

**ENVIRONMENTAL ASSESSMENT
FOR
GYPSY MOTH TREATMENT
RIDGE DISTRICT**

**Bedford, Botetourt, Floyd, Franklin, and Rockbridge Counties,
Virginia
Blue Ridge Parkway**



March 31, 2003

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PURPOSE AND NEED

The purpose of this document is to evaluate the direct, secondary, and cumulative environmental consequences of suppressing gypsy moth caterpillars, a non-native pest, in identified areas with potential for severe defoliation along the Blue Ridge Parkway.

Specific objectives for this proposed action include:

- Protect special value areas from excessive defoliation and tree mortality that would permanently change the character of the scene or detract significantly from visitor use and/or enjoyment of the area.
- Reduce risks to visitor safety by preventing and/or reducing the number of hazard trees.
- Reduce loss of sensitive plant and animal species and natural communities by tailoring intervention measures to specific needs of the site.
- To minimize spread of the gypsy moth beyond the “Slow-the-Spread” (STS) boundaries in Virginia.
- Ensure that a program of integrated pest management is implemented in concurrence with National Park Service policies and in cooperation with other federal and state agencies and landowners adjacent to the Park.

National Park Service (NPS) guidelines for compliance with the National Historic Preservation Act (NHPA) and National Environmental Policy Act (NEPA) require an analysis of potential impacts of the proposed activities on historic resources and the human environment.

BACKGROUND

The gypsy moth is a European insect accidentally released in eastern Massachusetts in late 1869. The gypsy moth caterpillar alters ecosystems and disrupts people’s lives when they reach outbreak proportions. The feeding caterpillar defoliates trees, shrubs, and other plants. Heavy defoliation weakens trees and increases their vulnerability to other insects and diseases that may kill them. Defoliation and subsequent tree mortality alter wildlife habitat, change water quality, and reduce aesthetic, recreation, and property values of woodlands and forests. Some people experience short-term skin, eye, and respiratory irritations during gypsy moth outbreaks caused by allergic reactions. Masses of caterpillars and frass (fecal excrement) during outbreaks are, at a minimum, unpleasant and can be quite disturbing to some people.

The Blue Ridge Parkway is known for its scenic vistas and natural areas that can be viewed from the roadway, overlooks, and numerous picnic and camping areas along the parkway drive. The defoliation and subsequent mortality of roadside trees by gypsy moth larvae result in hazard trees that must be removed. Action is needed to suppress this non-native pest in identified areas with potential for severe defoliation. Suppression prevents or minimizes heavy defoliation of trees by reducing outbreak populations of the gypsy moth in areas where the insect is already established. The gypsy moth is a regulated pest and the United States Department of Agriculture (USDA) Animal and Plant Health Inspection Service, the USDA Forest Service (USFS), and the Departments of Agriculture for the 50 states monitor the spread of this insect.

Since the gypsy moth was accidentally introduced, it has steadily expanded its range west and southward and is now established in about one-third of the potentially susceptible habitat in the United States (U.S.). The Gypsy Moth Slow-the-Spread (STS) pilot project (1993-1999) demonstrated that the rate of spread of the gypsy moth could be reduced by approximately 60% through comprehensive monitoring and management of recently established populations in the transition area. The benefits of reducing the rate of spread of gypsy moth exceed the costs by a factor of more than three to one.

SCOPING HISTORY

In November 2002, the Blue Ridge Parkway Superintendent mailed a scoping notice announcing the project proposal and inviting review comments. This letter was sent to over 26 individuals and organizations on the park's planning mailing list, and was posted on the park's website. A news statement was released at that time for the media, as well as staff within the Park, that announced the project proposal, notified interested parties where more information could be obtained, and invited their review comments. The comment period closed on December 15, 2002.

Through scoping and the public comment review process on the *Gypsy Moth Treatment Environmental Assessment*, the planning process is being conducted in consultation with affected federal agencies, state and local governments, tribal groups, and interested organizations and individuals.

As a result of the scoping effort, three responses were elicited, all of which supported the proposed project (Appendix 2). All comments received in response to the scoping notices have been duly considered and will remain in the project record throughout this planning process. In consideration of these comments throughout the scoping and planning process, careful review of potential resource and visitor impacts, and developing appropriate mitigation to protect resources, the preferred alternative best strikes a balance between the widest range of use and enjoyment of the Blue Ridge Parkway without degradation of the environment or risk of health or safety.

ISSUES AND IMPACT TOPICS

The environmental analysis was prepared in accordance with the regulations of the Council on Environmental Policy Act (CEQ) (40 CFR 1500 et seq.) and in part 516 of the U.S. Department of the Interior's Departmental Manual (516 DM). The National Environmental Policy Act (NEPA) is the basic national charter for environmental protection; among other actions it calls for an examination of the impacts on the components of affected ecosystems. The Parkway Strategic Plan, 2001 NPS Management Policies, DO-12 (Conservation Planning, Environmental Impact Analysis, and Decision-making), DO-28 (Cultural Resources Management), and NPS-77 (Natural Resources Management), among other NPS and park policies, provides general direction for the protection of the natural abundance and diversity of the park's naturally occurring communities.

Issues and concerns affecting this proposal were identified during discussions with groups and individuals. The major resource issues are natural resource issues including impacts to vegetation, impacts to threatened and endangered plant and animals species, neo-tropical birds, vegetation, water quality, air quality, aquatic fauna, recreational resources, cultural (historic and archeological) resources, socioeconomic values, and environmental justice.

IMPACT TOPICS INCLUDED IN THIS DOCUMENT

Vegetation

Proposed activities have the potential to impact vegetation resources due to defoliation of gypsy moth insect. Therefore, this topic will be briefly analyzed in this document.

Invertebrate Fauna

The proposed activities have the potential to impact invertebrate species, therefore, this topic will be briefly analyzed in this document.

Threatened and Endangered Species

Endangered Species Act of 1973, as amended (16 USC 1531 et seq.). Section 7 of the Endangered Species Act requires all federal agencies to consult with the U.S. Fish and Wildlife Service to ensure that any action authorized, funded, or carried out by the agency does not jeopardize the continued existence of listed species or critical habitats. In a letter dated November 19, 2002, the USFWS provided a list of species for the counties within which the project areas occur. The USFWS has stated that the project, as proposed, is not likely to adversely affect Federally listed, proposed or candidate species, and further states that no designated or proposed critical habitat occurs within the project areas (see Appendix 2).

Also, *NPS Management Policies 2001* requires the National Park Service, to the greatest extent possible, to manage state and locally listed species in a manner similar to that of federally listed species. There are several rare state species that are known to occupy sensitive habitats located on or near areas proposed for gypsy moth treatment. The potential impacts to protected species will be analyzed in this document.

Neo-tropical Birds

A recent Executive Order (E.O. 13186, January 2001) directs each Federal agency taking actions having or likely to have a negative impact on migratory bird populations to work with the U.S. Fish and Wildlife Service to develop an agreement to conserve those birds. The protocols developed by this consultation are intended to guide future agency regulatory actions and policy decisions; renewal of permits, contracts or other agreements; and the creation of or revisions to land management plans. In addition to avoiding or minimizing impacts to migratory bird populations, agencies are expected to take reasonable steps that include restoring and enhancing habitat, preventing or abating pollution affecting birds, and incorporating migratory bird conservation into agency planning processes whenever possible. Gypsy moth suppression

activities can both enhance and adversely impact neo-tropical birds, therefore, it will be analyzed in this document.

Water Quality

Alternatives presented and analyzed in this document could affect waters within the park; therefore, water quality will be addressed as an impact topic in this document.

Recreational Resources

The proposed activity has the potential to impact 18 parking overlooks and 17 trails. The proposed project will include the area of a highly visited lodge and concession facility, two campgrounds, three picnic areas, and two Blue Ridge Parkway offices. Therefore, this topic will be analyzed in this document.

Visual Resources

The legislative mandate and history of the Blue Ridge Parkway is to provide a connecting scenic parkway linking Shenandoah National Park and the Great Smoky Mountains National Park, by way of a recreational-oriented motor road intended for public use and enjoyment. The proposed project area includes 18 parking overlooks, therefore, this topic will be analyzed in this document.

IMPACT TOPICS DISMISSED FROM FURTHER ANALYSIS

Air Quality

Clean Air Act, as amended (42 USC 7401 et seq.). Section 118 of the Clean Air Act requires all federal facilities to comply with existing federal, state, and local air pollution control laws and regulations.

The proposed alternative would present no significant deterioration of ambient air. Visitors may smell aircraft exhaust, but only if they were fairly close to the aircraft. Local air quality may be temporarily degraded by Bt treatments, which have a mild odor. This degradation would last approximately 2-6 hours depending on weather conditions and neither overall park air quality nor regional air quality would be affected. For these reasons, air quality was dismissed as an impact topic.

Noise

The Noise Control Act of 1972, as amended, sets standards and procedures for limiting noise that jeopardizes Americans' health and welfare. Impacts to noise levels would be very temporary (generally a 20 acre spray block can be sprayed in less than 15 minutes, depending on the shape of the spray block). Visitors would not be allowed within spray blocks when spraying is occurring. Helispots (helicopter landing and take off area) are usually located within the park and are also closed during operations to the public, but helicopters will need to go to a helispot

numerous times during an operation to refuel and take on more chemical product. When fixed-wing aircraft are used (as in pheromone flake treatments), local airports are used for service areas. When using Bt, spraying usually begins early (6 AM) in the morning when weather conditions are ideal and can last until nightfall. Visitor disruption would be minor. For these reasons, noise was dismissed as an impact topic.

Soils

The proposed activities do not have the potential to impact soil resources therefore, this issue will not be addressed in this document.

Prime and Unique Farmlands

Proposed activities do not have the potential to impact prime and unique farmlands, therefore, this issue will not be addressed in this document.

Wetlands

The purpose of Executive Order 11990, Protection of Wetlands (42 Fed. Reg. 26961), is to take action and provide leadership to minimize destruction, degradation or loss of wetlands, to avoid direct or indirect construction or support of construction in wetlands, and to enhance and preserve the natural values of wetlands (DO-77, 1998). Proposed activities do not have the potential to impact wetlands, therefore, this issue will not be addressed in this document.

Cultural Resources

The NPS is mandated to preserve and protect its cultural resources through the Organic Act of August 25, 1916, and through specific legislation such as the Antiquities Act of 1906, the National Environmental Policy Act of 1969 (as amended), and the National Historic Preservation Act of 1966, NPS Management Policies, the Cultural Resource Management Guideline (DO-28), and the Advisory Council on Historic Preservation's implementing regulations regarding "Protection of Historic Properties" (36 CFR 800). Other relevant policy directives and legislation are detailed in DO-28.

Section 106 of the National Historic Preservation Act of 1966 requires that federal agencies having direct or indirect jurisdiction over undertakings consider the effect of those undertakings on properties on or eligible for listing on the National Register of Historic Places and afford the Advisory Council on Historic Preservation and the state historic preservation office an opportunity to comment. The park has determined that there would be no ground disturbing activities involved with the proposed project, no alteration of any historic structures, nor any change in the use of historic resources, therefore, it has been determined that there will be no effect and that the proposed project is in compliance with Section 106 of the National Historic Preservation Act (see Appendix 2).

The Blue Ridge Parkway has and will continue to consult with affiliated American Indian tribes to develop and accomplish its programs in a way that respects the beliefs, traditions, and other cultural values of the American Indian tribes who have ancestral ties to the lands encompassed by the park. The necessity for consultations with American Indians arises from the historic and current government-to-government relationship of the federal government with the American Indian tribes, particularly those that are federally recognized (*Federal Register* 1995 9250-9255), as well as from the related federal trust responsibility to conserve tribal resources. Consultations with American Indians are also required for compliance with a variety of laws and other legal entities, such as presidential executive orders, proclamations, and memoranda; federal regulations; and agency management policies and directives. Examples are the Indian Self-Determination and Education Assistance Act (1975); The American Indian Religious Freedom Act (1978 and as amended in 1994); the Native American Graves Protection and Repatriation Act (1990); National Historic Preservation Act (as amended in 1992); the Presidential Memorandum of April 29, 1994, entitled “Government-to-Government Relations With Native American Tribal Governments; and Executive Order 13007 of May 24, 1996, entitled “Indian Sacred Sites.”

The 1992 amendments to the National Historic Preservation Act and the Archeological Resources Protection Act provide means whereby information about the character, location, or ownership of archeological sites, historic properties, and ethnographic sites, including traditional and cultural sites, might be withheld from public disclosure. This provision is especially important in cases where disclosure could risk harm to the resource or impede the use of a traditional site by practitioners.

It is proposed in this project to spray certain infested areas of the Parkway with one component or a combination of Btk, Gypchek, or pheromone flakes. All three of these spray compounds have been proven conclusively to have no effect on any historic buildings, any sub-surface archeological resources or any Parkway structures, such as stone-faced bridges, that are potentially contributing resources to any historic district designated in the future. Since the elements of the gypsy moth treatment project will not affect Parkway cultural resources, there would be no ground disturbing activities involved with the proposed project, no alteration of any historic structures, nor any change in the use of historic resources, cultural resources were dismissed as an impact topic.

Socioeconomic Values

The local economy and most business of the communities surrounding the park are based on construction, recreation, transportation, tourist sales, services, and light industry; the regional economy is strongly influenced by tourist activity. There may be short-term affects to the local and regional economy resulting from loss of expenditures from park visitors during times of proposed activities. Treatment of developed recreation areas or dispersed areas of high concentrated use would be scheduled during low-use periods, therefore local and regional businesses would not be appreciably affected in the long-term. Therefore, socioeconomic values were dismissed as an impact topic in this document.

Environmental Justice

No alternative would have health or environmental effects on minorities or low-income populations or communities as defined in the Environmental Protection Agency's Draft Environmental Justice Guidance (July 1996). Environmental Justice was dismissed as an impact topic in this document.

RELATIONSHIP TO OTHER DECISIONS AND LAWS

Agencies are encouraged to tier their environmental documents to eliminate repetitive discussions of the same issues and to focus on the actual issues ripe for decision at each level of the environmental review (CEQ, 1986. Part 1502, Sec. 20).

This EA is tiered to the USDA 1995 Final Environmental Impact Statement (GM-FEIS) entitled *Gypsy Moth Management in the United States: a Cooperative Approach*. Alternatives considered in the GM-FEIS ranged from using no strategy to using one or more strategies to reduce damage caused by outbreaks where gypsy moth is established (**suppression**), eliminate isolated infestations that are newly detected (**eradication**), and slow the insect's rate of spread from the area where it is established (**slow the spread**). The environmental effects and human health risks associated with each alternative are presented. The Record of Decision that accompanied the GM-FEIS selected Alternative 6 under which the USDA would fully pursue its goal of reducing adverse effects of the gypsy moth anywhere in the United States. A full range of strategies is available under Alternative 6, with site-specific environmental analysis of individual project proposals to determine whether they are environmentally acceptable, biologically sound, and economically feasible (USDA, 1995).

