2008 Cook and Lake Counties

Gypsy Moth Slow-the-Spread Project

Environmental Assessment

Forest Service
Eastern Region
Superior National Forest

Forest Service
Northeast Area State and
Private Forestry

Minnesota Department of
Agriculture
Plant Protection Division
Gypsy Moth Unit

May 2008

ABBREVIATIONS

Btk	*Bacillus thuringiensis* spp *Kurstaki*
BWCAW	Boundary Waters Canoe Area Wilderness
CFR	Code of Federal Regulations
CWPP	Community Wildfire Protection Plan
DEIS	draft environmental impact statement
DNR	Department of Natural Resources (State of Minnesota)
EA	environmental assessment
ELT	ecological landtype
FEIS	final environmental impact statement
FPR	Forest Plan Revision
FRCC	fire regime condition class
FS	Forest Service (USDA)
GMPAC	Gypsy Moth Program Advisory Committee (interagency)
HFRA	Healthy Forest Restoration Act
LE	landscape ecosystem
MA	management area
MDA	Minnesota Department of Agriculture (State of Minnesota)
MIH	management indicator habitat
NA S&PF	Northeast Area State and Private Forestry (USDA Forest Service)
NF	National Forest
NFS	National Forest System (USDA)
NNIS	non-native invasive species
NSU	Northern Superior Uplands
PA	project area
RNA	Research Natural Area (USDA Forest Service)
ROD	record of decision
SNA	Scientific and Natural Area (State of Minnesota)
SNF	Superior National Forest (USDA Forest Service)
STS	Slow-the-Spread (USDA Forest Service)
TES	Threatened, Endangered, and Sensitive (species)
USDA	United States Department of Agriculture
WUI	wildland urban interface

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Overview

The purpose of this environmental assessment (EA) is to inform the public and the Responsible Officials about the potential environmental effects of a cooperative proposal to slow the spread of gypsy moths along the North Shore of Lake Superior.

Previously, a Public Involvement Package describing the proposed project was available for interested people to review, and the Forest Service invited public comments. This package identified a preliminary list of anticipated concerns with the proposal. These issues helped frame the analysis. An interdisciplinary team reviewed the public comments from the Public Involvement Package and determined that it was not necessary to analyze additional issues.

This EA builds on the information in the Public Involvement Package. The EA has four sections:

1. Describes the need for slowing the spread of gypsy moths and describes the proposal.
2. Outlines a no-action alternative, the proposed action and the alternatives that have been eliminated from detailed study.
3. Discloses the effects analysis of the proposal and of taking no action.
4. Describes the pre-decisional objection process

Appendix A lists the public comments on the Public Involvement Package and the agency responses.

This proposed action applies to National Forest System land and is part of a larger proposal to treat areas of mixed ownership in Cook and Lake Counties in 2008. Separate Environmental Assessments are being prepared for proposed treatments on the Grand Portage Reservation as well as for proposed treatments on private, state and county lands within the overall project area.

1 Need for Action & Proposal

1.1 Non-native Invasive Species

Non-native invasive species (NNIS) are plants, animals, insects or other organisms whose introduction to an area do or is likely to cause economic or environmental harm or harm to human health. Other names for NNIS include exotic species, noxious weeds, and pests.

Invasive species are major threats to our Nation's aquatic and terrestrial ecosystems. Invasives destroy fish and wildlife habitats, alter nutrient cycling and natural fire regimes, and can reduce biodiversity and degrade native ecosystem health.

Invasive species recognize no borders. Prevention and control of invasive species require tremendous cooperation across all landscapes and among public and private stewards of the land.

Invasive species come in all shapes and many guises: nonnative insects (e.g., Asian long horned beetle, emerald ash borer), land-based and aquatic invasive plants (e.g., weeds, ornamentals, trees), diseases and pathogens (e.g., white pine blister rust, Dutch elm disease) – the list continues to grow with each new introduction.

Invasives have the capacity to dominate, overwhelm, or wipe out native species. Chestnut blight all but killed the American chestnut and Dutch elm disease decimated elm trees from our landscape.

