North Carolina Department of Agriculture & Consumer Services

In Cooperation with

United States Department of Agriculture - APHIS-PPQ

ENVIRONMENTAL ASSESSMENT

2011 Cooperative Gypsy Moth Eradication Project

For

Onslow County

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1.0 PURPOSE OF AND NEED FOR ACTION

1.1 Proposed Action

As part of the statewide strategy to slow the spread of the gypsy moth, *Lymantria dispar* (L.), the North Carolina Department of Agriculture & Consumer Services (NCDA&CS) in cooperation with the United States Department of Agriculture-Animal and Plant Health Inspection Service-Plant Protection and Quarantine (USDA-APHIS-PPQ) is proposing to treat 1 localized infestation in 1 county (Table 1). The gypsy moth infestations proposed for treatment cover an estimated 400 acres of non-federal lands in Onslow County. The proposed action for this project is Alternative 2: for the 400 acre Hubert site, a triple application of the biological insecticide Gypchek®; for a 20 acre site completely within the Hubert site, a single application of Mating Disruption.

1. One site totaling 400 acres (Hubert) would receive 3 applications of Gypchek® at 1 trillion (1×10^{12}) OBs per acre.
2. Approximately 20 acres within the 400 acre Hubert site would receive 1 application of Mating Disruption at 45g ai per acre.

Table 1: The proposed action by site name, county, total acres, number of applications, insecticide and dose per application.

Site Name	County	Total Acres	No. Applications	Insecticide and Dose
Hubert	Onslow	400	3	Gypchek® at 1 trillion ($1x10^{12}$) OBs per acre
Hubert	Onslow	20	1	Mating Disruption at 45g ai per acre
	Total all treatments	**420***		

**The 20 acre Mating Disruption site is located entirely within the 400 acre Gypchek site. Thus total treatment area is 400 acres*

Private aerial application contractors under the supervision of NCDA&CS and APHIS-PPQ personnel will complete the treatment of the 400 acre site. NCDA&CS personnel will complete the treatment of the 20 acre site using ground application equipment.

The proposed treatments would be scheduled to coincide with the most susceptible stage of the gypsy moth. For the 400 acre site, young caterpillars are targeted with Gypchek® in early- to mid-April. For the 20 acre site, adult male moths are targeted with Mating Disruption in May or June.

The treatments will be followed by monitoring with pheromone traps in 2011 and 2012 to determine treatment effectiveness.

1.2 Need for Action

The gypsy moth is not native to the United States; therefore, it lacks many of the natural controls from its native range. Although oaks are the preferred host, gypsy moth caterpillars feed on the foliage of many plants and many other tree species are defoliated when oaks are not available. When gypsy moth populations increase to the level where defoliation is evident, the caterpillars can cause a substantial public nuisance, affect human health, reduce tree growth, and cause branch dieback or tree mortality.

Since the gypsy moth was accidentally introduced into Massachusetts in 1869, it has steadily expanded its range west and southward and is now established in about one-third of the susceptible habitat in the United States. 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 (Liebhold et al 1992, Sharov et al 1998). The transition area is an area where gypsy moth populations located within it are transitioning from continuous to isolated and are characterized as recently established, separate from one another and at very low densities. The benefits of reducing the rate of spread of gypsy moth exceed the costs of treatment and monitoring by a ratio greater than three to one (Leuschner et. al 1996, Mayo et al 2003).

Invasion biology shows that the further a population is from the proximal population boundary, the more beneficial it is to eradicate that population (Sharov and Liebhold 1998). Thus eradication treatments far beyond the proximal boundary of the STS project, such as Hubert, would be expected to have a yet higher benefit to cost ratio.

Areas proposed for treatment outside of STS are selected by geographically analyzing monitoring data collected using roughly 10,000 pheromone traps deployed annually throughout the eradication zone. There are 5 infestations located in North Carolina but 4 are in the STS area and are thus considered under a separate EA. The infestation outside the STS area in North Carolina is proposed for action here.

The State of North Carolina, with the NCDA&CS as the lead agency, is dedicated to protecting urban and rural forested habitats from damage by the gypsy moth and to enforcing interstate and intrastate quarantines to protect areas not currently infested by this exotic forest pest.

1.3 Objectives of the Proposed Action

If this population is left unchecked, it is expected to continue to grow, contributing to further spread and to reach defoliating levels within 3 to 5 years. The objective for the proposed project is to eradicate this localized gypsy moth population, thus preventing further spread and damage. The purpose of the proposed Gypchek treatment is to reduce the gypsy moth population to the point that the ground application of mating disruption would be effective in causing further population reduction, perhaps even eradication.

1.4 Relationship To Other Decisions

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

In late 1995, the USDA issued a new programmatic FEIS entitled, "Gypsy Moth Management in the United States: a cooperative approach". Pursuant to the National Environmental Policy Act (NEPA), a ROD was signed in January of 1996. The ROD documents the selection and rationale for approving the alternative selected from the FEIS. The selected alternative calls for the use of six techniques to suppress, slow the spread, or eradicate gypsy moth populations, when a site-specific environmental analysis indicates a need to do so. Due to the location of the infestation in this proposed action, eradication is the objective (FEIS Vol. II, p. 2-7 through 2-11).

The environmental analyses for the FEIS examined biological, physical, economic, and social considerations for gypsy moth management (FEIS, Vol. II, 4-71 through 4-95). The biological factors analyzed were: the extent of damage caused by infestations (FEIS Vol. II, p. 4-39 through 4-42); gypsy moth spread (FEIS Vol. II, p. 2-18 through 2-19); the range of gypsy moth host vegetation (FEIS Vol. II, p. 3-3 through 3-5); the human population including permanent residents, visitors to the intervention area, and workers (FEIS Vol. II, p. 3-8 through 3-10); and non-target organisms including other insects, fish, wildlife, soil organisms, and rare or endangered species (FEIS Vol. II, p. 4-43 through 4-44; 4-46 through 4-50). Physical factors analyzed were topography, lakes, streams, ponds, and soils (FEIS Vol. II, p. 3-7 through 3-8). Economic factors considered were the impact that larval nuisance, tree defoliation, and tree mortality may have on recreation, property values, aesthetic values, and the timber resource. Social factors considered were the impacts that gypsy moth larva,

tree defoliation, and tree mortality can have on homeowners and outdoor recreational activities, and the potential for human exposure to, and subsequent risk from the use of insecticides.

The alternative selected in the ROD includes all three of the gypsy moth management strategies analyzed in the FEIS--suppression, eradication, and slow the spread. NEPA demands that implementation of this alternative be preceded by a site-specific analysis that addresses local issues. This environmental assessment (EA) provides the site-specific analysis and is tiered to the programmatic FEIS as required by the ROD. The purpose of tiering is to eliminate repetitive discussions of the issues addressed in the FEIS (40 CFR, 1502.20 and 1508.28 in Council on Environmental Quality 1992). Thus, throughout this EA, many references to material in the FEIS will be used. This allows the EA to focus on issues specific to the action proposed by the NCDA&CS.

