Garden Mountain block proposed for treatment in 2013 meets the first FSM criteria.

One lesson from the Kimberling Creek scenario, discussed earlier in this analysis, is that in a situation where treatment of a Wilderness is under consideration, it is preferable to use specific known tactics if they are available and will work. Initial avoidance of treatment within Kimberling Creek Wilderness in 2003 failed, resulting in the need for both MD and *Btk* treatment for moderate-high density moth infestations in the Wilderness in 2007. This history demonstrates the need to treat the expanding populations in Wilderness and the pitfalls of attempts to treat only around but not within Wilderness. The

current Garden Mountain situation is very similar to Kimberling Creek, and the threat cannot be abated by treating outside of Wilderness only; meeting the second criteria of the FSM.

Economics and Timing Constraints

The cost estimate for applying disparlure under this alternative is \$93,240. The products and application methods known to be both available and effective for this non-native invasive pest are limited.

Timing is constrained by the timeline of emergence of male moths in order for the pheromone to be effective; mid to late June. This timing is not expected to have any significant impacts on authorized human uses of the Wildernesses

Impacts to safety of visitors and workers

No impacts on the safety of visitors and workers are expected. Information signs will be posted throughout the project area to inform users of the activity and the low-flying aircraft. Media releases will also be used in advance of the project.

Workers involved in the aerial application must meet strict USFS contract requirements for safety of themselves and the public.

Impacts Comparison Tables

Qualities of Wilderness Character

Untrammeled

| | positive impacts | negative impacts | |
|---|------------------|------------------|-------------------------------|
| Aerial application of Gypsy Moth MD treatment | None | -1 | |
| | | | |
| | | | |
| | | | |
| TOTAL | None | -1 | Untrammeled Grand Total -1 |

Undeveloped

| | positive impacts | negative impacts | |
|---|------------------|------------------|------------------------------|
| Aerial application of Gypsy Moth MD treatment | None | None | |
| | | | |
| | | | |
| | | | |
| TOTAL | None | None | Undeveloped Grand Total 0 |

Natural

| | positive impacts | negative impacts | |
|---|---|--|---------------------|
| Aerial application of Gypsy Moth MD treatment | Reduce, and possibly eliminate, infestations of non-native, invasive gypsy moths in two Wildernesses. | Introduction of non-native materials into Wilderness in several of the inert ingredients in the treatment product. | |
| | | | Natural Grand Total |

| | | | |
|-------|----|----|---|
| | | | |
| | | | |
| TOTAL | +1 | -1 | 0 |

Solitude or Primitive and Unconfined Recreation

| | positive impacts | negative impacts | |
|----------------------------------|------------------|--|----|
| Aerial application of Gypsy Moth | None | Noticable aural impact on solitude on day of treatment in both Wildernesses. | |
| | | | |
| | | | |
| | | | |
| TOTAL | None | -1 | -1 |

S or P&UR
Grand Total

Unique Attributes or Other Features

| | positive impacts | negative impacts | |
|---|------------------|------------------|---|
| Aerial application of Gypsy Moth MD treatment | None | None | |
| | | | |
| | | | |
| | | | |
| TOTAL | None | None | 0 |

UA or OF
Grand Total

Other Criteria

Maintaining Traditional Skills

| | actions with beneficial effects | actions with adverse effects | |
|---|---------------------------------|------------------------------|---|
| Aerial application of Gypsy Moth MD treatment | None | None | |
| | | | |
| | | | |
| | | | |
| TOTAL | None | None | 0 |

Traditional
Skills
Grand Total

Special Provisions

| | positive impacts | negative impacts | |
|---|------------------|------------------|---|
| Aerial application of Gypsy Moth MD treatment | None | None | |
| | | | |
| | | | |
| | | | |
| TOTAL | None | None | 0 |

Special
Provisions
Grand Total

Economics and Timing Constraints

| | positive impacts | negative impacts | |
|---|------------------|------------------|---|
| Aerial application of Gypsy Moth MD treatment | None | None | |
| | | | |
| | | | |
| | | | |
| TOTAL | None | None | 0 |

Economics &
Timing
Grand Total

Safety of Visitors and Workers

| | positive impacts | negative impacts | Safety Grand Total |
|---|------------------|------------------|-----------------------|
| Aerial application of Gypsy Moth MD treatment | None | None | |
| | | | |
| | | | |
| | | | |
| TOTAL | None | None | 0 |

Alternative # B: Aerial Application of Gypchek Biological

Description: Treat the identified 33,456 acre Garden Mountain Treatment Block with a single application of Gypchek® biological insecticide, as a part of the overall 2013 STS program. The Garden Mountain Block is 33,456 acres of public and private lands, including 6,216 acres of two Wildernesses – Garden Mountain Wilderness (3,048 acres) and Hunting Camp Creek Wilderness (3,168 acres). Gypchek® is the trade name for the Forest Service formulation of the nucleopolyhedrosis virus, a natural occurring gypsy moth-specific pathogen. Gypchek® is produced in limited quantities each year and only made available when there is a demonstrated need. The treatment would be applied aerially likely by fixed-wing aircraft. Unlike mating disruption treatments, the formulation of Gypchek® does not include plastic laminates or polymers. Similar to mating disruption and as stated earlier, Gypchek® is species-specific to the gypsy moth.

The need for treatment is based on the results of repeated annual moth trap captures by STS program personnel. The timeframe for application is late April to early May 2013. The single application covering both Wildernesses (6,216 acres) will take several hours of flight time, and be applied by aircraft flying at a height of less than 200 feet above canopy level. Application to the Wildernesses would be separate from the overall application of mating disruption (MD) treatment to the remainder of the 33,456-acre STS Garden Mountain block, one of [nine](#) treatment blocks in FY2013. All transportation, mixing, and loading of materials will occur outside of Wilderness. No landing of aircraft, use of motorized vehicles, or use of mechanical equipment will occur within Wilderness.

The probability of successfully suppressing low-density populations of gypsy moths like those found in the STS area using Gypchek is not well documented. Gypchek® was developed for, and is most effective in, treating moderate-density populations of gypsy moths where adequate numbers of caterpillars are present to transmit the virus among the population.

Table 4. Land ownership in the Garden Mountain block under Alternative B.

| Ownership in Garden Mountain Block | Acres |
|------------------------------------|---------|
| Private lands | 24,621* |
| Jefferson National Forest | |
| Garden Mountain Wilderness | 3,048 |
| Hunting Camp Creek Wilderness | 3,168 |
| Other Jefferson National Forest | 2,619* |
| Total | 33,456 |

* - Non-Wilderness lands within the Garden Mountain Treatment Block would be _____treated with mating disruption (MD) treatment, as in Alternative A.

The treatment area includes 93% of Garden Mountain Wilderness and 37% of Hunting Camp Creek Wilderness.

Impacts to Wilderness Character:

Untrammeled

Trammeling would occur on 6,216 acres in two Wildernesses. The application of Gypchek® constitutes human influence or control over natural processes.

Undeveloped

No development would occur. There would be no impact to the undeveloped quality of wilderness character in either Wilderness.

Natural

Impacts to the natural quality on 6,216 acres of Wilderness may be either positive or negative. The treatments may protect the natural character of the two Wildernesses by reducing or possibly eliminating the current infestation of gypsy moths. However, due to uncertainty of the effectiveness of Gypchek® in reducing the low level populations found in the treatment block, alternative B may not protect the natural character of the treated Wildernesses as well as alternative A. The gypsy moth is an introduced, invasive, non-native insect pest and is not naturally occurring in the areas to be treated. This project may also contribute to slowing the spread of the non-native gypsy moth into as many as 8 Wildernesses downrange over the next 10 years. Gypchek® is species-specific and would have no impact on any other species within the treated areas. If, as suspected, Gypchek is ineffective on the low-density population of gypsy moths, repeat treatment or treatment with another active ingredient may be necessary in the future.

Solitude or Primitive and Unconfined Recreation

On the days of treatment, low-flying aircraft above the two Wildernesses and nearby lands would be noticeable, primarily aurally (sound), and would negatively impact visitors' sense of solitude, their primitive recreation experience, and their feeling of remoteness. Treatment is planned during the relatively higher use period of the year for the two Wildernesses, although the total number of users is relatively low overall in this area. Negative impacts to solitude under this alternative would be greater than Alternative A for several reasons. The application of Gypchek® involves more limiting environmental constraints such as temperature and relative humidity. The Gypchek® treatment would likely occur over multiple days for several hours each day starting at dawn and continuing for a few hours until relative humidity becomes too low or temperature too high. Additionally, while the mating disruption treatment would not occur directly over Wilderness, it would occur adjacent to and in the valley below the Wilderness and the A.T. Sounds from this second treatment later in the summer would also likely be heard within the Wilderness, although this disturbance would not be as intrusive as that under Alternative A.