This EA is also tiered to, and consistent with, the Blue Ridge Parkway's 1992 *Gypsy Moth Integrated Pest Management Plan*. This plan provides guidance and information on the biology of the species, management objectives, and threshold levels for various types of management actions.

This Environmental Assessment has been prepared to comply with the National Environmental Policy Act of 1969 (P.L. 91190, 42 USC 4321 *et. seq*). This law requires detailed environmental analysis of a proposed Federal action that may affect the quality of the human environment.

The selection of potential insecticides used for the control of the gypsy moth is regulated under the Federal Insecticide, Fungicide and Rodenticide Act of 1947 (7 U.S.C. 136), as amended.

ALTERNATIVES

This section describes the five alternatives that are analyzed in this environmental assessment. The five alternatives are 1) no action, 2) treat areas with Btk only, 3) treat areas with Gypcheck only, 4) treat areas with pheromone flake only, and 5) combine alternatives 2, 3, and 4 (the preferred alternative).

areas considered for treatment in each of the alternatives were carefully selected based on 1) egg mass density, and 2) values at risk. In all alternatives, surveys and monitoring of gypsy moth populations will continue.

ALTERNATIVE 1 - NO ACTION

Alternative 1, the No Action Alternative, represents conditions and management practices as they currently exist on Blue Ridge Parkway lands. It provides the basis of comparison for the action alternative. Under the No Action Alternative, gypsy moth populations will follow their natural course in all of the identified areas and defoliation of vegetation would continue to occur. Naturally occurring predators and parasitoids of the gypsy moths, while numerous and abundant, are not capable of preventing outbreaks. Epidemics of disease may reduce gypsy moth numbers and may lead to a population crash or collapse. Tree defoliation will continue and will likely be severe where populations are greater than 1,000 egg masses per acre. Tree mortality occurs after 2-3 consecutive years of defoliation. In areas where new outbreaks have occurred the overall spread of the gypsy moth south and westward will increase.

ALTERNATIVE 2 – TREAT AREAS WITH BTK ONLY

Under Alternative 2, all identified areas with egg mass densities approaching or exceeding 250 per acre would be treated with one or two aerial applications of *Bacillus thuringiensis* var. *kurstaki* (Btk) at 24 billion international units/acre (BIUs). 24 BIUs equals one-half gallon of undiluted product per acre. The applications would begin when the leaves of oak (*Quercus*) trees have expanded to approximately 20-35% of their normal size and the first and second instar caterpillars are present and feeding. The specific time would depend on weather conditions, but the operation would probably begin in early May. The second application, if needed, would occur 5-7 days later when oak leaves have expanded to approximately 40-50% of their normal size. This treatment is necessary on an annual basis until gypsy moth populations are below 250 egg masses per acre. Evaluation of treatment success is determined by fall egg mass surveys; also conducted annually. While treatment may be successful in a given year, the likelihood of reinfestation from untreated areas is high due the relatively narrow treatment area being proposed.

ALTERNATIVE 3 – TREAT AREAS WITH GYPCHECK® ONLY

Alternative 3 treats all identified areas with egg mass densities approaching or exceeding 250 per acre with two applications of nucleopolyhedrosis virus (NPV) (manufactured as Gypchek®). NPV is a natural disease of gypsy moth larvae. This treatment is necessary on an annual basis until gypsy moth populations are below 250 egg masses per acre. Evaluation of treatment success is determined by fall egg mass surveys; also conducted annually. While treatment may be successful in a given year, the likelihood of reinfestation from untreated areas is high due the relatively narrow treatment area being proposed.

ALTERNATIVE 4 – TREAT AREAS WITH PHEROMONE FLAKE ONLY

Under Alternative 4, a pheromone mating disrupter called Disparlure™ would be used to treat areas where gypsy moth populations are relatively small and located on the leading front of the overall population. The pheromone is injected between thin sheets of plastic, then chopped into small pieces (1/32 x 3/32 inches) and scattered over the forest canopy using an airplane. The plastic flakes 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 find the females. This process is called mating disruption and is effective at controlling low-level infestations. The pheromone used is specific to the gypsy moth and is applied at a rate of 6 grams active ingredient per acre. The time of application is early to mid-June when gypsy moth mating begins. This success of this treatment will be evaluated by gypsy moth trapping conducted by the Virginia Division of Consumer Protection – Gypsies Moth STS Program. Trapping uses temporary boxes baited with pheromone which attract gypsy moths. Trapping occurs on an annual basis throughout the state of Virginia. This alternative uses a tactic that is only suitable for newly infested areas in isolated areas along the leading edge of the gypsy moth invasion, otherwise known as slow-the-spread.

ALTERNATIVE 5 – PREFERRED ALTERNATIVE: COMBINE ALTERNATIVES 2, 3 AND 4

Under Alternative 5, either *Btk*, Gypchek® or pheromone flakes would be used to treat areas depending upon specific situations. Along the leading edge of the gypsy moth infestation the use of pheromone flakes would be effective at low population densities. When population levels are moderate to large then the use of *Btk* would be more effective. In areas where sensitive natural resources exist the use of gypcheck would have less of an impact than *Btk*. However, gypcheck is not as effective as *Btk* when egg mass densities exceed 1,000 egg masses per acre.

As a result of the analysis documented in this environmental assessment, the proposed treatments are shown in table 1. Treatment blocks are areas that have been identified as having high gypsy moth populations and where protection against hazardous trees is needed. Treatment Blocks A through G are slated for *Btk* because of high egg mass densities and due to the high visitor use in these areas. Treatment Blocks H through J are slated for Disparlure® treatment because they are new, localized gypsy moth outbreaks and are located within the slow-the-spread area. Figures 1 through 11 at the end of this document illustrate the locations of the proposed spray blocks.

Table 1. Proposed treatment blocks for gypsy moth in 2003.

TREATMENT BLOCK	EGG MASSES PER ACRE (block avg)	MANAGEMENT OBJECTIVE(S)	TREATMENT OPTIONS	ISSUES & CONCERNS
Block A (221 acres)	>2,000	Hazard trees (road corridor)	2 applications <i>Btk</i>	Visitor Safety
Block B (30 acres)	>2,000	Hazard trees (roads, trails)	2 applications <i>Btk</i>	Visitor Safety
Block C (388 acres)	>2,000	Hazard trees (road)	2 applications <i>Btk</i>	Visitor Safety
Block D (145 acres)	>2,000	Hazard trees (road)	2 applications <i>Btk</i>	Visitor Safety
Block E (16 acres)	>2,000	Hazard trees (picnic area)	2 applications <i>Btk</i>	Visitor Safety
Block F (20 acres)	>2,000	Hazard trees (road corridor and campground)	2 applications <i>Btk</i>	Visitor Safety
Block G (243 acres)	>2,000	Hazard trees (road corridor)	2 applications <i>Btk</i>	Visitor Safety
Block I (2,027 acres)	NA	Slow-the-Spread	Disparure	
Block J (200 acres)	NA	Slow-the-Spread	Disparlure	

ENVIRONMENTALLY PREFERRED ALTERNATIVE

National Park Service policy requires that an environmentally preferred alternative be identified as the one that best promotes the national environmental policy expressed in the National Environmental Policy Act, section 101(b). This includes alternatives that:

- fulfill the responsibilities of each generation as trustee of the environment for succeeding generations;
- ensure for all Americans safe, healthful, productive, and esthetically and culturally pleasing surroundings;
- attain the widest range of beneficial uses of the environment without degradation, risk of health or safety, or other undesirable and unintended consequences;
- preserve important historic, cultural, and natural aspects of our national heritage and maintain, wherever possible, an environment that supports diversity and variety of individual choice;
- achieve a balance between population and resource use that will permit high standards of living and a wide sharing of life's amenities; and
- enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources.

The environmentally preferred alternative is determined by applying the above criteria, which is guided by the Council on Environmental Quality (CEQ). The CEQ provides direction that “[t]he environmentally preferable alternative is the alternative that will promote the national environmental policy as expressed in NEPA’s Section 101. Generally, this means the alternative that causes the least damage to the biological and physical environment. It also means the alternative that best protects, preserves, and enhances historic, cultural, and natural resources.” (Council on Environmental Quality, “Forty Most Asked Questions Concerning CEQ’s National Environmental Policy Act Regulations” (40 CFR 1500-1508), *Federal Register* Vol. 46, No. 55, 18026-18038, March 23, 1981: Question 6a.

Alternative 5, the Proposed Alternative, is the environmentally preferred alternative because it allows the flexibility to use the appropriate treatment for the given population level, which maximizes the effectiveness of the treatment. Therefore, this alternative will help lessen the effects of the gypsy moth which will ultimately protect park resources.

ALTERNATIVES CONSIDERED AND DISMISSED

ALTERNATIVE A - USE OF DIMILIN® TO CONTROL HIGH POPULATION LEVELS OF GYPSY MOTH

The use of Dimilin® (*diflubenzuron*), while highly effective at providing canopy protection from feeding gypsy moth larvae, has some serious environmental concerns. *Diflubenzuron* is persistent on vegetation throughout the growing season and may remain in leaf litter at least one year after spraying. Dimilin® has a restricted use label for which it specifies “for use only by certified applicators or individuals under their supervision.” Studies have also shown that Dimilin may have adverse effects on several species of insects. Killing takes place at the time of molting; in heavy populations substantial amounts of defoliation may happen before the pest succumbs to treatment.

MITIGATION MEASURES ON THE PREFERRED ALTERNATIVE

Mitigation measures are analyzed as part of the action alternative. The following precautionary or resource mitigation measures will be taken to reduce the impact of the alternatives using aerial application of insecticides.

1. Application of insecticides will comply with all applicable Environmental Protection Agency label restrictions and State and Federal laws. All label warnings and restrictions will be strictly adhered to by the applicator. Application of insecticide will be made when wind speeds are less than ten (10) mph and when temperatures are less than 75°F yet warm enough for the insecticide to flow. Foliage must be dry and no threat of rain should exist within one hour of application. Relative humidity will be at least 45%. Application will be suspended if

thermal inversion conditions, which cause the spray to rise, exist or develop during spraying. These conditions will be monitored by aerial observers in an observation aircraft and/or ground observers within the treatment block. Application heights will range between 50 and 150 feet over tree tops, depending on aircraft and terrain.

2. The spray blocks will be marked by natural geographic features or helium balloons raised thirty feet above the tree canopy. The applicator will conduct a pre-treatment flight of the proposed area to become familiar with boundaries and balloon locations. Aerial photographs or topographic maps will be provided to the spray pilot to assist in identifying area boundaries. The spray pilot will have radio communication with an observer aircraft and the ground crew to assure the proper application of insecticides and to provide for safety. Aircraft guidance and tracking system using Digital Global Positioning System (DGPS) satellites may be used in place of balloons. Aircraft DGPS guidance and navigation systems are extremely accurate and can record flight track and aid the pilot in making precise applications.
3. Insecticides known to have adverse impacts on aquatic ecosystems would not applied within 200 feet of streams or open bodies of water.
4. The public will be notified of the proposed treatment dates and times through local print and electronic media. A notice of intent to apply insecticides or other intervention tactics is posted on signs prior to treatment. Signs are placed along roads and trails at major entry points to the treatment areas. Signs inform visitors of the type of intervention tactic and the time span in which application may occur.
5. Treatment of developed recreation areas such as picnic areas and campgrounds or dispersed areas of high concentrated use are scheduled during low-use periods and the areas may be temporarily closed in order to minimize human exposure to the treatment. Area closure signs are posted in these areas at least 24 hours before treatment begins. Signs provide information on scheduled treatment dates and type of treatment.

AFFECTED ENVIRONMENT

PARKWAY-WIDE OVERVIEW

The Blue Ridge Parkway follows the high crests of the central and southern Appalachians for 469 miles from Shenandoah National Park in Virginia to the Great Smoky Mountains National Park in North Carolina. Its breathtaking scenic beauty, unbridled natural resources, and unique historic sites make it the showpiece rural parkway of the National Park Service. But the Parkway is also notable as a remarkable landscape architecture and engineering achievement. Design of the Parkway began in 1934. More than 50 years in the making, the Parkway was completed in 1987 with the construction of a 7.5-mile section around the rugged and winding terrain of Grandfather Mountain.

The Parkway intersects three mountain provinces (ridge, plateau, and highlands) and extends almost 4 degrees in longitude and 2½ degrees in latitude, the third largest geographic range of any unit in the national park system. Yet, despite this extent, its width averages only 800 feet wide between developed areas.

The Parkway occupies 88,000 acres of lands within the socio-political boundaries of two states, six congressional districts, 12 counties in Virginia, 17 counties in North Carolina, 185 miles within four national forests, 11 miles within the Qualla Boundary Reservation of the Eastern Band of Cherokee Indians (Cherokee Indian Reservation), two state parks, twelve watershed basins, a dozen municipal watersheds, and three metropolitan areas. There are more than 1,200 miles of boundary and 4,500 adjacent property owners. Three interstates, 270 secondary roads, and 400 utility lines bisect natural features. Like beads on a necklace, 900 vistas, 275 paved overlooks, 18 recreational areas, 14 backcountry areas (ranging from 1,000 to 5,000 acres), and 13 maintenance facilities line the Parkway to accommodate visitors. With annual use approaching 20,000,000 people, it is the most highly visited unit in the National Park System.

Parkway natural resources include more than 600 miles of streams with at least 150 headwaters, 1,250 vascular plants species (50 rare or endangered), six rare or endangered animals, a variety of slopes (mostly steep) and exposures, possibly 100 different soil types, an elevation range of 5,700 vertical feet, and 100 exotic plants. The Parkway also bisects more than 40 natural heritage areas, including more than half of the high-elevation wetlands known in North Carolina.

The primary activity is recreational driving, sight seeing and hiking. The Parkway also provides naturalist walks and talks, self-guided nature trails, roadside exhibits, picnicking, and camping.

VIRGINIA OVERVIEW

The 217 mile Virginia section of the Parkway consists of two distinct geomorphic provinces: ridge and plateau. The first 106-miles is located in the ridge province and is almost entirely surrounded by U.S. Forest Service lands, providing distant views of undeveloped mountain slopes and ridges. It is bounded on the northern end by Waynesboro, a town of approximately 25,000 people, and the metropolitan area of Roanoke (250,000 people) at the southern end. Several small towns whose primary economy is light industry and agriculture also occur along its length.