The FEIS provides for Federal funding and technical assistance by the USDA-APHIS-PPQ to state agencies for conducting gypsy moth projects outside the STS area. The selected alternative of the FEIS allows federally funded projects to use an IPM approach, if site-specific analysis indicates the need to do so. The FEIS also provides (1) standard operating procedures for spray projects and associated public involvement activities, and (2) an analysis of potential environmental and human health-related effects. A copy of the FEIS is available upon request from the NCDA&CS office listed on the title page of this EA.

This EA fulfills the state and NEPA-related site-specific planning necessary for the proposed 2011 NCDA&CS project and provides the USDA-APHIS-PPQ with the necessary information to make a decision on the proposed project. This EA presents management strategies that are designed to meet the objectives of the project on the proposed treatment site listed in Table I of this EA. It does not relate to other STS, suppression or eradication treatment activities outside the scope of this EA that may be conducted by the United States Department of Agriculture-Forest Service (USDA-FS), or NCDA&CS on other public and private North Carolina lands. Those activities are covered by other EAs and decisions. This EA does not prevent private citizens from managing gypsy moth on their own, nor does it constrain their control activities. The only constraints of private citizen actions are those imposed by Federal and State laws, local ordinances, or specific insecticide labeling.

1.5 Decisions to Be Made

State law authorizes the Commissioner of NCDA&CS to control quarantined and dangerously destructive plant pests (Appendix A). Every year, the NCDA&CS designates areas for gypsy moth STS and eradication treatments, and petitions the USDA-FS (State and Private Forestry) and/or USDA-APHIS-PPQ for cost-share funds to treat designated areas. Authorizing Federal legislation allows the USDA-FS or USDA-APHIS-PPQ to enter into these cooperative agreements with states to slow the spread of gypsy moth populations (Appendix A).

Each year, the USDA-FS and/or USDA-APHIS-PPQ assist the NCDA&CS (the applicant) in preparing the required EA for the requested cost-share funding when inside the STS boundaries (USDA-FS) or outside STS boundaries (USDA-APHIS-PPQ or USDA-FS). The USDA agency then evaluates the State's proposal in terms of its effectiveness and environmental consequences following the process required under the NEPA.

If, after those evaluations, APHIS determines that the program should proceed and is able to make a Finding of No Significant Impact (FONSI) to the environment, funding may be approved and the action could be implemented as early as March 10, 2011.

For further information on the 2011 North Carolina Statewide and STS Project contact the NCDA&CS office listed on the title page of this EA.

1.6 Summary of Public Involvement and Notification Process

NEPA requires public involvement and notification for projects utilizing Federal funds (40 CFR, 1506.6 in Council on Environmental Quality 1992), including those projects involving Federal cost share, as does the proposed action. Procedures outlined in this section address the NCDA&CS's compliance with those requirements.

It is the policy of North Carolina to have all proposed treatment areas reviewed through the intergovernmental review process. In January of 2011 the NCDA&CS provided maps of the proposed treatment sites to USDA-FS, United States Department of Interior Fish & Wildlife Service (FWS), NC Department of Environment, Health, and Natural Resources-Natural Heritage Program (NHP) and Division of Forest Resources (DFR), and North Carolina State University (NCSU) and requested input on the occurrence of proposed, threatened or endangered species or natural heritage resources that could potentially be impacted by the proposed action. This information was used to identify the issues associated with this project, to formulate the alternatives and to assess potential impacts for this proposed action.

1.7 Significant Issue

1) The effects of the proposed treatments on non-target organisms: The major concern under this issue is the potential impact of treatment activities on non-target lepidopterans (moths and butterflies) or their habitats in both of the project areas. Due to their highly specific mode of action, neither Gypchek® nor Mating Disruption impact non-target lepidopterans.

1.8 Other Issues

The following issues have been raised during scoping either this year or in the past. They are summarized here, with an explanation of why they were deemed non-significant.

1) The impact of these applications on cultural resources is not a significant issue because there are no architectural, historic, or archaeological sites that will be impacted from the use of Gypchek or Disparlure.
2) The impact of this application on the physical characteristics of wetlands and flood plains (compliance with Executive Orders 11988 and 11990) is not significant because no soil-disturbing actions are proposed; therefore, no effects on the physical characteristics of these areas are anticipated.
3) The effect of aerial application of Gypchek® on human health is not a significant issue: an extensive analysis with this conclusion is available in the Human Health Risk Assessment of the FEIS (Vol. II pp. 5-1 through 5-12). Gypchek® is a formulation of the naturally occurring Lymantria dispar nucleopolyhedrosis virus (LdNPV); a virus that is specific to the gypsy moth. Studies indicate that it does not cause infection even in people with compromised immune systems. There is no evidence to indicate that Gypchek® causes birth defects. The only human health hazard relates to potential minor allergic responses. No other effects (that is, systemic toxicity or infectivity) seem plausible. (FEIS, Vol. III, page 5-2).
4) The impact of open burning is not a significant issue because no burning of any kind is proposed.
5) The risk of a “Coastal Effect” is not a significant issue because aerial applications are typically completed within a couple of hours.

2.0 ALTERNATIVES INCLUDING THE PROPOSED ACTION

2.1 Discussion of Alternatives

The alternatives available under the 1995 FEIS are broad strategies developed to meet the needs of a national management program for gypsy moth. A range of treatment options are available to meet the objectives of each of the strategies described in the FEIS, including the selected alternative of suppression, eradication, and slow the spread. Six treatment options are available for use, alone or in combination. They are discussed in the FEIS (Vol. II, Table 2-1, p. 2-15). The treatment tactics and their effects on human health and safety, ecological effects, and the environmental consequences are discussed in Vol. II, Chapter 4 of the FEIS. The treatment options include 1) *Bacillus thuringiensis* variety *kurstaki* (*Btk*), 2) the gypsy moth virus (Gypchek®), 3) the insect growth regulator, diflubenzuron (Dimilin®), 4) mass trapping, 5) mating disruption and 6) sterile insect release.

The particular treatment or combination of treatments to be used in any project is a decision made at the project level in accordance with NEPA. The NCDA&CS and USDA-APHIS-PPQ considered different alternatives (treatment options) including the no action alternative, to meet the 2011 project objectives. The following section describes the alternatives (treatment options) considered for use in this site-specific proposal to eradicate an isolated gypsy moth population far in advance of the STS project area in North Carolina.