1.2 Gypsy Moth

The European gypsy moth (*Lymantria dispar* L.) is not native to the United States. It is currently established in 19 states. Although gypsy moth adults have been found in

Minnesota, the State has no known permanently established populations. The closest known populations are in central and northern Wisconsin and in the Upper Peninsula of Michigan (see Figure 1 Gypsy Moth Slow-the-Spread Action Area and USDA-Quarantine Area 2008). *'Established' means there are reproducing populations near each other. Established populations cannot be eliminated by focused treatments.*

Gypsy moths move into new areas primarily in two ways. One is on their own – wind blows the tiny, newly hatched caterpillars a short distance into new areas. The other way is with the help of people – they hitch a ride on cars, boats, lumber, firewood, nursery stock, and other goods and materials and get transported to new locations.

Caterpillars feed on the foliage of many plants, but they prefer oaks, aspens, paper birch, basswood, and willows, which are all very common trees in Minnesota. As the caterpillars grow older and get larger, they are less selective about what they eat and they will feed on conifers such as white pine. At dense populations, gypsy moth caterpillars may eat all the leaves off trees and shrubs. After severe defoliations, trees and shrubs often become so weakened that other pests, drought, and diseases kill them.

High numbers of gypsy moth caterpillars can cause a substantial public nuisance, a reduction in tree growth, branch dieback and tree mortality. This damage to forests diminishes environmental quality and may affect human health and local economies. Widespread gypsy moth outbreaks can alter water quality, wildlife habitat, microclimate, and soil fertility (USDA 1995, Vol. IV, Appendix G, Ecological Risk Assessment). In eastern states, ecosystems have generally recovered from gypsy moth damage. However there are still local outbreaks with defoliation.