The primary recreational uses of these Wildernesses are hiking the Appalachian National Scenic Trail (A.T., Forest Trail #1) in Hunting Camp Creek Wilderness and adjacent to Garden Mountain Wilderness, and hunting. Hiking on this portion of the A.T. is primarily long

distance hiking, with relatively low casual day hiking. The timeframe for most northbound A.T. thru-hikers is mid-May to early June. The timeframes for most hunters is October through early January (fall deer, bear and turkey seasons) and mid-April through mid-May (spring turkey season).

It is possible to hear the product itself hit the canopy as it falls, a sound similar to a light rain shower.

The impacts of both the aircraft and that product itself will be short-term (most likely one day) and would likely affect few people. The area will be well signed prior to treatment to inform visitors of the planned activity and the potential impacts.

Unique Attributes or Other Features

No “unique attributes or other features” are identified for either Garden Mountain Wilderness or Hunting Camp Creek Wilderness, either explicitly in their enabling legislation, or through subsequent analyses, including the 2011 forestwide Wilderness Information Needs Assessment.

Impacts To Other Criteria:

Maintaining Traditional Skills

No effects or impacts on maintaining traditional skills are expected from this activity.

Special Provisions

The discussion regarding Special Provisions under Alternative A would also apply here. However, given the uncertainty of the efficacy of Gypchek® on low level moth populations found in the Garden Mountain area, it is conceivable that this alternative may fail to satisfy the first criteria of FSM 2324.04b. Populations may continue to build and move down range causing unacceptable damage to resources outside of Wilderness despite treatment in the Wilderness.

Economics and Timing Constraints

The cost estimate for applying Gypchek® under this alternative is \$149,184.

Timing: The activity would occur in late April or early May in order to optimize effectiveness on gypsy moth caterpillars. This is prior to the peak of the A.T. thru-hiker season. Application would be made within a narrow biological window. The timing is not expected to have any significant impacts on authorized human uses of the Wildernesses.

Impacts to safety of visitors and workers

No impacts on the safety of visitors and workers are expected. Information signs will be posted throughout the project area to inform users of the activity and the low-flying aircraft. Media releases will also be used in advance of the project.

Workers involved in the aerial application must meet strict USFS contract requirements for safety of themselves and the public.

Impacts Comparison Tables

Qualities of Wilderness Character

Untrammeled

| | positive impacts | negative impacts | Untrammeled Grand Total |
|---|------------------|------------------|----------------------------|
| Aerial application of Gypsy Moth Gypcheck treatment | None | -1 | |
| | | | |
| | | | |
| | | | |
| TOTAL | None | -1 | -1 |

Undeveloped

| | positive impacts | negative impacts | Undeveloped Grand Total |
|--|------------------|------------------|----------------------------|
| Aerial application of Gypsy Moth Gypcheck and MD treatment | None | None | |
| | | | |
| | | | |
| | | | |
| TOTAL | None | None | 0 |

Natural

| | positive impacts | negative impacts | Natural Grand Total |
|--|---|---|------------------------|
| Aerial application of Gypsy Moth Gypcheck and MD treatment | Reduce, and possibly eliminate, infestations of non-native, invasive gypsy moths in two Wildernesses. | Possible failure to affect current moth populations, leading to increased probability of need for future treatments | |
| | | | |
| | | | |
| | | | |
| TOTAL | +1 | -1 | 0 |

Solitude or Primitive and Unconfined Recreation

| | positive impacts | negative impacts | S or P&UR Grand Total |
|--|------------------|--|--------------------------|
| Aerial application of Gypsy Moth Gypcheck and MD treatment | None | Noticable aural impact on solitude on multiple days of treatment at two separate times of the year in both Wildernesses. | |
| | | | |
| | | | |
| | | | |
| TOTAL | None | -1 | -1 |

Unique Attributes or Other Features

| | positive impacts | negative impacts | UA or OF Grand Total |
|---|------------------|------------------|-------------------------|
| Aerial application of Gypsy Moth Gypcheck treatment | None | None | |
| | | | |
| | | | |
| | | | |

| | | | |
|-------|------|------|---|
| TOTAL | None | None | 0 |
|-------|------|------|---|

Other Criteria

Maintaining Traditional Skills

| | actions with beneficial effects | actions with adverse effects | Traditional Skills Grand Total |
|---|---------------------------------|------------------------------|-----------------------------------|
| Aerial application of Gypsy Moth Gypcheck treatment | None | None | |
| | | | |
| | | | |
| | | | |
| TOTAL | None | None | 0 |

Special Provisions

| | positive impacts | negative impacts | Special Provisions Grand Total |
|---|------------------|------------------|-----------------------------------|
| Aerial application of Gypsy Moth Gypcheck treatment | None | None | |
| | | | |
| | | | |
| | | | |
| TOTAL | None | None | 0 |

Economics and Timing Constraints

| | positive impacts | negative impacts | Economics & Timing Grand Total |
|---|------------------|------------------|-----------------------------------|
| Aerial application of Gypsy Moth Gypcheck treatment | None | None | |
| Inert Ingredients | None | None | |
| Gypcheck® | None | None | |
| Human Intervention | None | None | |
| TOTAL | None | None | 0 |

Safety of Visitors and Workers

| | positive impacts | negative impacts | Safety Grand Total |
|---|------------------|------------------|-----------------------|
| Aerial application of Gypsy Moth Gypcheck treatment | None | None | |
| Inert Ingredients | None | None | |
| Gypcheck® | None | None | |
| Human Intervention | None | None | |
| TOTAL | None | None | 0 |

Alternatives Eliminated from Detailed Study:

Alternatives that utilize broader spectrum insecticides, such as *Btk* and Dimilin®, were eliminated from consideration in this analysis because they would clearly have a more

adverse impact on the natural quality of Wilderness character due to non-target species impacts, and be a higher degree of trammeling.

Alternatives that utilize the release of predators and parasites or mass trapping were eliminated from detailed consideration because previous studies and experience on this forest is either inconclusive or has failed in the past. Furthermore, mass trapping would require 56,000 traps and an estimated 2,333 person days at a cost of over \$583,000.

Comparison of Alternatives

It may be useful to compare each alternative's positive and negative impacts to each of the criteria in tabular form, keeping in mind the law's mandate to "preserve wilderness character."

| | Alternative A | Alternative B | Alternative C | No Action |
|--|--|--|---------------|-----------|
| Untrammeled | Negative on 6,216 acres of two Wildernesses. | Negative on 6,216 acres of two Wildernesses. | n/a | n/a |
| Undeveloped | None | None | | |
| Natural | Both Positive and Negative | Both Positive and Negative | n/a | n/a |
| Solitude or Primitive and Unconfined Recreation | Negative on day(s) of treatment. | Negative on multiple days of treatment. | n/a | n/a |
| Unique / Other Features | None | None | n/a | n/a |
| QUALITIES OF WILDERNESS CHARACTER SUMMARY | Negative | Negative | n/a | n/a |

| | Alternative A | Alternative B | Alternative C | No Action |
|--------------------------------|---------------|---------------|---------------|-----------|
| Maintaining Traditional Skills | None | None | n/a | n/a |
| Special Provisions | None | None | n/a | n/a |
| Economics & Timing | None | None | n/a | n/a |
| OTHER CRITERIA SUMMARY | None | None | n/a | n/a |

| | Alternative A | Alternative B | Alternative C | No Action |
|--|---------------|---------------|---------------|-----------|
| SAFETY (visitors & workers) | None | None | n/a | n/a |

Safety Criterion

Safety concerns are not the overwhelming or predominant factor in deciding whether or not action is needed, or in choosing between the two alternatives. Aerial application of both mating disruption (disparlure) treatments and direct suppression (Gypchek, *Btk*, Dimilin) treatments occur annually in several states as a part of the Gypsy Moth Slow The Spread effort. Extensive safety proposals and procedures are in place and followed.

Documentation:

Not applicable.

Step 2 Decision: What is the Minimum Activity?

Please refer to the accompanying MRDG Instructions before describing the selected alternative and describing the rationale for selection.

Selected alternative: **Alternative A: Aerial Application of Gypsy Moth Mating Disruption (MD) Treatment.**

Rationale for selecting this alternative (including safety criterion, if appropriate):

The impacts to Wilderness character are somewhat similar between the two alternatives analyzed in detail. Both will result in a trammeling of Wilderness and impacts on solitude on the same acres and in similar ways. Alternative B may have a slight perceived advantage in that it may impact the natural quality of Wilderness character less since it would not introduce plastic laminate or polymers as inert ingredients during applications. However, alternative B may not successfully reduce populations of the non-native gypsy moth and therefore not protect the natural quality as well as alternative A. Alternative A is highly likely to protect the Wilderness natural quality based on the proven success of mating disruption treatments. Alternative B would also create a greater negative impact on solitude. Treatments would occur over multiple days at two separate times of the year.