2.2 Alternatives Not Considered in Detail

Some treatment options were eliminated from detailed consideration for use on this proposed project. The rationale for their elimination is as follows:

Btk: Btk is an effective treatment for all gypsy moth population densities. Furthermore, it generally has limited effects on non-target organisms. However, Btk does have the potential to adversely impact any lepidopterous larvae present during treatment. Typically, this is of limited concern as any limited impact to Lepidopterans in a Btk treatment site is quickly remedied by recolonization from Lepidopteran populations immediately surrounding the site. However, this site contains a state rare species that might be adversely impacted if Btk were used. Recolonization would possibly be slow due to the limited population size. Additionally, other treatment alternatives that would not adversely impact this species should be given the chance to meet project objectives. This does not preclude the use of Btk in future eradication projects.

Use of Mass Trapping: Mass trapping is a labor-intensive treatment, especially over large areas. It is only used on small infestations of less than 100 acres. The extent of acreage proposed for treatment here and the inaccessibility of many areas within the proposed treatment sites eliminate mass trapping as a viable treatment option under these circumstances. Additionally, the application of Mating Disruption renders ineffective the use of pheromone-baited traps for control agents.

Sterile Release: The objective of the sterile insect technique is to reduce the chance that female moths will mate with fertile males by releasing large numbers of sterile males. The result is progressively fewer fertile egg masses are produced, with eventual elimination of the population. The extended period during which pupae must be repeatedly released and the need to synchronize rearing of mass quantities of pupae for that release (treated pupae cannot be stockpiled) are obstacles to an operational program (FEIS-1995, Vol. II, App. A-10). The amount of acreage proposed for treatment, insufficient availability of treated pupae, and greatly increased application cost associated with a sterile insect release does not make this a viable option for this project.

Use of Diflubenzuron (Dimilin®): Dimilin® is an effective treatment for all population densities of the gypsy moth but it can have impacts on aquatic organisms and other insects. This treatment site contains waterbodies such as ponds, marsh, swamps, wet weather springs, rivers or creeks. Other treatments that have fewer non-target impacts will meet project objectives, therefore the use of Dimilin® is not considered in detail for this project. This does not preclude the use of Dimilin in future projects.

2.3 Alternatives Considered in Detail

2.3.1 Alternative 1 - No Action

Under this alternative the USDA-APHIS-PPQ would not fund the project to eradicate an isolated gypsy moth population on public lands in North Carolina outside of the STS area; consequently populations would increase and spread via natural or artificial means to uninfested areas in North Carolina and other states. Spread rates would increase to historical levels of 13 miles per year and populations would increase to defoliating levels within 3 to 5 years. Defoliation could be light, moderate or heavy, depending on the availability of gypsy moth preferred tree species.

2.3.2 Alternative 2 - Use of Gypchek® and Mating Disruption (Proposed action)

Under this alternative the USDA-APHIS-PPQ would cost-share with the NCDA&CS to treat the entire Hubert site (400 acres) with: 3 applications of Gypchek® in April timed for the early instar developmental stage; and 20 acres within the 400 acre Hubert site with one application of Mating Disruption in May or June immediately prior to male moth emergence.

Gypchek®: Gypchek® is a target-specific insecticide that is effective against moderate to high-density populations of the gypsy moth (300 to 5,000 egg masses per acre) but little is known about its efficacy in low-density populations. Gypcheck® is formulated out of a naturally occurring nucleopolyhedrosis virus that is specific to only gypsy moth larvae. Gypcheck® is not a contact pesticide; rather, gypsy moth larvae need to ingest the product in order for it to be effective. The virus interferes with food absorption and the larvae die in approximately 7-10 days. No other insects are affected by this product. Gypchek® is produced in limited quantities by the USDA-Forest Service, therefore it is reserved for use on sites where a gypsy moth-specific insecticide is required to protect sensitive, threatened or endangered species. Consultation with NC State Parks revealed one such Lepidopteran species, *Atrytonopsis n.s. 1,* that could be adversely impacted by other treatment options. Gypchek® consists of occlusion bodies (OBs) (polyhedra) of the gypsy moth nucleopolyhedrovirus and inert insect parts from the gypsy moth larvae in which the virus was produced. Gypchek® will be delivered at a dosage of 1 trillion OBs per acre per application.

Mating Disruption: In nature, pheromone is produced and emitted by female gypsy moths to communicate their readiness to mate. Males use receptors found in their antennae to follow a pheromone trail to the source female, mating occurs and eggs are laid. When controlled-release pheromone dispensers are applied, the treated area is saturated with pheromone during the 6 to 8 week period when adult gypsy moths are active. The cloud of applied pheromone disrupts the normal communication between the sexes and prevents the males from finding and mating with the flightless females. Mating disruption is only effective in low population densities because the chance of random encounters between the sexes is high in more dense populations (Reardon et al 1998, Sharov et al 2002a). Prior to a Mating Disruption treatment, the program's objective is to reduce the Hubert gypsy moth population using Gypchek® to a level at which a Mating Disruption treatment would be effective.

2.4 Treatment Design Criteria That Apply to the Action Alternatives

The following precautionary or mitigating measures would apply to the action alternative to enhance the effectiveness of the treatment and to reduce the risk of off-site impacts. Specific safety procedures and guidelines are presented in the joint NCDA&CS and USDA-APHIS-PPQ Eradication Project Work and Safety Plan, copies of which are available from the address found on the cover page of this EA.

Procedures that Apply to All Treatments: By adhering to the following procedures during aerial application, a safe, consistent, and effective spray project that also minimizes spray drift can be implemented.

- A private aerial contractor under the supervision of NCDA&CS and USDA-APHIS-PPQ personnel would conduct pesticide spraying and government personnel would inspect and calibrate the contractor's application equipment prior to treatment. Treatment will be applied by fixed or rotary wing aircraft and timed to coincide with the most vulnerable stage of the gypsy moth.
- Insecticides would be applied according to label directions, and all label warnings and restrictions would be strictly followed by the applicator. No applications will be made over open water.
- Personnel in the observation aircraft and on the ground in the treatment site will continually monitor application conditions and advise the project supervisor on weather conditions and insect development.
- Application pilots will conduct a pre-treatment flight of the proposed treatment areas to become familiar with the treatment boundaries, restricted sites, or potential hazards. Topographic maps will be provided to the application pilots and/or observation pilots to assist in identifying boundaries, restricted sites, and hazards.
- Aircraft used in the treatment applications will be equipped with Differential Global Positioning System (DGPS) to assist the pilot in locating treatment sites, identifying treatment block boundaries, and ensuring even coverage throughout the site.
- Pilots will have radio communication with each other and with the operations base to insure compliance with all application constraints and safety requirements.
- Height of the application aircraft will range between 50 and 100 feet above treetop during Gypchek® applications.

Weather Conditions during Application of Gypchek®

- Applications would be made when wind speeds are less than 10 mph, temperatures are between 35 and 75°F and relative humidity is above 45%. Studies show that evaporation and subsequent insecticide drift can be minimized under these conditions and ultimately more of the insecticide will settle into the forest canopy.
- Foliage must be dry. No threat of rain should exist for 4 hours following application to ensure good drying time for the droplets, which minimizes wash off of the insecticides.
- Application will be suspended if thermal inversion conditions cause the spray to rise during application.