The lower 110-miles is located in the plateau province and is bound to the north by the Roanoke Valley/Roanoke River Basin and to the south by the high plateau of southwest Virginia. The Parkway follows the edge of the Blue Ridge escarpment throughout much of this section.

The Roanoke Valley is the largest metropolitan area along the Blue Ridge Parkway. The Roanoke Metropolitan area consisting of Roanoke City, Roanoke County, the City of Salem, and the town of Vinton, boasts a population of approximately 220,000. Roanoke is an important employment center for southwestern Virginia. Important employers in the Roanoke Valley include retail and service industries as well as light manufacturing. Residential development has rapidly spread outward from the Roanoke City and Roanoke County and is causing increasing pressure on the Parkway and its natural resources.

South of the Roanoke Valley, the Parkway generally consists of rolling agriculture consisting of farmsteads, pastures and small rural communities. This is the most narrow portion of the park, and most lands adjacent to the Parkway are privately owned, rural countryside, consisting primarily of farms and private dwellings. Small towns of a few hundred people dot the fringes, providing economic and cultural variety to an otherwise agriculturally dominated area. Mixed agriculture, tourism and light manufacturing are important employers.

PROPOSED PROJECT AREA OVERVIEW

NATURAL RESOURCES

Plant Species

Two rare plant species occur in or near the proposed treatment areas. The Kankakee globe-mallow (*Iliamna remota*, G1/S1) can reach heights of six feet and is insect pollinated. This perennial plant is extremely rare having only been recorded in Virginia in scattered populations along the James River and its tributary, the Jackson River. The only other known populations of this plant occur along the Kankakee River in Illinois and Indiana. This plant grows in disturbed riverine areas and along adjacent railroad, roadside, and powerline right-of-ways, where artificial disturbance such as mowing mimics natural flooding disturbance. Threats include competition from non-native plant species and changes in management to artificial habitats. This species is globally-rare, known only from Virginia and the Kankakee River (written response from Virginia Department of Conservation and Recreation). This species is currently classified as a species of concern by the U.S. Fish and Wildlife Service.

The Large purple fringed orchid (*Platanthera grandiflora*, G5/S1) has been documented in the project vicinity. This species typically inhabits rich, moist, mixed woods with dense vegetation under young, open canopies. This rare plant can also be found in seepage areas along small streams. No other rare plant species are known to occur in the project area; however, a recent inventory of the flora in the project area has not been conducted.

Animal Species

The Peaks of Otter salamander (*Plethodon hubrichti*, G2/S2) is known to occur in the project area. This salamander inhabits mature Appalachian hardwood forests at elevations above 550 m above sea level. Loose rocks or logs are usually present and serve as ground cover. During wet, rainy periods, the salamanders are usually active and forage at night. The Peaks of Otter salamander is known globally only from a small section of the northern Blue Ridge Mountains in Virginia and adults seldom disperse more than several yards during their entire lifetimes. Colonization of newly created habitats, therefore, is very slow for this salamander. Because this species does not disperse widely, the greatest threat to this salamander is from forest fragmentation within its range through logging activities and the creation of roads, trails, and utility corridors (Virginia Department of Conservation and Recreation).

In 2001 the National Park Service (NPS) contracted the Virginia Department of Conservation and Recreation, Division of Natural Heritage (DCR-DNH) to conduct an inventory of nocturnal Lepidoptera on Sharp Top Mountain, at the Peaks of Otter in Bedford County, Virginia. One

state rare species tracked by VDCR-DNH, *Hadena ectypa* (G3G4 S1S3), and 11 watchlist species were found in the collection. The table below indicates the probable larval foodplants and flight periods of twelve rare or watchlisted moths captured on Sharp Top Mountain, 2001.

Table 2. Probable larval foodplants and flight periods of twelve rare or watchlisted moth inventoried on Sharp Top Mountain.

Scientific name	Larval foodplant	Adult flight period
<i>Hadena ectypa</i> (Morr.)	Starry campion	June-August
<i>Eulithis explanata</i> (Wlk.)	Blueberries	June-September
<i>Itame subcessaria</i> (Wlk.)	Currants, gooseberries	June-July
<i>Acronicta superans</i> Gn.	Birch, cherry, mountain ash, etc.	May-August
<i>Anaplectoides prasina</i> (D.&S.)	Blueberries, raspberries	July-September
<i>Catocala serena</i> Edw.	Hickories?, walnut?	June-August
<i>Diarsia jucunda</i> (Wlk.)	Grasses	July-August
<i>Eueretagrotis sigmoides</i> (Gn.)	Unknown	July-August
<i>Euxoa obeliscoides</i> (Gn.)	Unknown	July-September
<i>Hypena edictalis</i> Wlk.	Unknown	June-August
<i>Papaipema rigida</i> (Grt.)	Sunflowers, burdock, ox-eye, etc.	September-October
<i>Phlogophora iris</i> Gn.	Dandelion, thistle, dock	June-July

Invertebrate Species

A federally listed butterfly known as St. Francis' Satyr (*Neonympha mitchelli francisci*) is reported to occur in Floyd County, Va. However, this endangered species is not known to occur within the treatment block.

CULTURAL RESOURCES

Peaks of Otter

The most popular recreation area on the Virginia section of the Parkway, Peaks of Otter derives its name from the nearby summits that have attracted attention since the early years of the nation. The group of three peaks—Flat Top Mountain, Sharp Top Mountain and Harkening Hill—was a prominent frontier landmark and an early destination for tourists. For years, Sharp Top Mountain was thought to be the highest peak in Virginia and drew many visitors hoping to climb to the Old Dominion's loftiest point. The narrow Mons Valley between the peaks was settled from early days and now cradles the present recreational park.

Of the numerous buildings constructed in the area, only two historic ones remain. In the area now covered by Abbott Lake stood the Rosser or Polly Woods cabin, which may have served as a guest house for Polly Woods Ordinary, an early tavern. Polly Woods Ordinary was the first of several hotels that operated in the area. Mary "Polly" Woods, the widow of Revolutionary veteran Jeremiah Woods, operated an "ordinary," a tavern offering overnight lodging, from 1834 to 1844, at which time she was succeeded by her son-in-law. The log house now interpreted as

“Polly Woods Ordinary” may have been the original cabin or a guest house from this early stand. This log structure was relocated to the picnic area when the lake was built. On the slopes of Harkening Hill stood the ca. 1850s John T. Johnson farmstead, now an interpretive farm restored by the Parkway.

Despite years of settlement and the numerous developed facilities, the Peaks of Otter remains one of the large wild areas on the Parkway. Remnants of early trees and shrubs introduced by settlers, including apples, quince and lilac can be found in several locations.

Mabry Mill

Also in the affected environment is the most popular attraction along the Parkway, as well as the most photographed, Mabry Mill at Milepost 76. The picturesque wooden mill is visited by nearly 3 million people each year.

Edwin Boston Mabry (1869-1936), a native of nearby Patrick County, moved to the Meadows of Dan area in 1899, farming for a while before his mechanical bent led him to construct a mill. Mabry Mill contains a grist mill, a sawmill, and a woodworking shop, all powered by a 14’ overshot wheel. Research by a Parkway seasonal historian indicates the grist mill was probably built in 1908, the blacksmith shop in 1910, the sawmill section in 1915, and woodworking shop in 1916.

On Mabry’s death in 1936, the National Park Service acquired the mill to preserve it as a cultural exhibit. The mill is presently used as a display and interpretive site.

A concessionaire coffee and craft sales shop was completed in May 1956, when all public use facilities were removed from the exhibit area. For years, visitors were able to purchase cornmeal ground and bagged at the mill. In 1989, the National Park Service became concerned over a disease infestation at all NPS mills and terminated the sale of products produced on-site. The mill and the adjacent concessionaire gift shop still sell cornmeal and buckwheat flour in bags featuring illustrations of Mabry Mill, but the products are ground off-site by a private company.

RECREATIONAL RESOURCES

Blocks A through G includes coverage over the Peaks of Otter Lodge and Restaurant and sections of 12 highly visited major trails. These trails include the Appalachian Trail, Hunting Creek Trail (MP 74.9), Apple Orchard Trail (MP 78.7), Falling Water Cascades Trail (MP 83.1), Flat Top Trail (MP 83.5), Sharp Top Trail (MP 86), and Harkening Hill Trail (MP 85.9). Coverage would include much of several short day hike trails including Yankee Horse Overlook Trail (MP 34.4 - .1 mile), Thunder Ridge Trail (MP 74.7 - .1 mile), Onion Mountain Loop Trail (MP 79.7 - .1 mile), Abbot Lake Loop Trail (MP 85.7 - 1 mile), and Elk Run Trail (MP 85.9 - .8 mile loop). Coverage will include the Peaks of Otter Campground and Picnic Area. It will also include coverage over the James River and Peaks of Otter Visitor Centers, as well as Parkway Maintenance and Ranger Offices. Trail coverage would include only the trailhead sections for an approximate distance of 1,000 to 1,500 feet.

The Pheromone Flake coverage area includes the Rocky Knob Campground and Picnic Area, Visitor Center, Maintenance and Ranger Offices, and the Smart View Picnic Area. It also includes the Mabry Mill Historic Site, one of the mostly highly visited on the Blue Ridge Parkway. Sections of major and minor trails to be covered in this area include Smart View Loop Trail (MP 154.5 - 3 miles), Rock Castle Gorge Trail at (MP 167.1 - 10.6 miles), Woodland Trail (MP 169 - .8 miles), and the Black Ridge Trail (MP 169 - 3 miles). Trail coverage would include only the trailhead sections for an approximate distance of 1,000 to 1,500 feet.

Recreation has been surveyed and determined to provide 2.2 million direct and indirect economic impacts per mile to the Blue Ridge Parkway surrounding communities.

VISUAL RESOURCES

Blocks A through G will include coverage of 13 overlooks and numerous vista cut areas providing scenic viewing opportunities. The pheromone flake coverage area will include six overlook areas, and numerous vista cut areas providing scenic vista viewing opportunities.

ENVIRONMENTAL CONSEQUENCES

INTRODUCTION

The National Environmental Policy Act requires environmental documents to disclose (1) the environmental impacts of proposed federal actions, (2) reasonable alternatives to that action, and (3) adverse environmental impacts that cannot be avoided should the proposed action be implemented. This section analyzes the environmental impacts of the five alternatives for managing gypsy moth infestations on natural resources, cultural resources, recreational resources, and visual resources. This analysis provides the basis for comparing the effects of the five alternatives and is summarized in Table 3. The intensity and duration of the impacts, mitigation measures, cumulative impacts, and secondary impacts were assessed in considering the impacts. A large amount of information on impacts from various gypsy moth treatment alternatives on a number of ecological, cultural, social, and economic factors were analyzed in the 1995 *Final Environmental Impact Statement for Gypsy Moth Management in the United States: A Cooperative Approach* (GM-FEIS). The analysis of impacts in this chapter is tiered to the GM-FEIS. Additional detail on the effects of various treatment alternatives on the environment is available in the GM-FEIS.

METHODOLOGY

In this document, the NPS based its analysis of impacts and conclusions on discussions with the Virginia Natural Heritage Program, on a review of scientific literature and park studies, and on professional judgment of park technical experts.

Thresholds of Change

Threshold events are marked by a distinct change in conditions or level. Although environmental thresholds are not events in themselves, data from extensive monitoring programs and more general sources of information indicates that thresholds of change may be identifiable for this project and that a practical means of monitoring proximity to thresholds is available. The thresholds of change of a biological or ecological impact are designated as *intensity* and *duration*.

Intensity

For the purpose of this analysis, intensity or severity of the impact to the resource or discipline is defined as:

- *Negligible* is barely perceptible, not measurable, and confined to a small area.
- *Minor* is perceptible, measurable, and localized.
- *Moderate* is clearly detectable and could have appreciable effect.
- *Major* is substantial and highly noticeable.

Duration

For the purpose of this analysis, duration of the impacts to the resource or discipline is defined as:

- *Short-term* are those that occur during implementation of the alternative.
- *Long-term* are those that extend beyond implementation of the alternative and would likely have permanent effects.

CUMULATIVE IMPACTS

As defined by CEQ Regulations (40 CFR, Part 1508.7), "cumulative impacts" are those impacts on the environment resulting from the incremental impacts of the proposed, past, present, and foreseeable future actions regardless of who or what agency undertakes the actions. Cumulative impacts can result from minor but collectively significant actions taking place over time.

IMPAIRMENT

Pursuant to the 1916 Organic Act, the National Park Service has a management responsibility "*to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations.*" As a result, the National Park Service cannot take an action that would "impair" park resources. National Park Service *Management Policies 2001* provide guidance on addressing impairment.

Impairment is an impact that, in the professional judgment of the responsible National Park Service manager, would harm the integrity of park resources or values, including the opportunities that otherwise would be present for the enjoyment of those resources or values. An impact would be less likely to constitute an impairment to the extent that it is an unavoidable result, which cannot reasonably be further mitigated, of an action necessary to preserve or restore the integrity of park resources or values (NPS 2000e). An impact would be more likely to constitute impairment to the extent that it affects a resource or value whose conservation is:

- Necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the park;
- Key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or
- Identified as a goal in the park's *General Management Plan* or other relevant National Park Service planning documents.

For the *Gypsy Moth Treatment Project*, the Blue Ridge Parkway is the key resource for which impairment must be addressed. Impairment of park resources was evaluated on the basis of the type and intensity of impacts, and in terms of the types of resources affected. Overall, beneficial impacts would not constitute impairment. With respect to the intensity of impacts, negligible and minor adverse impacts are not of sufficient magnitude to constitute impairment. Moderate and major adverse impacts may constitute impairment, but do not automatically do so. Rather, these impacts must be analyzed with respect to the three bulleted criteria above. In addition, when considering potential impairment of the Blue Ridge Parkway, not all resource topics have been analyzed. Impairment is considered for geologic, hydrological, biological, cultural, and scenic resources and recreation. However, analyses for air quality, noise, and park operations do not discuss impairment of the Blue Ridge Parkway because these resource topics are peripheral to the protection of the Blue Ridge Parkway, the intent of the 1916 Organic Act, and the *Management Policies 2001* impairment mandate.

Director's Order #12 requires that impairment be addressed in all environmental assessments and draft and final environmental impact statements, as well as in the decision documents (Finding of No Significant Impact, Record of Decision). Within this environmental assessment, impairment is addressed in the conclusion section of each impact topic under each alternative.