Furthermore, alternative A is fully expected to comply with Section 4(d)(1) of the Wilderness Act and FSM 2324.04b. Mating disruption under Alternative A will very likely prevent unacceptable damage to resources outside of the two Wildernesses based on the track record of such treatments. Further, past experience in the Kimberling Creek area where treatments on the edges of Wilderness only were attempted and failed, indicate that treatment outside of Wilderness only will not reasonably abate the threat. Due to the uncertainty of the effectiveness of Gypchek® on the relatively low level moth populations found in the Garden Mountain block, alternative B may not comply with Section 4(d)(1), as it may not prevent unacceptable damage outside of the Wilderness boundaries.

Additionally, disparlure, the active ingredient in alternative A, is readily available and cheaper to use. Gypchek®, the active ingredient in alternative B, is only produced in very limited quantities and is reserved for use in higher level moth populations where the presence of threatened, endangered, sensitive, or locally rare (TESLR) species requires the use of a species-specific insecticide. Gypchek® is significantly more expensive to apply than disparlure.

Alternative A is more likely to protect the natural quality and prevent unacceptable damage outside of the Wilderness boundaries in the long term. This alternative is fully expected to comply with Section 4(d)(1) of the Wilderness Act. The material proposed under alternative A is readily available and cheaper to apply. For all of these reasons, alternative A would have the minimum impact on the qualities of Wilderness character and the characteristics of these two Wildernesses.

Monitoring and reporting requirements:

The treatment areas will be monitored with gypsy moth pheromone traps in 2014 and 2015 to

determine the effectiveness of the treatments.

Check any Wilderness Act Section 4(c) uses approved in this alternative:

(Note: Motorized equipment [aircraft – either fixed-wing or helicopter] will be used to apply gypsy moth mating disruption treatment over portions of Garden Mountain Wilderness and Hunting Camp Creek Wilderness, but will not land in the Wilderness. No other mechanical transport or motorized equipment will occur within the Wildernesses as a result of this work.)

- | | |
|---|--|
| <input type="checkbox"/> mechanical transport | <input type="checkbox"/> landing of aircraft |
| <input type="checkbox"/> motorized equipment | <input type="checkbox"/> temporary road |
| <input type="checkbox"/> motor vehicles | <input type="checkbox"/> structure |
| <input type="checkbox"/> motorboats | <input type="checkbox"/> installation |

Record and report any authorizations of Wilderness Act Section 4(c) uses according to agency policies or guidelines.

Follow agency policies for the following review and decision authorities:

| Approvals | Signature | Name | Position | Date |
|--------------|-----------|--------------------------|--------------------------------------|------|
| Prepared by: | | Russ MacFarlane | Forest Silviculturist | |
| Prepared by: | | Pete Irvine | Forest Trails & Wilderness Splist | |
| Recommended: | | Ted Coffman | Forest Staff Officer, RWH&VP | |
| Recommended: | | Annie Downing | Acting Forest Staff Officer, FAT | |
| Recommended: | | H. Thomas Speaks, Jr. | Forest Supervisor | |
| Recommended | | C. Jimmy Gaudry | R-8 Wilderness Program Manager | |
| Approved: | | Liz Agpaoa | Regional Forester, R-8 | |

**Rationale for Proposed Treatments in Wilderness
on the Jefferson National Forest as Part of the STS Program
October 2012**

EXECUTIVE SUMMARY

- The U.S. Forest Service is a cooperating partner in the Slow The Spread (STS) Program. STS officials are proposing to treat two areas which include both USFS lands and nearby private lands as a part of their overall 2013 program. One proposed treatment area includes portions of two Wildernesses on the Eastern Divide Ranger District of the George Washington and Jefferson National Forests (Garden Mountain Wilderness and Hunting Camp Creek Wilderness).
- The STS program is the most advanced integrated pest management project in the world. Over the past 12 years it has reduced the spread of gypsy moth by more than 60% from the historical rate of 13 miles per year and prevented infestation of more than 110 million acres.
 - Under STS, about 70,000 pheromone traps are deployed annually in systematic grids across the 10-state program area. Moth capture data from these traps are used to feed a decision support system called the Decision Algorithm (DA) that measures the rate of spread, recommends changes in the boundary of the action area based on the proximity of the advancing front of populations and identifies and analyzes problem areas where moth captures indicate a potential infestation that requires action.
 - The DA evaluates the location, degree of isolation, growth rate and density of each infestation, then calculates a priority index for each problem area and recommends an action. The priority index indicates the relative importance of the recommended action – **the higher the priority index the more important it is to take action in order to reduce spread.**
 - The success of STS is based upon the consistent implementation of the scientifically based DA recommendations **across all jurisdictional and administrative boundaries within the action area.**
 - Intuitively one would think that the importance of controlling detected colonies would increase with increasing distance from the infested area but both Sharov (1998) and Johnson (2006) found that controlling peaks in the gypsy moth population, called hotspots, located on the advancing front of gypsy moth populations has a significant effect on its rate of spread into uninfested areas.
- The infestation proposed for treatment in the area that includes portions of two Wildernesses (the Garden Mountain block) has a priority index of 6.61, the 9th highest priority for treatment of all 55 infestations located within the STS action area.
 - Failure to control the infestation poses a threat of accelerated spread outside of the Wildernesses into uninfested areas within Virginia and into the states of Tennessee and North Carolina.
 - The infestation cannot be controlled by taking action only outside of the Wildernesses because the level of trap captures inside the Wildernesses indicate the population would persist.

INTRODUCTION AND PROPOSAL

In 2012 one gypsy moth infestation consisting of 33,456 acres, located primarily on the Garden Mountain quad in Bland and Tazewell counties and consisting of intermingled private and national forest lands, has been thoroughly delineated and is a high priority for treatment in 2013 in association with the national program to slow the spread of gypsy moth (STS). The proposed treatment area, named the Garden Mountain block, also includes 6,216 acres in two Wildernesses (Table 1). Mating disruption, which is specific to the gypsy moth, is recommended as the treatment (see Appendix for more information on mating disruption).

Table 1. Land ownership in the Garden Mountain block proposed for treatment in 2013

| Ownership in Garden Mountain Block | Acres |
|------------------------------------|--------|
| Private lands | 24,621 |
| Jefferson National Forest | |
| Garden Mountain Wilderness | 3,048 |
| Hunting Camp Creek Wilderness | 3,168 |
| Other Jefferson National Forest | 2,619 |
| Total | 33,456 |

THE SCIENCE BEHIND STS

The STS program is the most advanced integrated pest management project in the world (Sharov and Liebhold 1998, Sharov et al 1998, Sharov et al 2002, Johnson 2006). The current operational program encompasses approximately 50 million acres distributed across 10 states. Economic assessments of this management strategy document at least a 3:1 benefit to cost ratio (Leuschner et al. 1996, Mayo et al. 2003).

The strategy used in STS was pilot tested on 7 million acres for 7 years prior to implementing the operational program in the year 2000. During the pilot phase gypsy moth spread was modeled by Sharov and Liebhold (1998). Their model describes three zones at the moving population front: the infested zone that is assumed to be a source of long distance dispersal, the transition zone where new colonies become established and the uninfested zone where no colonies exist (Figure 1).

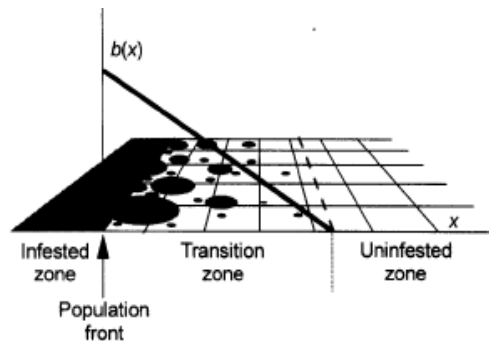


Figure 1. Three zones at the expanding population front. The probability of colony establishment, $b(x)$, decreases with increasing distance, x , from the infested zone.

Sharov et al (1998) found spread reduction is optimized when control actions are focused in a 100 km wide band whose proximal boundary is located approximately 20 km ahead of the 10-moth boundary line (Figure 2). Within this band, which is called the action zone in the STS project, gypsy moth populations are intensively monitored and detected colonies are treated. The evaluation zone, which is located adjacent to the proximal boundary of the action zone, is monitored less intensively. The data collected in the evaluation zone is used to evaluate the project's effectiveness and to correctly position the action zone relative to the advancing front of gypsy moth populations each year.