Human Health Precautions

Several precautions are used in the program to minimize exposure of the people handling the insecticide during loading operations and those in the treatment areas. At the loading site, standard handling precautions will be followed as specified on the product label. Prior to the treatment, landowners and residents will be notified of the treatments via individual letters. Public notices and open-house sessions will be used to inform the public about the proposed treatments. Certain hypersensitive or immune-compromised individuals may be at higher risk of developing allergic responses or infection than the general population. For this reason, residents will be alerted so they can take common sense precautions prior to treatments such as avoiding exposure to the spray material, leaving the area if they believe they are sensitive to the pesticide, or removing articles such as drying clothes and children's toys from exposure to spray.

2.5 Monitoring

During the treatments, ground and/or aerial observers will monitor the application for accuracy within the site perimeters, swath width, and drift. Downloading of DGPS information from application aircraft to an operations-base computer will also be conducted to help determine swath widths, spray-on and spray-off, acreage treated, and aircraft altitude during spray runs.

2.6 Comparative Summary of Alternatives

Table 2. Comparative summary of the environmental consequences of each alternative

	Alternative 1 No Action	Alternative 2 (Proposed Acton) Aerial application of Gypchek® on 400 acres; Mating Disruption on 20 acres within the 400 acres
Effects on forest condition	- Moderate impacts from defoliation (reduced tree growth, limb dieback, tree mortality and a reduction in oak component) would occur within 3 to 5 years.	- Delays impacts by an additional 5 to 25 years on 100% of the project area
Effects on water quality	- No direct effects on water quality. -Indirect effects are expected to be short-lived and slight.	- Gypchek® and Mating Disruption have no direct or indirect effects on water quality
Effects on non-target organisms	-No direct effects on non-target organisms -Indirect effects of defoliation are variable but most are not adverse. Species requiring shade would be most at risk.	-No direct or indirect adverse impacts are anticipated as a result of treatment with Gypchek® and Mating Disruption
Effects on federally protected species	-No direct or indirect adverse impacts are anticipated as a result of no action	- No direct or indirect adverse impacts are anticipated as a result of treatment with Gypchek® and Mating Disruption

3.0 ENVIRONMENTAL EFFECTS OF THE ALTERNATIVES

This section provides the scientific and analytical basis for comparing the alternatives described in Section 2.3. It describes the probable environmental consequences of each alternative on selected resources and includes the direct, indirect, short-term, long-term, beneficial, adverse, and cumulative potential impacts linked to the issue discussed in section 1.7. All resource impacts from a single alternative appear under the discussion of that alternative. This section starts with a description of resources that are found in the project areas and which could be impacted by the alternatives.

3.1 General Description of Project Area

The purpose of this section is to present baseline information on the existing environment for the purpose of comparing environmental consequences. One site totaling 400 acres are proposed for treatment in this EA. Four additional sites to be treated in NC are proposed in a separate environmental assessment.

Water and Forests:

This 400 acre proposed block is located on Bear Island, which is the first barrier island in Onslow County located south of Bogue Banks in Carteret County. The entire island is within Hammocks Beach State Park. It is approximately 3 miles in length and varies in width from ¼ to ½ mile and runs east to west. There are no permanent inhabitants, but several structures on the island house researchers during spring, summer and fall. There are numerous campsites on the island which may be occupied at anytime. A staff of full-time park rangers monitors the island daily. There are one housing unit and numerous maintenance facilities on the island. The island is not accessible by car and may only be reached by paid ferry or private vessels. The predominant vegetation is live oak and

wax myrtle. The site also has grasses and sedges associated with dune, marsh and maritime forest environments. The vegetation is typically low growing. There are currently no aerial hazards on the island; however, Bear Island is bordered by the Camp LeJeune bombing range. The newly discovered rare butterfly *Atrytonopsis new species 1* inhabits the island.

Non-target Organisms:

Non-target organisms include all species except the target pest (gypsy moth) that live in or near treatment sites. Although they are not the targets of treatment activities, some may be impacted directly or indirectly by the alternatives.

Federal Species of Concern (FSC) are species that may or may not be listed in the future, which are not currently afforded any protection under the Endangered Species Act (ESA). T(S/A) species are threatened due to similarity of appearance with other species and are listed for protection, but T(S/A) species are not biologically threatened or endangered and are not subject to Section 7 consultation under the ESA. Accordingly, any potential impacts to FSC or T(S/A) are analyzed together with other non-target species. The species listed in Tables 3 and 4 are known to occur in counties where treatments are proposed.

Table 3. Plants that are on the list of FSC and are known to exist in the county(s) where action is proposed.

SCIENTIFIC NAME	COMMON NAME	COUNTY LISTED	STATUS
Allium sp. 1	Savanna Onion	Onslow	FSC
Amaranthus pumilus	Seabeach Amaranth	Onslow	T
Asplenium heteroresiliens	Carolina Spleenwort	Onslow	FSC
Calopogon multiflorus	Many-flower Grass-pink	Onslow	FSC
Carex lutea	Golden Sedge	Onslow	E
Dionaea muscipula	Venus Flytrap	Onslow	FSC
Isoetes microvela	Thin-wall Quillwort	Onslow	FSC
Lindera melissifolia	Pondberry	Onslow	E
Litsea aestivalis	Pondspice	Onslow	FSC
Lobelia boykinii	Boykin's Lobelia	Onslow	FSC
Lysimachia asperulifolia	Rough-leaf Loosestrife	Onslow	E
Myriophyllum laxum	Loose Water-milfoil	Onslow	FSC
Parnassia caroliniana	Carolina Grass-of-parnassus	Onslow	FSC
Plantago sparsiflora	Pineland Plantain	Onslow	FSC
Rhexia aristosa	Awned Meadow-beauty	Onslow	FSC
Rhynchospora decurrens	Swamp Forest Beaksedge	Onslow	FSC
Rhynchospora pleiantha	Coastal Beaksedge	Onslow	FSC
Rhynchospora thornei	Thorne's Beaksedge	Onslow	FSC
Sagittaria weatherbiana	Grassleaf Arrowhead	Onslow	FSC
Scleria sp. 1	Smooth-seeded Hairy Nutrush	Onslow	FSC
Solidago verna	Spring-flowering Goldenrod	Onslow	FSC
Solidago villosicarpa	Coastal Goldenrod	Onslow	FSC
Thalictrum cooleyi	Cooley's Meadowrue	Onslow	E
Trillium pusillum var. pusillum	Carolina Least Trillium	Onslow	FSC

Table 4. Animals that are on the list of FSC or T(S/A) and are known to exist in the county where action is proposed.