Consequently, the preferred alternative would not impair park resources and conserves values embodied in the Organic Act to:

- Accomplish the mission of the National Park Service.
- Achieve goals of the *Parkway Master Plan* and *Strategic Plan*.
- Prevent impairment of park resources in a manner that meets legal and policy requirements.
- Achieve the purposes and criteria of the following NPS Mission Goals, the Parkway's Mission Goals, and the Parkway's long-range GPRA goals:

- natural resources are protected to maintain ecological and biological diversity with the abundance of plant and animal species found in the Central and southern Appalachian ecosystem.
- the natural and cultural resources are protected, restored, and maintained in good condition.
- provide opportunities for visitors to experience the scenic qualities, recreational uses and natural and cultural resources of the Blue Ridge Parkway and its corridor.

IMPACTS OF MANAGING GYPSY MOTH INFESTATIONS

Alternative 1 – No Action

There would be both direct and indirect impacts to natural, visual, and recreational resources under this alternative. Tree defoliation would continue and would likely be severe where populations are greater than 1,000 egg masses per acre. Without treatment, populations of the gypsy moth would continue to increase to levels where individual trees would be heavily defoliated and stressed above levels typical for these areas. Mortality of some trees could be expected. Change in the forest composition and appearance could also be expected. In areas where new outbreaks occur, the overall spread of the gypsy moth south and westward would increase.

Natural Resources

Vegetation

Direct/Indirect Impacts

Under this alternative, the gypsy moth would become a permanent component of the ecosystem in forested areas where no treatment action is taken. In areas considered for treatment efforts, insect populations will increase to high levels and then collapse, a cycle which normally occurs over several years (USFS Gypsy Moth EIS). The increased density of gypsy moths will result in canopy defoliation and eventual death of canopy trees over a 2 to 5 year period. Canopy mortality will likely result in a drastic change in species composition across the landscape. This large-scale disturbance may provide opportunities for exotic invasive plant species, such as garlic mustard (*Alliaria petiolata*) and tree-of-heaven (*Ailanthus altissima*), to become established thus having a negative effect by outcompeting native species and disrupting natural processes and mechanisms. A potential indirect effect on vegetation is wildfire hazard and difficulty of control. In the short term, there could be a noteworthy increase in the amount of fuel (twigs, limbs and standing dead trees) available for wildfires as a result of gypsy moth-caused tree mortality. This fuel could cause a wildfire to spread faster, and if standing dead trees caught fire, would make control much more difficult.

Cumulative Impacts

In developed areas (such as campgrounds and picnic areas) and along the Parkway motoroad the number of hazard trees would dramatically increase as trees would continue to be defoliated over time and result in overwhelming maintenance resources which are already limited.

Impairment

There would be no impairment of Parkway vegetation under this Alternative, however with the continued spread of the gypsy moth, park vegetation would continue to degrade.

Conclusion

Without treatment canopy tree mortality will occur at a much higher rate than is normally expected. The safety hazard to visitors and park facilities from dead and dying trees will be monumental. The intensity and duration level of this alternative on vegetation issues can be characterized as major and long-term.

Threatened and Endangered Species

Direct/Indirect Impacts

The rare species previously mentioned, would both be directly and indirectly impacted by this alternative. The Peaks of Otter salamander would be negatively impacted by the change in habitat due to impacts to vegetation. The salamanders prey base could be negatively affected by vegetation changes that could affect native insects and therefore reduce the salamander's food source. Peaks of Otter salamander habitat would increase due to an abundance of down wood resulting from gypsy moth-caused tree mortality.

The large purple fringed orchid and Kankakee globe-mallow would be negatively affected by accelerated canopy mortality and predation by gypsy moth. The St. Francis Satyr would be negatively effected through competition with gypsy moth for available resources.

Cumulative Impacts

Changes in forest composition as a result of repeated annual defoliation of canopy trees will alter habitat conditions necessary for the long-term health and survival of rare species. As species adjust to the new forest conditions the rare species present would likely decline due to competition with similar species or due to a change in available resources.

Impairment

There would be no impairment to threatened and endangered species under this alternative.

Conclusion

Failure to treat and therefore reduce the damaging effects of gypsy moth outbreaks could have a negative effect on rare and sensitive species.

Animal Species

Direct/Indirect Impacts

Wildlife are dependent upon their habitat. If gypsy moth outbreaks occur, changes in wildlife habitat (see preceding discussion on potential changes in vegetation), would cause changes in wildlife abundance, distribution and animal community composition. Wildlife responses to these changes can be grouped into three general categories: 1) response to changes in vegetation structure, 2) response to changes in food supply, 3) response to indirect effects. Wildlife that feed, rest, nest or escape in forest vegetation may disperse to adjacent suitable habitat. Birds that

feed from exposed perches or are accustomed to open habitats are attracted to recently defoliated areas. Wildlife that rely on hard mast from oak species may be indirectly and negatively impacted due to gypsy moth induced tree mortality.

Cumulative Impacts

Long-term effects of repeated defoliation on vegetative structure generally results in a shift in habitat diversity (i.e., more standing snags, increased ground cover, increased habitat patchiness, and a more diverse plant community). Availability of habitat for high-canopy nesters decreases, while habitat increases for secondary-cavity nesters in areas with extensive tree mortality. Repeated defoliation causes oak and other trees to abort hard mast crops which will have negative impacts on animals dependent on this food source. Animals that utilize fall mast crops in defoliated areas will be forced to shift to secondary food items or relocate.

Impairment

There would be no impairment of Parkway animal species under this alternative.

Conclusion

Animal diversity and distribution across the landscape will be modified as a result of altered forest conditions that affect food supply and habitat conditions. These changes will have both positive and negative impacts on wildlife, depending on the species under consideration.

Invertebrates

Direct/Indirect Impacts

There are 12 Lepidoptera species listed as sensitive in Table 2 that may be directly and negatively impacted through competition for food and habitat by the gypsy moth if left untreated. Species competition between native species and the gypsy moth may result in changes in native population levels and distribution as gypsy moth becomes naturalized in untreated areas.

Cumulative Impacts

None expected.

Impairment

There would be no impairment of park invertebrates under this alternative.

Conclusion

Since many of the native insects that occur within the proposed treatment area also occur throughout similar forests of the Eastern United States, and continue to occur in these forests already infested by the gypsy moth, long-term direct, indirect, or cumulative impacts on many of these insects are expected to be minimal.

Recreational Resources

Direct/Indirect Impacts

The no-action alternative would have direct and indirect impacts on recreation. Hazard trees would proliferate increasing the safety risk to visitors and Blue Ridge Parkway staff within

campgrounds, picnic areas, overlooks, and concession facilities, which are among the most highly rated risk areas identified in the “Blue Ridge Parkway Hazardous Tree Management Plan.”

Cumulative Impacts

The accumulation of forest litter would increase the safety risk of potential forest fires. The appreciation of the natural environment would be highly reduced, leading to a decrease in visitor enjoyment and visitation of the area.

Impairment

There would be no impairment to park recreational resources under this alternative.

Conclusion

There would be a direct economic impact to surrounding communities that Blue Ridge Parkway tourism provides.

Visual Resources

Direct/Indirect Impacts

The area of coverage includes the most highly visible or foreground vista area within the Blue Ridge Parkway boundary. Visitor surveys and Blue Ridge Parkway vista management planning has rated and assessed the views within the coverage area. Many are among the most highly rated on the Blue Ridge Parkway.

Cumulative Impacts

Proliferation of dying trees would negatively impact this resource and reduce visitor appreciation, which would lead to lower visitor satisfaction resulting in decreased visitation.

Impairment

There would be no impairment to park visual resources under this alternative.

Conclusion

There would be a direct economic impact to surrounding communities that Blue Ridge Parkway tourism provides.

Conclusion for Alternative 1

Under this alternative the trees close to developed areas and along the Parkway motor road would not be protected from gypsy moth and would decline and seriously compromise visitor safety. The decline and eventual mortality of the tree canopy would result in an increase in hazardous fire fuels due to a large accumulation of coarse woody debris. Tree mortality would provide additional habitat for cavity dwelling birds and increase habitat diversity for many animals. Forest composition and structure would be permanently altered, these changes would in turn affect other resources that depend on vegetation for habitat and food.

Under this alternative, there would be no impairment to park resources.

This alternative would have a long-term negative impact to recreational and visual resources on the Blue Ridge Parkway.

Alternative 2 – Treat areas with Btk only

Under this alternative, all sites where hazardous trees could become a problem or where sensitive resources are at risk by gypsy moth and where egg mass counts exceed 250 per acre would be treated with *Btk*. Advantages of using *Btk* include: (1) *Btk* is a non-chemical and as such is harmless to man, animal and plant life, (2) it is selectively pathogenic against Lepidoptera insects such as the gypsy moth, and (3) it does not affect beneficial insects. No immunity or resistance has ever been shown to exist in insects such as the gypsy moth against *Btk*. The disadvantage of using *Btk* is that gypsy moth numbers may not be reduced, particularly where egg mass densities exceed 1,000 egg masses per acre (USDA Forest Service). *Btk* is only effective against early larval instars and the timing of application is critical. Weather conditions can also affect the effectiveness of the application; the material can be washed off of treated foliage if it rains within six hours of spraying. *Btk* is lethal to non-target Lepidoptera insects. Long-term success requires annual treatment when gypsy moth populations exceed 250 egg masses per acre.

Natural Resources

Vegetation

Direct/Indirect Impacts

When applied under ideal conditions this alternative can be very effective at protecting canopy foliage from gypsy moth. Typically, a double application of *Btk* is required to successfully treat high gypsy moth densities. However, success can be compromised by less than ideal weather conditions when spraying occurs during extended periods of rain. *Btk* has no known negative effects on vegetation. Under this alternative, vegetation within treated areas would be protected from defoliating gypsy moth larvae, therefore, this alternative will have a positive and temporary impact on vegetation resources.

Cumulative Impacts

The use of *Btk* would have no cumulative impacts on vegetation. Sites with high gypsy moth populations and which do not receive treatment will experience cumulative impacts similar to those described under alternative 1.

Impairment

Under this alternative, there would be no impairment to park vegetation.

Conclusions

Btk reduces defoliation caused by some spring feeding caterpillars and does not have any negative impacts on vegetation if successfully applied.

Threatened and Endangered Species

Direct/Indirect Impacts

Only rare lepidopteran species (butterflies and moths) would be negatively impacted by this alternative. There will be no adverse impacts to the two rare plants and one rare animal

indicated previously in this document. The Peaks of Otter salamander would benefit from this alternative in that the species preferred habitat and food base would be protected.

Cumulative Impacts

There would be no cumulative impacts from this alternative due to the short life of Btk in the environment. Sites with high gypsy moth populations and which do not receive treatment will experience cumulative impacts similar to those described under alternative 1.

Impairment

Under this alternative, there would be no impairment to threatened and endangered species.

Conclusions

This alternative will have both a negative and positive effect on threatened and endangered species. Lepidopteran species that have spring feeding larval life stages would be negatively impacted by this alternative.

Animal Species

Direct/Indirect Impacts

In areas where this alternative is implemented, impacts on wildlife or wildlife habitat would be proportional to the degree of gypsy moth control achieved. Application of *Btk* in gypsy moth infested areas are not known to have any direct negative impacts on wildlife or wildlife habitat. *Btk* may reduce populations of leaf-chewing insects that contribute to the food base for some insect-eating animals (i.e., shrews, warblers, vireos). Birds that often prey on native defoliating lepidoptera may be indirectly impacted by the application of *Btk*. These insects are often a major food source for both mature and immature birds. The extent of the indirect impact will depend upon the availability of alternate food sources and the scale of the treated areas. The effectiveness of *Btk* declines rapidly after application, normally lasting from 7-14 days. Lepidoptera larvae emerging after this period would not be affected and would become a food source to insect-eating wildlife.

Cumulative Impacts

There would be no cumulative impacts from this alternative due to the short life of Btk in the environment. Sites with high gypsy moth populations and which do not receive treatment will experience cumulative impacts similar to those described under alternative 1.

Impairment

Under this alternative, there would be no impairment to animal species on the Parkway.

Conclusions

This alternative would have both a negative and positive effect on animal species. Species that depend on the current habitat offered by existing conditions will benefit from this alternative. Species that eat leaves in the spring would be negatively impacted by this alternative. In addition any species that utilizes leaf eating species as food base would be negatively impacted.

Invertebrates

Direct/Indirect Impacts

It is unlikely that any lepidoptera from the project area would suffer any long-term decline from the application of *Btk* because 1) the short-life of *Btk*, 2) the restricted treatment area that consists largely of corridors along the Parkway motor road. *Btk* applications would negatively affect native lepidoptera that are feeding on foliage treated with *Btk*. A recent inventory of lepidoptera species in the project area revealed that 12 species are state or watch listed in Virginia (Table 2). The use of *Btk* will have negative impacts only those native lepidoptera that are actively feeding in the treatment area during or shortly (7-14 days) after application. The magnitude of this impact on native populations is expected to be small because the treatment areas are generally narrow corridors. While species within the treatment areas would be negatively impacted spring feeding lepidoptera, re-establishment of these species from adjacent untreated areas is expected to occur rapidly (1-2 years). Lepidoptera that feed on the underside of leaves would also be negatively affected by application of *Btk*.

Cumulative Impacts

If sites require several consecutive annual treatments then spring feeding lepidoptera species could be adversely affected. Sites with high gypsy moth populations and which do not receive treatment will experience cumulative impacts similar to those described under alternative 1.

Impairment

There would be no impairment to invertebrates under this alternative.

Conclusion

This alternative would negatively impact lepidoptera species that feed on foliage in the spring, specifically within 14 days of treatment. No long-term impacts to lepidoptera species are expected because of the relatively small area being treated with *Btk*.

Recreational Resources

Direct/Indirect Impacts

This alternative would have direct and indirect, as well as short- and long-term impacts on recreation. Hazard trees as a result of this treatment would be reduced improving the safety risk to visitors and Blue Ridge Parkway staff within campgrounds, picnic areas, overlooks, and concession facilities that are among the most highly rated risk areas identified in the "Blue Ridge Parkway Hazardous Tree Management Plan."

Cumulative Impacts

The accumulation of forest litter would decrease, and thus, the safety risk of potential forest fire would be equitably reduced. The effect of forest loss and dying trees would likely remain unnoticed in the long-term. Visitor enjoyment of the recreational opportunities would remain temporarily rather than permanently affected. The economic impact to surrounding communities would be preserved.

Impairment

Under this alternative, there would be no impairment to park recreational resources.

Conclusion

Visitor enjoyment of the recreational opportunities would remain temporarily rather than permanently affected. The economic impact to surrounding communities would be preserved.