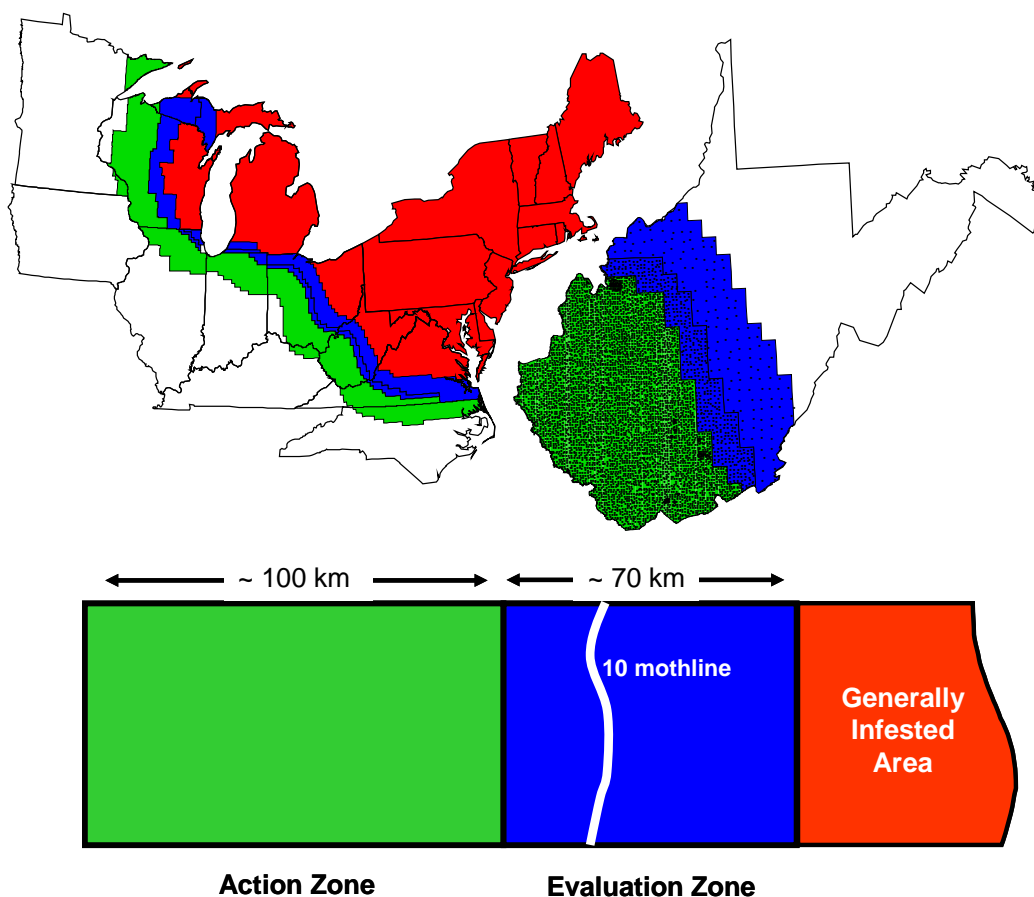


Figure 2. Diagram of the STS Project Area in 2005. The positions of the action (green area) and evaluation (blue area) zones are shown relative to the area where defoliation occurs (red area). The map of West Virginia is an example of the different trap grid densities (traps represented as small black dots) used in STS. The action zone is 100 km wide and its proximal boundary is set relative to the 10-mothline.

Each year about 60,000 pheromone traps are deployed in systematic grids across the 10-state STS program area. Moth capture data from these traps are used to run a model called the Decision Algorithm (DA) which:

1. Measures the yearly rate of spread (Sharov et al, 1995, Sharov et al 1996a, Sharov et al 1996b, Sharov et al 1997, Tobin et al. 2006),
2. Recommends changes in the boundaries of the action zone based on the proximity of the advancing front of gypsy moth populations and
3. Identifies, analyzes and prioritizes potential problem areas (PPA) located within the action zone where the moth captures indicate a potential infestation and recommends action(s) for each (Tobin et al 2004).

Intuitively one would think that the importance of controlling detected colonies would increase with increasing distance from the infested area. However, Sharov et al (1998) found that control and monitoring activities should be most intense in the proximal portion of the action zone. Furthermore, a paper recently accepted in the prestigious scientific journal *Nature* (Johnson et al. 2006) validated this approach to the management of gypsy moth. Specifically Johnson found that suppressing peaks or hot spots located just at the advancing front of gypsy moth (i.e. the proximal portion of the STS action zone) have a significant effect on its rate of spread into uninfested areas.

In calculating a priority index for each PPA the DA uses the degree of isolation, growth rate and density of each infestation and its distance from the back of the action zone. PPA's with a priority index > 2.3 are recommended for some kind of immediate action. In determining the appropriate action to recommend, the DA also evaluates how well each infestation has been delineated with traps (delimit index must be ≥ 1.2). **The success of STS in**

reducing the spread of gypsy moth by more than 60% is based upon the consistent implementation of these scientifically based recommendations across all jurisdictional and administrative boundaries within the action zone (Figure 3).

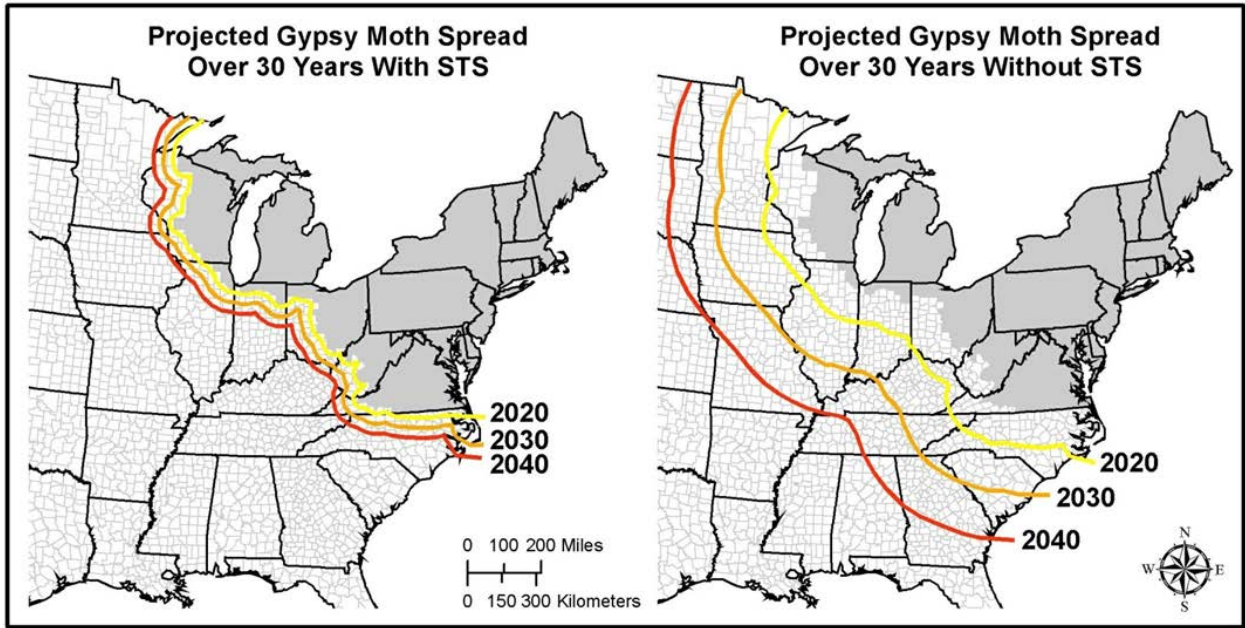


Figure 3. Grey shaded area is infested as of 2012; colored lines indicate areas that will become Infested in the future with and without the STS program

HISTORY OF THE INFESTATION ON THE GARDEN MOUNTAIN QUAD

The analysis performed by the DA takes into account the infestation’s location relative to the back of the action zone along with its growth rate, and degree of isolation when calculating the priority. If the priority is high enough (≥ 2.8) and the infestation is well delineated with traps (delimit index ≥ 1.2) the DA will recommend treatment. If the priority is high but the infestation is not well delineated with traps the DA will recommend more intensive trapping to delineate the extent of the infestation prior to treatment **The higher the priority index the more important it is to take action regardless of the distance to the back of the action zone.**

The current infestation located on the Garden Mountain quad in Bland and Tazewell counties was highlighted by the decision algorithm in 2011 when several adjacent traps caught more than 100 moths each (Figure 4). Although the priority was high at 4.51 the delimit index was only 0.51 in 2011. Therefore the DA recommended that the infestation be delineated with a more intensive grid of traps in 2012. The recommendation was implemented in 2012 when a grid of 52 traps spaced at 1 km was deployed. Results from the 2012 trapping grid delineated a large area with a high priority for treatment (6.61 priority index).