SCIENTIFIC NAME	COMMON NAME	COUNTY LISTED	STATUS
Acipenser brevirostrum	Shortnose Sturgeon	Onslow	E
Alligator mississippiensis	American Alligator	Onslow	T (S/A)
Ammodramus henslowii susurrans	Eastern Henslow's Sparrow	Onslow	FSC
Atrytonopsis sp. 1	an undescribed skipper	Onslow	FSC
Caretta caretta	Loggerhead Seaturtle	Onslow	T
Charadrius melodus	Piping Plover	Onslow	T
Chelonia mydas	Green Seaturtle	Onslow	T
Dermochelys coriacea	Leatherback Seaturtle	Onslow	E
Heterodon simus	Southern Hognose Snake	Onslow	FSC
Laterallus jamaicensis	Black Rail	Onslow	FSC
Ophisaurus mimicus	Mimic Glass Lizard	Onslow	FSC
Passerina ciris ciris	Eastern Painted Bunting	Onslow	FSC
Picoides borealis	Red-cockaded Woodpecker	Onslow	E
Puma concolor couguar	Eastern Cougar	Onslow	E
Rana capito	Carolina Gopher Frog	Onslow	FSC
Trichechus manatus	West Indian Manatee	Onslow	E
Triodopsis soelneri	Cape Fear Threetooth	Onslow	FSC

Other non-target organisms that may be found in or near the project area include:

- Anglers, hunters, fishermen, tourists, or other humans
- Outdoor pets such as cats or dogs
- Livestock such as cows, horses, pigs or chickens
- Small and large wild mammals such as mice, rabbits, bats, foxes, raccoons, squirrels, bear and deer
- Many species of freshwater fish
- Many species of reptiles and amphibians such as salamanders, frogs, turtles and snakes
- Invertebrates such as mollusks
- Moths, butterflies, other insects and invertebrates, including natural enemies of the gypsy moth, spiders, earthworms and centipedes

Threatened and Endangered Species: The Raleigh Field Office for Ecological Services (Raleigh, NC) of the USDI FWS conducted a review of the proposed sites for the occurrence of federally listed species or designated critical habitats. Their conclusion was that the proposed action at this site would not result in an effect on federally listed species or designated critical habitat (see Appendix D).

3.2 Environmental Consequences of the Alternatives

3.2.1 Impacts of Alternative 1 (no action) on Selected Resources

Under this alternative no action would be taken to control the localized gypsy moth infestations. Spread rates would increase to historical levels of 13 miles per year. Gypsy moth populations would increase to defoliating levels within 3 to 5 years in and near the project sites depending on availability of hosts. Moderate to heavy defoliation is anticipated where host type is abundant whereas light to moderate defoliation is anticipated where host type is less abundant.

Direct, Indirect and Cumulative Effects on Forest Condition and Soils: Defoliation may cause an increase in the seasonal temperature of soil and leaf litter, and increased exposure to sunlight, resulting in short-term increases in biological productivity on the forest floor. Any changes in microclimate, soil productivity and fertility are expected to be short-lived (FEIS, 1995, Vol. II, pp.4-48 and 4-49).

The effects of defoliation on the forest vary based upon the pre-existing condition of the forest, current stress, abundance of gypsy moth preferred host-type, and the severity and longevity of the outbreak. Defoliation will be most frequent and severe among preferred hosts of the gypsy moth such as oak. On average, trees will experience growth loss proportional to the levels of defoliation and tree mortality following defoliation will be variable. Based on data from previous outbreaks, stand losses from tree mortality can be expected to average 20-35 percent where preferred hosts are common and 5-20% where preferred hosts are less dominant. Hard mast production by oaks would decline after defoliation, but an increase in soft mast would partially compensate for the hard mast reduction. Hard mast is a tree/shrub-produced wildlife food contained in a shell (acorn, hickory, etc), while soft mast is a tree/shrub-produced wildlife food without a shell (berries, persimmons, etc). Cumulative effects from repeated defoliation can result in a shift in stand structure to a more one-storied stand and a shift in stand composition from gypsy moth preferred hosts such as oak to less preferred hosts such as maple. The resulting forest will be less susceptible to feeding by the gypsy moth. Further discussion of gypsy moth and its impact on forest conditions can be found in the FEIS (USDA 1995, Vol. II, pp. 4-39 to 4-42 and p.4-74; Vol. IV, pp. 2-14 to 2-21).

Direct, Indirect and Cumulative Effects on Water Quality: Under this alternative no insecticides would be used so there would be no direct effect of treatment on water quality. This alternative would result in defoliation in and near the 2 sites within 3 to 5 years. Changes in water quality such as elevated temperatures and reduced oxygen levels, could occur following defoliation but are expected to be minor and short-lived (FEIS, Vol. II, p. 4-49) even in the event of multiple consecutive defoliations.

Direct, Indirect and Cumulative Effects on Non-target Organisms: Under this alternative no treatments would be made so there would be no direct adverse impacts to non-target organisms. Indirect effects of defoliation on non-target organisms are variable, but most are not adverse.

Gypsy moth defoliation has varying effects on vertebrates (FEIS, Vol. II p.4-43 and Vol. IV, pp. 2-21 to 2-29). Defoliation is likely to be beneficial to birds, including the FSC listed in Table 4, because defoliation appears to have positive impacts, both short and long-term, on most non-game bird species. The effect of defoliation on bats is not well known. Deer, bear and turkey do not appear to be adversely affected by defoliation, acorn crop failure, or tree mortality. The gray squirrel and the white-footed mouse (an important predator of the gypsy moth) are possibly the most adversely affected due to their dependence on acorn crops. Tree mortality following defoliation will increase the availability of habitat for species that use standing or downed dead trees, such as woodpeckers. Surface habitats of reptiles and amphibians may be degraded in the short-term as a result of increased sunlight, but in the long-term reptiles and amphibians (especially salamanders) are expected to benefit from more dead and downed trees. Fish requiring cold water habitats such as trout may be indirectly affected by elevations in water temperature and reduced oxygen levels during defoliation but this is expected to be minor and short-lived. Fish should not be affected by defoliation. While no data are available on bivalves,

defoliation is not believed to pose a hazard to these organisms, including the Atlantic pigtoe and yellow lance.

Gypsy moth defoliation has varying effects on other invertebrates. In the short-run, natural enemies of the gypsy moth such as the nucleopolyhedrosis virus, parasitoids and entomaphagous fungus will increase as the gypsy moth population increases. Gypsy moth defoliation may occasionally result in reduced abundance or diversity of other terrestrial arthropods, especially species that require oak-dominated forest canopies, but in the long run, a more diverse arthropod community can be expected. (FEIS, Vol. II, p. 4-49; Vol. IV, pp. 2-28 through 2-33)

The most common response to gaps in the forest canopy created by defoliation and tree mortality is increased growth and density of woody and herbaceous plants (FEIS, Vol. II, p 4- 42). Sun-loving plants would benefit from defoliation, but a shade-loving species such as a trillium could be adversely impacted by the increased levels of sunlight following defoliation.