Visual Resources

Direct/Indirect Impacts

The proposed area of coverage includes the most highly visible or foreground vista area within the Blue Ridge Parkway boundary. Visitor surveys and Blue Ridge Parkway vista management planning has rated and assessed the views within the proposed coverage area. Many are among the most highly rated on the Blue Ridge Parkway.

Cumulative Impacts

Proliferation of dying trees would negatively impact this resource and reduce visitor appreciation, which would lead to lower visitor satisfaction resulting in decreased visitation. This alternative would likely have only short-term effects on visual enjoyment.

Impairment

There would be no impairment to park visual resources under this alternative.

Conclusion

Long-term enjoyment of visual resources would be preserved.

Conclusion for Alternative 2

Under this alternative areas where gypsy moth densities are moderately high (>250 egg masses per acre), good protection of canopy foliage is possible. Forest structure and composition would be maintained. No negative impacts to threatened and endangered species would occur. Some animal species could be adversely affected due to changes in food sources. Any native lepidoptera species that are actively chewing leaves would be negatively impacted by this alternative. The magnitude of this impact is lessened because of the relatively small treatment areas and the short life of *Btk*.

This alternative would have only short-term impacts to recreational and visual resources on the Blue Ridge Parkway, but would preserve vista and recreational resources against unalterable long-term impacts. Visitation rates would likely have no noticable long-term impacts. There would be no impairment to park resources under this alternative.

Alternative 3 – Treat areas with Gypchek® only

Under this alternative all sites where hazardous trees could become a problem or where sensitive resources are at risk by gypsy moth and where egg mass counts exceed 250 per acre would be treated with Gypchek® (nucleopolyhedrosis virus, NPV). This virus occurs naturally and is specific to the gypsy moth. Gypchek® is an insecticide product made from the gypsy moth

nucleopolyhedrosis virus. Advantages of this alternative include: (1) gypsy moth NPV is “species-specific; (2) it can result in a reduction in the pest population and bring about foliage protection; (3) no immunity or resistance has ever been shown to exist in insects such as the gypsy moth against Gypchek®. Disadvantages include: (1) Gypchek® is produced in limited quantities; (2) the probability of successfully suppressing gypsy moth populations with Gypchek® in areas of high egg mass densities (greater than 1,000 egg masses per acre) is low.

Natural Resources

Vegetation

Direct/Indirect Impacts

In cases where gypsy moth egg mass densities exceed 1,000 per acre the use of Gypchek® has limited success. Under such conditions adverse impacts to vegetation are similar as described in alternative 1. When egg mass densities are less than 1,000 per acre this alternative provides foliage protection to vegetation thus resulting in a positive affect.

Cumulative Impacts

Sites with high gypsy moth populations and which do not receive treatment will experience cumulative impacts similar to those described under alternative 1.

Impairment

Under this alternative, there would be no impairment to vegetation.

Conclusion

Gypsy moth populations that are less than 1,000 egg masses per acre can be successfully treated under this alternative. This alternative is not successful at treating large (>1,000 egg masses per acre) gypsy moth populations and as a result vegetation will be negatively impacted, with results identical to those described under alternative 1. When egg mass densities are less than 1,000 per acre this alternative is effective at providing foliage protection for vegetation thus resulting in a positive affect.

Threatened and Endangered Species

Direct/Indirect Impacts

In cases where gypsy moth egg mass densities exceed 1,000 per acre the use of Gypchek® has limited success at providing foliage protection. Under such conditions impacts to threatened and endangered species are similar as described in alternative 1. When gypsy moth populations are below 1,000 egg masses per acre there will be no adverse impacts to threatened and endangered species.

Cumulative Impacts

Sites with high gypsy moth populations and which do not receive treatment will experience cumulative impacts similar to those described under alternative 1.

Impairment

Under this alternative, there would be no impairment to threatened and endangered species.

Conclusion

The gypsy moth virus is not known to directly affect organisms other than the gypsy moth, and no change in non-target species or their populations is likely from the use of Gypchek®. When gypsy moth populations are below 1,000 egg masses per acre there will be no adverse impacts to threatened and endangered species.

Animal Species

Direct/Indirect Impacts

In cases where gypsy moth egg mass densities exceed 1,000 per acre the use of Gypchek® has limited success at providing foliage protection. Under such conditions impacts to animals are similar as described in Alternative 1. When gypsy moth populations are below 1,000 egg masses per acre there will be no adverse impacts to animal species as this alternative is effective at providing foliage protection.

Cumulative Impacts

Sites with high gypsy moth populations and which do not receive treatment will experience cumulative impacts similar to those described under alternative 1.

Impairment

Under this alternative, there would be no impairment to animal species.

Conclusion

The gypsy moth virus is not known to directly affect organisms other than the gypsy moth, and no change in nontarget species or their populations is likely from the use of Gypchek®.

Invertebrates

Direct/Indirect Impacts

In cases where gypsy moth egg mass densities exceed 1,000 per acre the use of Gypchek® has limited success at providing foliage protection. Under such conditions impacts to invertebrates are similar as described in Alternative 1. When gypsy moth populations are below 1,000 egg masses per acre there will be no adverse impacts to invertebrate species.

Cumulative Impacts

Sites with high gypsy moth populations and which do not receive treatment will experience cumulative impacts similar to those described under alternative 1.

Impairment

There would be no impairment to invertebrates under this alternative.

Conclusion

The gypsy moth virus is not known to directly affect organisms other than the gypsy moth, and no change in non-target species or their populations is likely from the use of Gypchek®.

Recreational Resources***Direct/Indirect Impacts***

This alternative would have direct and indirect, as well as short- and long-term impacts on recreation. Hazard trees as a result of this treatment would be reduced improving the safety risk to visitors and Blue Ridge Parkway staff within campgrounds, picnic areas, overlooks, and concession facilities that are among the most highly rated risk areas identified in the “Blue Ridge Parkway Hazardous Tree Management Plan.”

Cumulative Impacts

The accumulation of forest litter would decrease, and thus, the safety risk of potential forest fire would be equitably reduced. The effect of forest loss and dying trees would likely remain unnoticed in the long-term. Visitor enjoyment of the recreational opportunities would remain temporarily rather than permanently affected. The economic impact to surrounding communities would be preserved.

Impairment

Under this alternative, there would be no impairment to park recreational resources.

Conclusion

Visitor enjoyment of the recreational opportunities would remain temporarily rather than permanently affected. The economic impact to surrounding communities would be preserved.

Visual Resources***Direct/Indirect Impacts***

The proposed area of coverage includes the most highly visible or foreground vista area within the Blue Ridge Parkway boundary. Visitor surveys and Blue Ridge Parkway vista management planning has rated and assessed the views within the proposed coverage area. Many are among the most highly rated on the Blue Ridge Parkway.

Cumulative Impacts

Proliferation of dying trees would negatively impact this resource and reduce visitor appreciation, which would lead to lower visitor satisfaction resulting in decreased visitation. This alternative would likely have only short-term effects on visual enjoyment.

Impairment

Under this alternative, there would be no impairment to park visual resources.

Conclusion

Long-term enjoyment of visual resources would be preserved.

Conclusion for Alternative 3

This alternative provides a viable treatment option when gypsy moth populations are below 1,000 egg masses per acre. The species-specific nature of this treatment makes this alternative the preferred option for lessening impacts to the environment. When egg mass densities exceed 1,000 egg masses per acre this alternative has limited effectiveness for protecting canopy foliage.

Under this alternative, there would be no impairment to park resources. This alternative would have only short-term impacts to recreational and visual resources on the Blue Ridge Parkway, but would preserve vista and recreational resources against unalterable long-term impacts. Visitation rates would likely have no noticeable long-term impacts.

Alternative 4 – Treat areas with pheromone flakes only

Under this alternative, a pheromone mating disrupter called Disparlure® (chemical name: cis-7,8-epoxy-2-methyloctadecane) would be used to treat areas where gypsy moth populations are relatively small and located on the leading front of the overall population. Advantages include: (1) species-specific treatment that targets mating gypsy moth adults, (2) this tactic as slowed down the spread of gypsy moth by 50% (USFS STS). Disadvantages include: (1) treatment is only successful for small isolated gypsy moth populations along the leading edge of gypsy moth invasion, (2) annual treatment may be necessary.

Natural Resources

Vegetation

Direct/Indirect Impacts

Under this alternative gypsy moth populations would be contained and treated which would result in a positive effect on vegetation resources. The rate of spread of gypsy moth would be drastically reduced, therefore providing a positive impact on vegetation that would otherwise be negatively impacted by the presence of gypsy moth.

Cumulative Impacts

If recent outbreaks of gypsy moth populations do not receive treatment under this alternative the spread of gypsy moth will proceed unhindered into other, previously uninfested areas.

Impairment

Under Alternative 4, there would be no impairment to vegetation.

Conclusion

Disparlure® is not known to directly affect organisms other than the gypsy moth, and no change in non-target species or their populations is likely from the use of this mating disruption pheromone. Vegetation resources would benefit by this alternative where outbreak gypsy moth populations would otherwise threaten to defoliate canopy trees.

Threatened and Endangered Species

Direct/Indirect Impacts

Under this alternative, there would be no direct or indirect impacts. Gypsy moth populations would be contained and treated which would result in a positive effect on threatened and endangered species.

Cumulative Impacts

If recent outbreaks of gypsy moth populations do not receive treatment under this alternative the spread of gypsy moth will proceed unhindered into other, previously uninfested areas.

Impairment

Under this alternative, there would be no impairment to threatened and endangered species.

Conclusion

Disparlure® is not known to directly affect organisms other than the gypsy moth, and no change in non-target species or their populations is likely from the use of this mating disruption pheromone. Threatened and endangered species will benefit from a reduction in the rate of spread of gypsy moth because habitat alteration will not occur under this alternative.

Animal Species

Direct/Indirect Impacts

Animal species will benefit from a reduction in the rate of spread of gypsy moth. Pheromone flake treatments will not negatively affect any animal species due to its specificity for gypsy moth. Animal species will benefit from a reduction in the rate of spread of gypsy moth as offered by this alternative since changes to habitat or food base will not be altered.

Cumulative Impacts

If recent outbreaks of gypsy moth populations do not receive treatment under this alternative the spread of gypsy moth will proceed unhindered into other, previously uninfested areas.

Impairment

There would be no impairment to animal species under Alternative 4.

Conclusion

Disparlure is not known to directly affect organisms other than the gypsy moth, and no change in non-target species or their populations is likely from the use of this mating disruption pheromone. Animal species will benefit from a reduction in the rate of spread of gypsy moth as offered by this alternative since changes to habitat or food base will not be altered.

Invertebrates

Direct/Indirect Impacts

Invertebrate species will not be negatively impacted by the use of pheromone flake treatments due to the specificity of the treatment to gypsy moth. Invertebrates will be positively affected by the treatment of gypsy moth due to reduced competition.

Cumulative Impacts

If recent outbreaks of gypsy moth populations do not receive treatment under this alternative the spread of gypsy moth will proceed unhindered into other, previously uninfested areas.

Impairment

Under this alternative, there would be no impairment to invertebrates.

Conclusion

Disparlure is not known to directly affect organisms other than the gypsy moth, and no change in non-target species or their populations is likely from the use of this mating disruption pheromone. Invertebrates will not be negatively affected under this alternative, but rather benefit from gypsy moth treatment because of reduced competition with gypsy moth for available resources.

Recreational Resources

Direct/Indirect Impacts

This alternative would have direct and indirect, as well as short- and long-term impacts on recreation. Hazard trees as a result of this treatment would be reduced improving the safety risk to visitors and Blue Ridge Parkway staff within campgrounds, picnic areas, overlooks, and concession facilities that are among the most highly rated risk areas identified in the “Blue Ridge Parkway Hazardous Tree Management Plan.”

Cumulative Impacts

The accumulation of forest litter would decrease, and thus, the safety risk of potential forest fire would be equitably reduced. The effect of forest loss and dying trees would likely remain unnoticed in the long-term. Visitor enjoyment of the recreational opportunities would remain temporarily rather than permanently affected. The economic impact to surrounding communities would be preserved.

Impairment

Under Alternative 4, there would be no impairment to park recreational resources.

Conclusion

Visitor enjoyment of the recreational opportunities would remain temporarily rather than permanently affected. The economic impact to surrounding communities would be preserved.

Visual Resources

Direct/Indirect Impacts

The proposed area of coverage includes the most highly visible or foreground vista area within the Blue Ridge Parkway boundary. Visitor surveys and Blue Ridge Parkway vista management planning has rated and assessed the views within the proposed coverage area. Many are among the most highly rated on the Blue Ridge Parkway. Proliferation of dying trees would negatively impact this resource and reduce visitor appreciation, which would lead to lower visitor satisfaction resulting in decreased visitation. This alternative would likely have only short-term effects on visual enjoyment.

Cumulative Impacts

Long-term enjoyment of visual resources would be preserved.

Impairment

Under this alternative, there would be no impairment to park visual resources.

Conclusion for Alternative 4

This alternative is only viable for controlling very low density population levels of gypsy moth in isolated areas along the leading edge of the gypsy moth invasion. This treatment strategy is most often considered in the slow-the-spread area where the primary objective is to treat localized outbreaks thereby reducing or slowing the spread of this insect into new areas. The USFS estimates that spread has been reduced by 50% due to this treatment strategy (P.Sellers, pers. comm.). Natural resources would benefit under this alternative.

There would be no impairment to park resources under this alternative. This alternative would have only short-term impacts to recreational and visual resources on the Blue Ridge Parkway, but would preserve vista and recreational resources against unalterable long-term impacts. Visitation rates would likely have no noticeable long-term impacts.

Alternative 5 – Proposed Alternative and Environmentally Preferred Alternative – Combine Alternative 2, 3, and 4.

A combination of *Btk*, Gypchek®, and pheromone flake treatments are proposed under the Integrated Pest Management (IPM) approach because all are effective in reducing gypsy moth populations under different conditions. Parameters such as egg mass density, egg mass length, occurrence of sensitive and rare species, and threats to visitor safety from hazardous trees are all considered when selecting appropriate treatments. *Btk* would be used in areas where egg mass densities exceed 250 per acre and where there is an absence of sensitive resources that would be negatively impacted by this treatment. Gypchek® would be used in areas where egg mass densities exceed 250 per acre and where sensitive natural resources occur. Pheromone flake treatment would be used in areas where new spot infestations occur and which are located along the leading edge of the gypsy moth invasion. The Blue Ridge Parkway's 1992 *Gypsy Moth Integrated Pest Management Plan* provides guidance on treatment selection. Use of the proposed insecticides is contingent upon annual approval by the National Park Service IPM process. Advantages include: (1) flexibility to apply the appropriate treatment to fit the site

conditions, (2) provide a safer environment to park visitors by reducing the amount of hazardous trees. Disadvantage is (1) sites may require annual treatment to reduce gypsy moth populations to levels that do not result in an increase of canopy tree mortality above the natural range of variation.