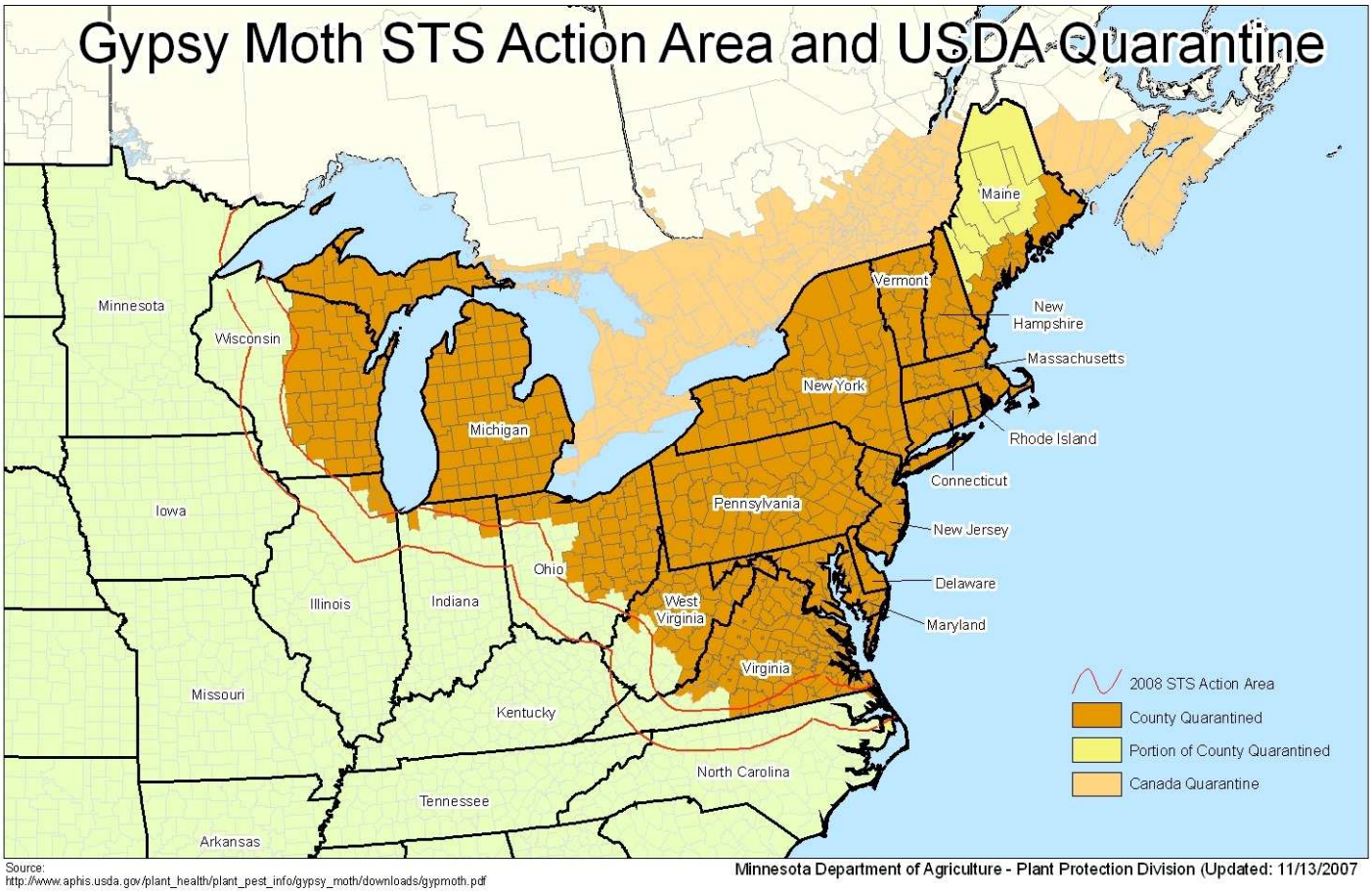

Figure 1. Gypsy Moth Slow-the-Spread Action Area and USDA-Quarantine Area – 2008

1.3 Slow-the-Spread Program

The Slow-the-Spread (STS) program is a national strategy for managing gypsy moths. It uses integrated pest management to reduce the rate of gypsy moth spread into uninfested areas. The goal of the STS program is to decrease the amount of new areas invaded by gypsy moths each year to protect forests, forest-based businesses, parks, and private property. *Areas where gypsy moth is established are called the 'generally infested' area. Next to this area is a band 50 to 100 miles wide, called the 'transition' area, where the gypsy moth is spreading from the generally infested area. The area where the gypsy moth is not established, is called the 'uninfested' area.*

STS Strategies

Different management strategies apply in the different areas: suppression in the generally infested area, slow the spread in the transition area, and eradication of isolated infestations of gypsy moth in the uninfested area. *The objective of 'eradication' is to eliminate isolated infestations of the gypsy moth that are detected in the uninfested area, to prevent the insect from becoming established. The objective of suppression is to reduce outbreak populations of gypsy moth caterpillars, thus minimizing heavy defoliation.* Suppression does not eliminate the gypsy moth from the generally infested area, but reduces damage to ecosystems and effects on people in treated areas. *The objective of 'slow the spread' is to slow the rate of spread of gypsy moth from the generally infested area, and to delay the impacts and costs associated with gypsy moth outbreaks*. This strategy entails intensively surveying the transition area and aggressively treating pockets of low-level gypsy moth populations to keep them from increasing rapidly.

It is likely that gypsy moths will eventually become established in Minnesota, with or without management. Gypsy moth has become established in other states with climates similar to Minnesota. The Slow-the-Spread program is a critical component for reducing or delaying the impacts and costs associated with gypsy moth outbreaks. The benefits of reducing the rate of spread of gypsy moths outweigh the cost of implementing the Slow-the-Spread program by a ratio of 3:1 (Leuschner et al,1996).

Before the STS program was underway, the rate of spread was approximately 13 miles per year. Since the STS program, the average rate of spread has been reduced to 6 miles per year along the transition zone. The *'transition' zone is where the gypsy moth is transitioning from uninfested to generally infested*. The transition area is very dynamic and populations of gypsy moths generally increase over time as the area is colonized by gypsy moths. Figure 1 shows the target transition zone across the Nation for the STS program. Comprehensive monitoring since 1993 has demonstrated that Slow-the-Spread projects can reduce the spread of gypsy moth by 50-70% over no treatment controls (A.A. Sharov, D. Leonard, A.M. Liebhold, E. Anderson Roberts, and W. Dickerson. 2002). In Wisconsin, Slow-the-Spread treatment projects have been occurring on state, county, and private forests since 1999.