Direct, Indirect and Cumulative Effects on Federally Listed Species: Under this alternative, no direct effects to federally listed species would occur because no action would be taken to control the gypsy moth. Indirect or cumulative effects from gypsy moth defoliation (increased sunlight) are unlikely.

Effects on Humans: Under this alternative, gypsy moth populations would continue to increase in density and spatial area. Larval hairs become airborne, and upon inhalation, cause an allergic reaction in humans prone to allergies.

3.2.2 Impacts of Alternative 2, Gypchek® and Mating Disruption on the Hubert site (Proposed Action)

Under this alternative, Gypchek® and Mating Disruption would be used on 400 acres in the Hubert site. This alternative would delay defoliation, reduce the risk of spread, and possibly result in eradication.

Direct, Indirect and Cumulative Effects on Forest Condition and Soils

The 400 acre Hubert area is proposed for treatment with Gypchek® and Mating Disruption. Naturally occurring virus, which can be found in soil, litter and on bark, is active for up to one year compared with just 3-15 days for Gypchek®. Therefore the use of Gypchek® is not likely to cause changes in soil productivity or fertility (FEIS, Vol. II, pp. 4-64 and 4-65). Mating disruption formulations (plastic flakes or waxy emulsion) which serve as the controlled-release dispensers for the pheromone may persist in the environment for years. Despite this, mating disruption is not likely to cause changes in forest condition, microclimate, or soil productivity and fertility (FEIS, Vol. II, p. 4-67).

In the short-term (5 to 10 years), this alternative will maintain forest condition, prevent changes in microclimate and maintain mast production (FEIS, 1995, Vol. II, pp. 4-52 to 4-55 and pp. 4-66 and 4-67). However, in the long-term (10 to 30 years), gypsy moth populations are likely to become permanently established in the area. At this point, some local populations would reach levels where defoliation could be light to heavy, with the same anticipated effects as described in the no action alternative.

Direct, Indirect and Cumulative Effects on Water Quality: Although the products proposed for use do not directly affect water quality, including domestic water supplies such as wells (FEIS; Vol. II, p 4-55 and 4-67), they will not be applied over open water in compliance with the product labels, project mitigation measures and NCDA&CS policy. The canopy will intercept the Gypchek® applied aerially to canopy-covered water bodies within this proposed treatment site.

For Gypchek®, the nucleoplyhedrosis virus itself poses no risk to altering water quality due to its host specificity. However, if such application prevents subsequent defoliation(s), it will indirectly have a positive effect on forest health. (FEIS, VOL. IV, p. 9-14)

During application of mating disruptants, more than 90% of the product will be intercepted by and adhere to vegetation, where it will remain until leaf fall. At this point, the product will have released at least 60% of its disparlure. The risk of the remaining disparlure leaching into surface or groundwater via translocation after leaf fall is minimal because disparlure is insoluble in water. In laboratory experiments, one of two mating disruption products, Disrupt II, was submerged in water and vigorously agitated for 24 hours. Under these conditions, less than 0.04% of the active ingredient (disparlure) contained in the Disrupt II leached into water (Reardon et al 1998). Therefore, the proposed treatment using mating disruption is not likely to cause changes in water quality.

Direct, Indirect and Cumulative Effects on Non-target Organisms: This action would not have any direct, adverse impacts on non-target organisms.

Indirect and cumulative affects associated with the use of Gypchek® are related to the loss of insect(s) as food items or pollinators. In the case of Gypchek® treatments, the only loss will be the target pest itself. This should not have any indirect or cumulative effects on non-target species because the gypsy moth has only recently become established and it is unlikely that any non-target species are dependent on gypsy moth for food or pollination.

In 2010, a similar treatment program utilizing Gypheck was conducted at this site. No cumulative impacts are expected from a second year of Gypchek treatment as there are no expected non-target impacts from these treatments.

A quantitative risk assessment for mating disruption was not performed in conjunction with the FEIS because of the pheromone's low toxicity to vertebrates and apparent specificity to the gypsy moth (FEIS, Vol. II, p. 4-67). In acute toxicity tests the pheromone was not toxic to mammals, birds or fish (FEIS, Vol. IV, p. 5-5). Therefore, no direct, indirect or cumulative adverse effects on non-target organisms are anticipated as a result of the proposed treatment with mating disruption.

Direct, Indirect and Cumulative Effects on Federally Listed Species: Under this alternative, no direct effects to federally listed species would occur. See tables 3 and 4, above, and US Fish and Wildlife Service letter of concurrence, Appendix D.

Effects on Humans: There will be no members of the public present during the treatment; as such, there will be no direct impacts to humans. Members of the public may come in contact with product residue. Neither Gypchek nor Disparlure has any known human toxicity issues.

4.0 LIST OF PERSONS AND AGENCIES CONSULTED

Agricultural Resources Service, Raleigh, North Carolina
Ms. Billie Karel

North Carolina Department of Administration
Ms. Valerie McMillan, NC State Clearinghouse

North Carolina Department of Agriculture & Consumer Services, Public Relations Division

North Carolina Department of Environment, Health, and Natural Resources
Mr. Rob Trickel, Division of Forest Pest Control
Mr. Stephen Hall, NC Natural Heritage Program
Ms. Melba McGee, Environmental Assessment Section

North Carolina State University
Dr. Fred Hain and Dr. George Kennedy, Department of Entomology

United States Department of Agriculture
Mr. Wes Nettleton, Forest Service

United States Department of Agriculture
APHIS, PPQ, Raleigh, NC

United States Department of Interior, Fish & Wildlife Service
Raleigh Field Office for Ecological Services (Raleigh, NC)

5.0 LIST OF PREPARERS

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Deborah Stewart, State Plant Health Director, USDA-APHIS-PPQ

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APPENDIX A

Authorizing Laws and Policies

Environmental Laws

Authorizing Laws and Policies for Lead and Cooperating Agencies

The authority to conduct the proposed project in North Carolina is granted to NCDA&CS by the North Carolina Plant Pest Law (G.S. 106-421, as amended 1971).

It is North Carolina's policy to have all proposed treatment areas reviewed through the North Carolina intergovernmental review process to assess the potential impacts of the proposed action to threatened or endangered species, critical habitat(s), and the cultural or historical resources of North Carolina.

The USDA has broad discretionary, statutory authority to conduct gypsy moth management activities.

The Plant Protection Act of 2000 as amended (7 USC7701 et. seq.) and Cooperative Forestry Assistance Act of 1978 as amended (16 USC 2101-2105). These statutes authorize, among other things, the development of USDA activities for the regulation of the artificial spread of the gypsy moth from the quarantined area, and the eradication of isolated gypsy moth infestations outside this area.