Natural Resources

Impacts to vegetation, threatened and endangered species, animals, and invertebrates are identical to those previously discussed under Alternatives 2, 3 and 4. However, specific impacts to each treatment area will depend on the the treatment that is most appropriate to the sites conditions and issues. Therefore, if site A is selected for treatment with *Btk* then the impacts to natural resources at that site are identical to those presented under Alternative 2.

Recreational Resources

Impacts to recreational resources have been addressed in previous Alternatives 2, 3 and 4.

Visual Resources

Impacts to visual resources have been addressed inprevious Alternatives 2, 3 and 4.

Conclusion for Alternative 5

Under this alternative an IPM approach would be used to select appropriate treatment strategies for the control of gypsy moth. The proposed treatments listed in Table 1 include *Btk* for areas where high egg mass densities greater than 1,000 egg masses per acre were measured.

Gypcheck® is not proposed for use because no sensitive resource sites are experiencing elevated gypsy moth population densities at this time. The use of Disparlure® pheromone flakes is proposed for areas with recent gypsy moth outbreaks and which are located along the leading edge of gypsy moth invasion.

This alternative would have only short-term impacts to recreational and visual resources on the Blue Ridge Parkway, but would preserve vista and recreational resources against unalterable long-term impacts. Visitation rates would likely have no noticable long-term impacts.

Table 3. Summarized comparison of the environmental consequences associated with each alternative.

Impact Topics	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
Natural Resources					
Vegetation	--	+	+	+	++
Threatened and Endangered Species	--	+/-	++	++	++
Animal Species	--	+/-	++	++	++
Invertebrate Species	-	+/-	++	++	++
Cultural Resources	+/-	+/-	+/-	+/-	+/-
Recreational Resources	--	++	++	++	++
Visual Resources	--	++	++	++	++

¹ **Key to symbols:** There is no scale associated with these symbols, they merely provide a comparison between alternatives: (++) a positive effect is likely to result from implementation of this alternative. (+) a positive effect less than ++. (+/-) either no positive or negative effect, or both positives and negatives would result. (--) a negative effect is likely to result from implementation of this alternative. (-) A negative effect less than --.

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CONSULTATION AND COORDINATION

US Fish and Wildlife Service, Ecological Services, Virginia Field Office
Virginia Department of Conservation and Recreation, Natural Heritage Program
Virginia Department of Game and Inland Fisheries
US Department of Agriculture, Forest Health Protection
US Department of Agriculture, Forest Service

SELECTED REFERENCES

EXECUTIVE ORDERS

Executive Order 11988 (Floodplain Management)

Executive Order 11990 (Protection of Wetlands)

Executive Order 11593 (Cultural Resources)

Executive Order 12898 (Environmental Justice)

Executive Order 13175 (Consultation and Coordination with Indian Tribal Governments)

Executive Order 13186 (Migratory Birds)

NPS DIRECTOR'S ORDERS

DO-2 (Planning Process Guidelines)

DO-12 (Conservation Planning, Environmental Impact Analysis, & Decision-making)

DO-28 (Cultural Resource Management)

DO-55 (Interpreting the NPS Organic Act)

DO 77-7 (Integrated Pest Management Manual)

US FEDERAL GOVERNMENT

1916 National Park Service Organic Act, as amended

16 U.S.C. National Park Service General Authorities Act

1947 Federal Insecticide, Fungicide and Rodenticide Act, as amended

1958 Fish and Wildlife Coordination Act, as amended

1963 Clean Air Act, as amended

1966 National Historic Preservation Act, as amended

1969 National Environmental Policy Act (NEPA)

1972 Noise Control Act, as amended

1973 Endangered Species Act, as amended

1974 Archeological and Historic Preservation Act (88 Stat. 174)

1976 General Authorities Act (90 Stat 1939)

1977 Clean Water Act, as amended

1979 Archeological Resources Protection Act

1984 Farmland Protection Policy Act

1990 Americans with Disabilities Act (ADA) (104 Stat. 327)

1990 Native American Graves Protection and Repatriation Act

1992 Blue Ridge Parkway Gypsy Moth Integrated Pest Management Plan

1993 Government Performance and Results Act (GPRA)

1995 Gypsy Moth Management in the United States: A Cooperative Approach – Final Environmental Impact Statement, USDA

1995 Programmatic Agreement among the National Park Service (U.S. Department of the Interior), the Advisory Council on Historic Preservation, and the National Conference of State Historic Preservation Officers

2000 Blue Ridge Parkway Hazardous Tree Management Plan

2001 Blue Ridge Parkway Strategic Plan

NPS-77 (Natural Resources Management)

Dept. of the Interior, Departmental Manual, DM 516-NEPA Policies

36 Code of Federal Regulations, Chapter 1 – National Park Service

40 Code of Federal Regulations, Parts 1500-1508: NEPA Regulations

43 Code of Federal Regulations, Part 7 – Archeological Resources Protection

43 Code of Federal Regulations, Part 10 – Native American Graves Protection and Repatriation

50 Code of Federal Regulations, Part 17 – Endangered and Threatened Wildlife and Plants

ACRONYMS & GLOSSARY

A list of terms relevant to managing the Blue Ridge Parkway is provided below. Although not exhaustive, this glossary highlights some of the key terms and evolving concepts that are important to understanding National Park Service management policies and principles. Statutory definitions can be accessed on-line, e.g., at: www4.law.cornell.edu/uscode/.

ACRONYMS

ACHP Advisory Council on Historic Preservation
BLRI Blue Ridge Parkway
BMP Best Management Practice
CFR Code of Federal Regulations
CRM Cultural Resource Management
DEA Draft Environmental Assessment
DM Department of the Interior Manual
DGPS Digital Global Positioning System
EA Environmental Assessment
EIS Environmental Impact Statement
ESA Endangered Species Act of 1973
FR Federal Register
FWS U.S. Fish and Wildlife Service
GPRA Government Performance and Results Act of 1993
GMP General Management Plan
IPM Integrated Pest Management
LPP Land Protection Plan
NAGPRA Native American

Graves Protection and Repatriation Act
NEPA National Environmental Policy Act of 1969
NHPA National Historic Protection Act
NCWRC North Carolina Wildlife Resources Commission
PL Public Law
USC United States Code
USDA United States Department of Agriculture
USDI United States Department of Interior
USFS United States Forest Service
ROD Record of Decision

DEFINITION OF KEY TERMS

Accessibility: The provision of NPS programs, facilities, and services in ways that include individuals with disabilities, or makes available to those individuals the same benefits available to persons without disabilities.

Accession: A transaction whereby a museum object or specimen is acquired for a museum collection. Accessions include gifts, exchanges, purchases, field collections, loans, and transfers.

Administrative record: The “paper trail” that documents an agency’s decision-making process and the basis for the agency’s decision. It includes all materials directly or indirectly considered by persons involved in the decision-making process. These are the documents that a judge will review to determine whether

the process and the resulting agency decision were proper.

Affected environment: The existing biological, physical, cultural, social, and economic conditions of an area that are subjected to both direct and indirect changes, as a result of actions described within alternatives under consideration.

Air quality: A measure of health and visibility-related characteristics of air often derived from quantitative measurements of the concentrations of specific injurious or contaminating substances.

Alternatives: A reasonable range of options that can accomplish an agency's objectives.

Ambient air: The surrounding air.

Aquatic species: A group of closely related and interbreeding living things, living or growing in, on, or near the water.

Archeological resource: Any material remains or physical evidence of past human life or activities, which are of archeological interest, including the record of the effects of human activities on the environment. An archeological resource is capable of revealing scientific or humanistic information through archeological research.

Area of Potential Effect: The area a project could potentially be affected by a proposed action.

Backcountry: Refers to primitive, undeveloped portions of parks, some of which may be categorized as "wilderness."

Best management practices

(BMPs): Practices that apply the most current means and technologies available to not only comply with mandatory environmental regulations, but also maintain a superior level of environmental performance.

Canopy: The uppermost layer of a forest where a layer of tree branches spread.

Consultation: A discussion, conference, or forum, in which advice or information is sought or given, or information or ideas are exchanged. Consultation usually takes place on an informal basis; formal consultation requirements for compliance with section 106 of NHPA are published in 36 CFR Part 800.

Cooperative agreement (CA): A negotiated agreement between two or more entities to achieve specific management objectives.

Cooperating associations: Private, non-profit corporations established under state law which support the educational, scientific, historical, and interpretive activities of the NPS in a variety of ways, pursuant to formal agreements with the Service.

Critical habitat: Specific areas within a geographical area occupied by a threatened or endangered species which contain those physical or biological features essential to the conservation of the species, and which may require special management considerations or protection; and specific areas outside the geographical area occupied by the species at the time of its listing, upon a determination by the Secretary of the Interior that such areas are essential for the conservation of the species.

Cultural landscape:

A geographic area, including both cultural and natural resources and the wildlife or domestic animals therein, associated with a historic event, activity, or person, or exhibiting other cultural or esthetic values. There are four non-mutually exclusive types of cultural landscapes- historic sites, historic designed landscapes, historic vernacular landscapes, and ethnographic landscapes.

Cultural resource: An aspect of a cultural system that is valued by or significantly representative of a culture, or that contains significant information about a culture. A cultural resource may be a tangible entity or a cultural practice. Tangible cultural resources are categorized as districts, sites, buildings, structures, and objects for the National Register of Historic Places, and as archeological resources, cultural landscapes, structures, museum objects, and ethnographic resources for NPS management purposes. By their nature, cultural resources are nonrenewable.

Council on Environmental

Quality (CEQ): The President's Council on Environmental Quality was established by the National Environmental Policy Act NEPA and is the agency responsible for the oversight and development of national environmental policy.

Critical habitat: Habitat approved in the *Federal Register* as critical for a particular listed species under section 4 of the Endangered Species Act. (1) The specific areas within the geographical area occupied by the species at the time it is listed, on which are found those physical or biological features (a) essential to the conservation of the species

and (b) which may require special management or protection (2)
Specific areas outside the geographical area occupied by the species at the time it is listed that are considered essential to the conservation of the species.

Cumulative effects (impacts):

Effects on the environment that result from the incremental impacts of an action when added to other past, present, and reasonably foreseeable future actions, regardless of which agency (federal or nonfederal) or person undertakes such actions. Cumulative effects can result from individually minor, but collectively significant, actions taking place over a period of time.

Deciduous: Shedding or losing foliage at the end of the growing season.

Defoliation: The separation of ripened leaves from a branch or stem; the falling or shedding of the leaves.

Degradation (natural

resources): Refers to negative impact(s) to natural resources or natural processes. The impact may be singular or cumulative; the extent may be local or ecosystemwide. The term degradation is used broadly and may refer to: reduction in habitat size, reduction in extent of plant populations, declining species vigor exhibited as reduced population numbers, reduced reproductive success, increased mortality rates, and/or decreased percent of available habitat utilized.

Denuded: To divest of covering; make bare.

Developed area: An area managed to provide and maintain

facilities (e.g., roads, campgrounds, housing) serving park managers and visitors. Includes areas where park development or intensive use may have substantially altered the natural environment or the setting for culturally significant resources.

DGPS System: A system that provides specially coded satellite signals that can be processed in a GPS receiver, enabling the receiver to compute position, velocity and time.

Ecosystem: A system formed by the interaction of a community of organisms with their physical environment, considered as a unit.

Environmental Assessment: A brief NEPA document that is prepared (a) to help determine whether the impact of an proposed action or its alternatives could be significant; (b) to aid the NPS in compliance with NEPA by evaluating a proposal that will have no significant impacts, but may have measurable adverse impacts; or (c) as an evaluation of a proposal that is either not described on the list of categorically excluded actions, or is on the list, but exceptional circumstances apply.

Environmental Impact

Statement: A detailed NEPA analysis document that is prepared when a proposed action or alternatives have the potential for significant impact on the human environment.

Environmental consequences:

A section of an environmental assessment that is the scientific and analytic basis for comparing alternatives. This discussion includes the environmental effects of the alternatives, any adverse

effects that cannot be avoided, and short-term, long-term and cumulative effects.

Encroachment: An advance beyond proper or legal limits; intruding.

Endangered species: Any species which is in danger of extinction throughout all or a significant portion of its range. These species are listed by the U.S. Fish and Wildlife Service.

Endangered Species Act of 1973 (amended) (ESA):

The Endangered Species Act ensures that no federal action will jeopardize the continued existence of federally listed or proposed threatened or endangered species of plant or animal.

Escarpment: A steep slope or long cliff that results from erosion or faulting and separates two relatively level areas of differing elevations.

Ethnographic landscape: An area containing a variety of natural and cultural resources that traditionally associated people define as heritage resources. The area may include plant and animal communities, structures, and geographic features, each with their own special local names.

Ethnographic resources:

Objects and places, including sites, structures, landscapes and natural resources, with traditional cultural meaning and value to associated peoples. Research and consultation with associated people identifies and explains the places and things they find culturally meaningful. Ethnographic resources eligible for the National Register of Historic Places are called traditional cultural properties.

Exclosure: An area from which livestock or other animals are excluded.

Exotic plants: Plant or animal species introduced into an area where they do not occur naturally; non-native species.

Facilities: Refers to buildings, houses, campgrounds, picnic areas, visitor-use areas, operational areas, and associated supporting infrastructure such as roads, trails, and utilities.

Fauna: Refers to animal life.

Floodplain: Land on either side of a stream or river that is submerged during floods; typically discussed in terms of 50, 100, or 500-year events.

100-year floodplain: The land adjacent to a river corridor that would be covered by water during a 100-year flood event. A 100-year flood event has a 1% probability of occurring during any given year.

Foraging: The act of looking or searching for food or provisions.

Finding of No Significant Impact (FONSI): The public document following the preparation of a final environmental assessment that reflects the agency's final decision, rationale behind the decision, and commitments to monitoring and mitigation.

Frass: Caterpillar fecal excrement.

Gateway community: A community that exists in close proximity to a national park, and whose residents and elected officials often have shared interests and concerns regarding decisions that are made in

managing the park. Gateway communities usually offer food, lodging, and other services to park visitors. They also provide opportunities for employee housing, and a convenient location to purchase goods and services essential to park administration.

Geologic resources: Features produced from the physical history of the earth, or processes such as exfoliation, erosion and sedimentation, glaciation, karst or shoreline processes, seismic, and volcanic activities.