STS in Minnesota

Minnesota is an active participant of STS. Gypsy moth populations have been monitored in Minnesota since 1973 and on the Superior NF every year since 1999. In 2001, the Minnesota Gypsy Moth Program Advisory Committee was formed. Committee membership includes

- State of Minnesota - Department of Agriculture and Department of Natural Resources
- US Department of Agriculture
  - Animal and Plant Health Inspection Service (APHIS)
  - Forest Service - Northeastern Area, State, and Private Forestry
- University of Minnesota

The Committee makes recommendations regarding gypsy moth management. This group interacts with the STS national program to develop recommendations for managing gypsy moth in Minnesota. Since 1980, about thirty infestations of gypsy moths have been detected and eradicated in Minnesota, mostly in the Twin Cities and southeast corner of the State. In 2002 a successful eradication project was conducted on approximately 2260 acres in Hennepin County, Minnesota.

In 2005, the Minnesota Department of Agriculture and Forest Service treated 640 acres with *Bacillus thuringiensis* (Btk) on the Superior NF and adjoining public and private land near Tower, MN because egg masses were found in that area. Monitoring in 2005 and 2006 found no moths in the treated area.

Most recently, in 2005/2006, the Forest Service collaborated with the Minnesota Department of Agriculture to conduct treatments on approximately 133,000 acres of mixed ownership in Cook and Lake Counties. After two years of follow-up survey, those blocks are all considered successfully treated and remain at very low levels of gypsy moth. Treatments proposed for 2008 are in adjacent areas and contain clusters of elevated moth numbers.

Due to the proximity of gypsy moth populations in northern Wisconsin and the Upper Peninsula of Michigan and because of repeated low-level captures of male moths along the North Shore since 2000, the gypsy moth STS "action" boundary was expanded into northeast Minnesota to include Cook and Lake Counties. *The "action" area is where gypsy moth is intensively monitored and managed to prevent establishment and spread; it moves as the moth front moves so it is always ahead of the infested areas.* Intensive management in the action area is designed to slow the rate of spread of the gypsy moth into the uninfested area.

Managing gypsy moth populations allows forests to retain their resistance to the negative effects of stressors (e.g., drought, insects, disease), reducing the environmental, social, and economic impacts of tree mortality.

Figure 2 Gypsy Moth Traps

Statewide, gypsy moths are monitored by baiting traps (See Figure 2) with pheromone to attract male moths and capturing the moths in the traps. Traps are set at different densities, largely depending on the previous years' monitoring results. The 2007 monitoring season captured a record number of male moths in Cook and Lake Counties. In 2007, these counties led the state with approximately 3,033 captured gypsy moths (See Figure 3). The jump in moth catches is due partially to increased trapping intensity, but it also suggests a reproducing and building gypsy moth population across the area. The potential for reproducing gypsy moth population in the area is further supported by

the repeated moth captures since 2000. However, with the exception of the Tower area infestation in 2005, no egg masses or other life stages have been identified.

At this time there are no quarantined nurseries or mills in Cook, Lake, or St. Louis Counties. However, there are 16 mills and nurseries that are considered moderate or high risk for gypsy moth introduction in the three counties. Because the arrowhead of Minnesota is adjacent to Canada, it is important to consider the status of gypsy moths north of the border.

Much of the area north of the international boundary in the eastern Provinces is regulated for gypsy moths (similar to infested, quarantined areas). Refer to the 2008 Gypsy Moth STS Action Area and USDA Quarantine map (figure 1). The Canadian Food Inspection Agency restricts the movement of roundwood from infested parts of Ontario into uninfested areas.