7CFR 301.45. This regulation establishes a federal gypsy moth quarantine covering infested areas of the U.S.

1989 Memorandum of Understanding between the USDA Forest Service and USDA Animal and Plant Health Inspection Service for Management of the Gypsy Moth (12-34-81-0091-MU). This MOU is intended to provide direction for the two Agency's cooperation to evaluate, manage, and regulate the spread of gypsy moth in the U.S. For infestations in the western U.S. it specifies that APHIS is responsible for eradication programs on infested non-Federal lands of 640 or fewer acres and not contiguous with Federal land, while FS is responsible for eradicating infestations on Federal land and non-federal land contiguous with Federal land or over 640 acres. This MOU is valid indefinitely or until canceled or modified by either party.

Environmental Laws

The National Environmental Policy Act requires the consideration and disclosure of environmental effects for proposed Federal actions that may significantly affect the quality of the human environment.

The Federal Insecticide, Fungicide, and Rodenticide Act of 1947 regulates the sale and usage of pesticides. This act requires that all insecticides, fungicides, herbicides, and rodenticides be labeled with: a) the name and address of the manufacturer, b) the name of the product, c) the net contents, d) the common and chemical name of the ingredients, and the percentage of the active and inert ingredients, and e) directions for use, including human safety and environmental precautions. The label must also carry a signal word that reflects its toxicity.

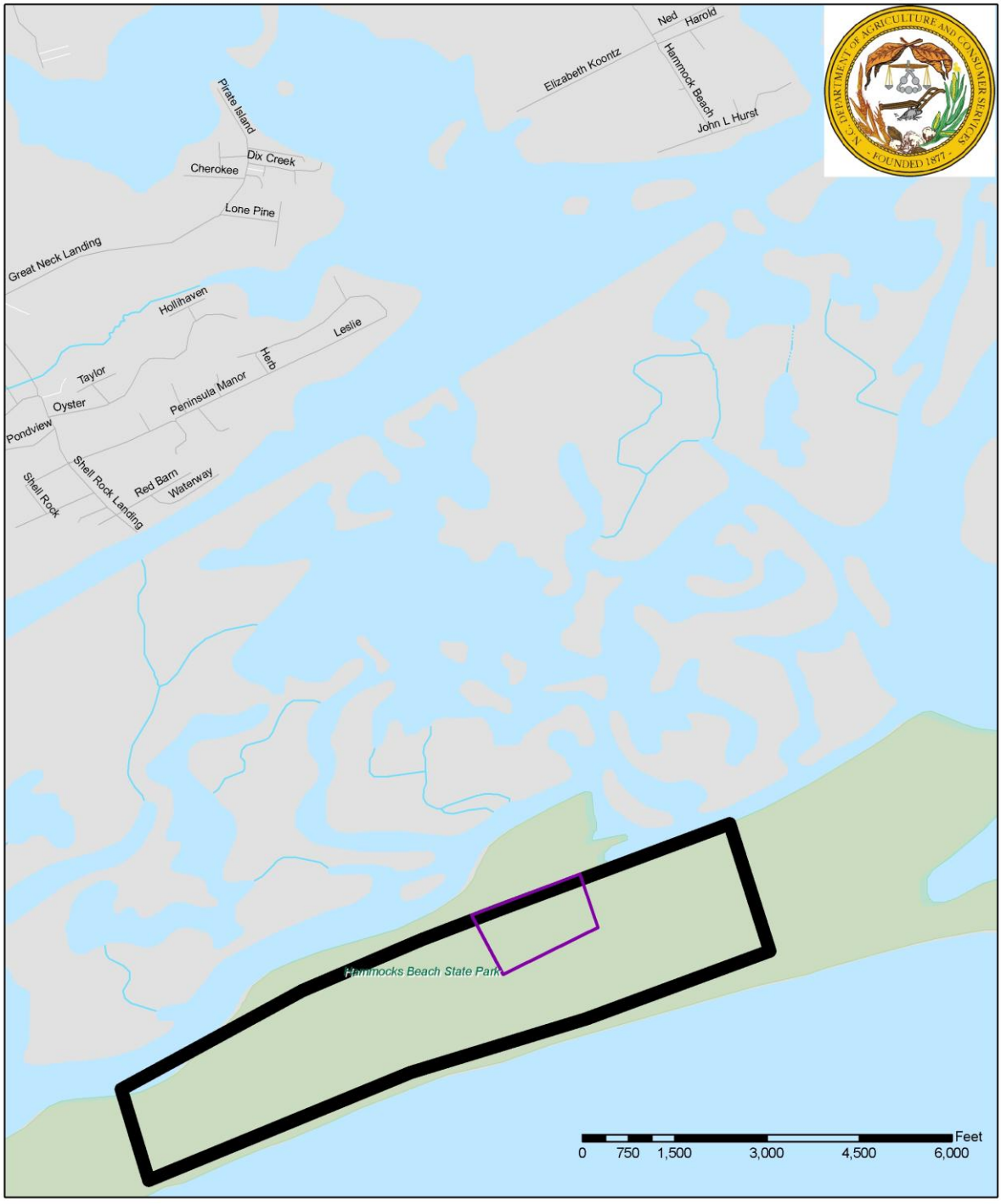
The Endangered Species Act prohibits Federal actions that jeopardize the existence of federally listed threatened or endangered species or adversely affect designated critical habitat. Federal agencies must consult with the US Department of the Interior-Fish & Wildlife Service to determine the potential for adverse effects. Federal agencies are also responsible for improving the status of listed species.

The National Historic Preservation Act recommends that Federal agencies proposing action consult with the State Historic Preservation Officer regarding the existence and significance of cultural and historical resource sites.

Executive Orders #11988 and #11990 require that Federal agencies shall attempt to avoid adversely impacting wetlands or floodplains in meeting their objectives.

APPENDIX B

MAP OF PROPOSED TREATMENT SITE



***Proposed alternative**: Triple application of Gypchek® on 400 acres; single application of Mating Disruption on 20 acres*

APPENDIX C

PUBLIC INPUT AND NOTIFICATION LETTERS

PUBLIC INPUT NOTICE ON GYPSY MOTH

Notices of public meetings were distributed to landowners of counties where proposed treatments would occur. The notice consisted of a letter describing the proposed action (example letter shown below) and a map of the proposed treatment block.

Example Letter Sent to Landowners in the Areas Proposed for Treatment:

WHO: Residents of Onslow County

WHAT: Public Input Meeting to Discuss an Infestation of Gypsy Moth in the Area

WHEN: Tuesday, January 25th, at 6:30 p.m.