General management plan (GMP): A plan which clearly defines direction for resource preservation and visitor use in a park, and serves as the basic foundation for decision making. GMPs are developed with broad public involvement.

Groundwater: All water found below the surface of the ground.

Gypsy moth: A European moth (*Lymantria dispar*) having hairy caterpillars that feed on foliage and are destructive to trees and shrubs. It was introduced into the United States in the late 1800s.

Ha: Hectare.

Hazard trees: A tree can be considered potentially hazardous if it is situated in an area frequented by people or is located adjacent to valuable facilities and has defects in roots, stem or branches that may cause a failure resulting in property damage, personal injury or death.

Headwaters: The water from which a river rises; a source.

Helispots: Helicopter landing and take off area.

Historic property: A district, site, building, structure, or object significant in the history of American archeology, architecture, culture, engineering, or politics at the national, state, or local level.

Historic district: A geographically definable area, urban or rural, possessing a significant concentration, linkage or continuity of sites, landscapes, structures, or objects, united by past events or aesthetically by plan or physical developments. A district may also be composed of individual elements separated geographically but linked by association or history.

Hydrology: A science dealing with the properties, distribution and circulation of water on the surface of the land, in the soil and underlying rocks, and in the atmosphere.

Impact: The likely effects of an action or proposed action upon specific natural, cultural, or socioeconomic resources. Impacts may be direct, indirect, cumulative, beneficial, or adverse. Direct impacts are those occurring at the same time and place as the action itself. Indirect impacts occur later in time or are farther removed in distance from the action, yet are reasonably foreseeable. Severe impacts that harm the integrity of park resources or values are known as "impairments."

Impairment: An impact so severe that, in the professional judgment of a responsible NPS manager, it would harm the integrity of park resources or values and violate the 1916 NPS Organic Act.

Implementation plan: A plan that focuses on how to implement

an activity or project needed to achieve a long-term goal. An implementation plan may direct a specific project or an ongoing activity.

Integrated pest management: A decision-making process that coordinates knowledge of pest biology, the environment, and available technology to prevent unacceptable levels of pest damage, by cost-effective means, while posing the least possible hazard to people, resources, and the environment.

Invasive native and exotic plants: A species which takes over a new habitat where it was not previously found, often to the detriment of species which were there before.

Invertebrate: Generally, any animal that does not have a spine (vertebrae).

Lessee: One that holds a lease.

Lightscares (natural ambient): The state of natural resources and values as they exist in the absence of human-caused light.

Management prescriptions: A planning term referring to statements about desired resource conditions and visitor experiences, along with appropriate kinds and levels of management, use, and development for each park area.

Mission-critical: Something that is essential to the accomplishment of an organization's core responsibilities.

Mitigation: An activity designed to avoid, minimize, rectify, reduce or compensate the severity of, or eliminate impacts from the proposed project. A mitigation

measure should be a solution to an identified environmental problem.

Monitoring: To keep track of systematically with a view to collecting information.

Museum collection: Objects, works of art, historic documents, and natural history specimens collected according to a rational scheme and maintained so they can be preserved, studied, and interpreted for public benefit.

National Environmental Policy Act of 1969 (NEPA): A law enacted on January 1, 1970 that established a national policy to maintain conditions under which humans and nature can exist in productive harmony and fulfill the social, economic and other requirements of present and future generations of Americans.

National Historic Landmark: A district, site, building, structure, landscape, or object of national historical significance, designated by the Secretary of the Interior under authority of the Historic Sites Act of 1935 and entered in the National Register of Historic Places.

National Historic Preservation Act of 1966 (NHPA): This act required federal agencies to give consideration to historic properties determined significant (properties listed on or determined to be eligible for the National Register of Historic Places) prior to expending funding for, authorizing, or licensing a federal project or permit.

National Natural Landmark Register: A program which seeks to identify and encourage the preservation of areas that illustrate the ecological and geological character of the United States.

National Park Service (NPS): An agency in the Department of the Interior responsible for protection and preservation of 384 natural and cultural units throughout the United States.

National Register of Historic Places: The comprehensive list of districts, sites, buildings, structures, and objects of national, regional, state, and local significance in American history, architecture, archeology, engineering, and culture kept by the National Park Service under authority of the National Historic Preservation Act of 1966.

Natural resources: Features and values that include plants and animals, water, air, soils, topographic features, geologic features, paleontological resources, natural quiet and clear night skies.

NEPA process: The objective analysis of a proposed action to determine the degree of its environmental impact on the natural and physical environment; alternatives and mitigation that reduce that impact; and the full and candid presentation of the analysis to, and involvement of, the interested and affected public. Required of federal agencies by the National Environmental Policy Act of 1969.

No action alternative: An alternative in an environmental assessment that continues current management direction. A no action alternative is a benchmark against which action alternatives are compared.

Nonnative species: Species of plants or animals that do not naturally occur in a particular area and of often interfere with natural biological systems. Also known as

alien, introduced, or exotic species.

Organic Act (NPS): The 1916 law (and subsequent amendments) that created the National Park Service and assigned it responsibility to manage the national parks.

Paleontological/paleoecological resources: Resources such as fossilized plants, animals, or their traces, including both organic and mineralized remains in body or trace form. Paleontological resources are studied and managed in their paleoecological context (that is, the geologic data associated with the fossil that provides information about the ancient environment).

Pheromone flakes: A mating disrupter that is detectable only to gypsy moths, so no other species is harmed.

Predation: The capturing of prey as a means of maintaining life.

Preservation (cultural resource): The act or process of applying measures to sustain the existing form, integrity, and material of a historic structure, landscape, or object. Work may include preliminary measures to protect and stabilize the property, but generally focuses on the ongoing preservation maintenance and repair of historic materials and features rather than extensive replacement and new work.

Preservation (natural resource): The act or process of preventing, eliminating, or reducing human-caused impacts to natural resources and natural processes.

Record of decision (ROD): The document which is prepared to substantiate a decision based on an analysis (e.g., an EIS). When

applicable, it includes a detailed discussion of rationale and reasons for not adopting all mitigation measures analyzed.

Rehabilitation (cultural resources): The act or process of making possible an efficient compatible use for a historic structure or landscape through repair, alterations, and additions while preserving the portions or features which convey the historical, cultural and architectural values.

Rehabilitation (natural resources): All activities conducted to improve the quality or biologic function of an impacted natural resource. The term rehabilitation connotes a less extensive process than restoration. Site impacts may preclude a full restoration but project work is undertaken to enhance the extent or function of natural processes.

restoration (cultural): The act or process of accurately depicting the form, features, and character of an existing historic structure, landscape, or object as it appeared at a particular period of time, by removing modern additions and replacing lost portions of historic fabric, paint, or other elements.

Restoration (natural): Work conducted to remove impacts to natural resources and restore natural processes, and to return a site to natural conditions.

Revegetation: Replacement or augmentation of native plants in an area largely or entirely denuded of vegetation.

Riparian areas: Areas that are on or adjacent to rivers and streams; these areas are typically rich in biological diversity.

Right-of-way (ROW): An authorization provided that specifies the legal right of use, occupancy, or access across land or water areas for a special purpose or purposes.

Rivulets: A small brook or stream; a streamlet.

Sacred sites: Certain natural and cultural resources treated by American Indian tribes and Alaska natives as sacred places having established religious meaning, and as locales of private ceremonial activities.

Section 7 Consultation: Section 7 of the Endangered Species Act requires consultation with the U.S. Fish and Wildlife Service if the habitat of a threatened or endangered plant or animal may be affected by a federally authorized action.

Slow-the-Spread: In 1999 and following a successful pilot project initiated in 1992, the USDA Forest Service, along with State and Federal cooperators, implemented the National Gypsy Moth Slow the Spread (STS) Project across the 1,200 mile gypsy moth frontier from North Carolina through the Upper Peninsula of Michigan. The goal of the Project is to use novel integrated pest management (IPM) strategies in order to reduce the rate of gypsy moth spread into uninfested areas.

Snag: A standing dead tree.

Soundscape (natural): The aggregate of all the natural, non-human-caused sounds that occur in parks, together with the physical capacity for transmitting natural sounds.

Strategic Plan: A Service-wide, 5-year plan required by GPRA (5 USC 306) in which the NPS states (1) how it plans to accomplish its mission during that time, and (2) the value it expects to produce for the tax dollars expended.

Similarly, each park, program, or central office has its own strategic plan, which considers the Service-wide mission plus its own particular mission. Strategic plans serve as “performance agreements” with the American people.

Sustainable design: Design that applies the principles of ecology, economics, and ethics to the business of creating necessary and appropriate places for people to visit, live, and work.

Sustainable practices/principles:

Those choices, decision, actions and ethics that will best achieve ecological/biological integrity; protect qualities and functions of air, water, soil, and other aspects of the natural environment; and preserve human cultures.

Sustainable practices allow for use and enjoyment by the current generation, while ensuring that future generations will have the same opportunities.

Surface water: Water that naturally flows or settles on top of natural landforms and vegetation, often as rivers, springs, seeps streams, lakes, ponds, and other bodies of water.

Threatened species: Any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range. These species are listed by the U.S. Fish and Wildlife Service.

Universal design: The design of products and environments to be usable by all people to the greatest extent possible, without the need for adaptation or specialized design.

Visitor experience: The perceptions, feelings, and interaction a park visitor has in relationship with the environment.

Watershed: The region draining into a river, river system, or body of water.

Wetland: Areas that are inundated by surface or groundwater with a frequency sufficient to support, under normal circumstances, vegetation or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction.

Wild and Scenic Rivers: Those rivers receiving special protection under the Wild and Scenic Rivers Act.

TYPES OF AUTHORITIES – SOURCES OF NPS GUIDANCE

Constitution: The fundamental law of the United States.

Code of Federal Regulations (CFR): A publication that codifies the general and permanent rules or regulations published in the Federal Register by the Executive branch departments and agencies of the federal government, and which carry the force of law. The citation 36 CFR 1.1 refers to part 1, section 1, of title 36.

Department of the Interior Manual (DM): The compilation

of policies, procedures, and guidelines governing operations of the various bureaus of the Department of the Interior.

Director’s Orders: Provide guidance for implementing certain aspects of NPS Management Policies, and are used as a vehicle for updating Management Policies between publishing dates. In many cases, Director’s Orders are further supplemented by handbooks or reference manuals.

Executive Orders, Memoranda, or Proclamations: Regulations having the force of law issued by the President of the United States to the Executive branch of the federal government.

Federal Register: A daily publication of the National Archives and Records Administration that updates the Code of Federal Regulations, in which the public may review the regulations and legal notices issued by federal agencies. Source citations for the regulations are referred to by volume number and page number of the FR and the date of publication (e.g., 65 FR 2984, January 19, 2000).

Public Law: A law or statute of the United States.

Regulations: Rules or orders prescribed by federal agencies to regulate conduct, and published in the CFR.

Unites States Code (USC): The systematic collection of the existing laws of the United States, organized under 50 separate titles. The citation 16 USC 1 refers to section 1 of title 16.

LIST OF AGENCIES AND ORGANIZATIONS TO WHOM COPIES OF THE EA WERE SENT

Congressional Offices

Honorable Rich Boucher, VA 9th District Office, Abingdon, VA
Honorable Virgil H. Goode, Jr., VA 5th District Office, Charlottesville, VA
Honorable Bob Goodlatte, VA 6th District Office, Roanoke, VA

Federal Agencies

Department of Agriculture
Forest Service, Glenwood & Pedlar Ranger District Office, Natural Bridge
Station, VA
Department of Interior
Fish and Wildlife Service, Chesapeake Bay Field Office
Fish and Wildlife Service, Virginia Field Office
National Park Service, Shenandoah National Park, Luray, VA
US Army Corps of Engineers
Norfolk District Office, Norfolk, VA

State Agencies

Virginia Department of Historic Resources
Division of Cultural Resources, Richmond, VA
Virginia Department of Agriculture and Consumer Services, Richmond, VA
Virginia Department of Conservation and Recreation
Division of Natural Heritage, Richmond, VA
Virginia Department of Game and Inland Fisheries
Nongame and Environmental Programs, Richmond, VA
Virginia Department of Environmental Quality
Office of Environmental Impact Review

Counties

Bedford City Manager, Bedford, VA
Floyd County Board of Supervisors, Floyd, VA
Mayor, Town of Floyd, Floyd, VA

Individuals

Dr. Joseph C. Mitchell, Richmond, VA
Dr. Carola Haas, Blacksburg, VA
Dr. Gwynne Ramsey, Lynchburg, VA
Kent Schwarzkopf, Harpers Ferry, WV
Virginia Chapter – Sierra Club, Richmond, VA
Jane Sutton, Editor, Parkway Milepost
The Nature Conservancy, Virginia Field Office, Charlottesville, VA
Dr. Paul Stattler, Lynchburg, VA
Department of Biology, Radford University, Radford, VA

Website

NPS/BLRI website: <http://www.nps.gov/blri/pphtml/facts.html>

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- USDA, Forest Service. 1995. *Gypsy Moth Management in the United States: A Cooperative Approach.* Final Environmental Impact Statement. Vols. I - V.
- Wilson, R.W., Jr.; Fontaine, G.A. 1978. *Gypsy Moth Egg Mass Sampling with Fixed and Variable-Radius Plots.* USDA Ag. Handbook #523. 45 p.

APPENDIX 1 – SPRAY LOCATION MAPS

(Please see link, “2003 Gypsy Moth Spray Maps”)

APPENDIX 2



United States Department of the Interior

FISH AND WILDLIFE SERVICE

Ecological Services
6669 Short Lane
Gloucester, VA 23061



November 19, 2002

Superintendent Daniel Brown
Blue Ridge Parkway
National Park Service
199 Hemphill Knob Road
Asheville, North Carolina 28803

Re: 2003 - Gypsy Moth Suppression
and Slow the Spread
Blue Ridge Parkway, Virginia

Dear Superintendent Brown:

This letter is the U.S. Fish and Wildlife Service's response to the U. S. Department of Interior, National Park Service's *Scoping Notice for the Proposed Treatment of Gypsy Moth Impacts Along the Blue Ridge Parkway in 2003* and request for information regarding Federally listed, proposed and candidate species and designated or proposed critical habitat in Virginia. The National Park Service is planning the 2003 gypsy moth (*Lymantria dispar*) Slow the Spread and Suppression program efforts. The proposed action may entail aerial spraying in May 2003 of 5,000 acres over ten isolated gypsy moth populations along the Blue Ridge Parkway. The ten spray blocks fall within the following Virginia counties: Amherst, Bedford, Floyd, Montgomery, Rockbridge, and Roanoke. Based on gypsy moth egg mass concentrations, suppression will be effected on approximately 1,000 acres using up to two applications of *Bacillus thuringiensis* var. *kurstaki* (Btk), a naturally occurring bacterium, and Slow the Spread will be effected over approximately 4,000 acres using Disparlure, a gypsy moth specific pheromone. The Fish and Wildlife Service submits the following comments in accordance with the provisions of the Endangered Species Act (87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.) and the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.), which authorizes the Fish and Wildlife Service to provide assistance and cooperate with other Federal, state, public and private agencies in the conservation of all species of wildlife and their habitats.