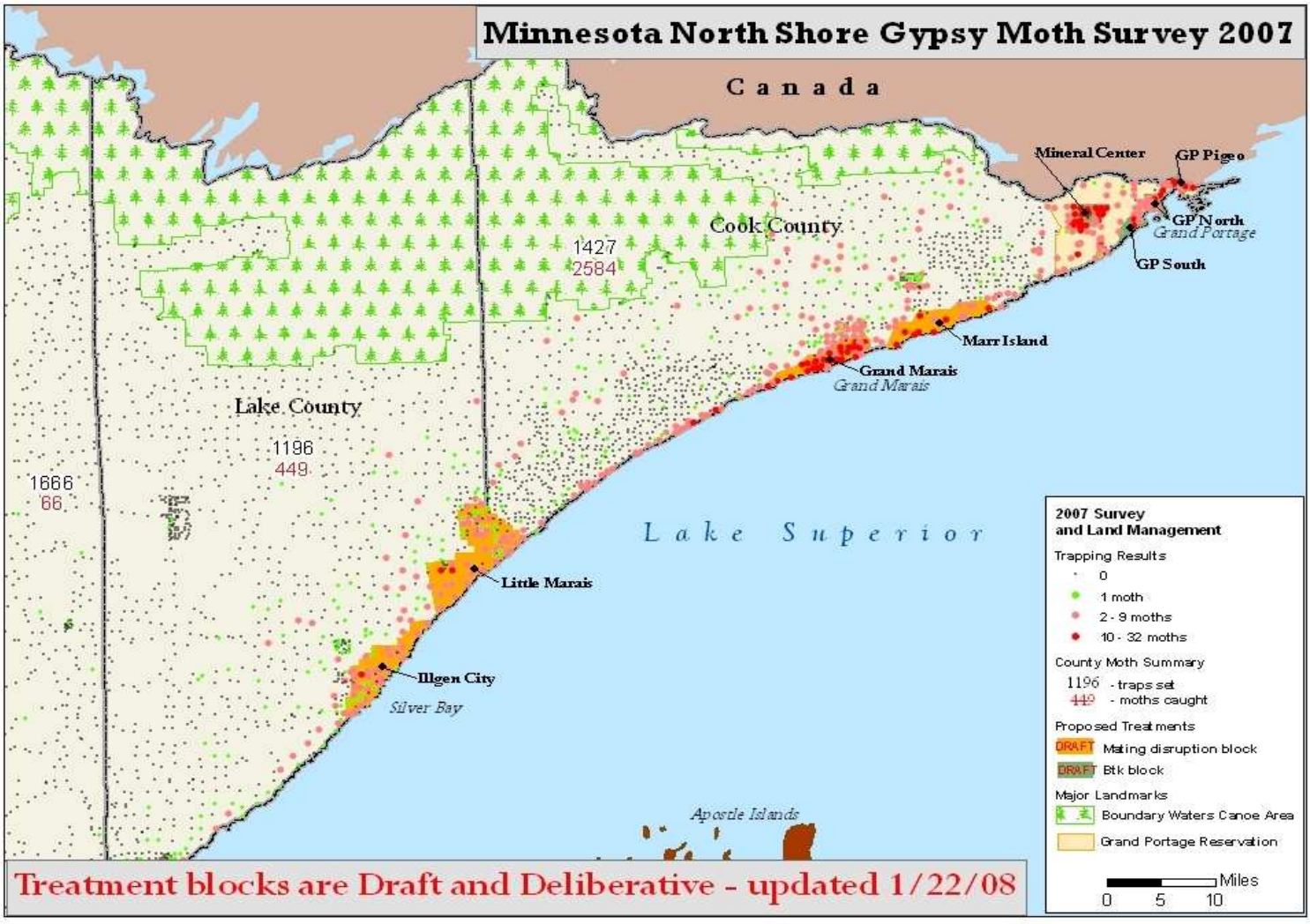

Figure 3 Results of 2007 Gypsy Moth Trapping Along the North Shore

Gypsy moths have been trapped along the Canadian north shore of Lake Superior, around Thunder Bay, and Quetico Provincial Park. At this time, Ontario does not have a formal trapping program. However, northwestern Ontario is not known to be currently infested.

1.4 Purpose and Need for Action

In order to slow the spread of the gypsy moth population, there is a need to effectively manage the gypsy moth population in Cook and Lake Counties with minimal adverse impacts to the environment. It is important to treat gypsy moths now, while the population is lower and when treatment methods with fewer adverse environmental impacts are effective.

The objective of the proposed project is to prevent the widespread establishment of reproducing gypsy moth populations and to meet State (18G.01) and Federal statutory requirements. At a national level, an integrated pest management approach was selected to manage gypsy moths, which included three management strategies (ROD; USDA, 1996). These management strategies were suppression, eradication, and slow-the-spread.