Table 2. Output from the decision algorithm for the Garden Mountain infestation.

| Year | Priority Index | Delimit Index | Action Recommended by Decision Algorithm | Action Implemented (2012) or Proposed (2013) |
|------|----------------|---------------|--|--|
| 2012 | 4.51 | 0.51 | Delimit | Delimit |
| 2013 | 6.61 | 1.84 | Treat | Mating disruption treatment |

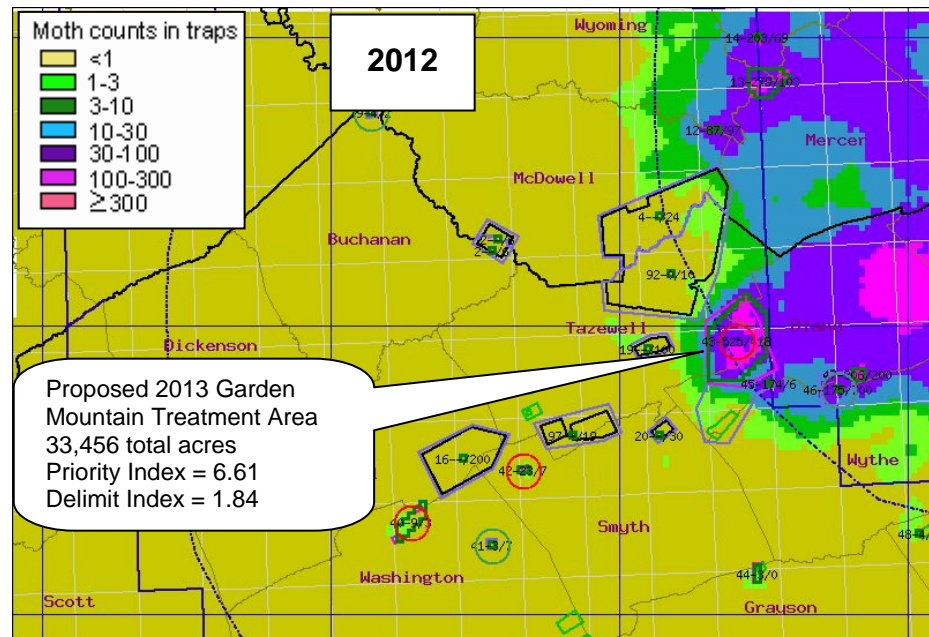
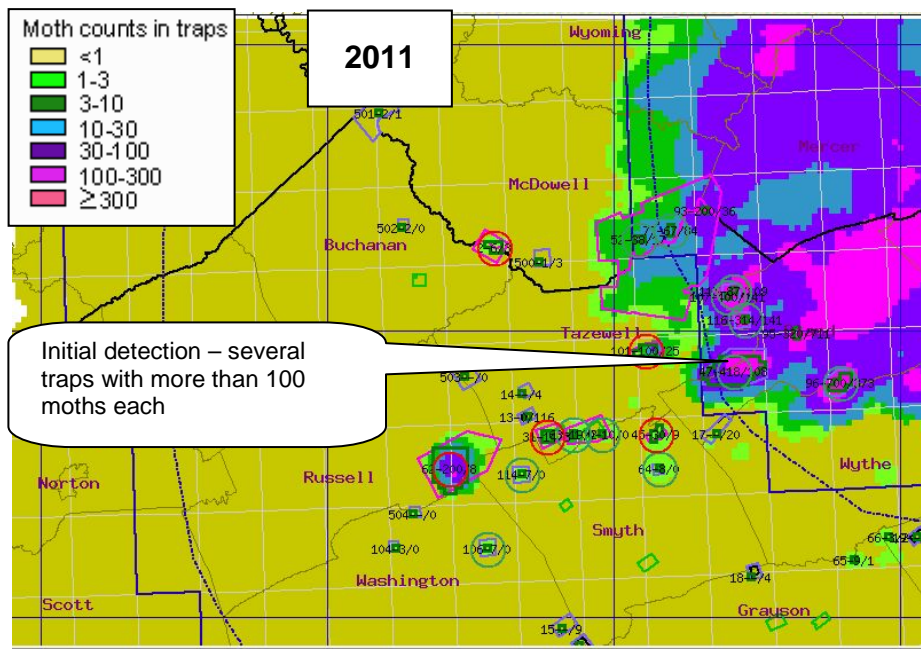


Figure 4. Surface interpolation of moth captures during 2011 and 2012 in the vicinity of the proposed Garden Mountain treatment.

However, the area surrounding the Garden Mountain quad has a long history of infestation and subsequent treatment. In 2000 the area was free of gypsy moth, and was located 90 km ahead of the advancing front of populations (Figure 5). In 2001 a large bubble of positive moth captures appeared just to the east of the area surrounding Garden Mountain. The next year more than 70,000 acres were treated to eliminate the core of the bulge in the line. Although the initial large treatment was successful, there were numerous smaller infestations that remained and had to be cleaned up over the next several years. The clean-up included several treatments in the vicinity of the Garden Mountain quad and one treatment of a portion of the area that became Garden Mountain Wilderness in 2009, with the gypsy moth specific mating disruption in 2008.

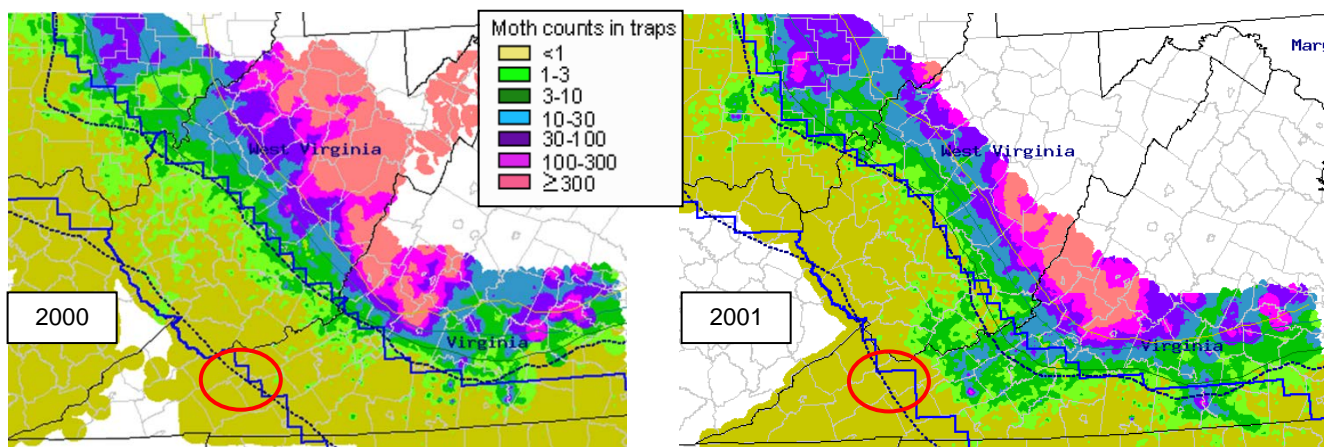


Figure 5. Surface interpolation of moth captures in 2000 and 2001; red circle indicates the area of interest surrounding the Garden Mountain quad.

The end result by 2011 was the leading edge of gypsy moth populations had advanced by 70 km down the ridges of excellent host type along the border of Virginia and West Virginia— a much higher rate of spread than desired, which is evident in the bulge in the line (Figure 6). But the scattered isolated colonies that bubbled out of the spread down these ridges had been controlled. In 2011, with most of the scattered isolated infestations ahead of the bulge cleaned up, the project's focus could return to the dealing with hot spots at the leading edge of the bulge.

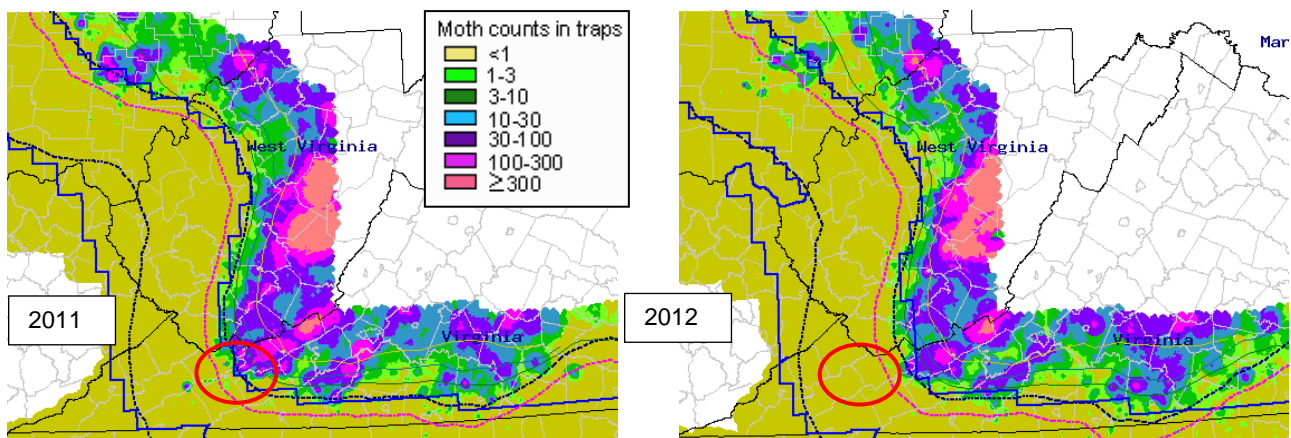


Figure 6. Surface interpolation of moth captures in 2011 and 2012; red circles indicate the area of interest surrounding the Garden Mountain quad

In 2012, 96,000 acres on the border of West Virginia and Virginia were treated at the tip of the bulge as well as several scattered populations just to the west of the bulge. The successful control of these populations means that areas further back into the bulge are popping up as high priorities for treatment 2013. Figure 7 illustrates the relative locations of the 2012 treatments and the 2013 Garden Mountain proposed treatment area whereas Figure 8 shows the 2013 moth captures and 2012 and 2013 treatment blocks.