Endangered Species Act Comments

The Fish and Wildlife Service has reviewed our records for species occurrences; enclosed are species lists for the counties within which the project areas occur. The St. Francis' Satyr (*Neonympha mitchelli francisci*), a Federally listed endangered butterfly, has been documented within Floyd County. A portion of spray block H (1,825 acres) and spray block J (200 acres) is

located in Floyd County, although the butterfly has not been documented with the two spray blocks. To avoid any impacts to the species from the Slow the Spread activity, as indicated on the National Park Service's *Scoping Notice*, these two spray blocks should be treated only with Disparlure, the pheromone flake which specifically affects the gypsy moth.

The Fish and Wildlife Service believes that the project, as proposed, is not likely to adversely affect Federally listed, proposed or candidate species. No designated or proposed critical habitat occurs within the project areas. Should project plans change, or if additional information on the distribution of listed, candidate, or proposed species or designated critical habitat becomes available, this determination may be reconsidered.

Fish and Wildlife Coordination Act Comments

Peaks of Otter Salamander (*Plethodon hubrichti*)

The Peaks of Otter Salamander, a species with which we are concerned, occurs within spray block D and outside, but proximal to, spray blocks E and F (all blocks are on the Peaks of Otter topographic quadrangle). The species is endemic to Virginia and considered rare. Much of the literature indicates the threat to this species is habitat deforestation and defoliation due to gypsy moth infestations. The three spray blocks are scheduled for two treatments with *Bacillus thuringiensis* var. *kurstaki*. Based on the habitat requirements for this species, mature forest with canopy that provides moist leaf littered habitat primarily along the Blue Ridge Parkway, we believe that this treatment may be beneficial in the long term for the salamander.

Aerial drift to non-target lands

In order to reduce pesticide spray drift onto non-target lands and waterbodies, the Fish and Wildlife Service routinely recommends that pesticides not be applied aerially when wind velocities are greater than seven miles per hour or when inversion conditions exist. Wind direction, wind speed, and inversion conditions can be assessed using measurement devices such as anemometers, windsocks, and smoke devices. Smoke from existing burning activity can be used for assessing inversions if similar in elevation and within one mile of the application block. To minimize spray drift in the riparian stream corridors, the Fish and Wildlife Service recommends that aerial spraying be shut off 300 feet from waterbodies and flight paths be parallel to, rather than perpendicular to, waterbodies.

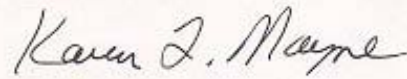
The Fish and Wildlife Service appreciates the opportunity to provide comment to the National Park Service early in the National Environmental Policy Act process for this proposed Integrated

Superintendent

3

Pest Management project. If you have any questions, please contact Cindy Kane at (804) 693-6694, extension 109.

Sincerely,



Karen L. Mayne
Supervisor
Virginia Field Office

Enclosure

cc:

Virginia Dept. of Game and Inland Fisheries, Richmond, VA
(Attn: Mr. Brian Moyer)

Virginia Dept. of Conservation and Recreation, Div. of Natural Heritage, Richmond, VA
(Attn: Ms. René Hypes)

Virginia Dept. of Agriculture and Consumer Services, Richmond, VA
(Attn: Mr. Keith Tignor)



United States
Department of
Agriculture

Forest
Service

George Washington & Jefferson
National Forests

Glenwood & Pedlar Ranger Districts
PO Box 10, 27 Ranger Lane
Natural Bridge Station, VA 24579
540/291-2188

File Code: 1950-1

Date: November 7, 2002

Superintendent
Attn: Gypsy Moth control
Blue Ridge Parkway
199 Hemphill Knob Road
Asheville, NC 28803

Dear Superintendent:

This letter responds to your scoping letter pertaining to proposed gypsy moth suppression projects in 2003. We fully support the proposal for the following reasons:

We are concerned about the impacts of defoliation and potential tree mortality that severe gypsy moth defoliation can cause and on various wildlife species. We are quite familiar with the species composition in the general area of Blocks A through G and know that there is a large oak component. We also know that these stands are generally 80 to 100 years old or more. Severe defoliation could reduce the hard mast production of these oaks for as long as three years. Given the relatively old age of these trees, gypsy moth induced mortality is a distinct possibility, which results in reduced hard mast production for much longer. Species such as black bear, squirrel, and wild turkey could be severely impacted. Suppression would help avoid such detrimental impacts.

We are also concerned about potential visual quality and aesthetic impacts (nuisance impacts) that the gypsy moth can cause for recreationists. This includes a concern for potential economic impacts to the local area and merchants that could result if gypsy moths were allowed to go unchecked. Suppression of the gypsy moth would help reduce adverse impacts to recreationists and the local economy.

Finally, we want to highlight the presence of the Peaks of Otter Salamander (POS) in the vicinity of Blocks D, E, F, and G. While I am sure that you are aware of the presence of this Forest Service sensitive species, we would be remiss in not mentioning it. Your proposal to use Btk is perfectly consistent with protection of the habitat of this salamander while mitigating any adverse impacts to insect populations upon which it feeds. Indeed, we have received correspondence from the U.S. Fish and Wildlife Service that supports the use of Btk within the POS Conservation Area in which they state that they believe the use of Btk may be beneficial in the long term for the salamander.

Thank you for the opportunity to comment on your 2003 Gypsy Moth Suppression proposal.

Sincerely,

PATRICIA EGAN
District Ranger



Caring for the Land and Serving People

Printed on Recycled Paper



W. Tayloe Murphy, Jr.
Secretary of Natural
Resources



Joseph H. Maroon
Director

COMMONWEALTH of VIRGINIA
DEPARTMENT OF CONSERVATION AND RECREATION

217 Governor Street
Richmond, Virginia 23219-2010
Telephone (804) 786-7951 FAX (804) 371-2674 TDD (804) 786-2121

Superintendent
Attn: Gypsy moth control
Blue Ridge Parkway
199 Hemphill Knob Road
Asheville, North Carolina 28803

December 15, 2002

Re: Proposed Treatment of Gypsy Moth Impacts along the Blue Ridge Parkway in 2003

Dear Mr. Superintendent:

The Department of Conservation and Recreation's Division of Natural Heritage (DCR) has searched its Biological and Conservation Datasystem (BCD) for occurrences of natural heritage resources from the proposed gypsy moth treatment blocks indicated on the submitted maps. Natural heritage resources are defined as the habitat of rare, threatened, or endangered plant and animal species, unique or exemplary natural communities, and significant geologic formations.

DCR's review of gypsy moth treatment areas is based on both known and potential occurrences of natural heritage resources within or adjacent to proposed blocks. A primary concern from the standpoint of biodiversity preservation is the impact that gypsy moth suppression treatments have on non-target organisms. For our purposes, non-target organisms include those species directly susceptible to the indications of a proposed treatment (e.g. Lepidopterans killed by Bt), as well as species that may be secondarily affected by a proposed treatment. Secondarily-affected organisms may include, but are not limited to, rare plants with insect pollinators that are directly susceptible to gypsy moth treatments, and songbirds or small mammals faced with a diminished prey base following gypsy moth treatment.

With these cautions in mind, DCR submits the following comments on the Proposed Treatment of Gypsy Moth impacts along the Blue Ridge Parkway in 2003:

Block A

According to information currently in our files, the Canada anemone (*Anemone canadensis*, G5/S1/NF/NS) has been documented within the proposed spray block. Canada anemone is a perennial with a white flower that blooms in mid-summer. Insects pollinate this rare plant and the use of *Btk* may have an adverse effect on these pollinators. Therefore, DCR recommends changing the proposed treatment from *Btk* to Disparlure for this spray block.

An Agency of the Natural Resources Secretariat

Block B- Block J

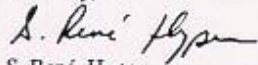
BCD documents the presence of natural heritage resources in the project area. However, due to the scope of the activity and the distance to the resources, we do not anticipate that this project will adversely impact these natural heritage resources.

Under a Memorandum of Agreement established between the Virginia Department of Agriculture and Consumer Services (VDACS) and the Virginia Department of Conservation and Recreation (DCR), DCR represents VDACS in comments regarding potential impacts on state-listed threatened and endangered plant and insect species. The current activity will not affect any documented state-listed plants or insects.

New and updated information is continually added to BCD. Please contact DCR for an update on this natural heritage information if a significant amount of time passes before it is utilized.

Should you have any questions or concerns, feel free to contact me at 804-371-2708. Thank you for the opportunity to comment on this project.

Sincerely,



S. René Hypes
Project Review Coordinator

ASSESSMENT OF ACTIONS HAVING AN EFFECT ON CULTURAL RESOURCES (Section 106)

A. DESCRIPTION OF UNDERTAKING

1. Park: Blue Ridge Parkway District: ALL Section: All Milepost: 0-469

2. Work/Project Description:

a. Project Title and Project ID Number: Gypsy Moth Management Plan EA (PIN 981)

b. Describe project and area of potential effects (as defined in 36 CFR Part 800.2(c)); explain why work/project is needed.

It is proposed in this project to spray certain infested areas of the Parkway with one component or a combination of Btk, Gypchek, or pheromone flakes. All three of these spray compounds have been proven conclusively to have no effect on any historic buildings, any sub-surface archeological resources or any Parkway structures, such as stone-faced bridges, that are potentially contributing resources to any historic district designated in the future. Since the elements of the gypsy moth treatment project will not affect Parkway cultural resources, there would be no ground disturbing activities involved with the proposed project, no alteration of any historic structures, nor any change in the use of historic resources, it has been determined that there will be no known cultural resources affected.

3. Has the area of potential effects been surveyed to identify cultural resources?

☐ No

☐ Yes Source or Reference—

☒ Check here if no known cultural resources will be affected. (If area has been disturbed in the past, please explain or attach additional sheets to describe nature, extent, and intensity of disturbance.)

4. Affected Resource(s):

Name and number(s): _____ Location: _____ NR status: _____

Name and number(s): _____ Location: _____ NR status: _____

(REPEAT FOR EACH AFFECTED RESOURCE)

5. The proposed action will: (Check as many as apply.)

☐ Destroy, remove, or alter features/elements from a historic structure

☐ Replace historic features/elements in kind

☐ Add nonhistoric features/elements to a historic structure

☐ Alter or remove features/elements of a historic setting or environment (inc. terrain)

☐ Add nonhistoric features/elements (inc. visual, audible, or atmospheric) to a historic setting or cultural landscape

☐ Disturb, destroy, or make archeological resources inaccessible, or alter terrain

☐ Potentially affect presently unidentified cultural resources

☐ Begin or contribute to deterioration of historic fabric, terrain, setting, landscape elements, or archeological or ethnographic resources

☐ Involve a real property transaction (exchange, sale, or lease of land or structures)

Other (please specify)

6. Measures to prevent or minimize loss or impairment of historic/prehistoric fabric, setting, integrity, or data:

N/A

7. Supporting Study Data: (attach if feasible; if action is in a plan, give name and project or page number):

8. Attachments: ☐ Maps ☐ Archeological Clearance, if applicable ☐ Drawings ☐ Specifications ☐ Photographs ☐

Site plan ☐ List of Materials ☐ Samples

☒ Other – Environmental Assessment

Prepared by:

Suzette Molling
Suzette Molling, Environmental Protection Specialist (828) 271-4779 ext. 219

B. PARK 106 COORDINATOR REVIEW AND RECOMMENDATIONS (completed by the park Section 106 coordinator)

1. Review by additional specialists:

2. Assessment of Effect:

☒ No Effect ☐ No Adverse Effect ☐ Adverse Effect

3. Compliance requirements: (The following is the park's assessment of Section 106 process needs and requirements for this undertaking.):

[] A. STANDARD 36 CFR PART 800 CONSULTATION

Consultation under 36 CFR Part 800 has been carried out subsequent to preparation of this XXX form.

[X] B. PROGRAMMATIC EXCLUSION

The above action meets all conditions for a programmatic exclusion under Stipulation IV of the 1995 Servicewide PA for Section 106 compliance.

APPLICABLE EXCLUSION(s): Exclusion IV.B 2 [specify 1-13] or IV.C addition to the list of exclusions.]

[X] C. PLAN-RELATED UNDERTAKING

Consultation and review of the proposed undertaking were completed in the context of a plan review process, in accordance with the 1995 Servicewide PA and 36 CFR Part 800.

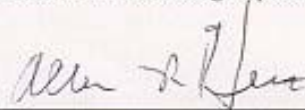
[] D. UNDERTAKING RELATED TO ANOTHER AGREEMENT

The proposed undertaking is covered for Section 106 purposes under another document such as a statewide agreement established in accord with 36 CFR Part 800.7 or counterpart regulations.

[] E. STIPULATIONS/CONDITIONS

Following are listed any stipulations or conditions necessary to ensure that the assessment of effect above is consistent with 36 CFR Part 800 criteria of effect or to mitigate potential adverse effects.

Recommended by



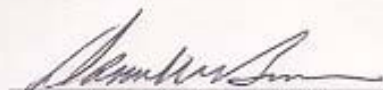
Date

3/28/03

Allen R. Hess, Cultural Resource Management Specialist

D. SUPERINTENDENT'S APPROVAL

The proposed work conforms to NPS Management Policies and DO-28 and I approve the recommendations, stipulations, or conditions noted in Section B of this form.



Daniel W. Brown, Superintendent

3/27/13

Date

GYPSY MOTH LIFE CYCLE PHOTOS



First instar larvae (caterpillars) hatch in the spring from eggs laid the previous summer.



Newly hatched larvae hang by silken threads, are caught by the wind, and thereby disperse to other trees in the forest.



Small larvae begin feeding on newly expanded leaves.



Larvae go through 5 to 6 larval stages (instars). Between stages they molt by shedding their skin.



Larvae feed during the night and rest in bark crevices. During the day (except at high densities, feeding occurs all day)



Pupation occurs about 8 weeks after egg hatch. Pupae are usually located in bark crevices or other cryptic locations.



The male moth has plumose antennae to detect the sex pheromone emitted by the female.



After mating, the female lays eggs in a single mass covered with hairs from the abdomen. Most egg masses are located on tree trunks. The winter is spent in the egg stage.