It is important that the Forest Service cooperates in this project to assure National Forest System lands do not unduly contribute to a rapid spread and establishment of gypsy moth in Minnesota. An established gypsy moth population would make it more likely that gypsy moths would spread to other parts of Minnesota more quickly.

Until recently, all of Minnesota was in the eradication area. Detection traps have caught male gypsy moths in the project area since 2000. Since 2005, there has been a dramatic increase in the number of male moths trapped, indicating that the population is beginning to increase and the Arrowhead region of Minnesota was designated as an action area in the STS program.

The impacts from gypsy moths are expected to be greater without treatment than if the front advanced with treatment. Once gypsy moth becomes established throughout a county, the annual production and value of agriculture, horticulture, and forestry products may be directly impacted, as well as indirectly impacted through the imposition of quarantines. Federal regulations prohibit the movement of certain items from those parts of the county regulated for gypsy moth to any unregulated part of the United States (7 CFR 301.45). In general, articles requiring inspection and certification prior to movement include the following:

- Nursery stock and Christmas trees
- Logs, pulpwood, and wood chips
- Mobile homes and associated equipment
- Outdoor household articles, such as outdoor furniture, barbecue grills, firewood, doghouses, and boats.

Infestations can also cost homeowners money to remove and replace trees and to apply pesticides. Loss of shade trees may reduce property values. Skin and hair shed by growing caterpillars may aggravate rashes or respiratory ailments in people with allergies.

It is unknown exactly how long it would take for gypsy moths to become a nuisance in Cook and Lake Counties. Some areas seem to take a number of years for gypsy moth to build to noticeable levels and in other areas the populations build quickly to noticeable levels.

The Slow-the-Spread program calculates a priority index for proposed treatment areas (Kyhl, 2008 and USDA, 2007). The priority index indicates how important it is to manage gypsy moth in an area. If priority index is equal to or greater than 2.8, the area is recommended for treatment in the following year. The following are the priority indices for the three treatment units containing National Forest lands:

- Little Marais – 4.42
- Grand Marais – 3.67
- Marr Island – 3.66

An interdisciplinary team compared the existing conditions on the ground in Cook and Lake Counties with the desired conditions and objectives in the Superior NF Forest Plan and found a need to manage gypsy moths. The Superior NF Forest Plan directs the Forest Service to do the following:

- Work cooperatively with other landowners and land managers
- Minimize insect outbreaks
- Use integrated pest management to avoid epidemics of non-native invasive species
- Manage vegetation to control insects at developed recreation sites
- Manage viewsheds for scenic beauty in Recreation Use in a Scenic Landscape Management Area
- Manage vegetation to enhance the recreation experience and maintain the near-natural environment and improve scenic values on Scenic River Segments
- Control non-native invasive species in Research Natural Areas and Candidate Research Natural Areas

The State of Minnesota has a responsibility to protect non-federal land from gypsy moth damage, similar to the need of the Superior National Forest to protect National Forest System land from gypsy moth damage. The NA S&PF is responsible for coordinating gypsy moth-related activities with States in protecting federal land, as established in the USDA departmental gypsy moth policy (USDA 1990).

The situation in Cook and Lake Counties meets the national criteria for treatment: low numbers of male moth trap catches, virtually no other life stages present, and located close to the infested area. Moth numbers are not yet high enough to cause damage but those that are present are too close to the infested areas to remain untreated (USDA 1995).

This project would slow the spread of the gypsy moth population in Cook and Lake Counties and delay introduction of the pest further into Minnesota and other parts of the nation. Slow-the-Spread projects are most effective when the gypsy moth population density is low, as is the case in both counties.
Without treatment, gypsy moth populations would continue to build, increasing in numbers and in extent. It is likely that this will occur eventually even with treatment, but the proposed treatments would reduce the speed of this process.

The Forest Service also has national direction to manage gypsy moths. The Chief of the Forest Service identified non-native invasive species as one the major threats to clean air; clean water; wildlife habitat; and fire-safe, healthy forests.