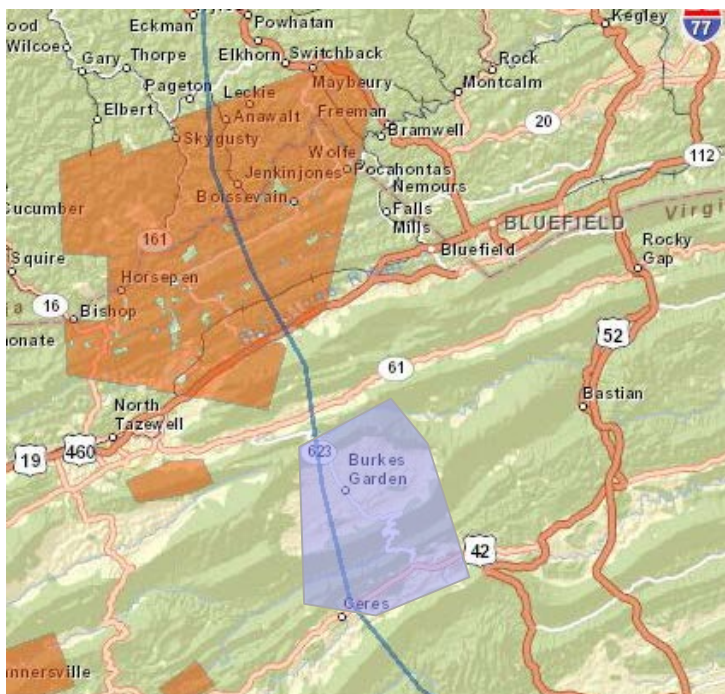


Figure 7. Relative locations of the 2012 and 2013 treatment blocks; 2012 treatments are shaded orange and the 2013 proposed Garden Mountain treatment block is shaded blue.

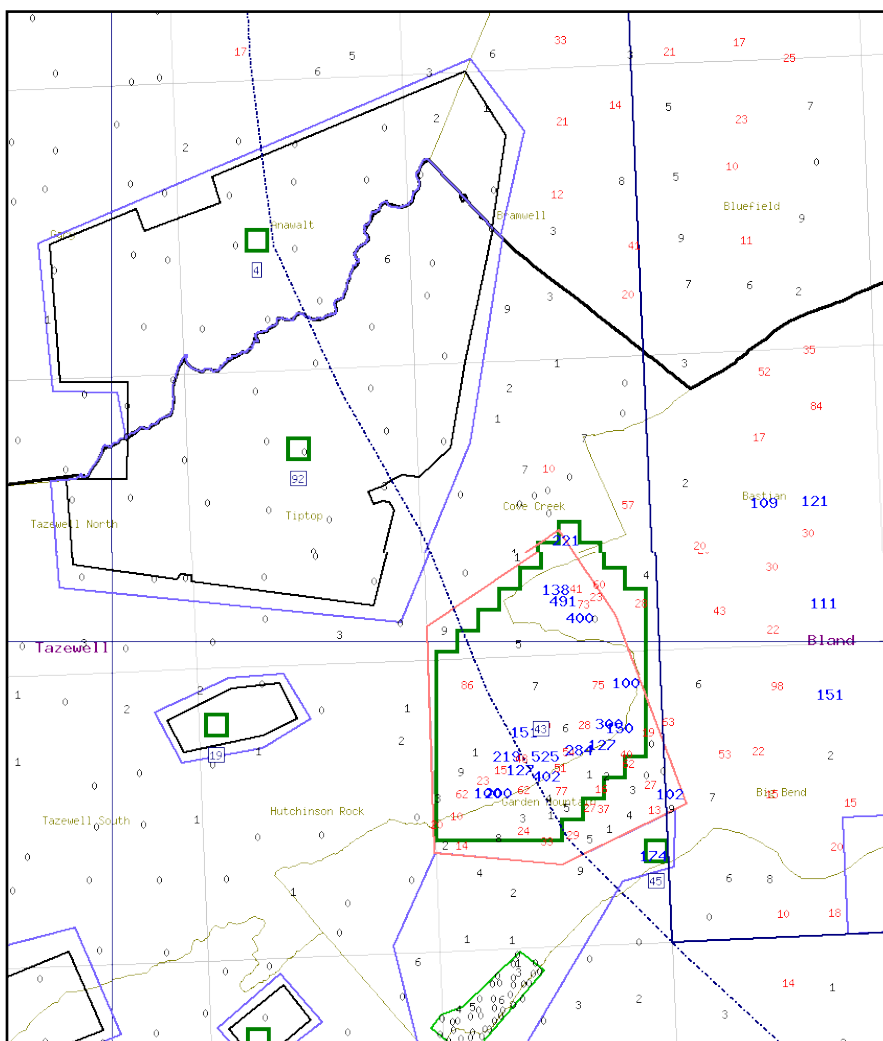


Figure 8. Moth captures in the area surrounding the 2013 proposed Garden Mountain block (red outline). 2013 proposed treatments are shown with red outlines and previous year treatments are shown with black outlines. The areas outlined in blue will be more intensively trapped in 2013

In 2012, the DA identified 500 potential problem areas across the 10-state program area where the moth catch data indicated there might be an infestation requiring action in 2013. DA recommendations for the 500 sites are:

- Do nothing on 265 sites because the priority index was less than 2.3
- More intensive trapping on 180 sites because the infestation was not well delineated with traps
- Treatment on 55 sites because each site was well delineated with traps (delimit index >1.2) and priority indices were above 2.8 (Figure 9). The Garden Mountain site ranks 9th from the top in terms of its priority for treatment

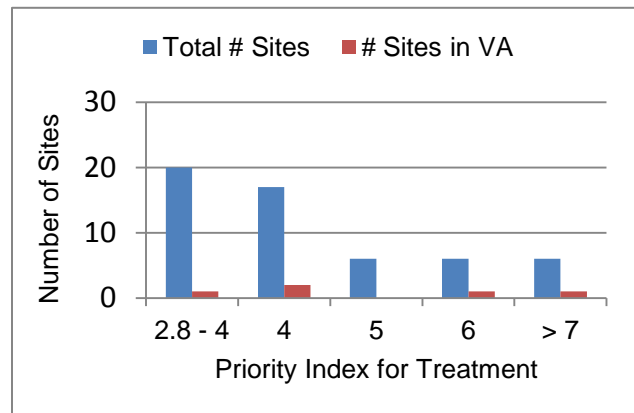


Figure 9. 2013 STS treatment sites by priority

TREATMENT IN WILDERNESS

Wilderness is an undeveloped area of federal land where the earth and its community of life are untrammelled by man, and which are protected and managed to preserve their natural conditions. One major objective is to maintain wilderness in such a manner that ecosystems are unaffected by human manipulation and influences. (FSM 2320.2)

The Regional Forester may approve insect and disease control projects in wilderness when the following conditions exist:

1. ***When there is an immediate threat of unacceptable damage to resources outside the wilderness boundary or of unnatural loss of the wilderness resource due to exotic pests.***
2. ***When the threat cannot reasonably be abated by control actions taken outside the wilderness boundary.*** (FSM 2324.04b)

Currently there are 9 Wildernesses that fall within the STS action zone and 78 Wildernesses in the Eastern US ahead of the STS action zone (Figure 10). At projected rates of spread under STS management, the action zone will move to include an additional 8 Wildernesses in the next 10 years, 8 additional Wildernesses by year 20, and by year 50 the STS area will have included a cumulative total of 40 Wildernesses.

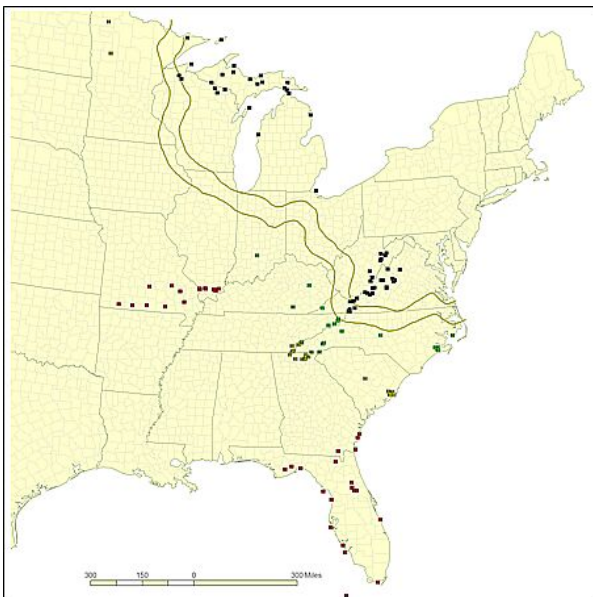


Figure 10. Location of the STS action area relative to designated Wildernesses.