WHERE: Hammocks Beach State Park Visitors Center

The North Carolina Department of Agriculture and Consumer Services' (NCDA&CS) Plant Industry Division has scheduled a public meeting on Tuesday, January 25th, at 6:30 p.m. at Hammocks Beach State Park Visitors Center, 1572 Hammocks Beach Road, Swansboro, NC. The purpose of the meeting is to permit NCDA&CS staff to provide information on a gypsy moth infestation that has been detected in your area, review treatment alternatives for these infestations, and to receive input from residents in the area. The meeting format will provide adequate time for questions and public comments.

No decision will be made on the treatment alternative for this gypsy moth infestation until residents of the area have an opportunity to express their comments through this public meeting. Residents of the area are encouraged to attend, hear the information presented, and express their comments. Individuals wishing to speak at the public meeting will be able to sign up at the Hammocks Beach State Park Visitors Center when they arrive for the meeting.

If you are not able to attend the meeting and you need additional information on this gypsy moth infestation, please contact the NCDA&CS, Plant Industry Division at 1-800-206-9333 or 919-733-6932. Resources are also on line at NCDA&CS's web page found at:

http://www.ncagr.com/gypsymoth

Additional Information Provided to Landowners

History and Biology of the Gypsy Moth:

The gypsy moth, Lymantria dispar L., is native to northern Africa, Europe, and parts of Asia and is a defoliator of hardwood trees species. The gypsy moth first invaded the United States in 1869 when it escaped from a laboratory in Medford, Massachusetts where attempts were being made to cross it with native silkworm moths. Since that time, the insect has spread throughout the northeastern and mid-Atlantic United States and into Canada. The gypsy moth earned its name because of its behavior and tremendous mobility. Several days after hatching, young caterpillars hang from tree limbs by silk threads that allow them to be carried aloft by wind currents and spread to other areas. Although the gypsy moth can spread relatively short distances on its own, it is also transported by humans. Man-assisted movement occurs when humans transport egg masses which can contain as many as 1000 viable eggs. In the forest, caterpillars hide in a variety of places including bark crevices, tree holes, and under vines on tree trunks. However, when the gypsy moth invades areas inhabited or used by people, these hiding places frequently include outdoor articles such as tents, wood piles, doghouses, utility sheds, garbage cans, lawn furniture, and recreational vehicles.

Impact of the Gypsy Moth:

The impact of a gypsy moth infestation varies from year to year. The direct impact of gypsy moth defoliation ranges from barely noticeable to devastating depending upon population density, tree health and weather conditions. For hardwood species such as oak, mortality of trees in fair or poor health, or those stressed by drought or frost, can reach 42% after two consecutive years of defoliation. Trees that are in good condition will grow new leaves later in the season but they use food reserves that were intended for the next season. Reduction in food reserves in trees reduces their ability to withstand future defoliation or stress. The most dangerous effect of gypsy moth defoliation is an increase in tree susceptibility to secondary pests such as wood boring beetles and fungi. Older gypsy moth larvae may attack conifer species such as pines resulting in tree mortality after just one year of defoliation. The economic burden of a severe gypsy moth defoliation can be great when homeowners are faced with a number of large, dead yard trees that must be removed. Likewise, timberland owners may be faced with a reduction in timber value as valuable hardwoods are killed.

The gypsy moth can also be a nuisance to the general public. In heavily infested areas, caterpillars may crawl on or into homes or they may end up in swimming pools. In parks and recreation areas, defoliation may affect the aesthetics of the surroundings. Upon inhalation, some people can have allergic reactions to the caterpillars' tiny hairs.

Description of Proposed Treatment Areas

The Slow the Spread Pilot Project was begun in 1992 with a goal of demonstrating that the rate at which gypsy moth populations colonize new areas can be reduced. The project uses techniques that are both environmentally safe and cost effective. This pilot program became operational in 2000. Management decisions within STS are primarily based on the presence of male gypsy moths in any given area. The presence and density of gypsy moths is determined by utilizing traps baited with the female gypsy moth sex pheromone. The Project currently operates in portions of Illinois, Indiana, Iowa, Kentucky, North Carolina, Michigan, Minnesota, Ohio, Virginia, West Virginia, and Wisconsin.

Hubert This 400 acre proposed spray block is located on Bear Island, which is the first barrier island in Onslow County located south of Bogue Banks in Carteret County. The entire island is within Hammocks Beach State Park. It is approximately 3 miles in length and varies in width from ¼ to ½ mile and runs east to west. There are no permanent inhabitants, but several structures on the island house researchers during spring, summer and fall. There are numerous campsites on the island which may be occupied at anytime. A staff of full-time park rangers monitors the island daily. There are one housing unit and numerous maintenance facilities on the island. The island is not accessible by car and may only be reached by paid ferry or private vessels. The predominant vegetation is live oak and wax myrtle. The site also has grasses and sedges associated with dune, marsh and maritime forest environments. The vegetation is typically low growing. There are currently no aerial hazards on the island; however, Bear Island is bordered by the Camp LeJeune bombing range. The newly discovered rare butterfly *Atrytonopsis new species 1* inhabits the island. This block is proposed to receive 3 aerial applications of Gypchek and one application of mating disruption.

APPENDIX D

US FISH & WILDLIFE SERVICE LETTER OF CONCURRENCE

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Raleigh Field Office
Post Office Box 33726
Raleigh, North Carolina 27636-3726

February 7, 2011

Matt Andresen
Research Operations Manager
Plant Protection Section
North Carolina Department of Agriculture and Consumer Services
1060 Mail Service Center
Raleigh, NC 27699-1060

Dear Mr. Andresen:

Thank you for your December 21, 2010 letter requesting concurrence from the U.S. Fish and Wildlife Service (Service) regarding the proposed gypsy moth control activities in four eastern North Carolina counties. The North Carolina Department of Agriculture and Consumer Services (NCDACS), in cooperation with the U.S. Department of Agriculture, Forest Service, proposes to treat gypsy moth infested sites with applications of Gypchek or Mating Disruption. All applications will be conducted according to label directions. The treatment sites identified in your letter occur include: Yanceyville (Caswell County), Leasburg (Caswell County), Ruffin (Rockingham), Johnathan Crossroads (Granville County) and Hubert (Onslow County).

Based on the information provided, it appears that the gypsy moth control projects, as described in your letter, are not likely to adversely affect any federally listed species. The Service believes that the requirements of section 7(a)(2) of the Endangered Species Act, as amended (16 U.S.C. 1531 *et seq.*) have been satisfied. We remind you that obligations under section 7 consultation must be reconsidered if: (1) new information reveals impacts of this identified action that may affect listed species or critical habitat in a manner not previously considered; (2) this action is subsequently modified in a manner that was not considered in this review; or, (3) a new species is listed or critical habitat determined that may be affected by the identified action.

If you have any additional questions about our review of this project, please contact me at (919) 856-4520 Ext. 18 or by email at Dale_Suiter@fws.gov.

Sincerely,

Pete Benjamin
Ecological Services Supervisor