Both Cook and Lake Counties have developed a Community Wildfire Protection Plan (CWPP) working collaboratively with Tribal representatives, federal agencies, state agencies, local governments, landowners, stakeholders, and community-based groups. The Cook County CWPP prioritized four

areas as high for protecting life, property, and critical infrastructure; these areas are Tom Lake, Devil Track, Mid-Gunflint Trail, and Lutsen Township. In Lake County, these priority areas include Birch/Slate Lake, Cloquet Lake, County Road #3 Corridor, Drummond/Knife River, Fernberg Corridor/Kawishiwi/Triangle, among others. In Cook County, the following communities are communities at risk from wildfire: Taconite Harbor, Schroeder, Tofte, Lutsen, Grand Marais, Croftville, Hovland, and Grand Portage. Similar communities at risk in Lake County include Fall Lake, Finland, Beaver Bay, Two Harbors, Isabella, Little Marais, Illgen City, Silver Bay and Knife River. *At risk communities are where fuel conditions are conducive to a large-scale wildland fire disturbance event and there is a significant threat to human life or property exists as a result of a wildland fire disturbance event.* It is especially important to prevent more fuels from being created in these areas, which would be one likely outcome of gypsy moth establishment and subsequent tree mortality.

1.5 Proposed Action

Who, What, How, Where, and When

Working cooperatively, the USDA Forest Service, Superior National Forest, the Minnesota Department of Agriculture (MDA), and the USDA Forest Service Northeast Area State and Private Forestry (NA S&PF), propose to manage gypsy moth populations in the summer of 2008 to slow-the-spread of gypsy moth in Lake and Cook Counties along the north shore of Lake Superior.

The Forest Service and the State propose to apply a pheromone that disrupts gypsy moth mating. The female pheromone is the scent that attracts male moths. In order for it to be distributed, a synthetic pheromone is embedded in tiny plastic flakes. After the flakes are distributed, the pheromone floods the area and confuses the male gypsy moths so they cannot find female moths. The gypsy moths then die without reproducing. The pheromone is detectable only to gypsy moths, so no other invertebrate species would be harmed and birds and mammals would not be adversely affected. Effects to people from the pheromone have not been documented in the 16+ years that the product has been used (Reardon et al. 1998, USDA 1995).

The components found in the pheromone and its plastic carrier all have low toxicity. It is classified as a "low risk" pesticide by the U.S. Environmental Protection Agency. Ecological toxicity studies indicate that it is practically non-toxic to birds, mammals, fish and *Daphnia* (a sensitive aquatic invertebrate). Both the resin and the plastic (PVC) films are essentially inert and pose no threat to the environment at the labeled application rate (Klotzbach and Durkin, USDA 2004).

Plastic flakes that hold the pheromone are very small:

Actual Size →

(1/16" x 3/16")

The synthetic pheromone proposed for use in this project is called disparlure. Disparlure would be applied by low-elevation aircraft flights over 7,328 acres of National Forest in the three project areas (see Table 1 and attached Superior National Forest Gypsy Moth Project – 2008 Proposed Treatments and Ownership map).

The flakes are very small (approximately 1/16" x 3/16"), like confetti, and would be applied at the lowest dose to remain

effective. Active ingredient applications will be 6 grams per acre in the Little Marais treatment block; and 15 grams per acre in the Grand Marais and Marr Island treatment blocks. The range of flakes that would land in one square foot is 0-4; average flakes per square foot would be less than two. The flakes would stick to leaves and branches and emit the pheromone into the air.

Aircraft would pass over the entire area one time, flying at approximately 100 to 200 feet above tree tops. From the ground it could appear that a plane is passing over the same area because the aircraft can only treat an area the width of the planes wings with each pass. Treatment would be avoided over lakes, rivers and other open water.

Figure 4. When aircraft apply pheromone the flakes practically are invisible

The application would happen once in July or early August 2008, just before adult moths emerge from pupae (similar to cocoons).

Mating disruption is best suited for areas that have low gypsy moth populations (Reardon et al. 1998, USDA 1995), such as in Cook and Lake Counties at this time.

The proposed treatment area involving National Forest System (Superior NF) lands is broken into three blocks in Cook and Lake Counties. These blocks are identified as Little Marais, Grand Marais and Marr Island (See attached treatment area map). No treatment is proposed in the Boundary Waters Canoe Area Wilderness.