With no management in Wilderness, spread rates will increase. Using a different policy to measure the importance of treatment that falls within a Wilderness than for other areas in STS negates all of the science

behind this extremely effective program. Ultimately it would reduce the effectiveness of the program, especially in the South. The biggest risk in the immediate future is spread down the southern Appalachians, which includes a chain of Wildernesses into and through western North Carolina and eastern Tennessee. Decisions regarding treatment in Wilderness as part of STS are complicated because a) the area is likely to become infested in the near future anyway and b) the benefits of STS do not accrue in the area where treatments are conducted; instead they accrue to the south and west of the project area. The risk of not treating the proposed Garden Mountain block, including the 6,216 acres of Garden Mountain and Hunting Camp Creek Wildernesses, is not damage to the Wilderness itself but an increase in the rate of spread into uninfested areas in the states of North Carolina and Tennessee.

Given the almost certain accelerated expansion of gypsy moth infestations that are expected to result in the absence of treatment, the Garden Mountain block that is proposed for treatment in 2013 meets the first criteria for Regional Forester approval. The remainder of this document presents information that is needed to make the determination if the proposed treatment meets the 2nd criteria that the threat cannot reasonably be abated by control actions taken outside Wilderness boundaries.

LESSONS LEARNED IN KIMBERLING CREEK WILDERNESS

A review of gypsy moth population dynamics and Wilderness considerations in Kimberling Creek Wilderness from 2001 to 2007 illustrates the adverse impacts that have occurred when infestation in a Wilderness is avoided in favor of treating just outside of the Wilderness. Based on past experience with an infestation in Kimberling Creek Wilderness, it is highly unlikely that control actions taken outside of the Garden Mountain and Hunting Camp Creek Wildernesses would also suppress the population within the Wildernesses. Although the highest moth captures associated with the Garden Mountain block were recovered from traps on non-wilderness lands, there are numerous traps located within the Wildernesses that caught more than 20 moths each. If left untreated, this population would persist through time and continue to contribute to accelerated spread.

Through 2001: The infestation in the vicinity of Kimberling Creek Wilderness on the Rocky Gap quad in Bland County, Virginia has a history going back to 2001. In 2001 an area of positive moth captures appeared across a large area in Virginia and West Virginia but centered on Wythe and Bland counties, with many of the traps yielding more than 10 moths. This large “bulge” in positive captures presented a major threat; if left untreated gypsy moth spread would have reached 30 km or more in just one year. As a result of these captures, the DA recommended intensive trapping be conducted on a large area surrounding Kimberling Creek Wilderness in 2002. The DA also recommended treatment of two areas in 2002 associated with the large area of positive moth captures; one located to the south in Wythe County and one located to the north on the border of Bland and Giles counties. As a result of these recommendations, 80,000 acres in Wythe County and 4600 acres on the border of Bland and Giles counties were treated in 2002 using mating disruption and a more intensive grid of traps was deployed in the large area between the treatments, encompassing the Wilderness.

2002: In 2002, the overall level of moth captures in Wythe and Bland counties had decreased because of the aggressive treatment strategy; however many smaller pockets of infestation remained including an infestation on and surrounding Kimberling Creek Wilderness. The DA recommended a 42,000 acre treatment block that encompassed the entire Wilderness and adjacent areas to the north and south. Instead of following this recommendation to treat 42,000 acres encompassing the Wilderness, it was decided to attempt to abate the threat by taking control actions only outside of the Wilderness – two blocks (each about 8,000 acres) were treated using mating disruption, both blocks located north of the Wilderness. An intensive trapping grid was deployed in and south of the Wilderness to continue monitoring the population that was not treated.

2003: The 2003 moth captures north of the Wilderness declined due to the treatments. Moth captures persisted within the area that was recommended for treatment in 2002 but not treated, that is within portions of the Wilderness and to the south of the Wilderness. The DA identified a PPA requiring treatment that extended into the western corner of the Wilderness. In a continuing effort to avoid treatment in the Wilderness, the mating disruption treatment that was conducted in 2004 to address this PPA excluded the Wilderness, and yet another intensive grid was deployed within the Wilderness to continue monitoring the remaining population.

2004: The 2004 moth captures re-surged within and near the untreated Wilderness, to the north of the Wilderness in the untreated area between the two 2004 treatment blocks, and in a previously untreated area to the west of the Wilderness. The DA identified several PPAs that required treatment, one of which was located in

the Wilderness. Obviously the effort to abate the problem by treating around but not in the Wilderness had not been effective. A decision was made to treat two blocks in the Wilderness in 2005 using mating disruption to address this PPA.

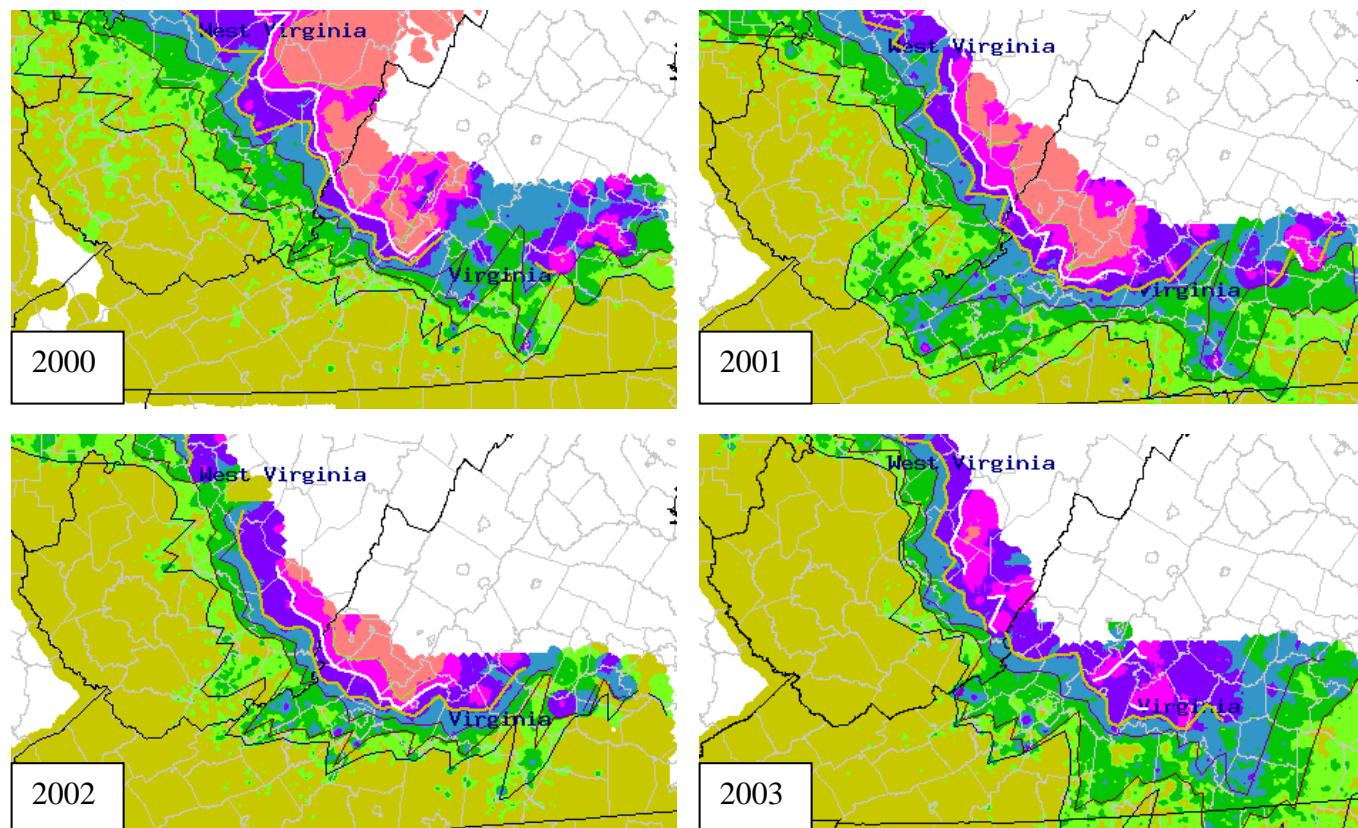
2005: In 2005, positive moth captures were recorded along the northern border of the Wilderness. The DA identified a PPA associated with these catches but recommended intensive trapping rather than treatment because the infestation was not well delineated.

2006: In 2006 the delimiting grid of traps deployed in and around the Wilderness yielded numerous positive traps with several traps catching more than 100 moths. The DA identified a high priority PPA associated with these captures.

The Decision to treat this PPA incorporated 3 treatment blocks:

1. Rocky Gap block: a small Btk block to the north of the Wilderness to address the 258 capture,
2. Rocky Gap MD: a 6562 acre mating disruption block that covers most of the positive captures in and around the Wilderness. This block includes 3037 acres of the Wilderness,
3. Rocky Gap Core block: a 1376 acre Btk block that includes 864 acres in the northern portion of the Wilderness to address the trap sites where more than 100 moths per trap were recorded. This entire block is located within the Rocky Gap MD block so the actual treatment will be Btk in the spring followed by a mating disruption treatment in the summer.

Mating disruption could not be used to treat the entire PPA because the gypsy moth population density had increased beyond the threshold where mating disruption can be expected to be effective.



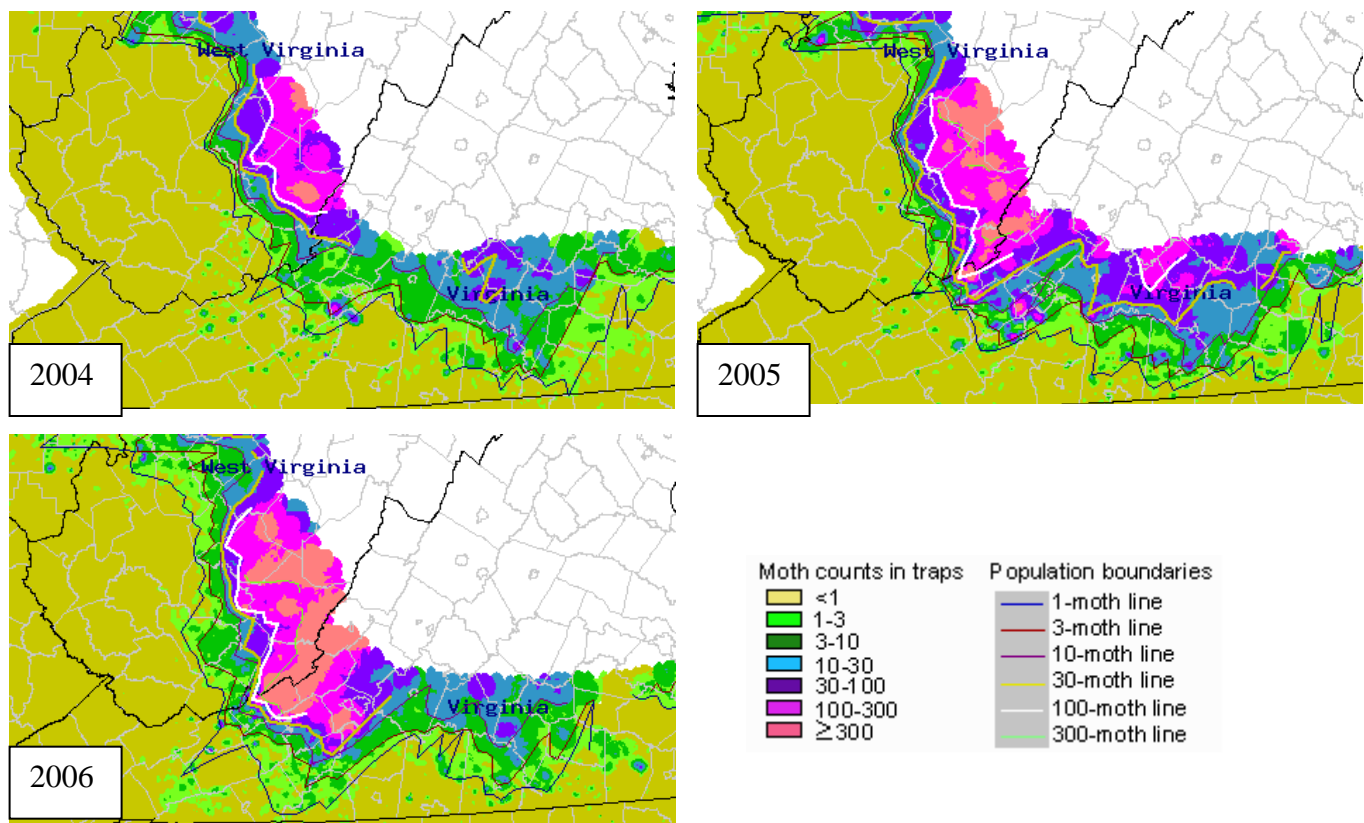


Figure 11. History of gypsy moth trap catches in the Kimberling Creek area 2001 through 2006.

Discussion: The multi-county bulge in moth captures centered on Wythe and Bland counties in 2001 represented a major threat to the success of STS in the southern US. The strategy used to address this was to chip away at the heavier pockets of infestation as recommended by the DA rather than treating the entire bulge which totaled several million acres. And this strategy paid big dividends in the long run (see the 2000 through 2006 maps above).

However, the initial strategy to manage the infestation in the area around Kimberling Creek Wilderness without treating the Wilderness itself was not as successful. The decision to leave the Wilderness untreated in 2003 and 2004 despite the DA recommendations to the contrary allowed the populations within the Wilderness to persist and grow. The piecemeal approach using a patchwork of mating disruption blocks around the edges of the Wilderness rather than addressing the entire infestation as recommended by the DA in 2002 backfired in the end. The pheromone from a mating disruption treatment drifts outside the actual treatment block on air currents. Pheromone is heavier than air, so the drifting may be especially pronounced when the top of a ridge is treated and the ridge face(s) are not treated. This was the case in 2003 when a mating disruption block adjoined but did not overlap the northern edge of the Wilderness on a ridgeline. The pheromone that drifted down the south face of the ridge into the Wilderness was enough to interfere with male's ability to locate the traps, which suppressed the trap captures in 2003 and possibly even into 2004, but not enough to provide control. So the infestation persisted and increased in density but this increase in density was not reflected in the trap captures until 2006. The low level of the trap captures led us to use mating disruption when the Wilderness was finally treated in 2005. The 2005 mating disruption treatments were poorly targeted because the trap captures preceding the treatment did not accurately reflect the extent of the infestation. By 2006, the pheromone had cleared and the traps are reflecting a dense population where Btk will be required for control.

With the benefit of hindsight, it appears that treating the entire Wilderness in 2003 when the DA first recommended treatment may have provided a better outcome. At that point, prior to a mating disruption treatment adjoining the Wilderness, the trap captures in the Wilderness were accurately reflecting a very low population density and the gypsy moth specific mating disruption treatment in the Wilderness would most likely have been effective. However, the efforts to control the infestation without treating the Wilderness not only failed, they allowed the population to increase to the point where Btk was required for effective control.

Perhaps the lesson to be learned is this: In a situation where treatment of a Wilderness is under consideration, it is preferable to use specific tactics if they are available and will work. Treating early when the populations are still at very low levels (i.e. when initially recommended by the DA) often allows the effective use of a gypsy moth specific tactic such as mating disruption. Delaying treatment in an attempt to abate the problem by treating only outside of the Wilderness may allow the population to increase to the point where other treatment tactics such as Btk must be used for control. Further, use of mating disruption outside of but adjoining a Wilderness may result in suppressed trap captures in the Wilderness in the year(s) following treatment and allow an undetected population to persist and grow.

GARDEN MOUNTAIN WILDERNESS AND HUNTING CAMP CREEK WILDERNESS

There are similarities to the Kimberling Creek Wilderness situation currently in the Garden Mountain area. A review of the history of gypsy moth infestations in the Garden Mountain area presented earlier in this document and figures 5 through 8 highlight these similarities. A bulge in gypsy moth populations in the advancing front is currently evident (Figure 6) similar to that witnessed in the Kimberling Creek area in 2002 and 2003 (Figure 11). Areas of high trap catches were successfully treated outside of the Garden Mountain Wilderness and Hunting Camp Creek Wilderness in 2012 (Figure 7 and 8) similar to treatments just north of Kimberling Creek Wilderness in 2002. The DA is now recommending MD treatment in and adjacent to both Garden Mountain Wilderness and Hunting Camp Creek Wilderness, just as it did in the Kimberling Creek Wilderness in 2003. In the Kimberling Creek situation, a decision was made to avoid treating Wilderness in an attempt to manage the expanding gypsy moth population outside of the Wilderness. The attempt failed, ultimately resulting in the need for both MD and Btk treatment in Kimberling Creek Wilderness in 2007. The history in Kimberling Creek demonstrates the need to treat the expanding populations in the Wilderness and the potential pitfalls of attempts to treat on the edges of Wilderness.

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