Table 1. Proposed pheromone treatment blocks (on the Superior National Forest (acres)

Block	Ranger District	National Forest	Other	Totals
Little Marais	Tofte	1,533	27,145	28,678
Grand Marais	Gunflint	2,841	7,240	10,081
Marr Island	Gunflint	2,954	9,401	12,355
Totals		7,328	43,786	51,114

Monitoring

Pheromone treatment reduces the reliability of trapping during the year of application (2008). According to STS protocols in the Action Area, trapping will be done in 2008 at a 2 kilometer (1.2 miles) density. In the year of evaluation (2009), the blocks will be trapped at a density of 500 meters (1,640 feet). If the evaluation deems that the treatment was successful, the area will continued to be trapped at normal densities.

An environmental impact statement (*Gypsy Moth Management in the United States; a cooperative approach, USDA 1995*) discloses the effects of implementing overall gypsy moth management programs. The Record of Decision discloses the effects of implementing overall gypsy moth management programs. The Record of Decision for *Gypsy Moth Management in the United States* (January 1996) provides

the direction for implementing site-specific treatments. The proposed action tiers to this direction, and the analysis is being done to disclose impacts of this site-specific proposal.

Healthy Forest Restoration Act (HFRA) Authorization

The proposal is authorized under Title IV, Insect Infestations and Related Diseases, of the Healthy Forest Restoration Act because the proposed action is:

- Consistent with the Superior NF Forest Plan
- Not in a wilderness area
- Collaboratively developed proposed action
- Identified through a collaborative process
- On Federal land on which windthrow or blowdown, ice storm damage, the existence of an epidemic of disease or insects, or the presence of such an epidemic on immediately adjacent land and the imminent risk it will spread, poses a significant threat to an ecosystem component, or forest or rangeland resource, on the Federal land or adjacent non-Federal land

Because this project is authorized under HFRA, the Forest Service will analyze a no action alternative and the proposed action (see Section 2). HFRA also has requirements for collaboration and public involvement (see Sections 2 and 4). HFRA projects are subject to a pre-decisional objection process (36 CFR 218) See Section 4.

1.6 Decision to be made

Treatments are proposed across multiple ownerships in Lake and Cook Counties. Based on separate Environmental Assessments (EA), there will be one decision for treatment on National Forest System (Superior National Forest) land; a second decision for treatment on the Grand Portage Reservation; and a third decision regarding proposed treatment on other ownerships within the proposed treatment blocks.

For this EA, the Responsible Official will decide whether to implement the proposed action. If the decision were made to implement the proposed action, the official would decide:

- Whether to implement the proposed action or to modify the proposed action
- If mitigation measures are needed
- What monitoring is required
- Whether implementation of the selected alternative is likely to have a significant impact that would require further analysis in an environmental impact statement

The Forest Supervisor for the Superior National Forest is the Responsible Official for activities proposed for National Forest System (Superior NF) land.

The Field Representative at USDA Forest Service, Northeastern Area State and Private Forestry, in St. Paul, Minnesota is the Responsible Official for activities proposed for all other ownerships.

1.7 Public Involvement and Collaboration

In November 2007, the Minnesota Department of Agriculture contacted the Forest Service to discuss the gypsy moth trapping results. This led to several interagency meetings between the Forest Service and MDA to develop the proposal.

Other agencies were also involved at this point, including Grand Portage Band of Chippewa; Cook, Lake, and St. Louis Counties; and Minnesota Department of Natural Resources Forestry, Ecological Resources and Parks Divisions.

The Forest Service and the State have met with groups and individuals to discuss ways of getting the most people involved and to identify potential concerns with the proposal.

In January 2008, this project appeared in the Superior NF's quarterly schedule of proposed actions.

During the 30-day pre-decision comment period, there were four public meetings held in different locations in the project area. The purpose of the meetings was to inform the public and answer questions about the proposed action.

The most effective way to slow the spread of gypsy moth is to educate the public on actions they can take in their daily lives. That message has been a component of our communication strategy, although it may not appear as significant because we are also trying to educate the public on the treatments that are proposed for the very near future.

MDA has an aggressive outreach and public education strategy aimed at those living or owning property in and around the proposed treatment areas. A letter, accompanied by fact sheets on gypsy moth and proposed treatments, was mailed to 2,785 landowners and local officials. In addition, the Forest Service mailed a public involvement package to 176 individuals or organizations interested in projects on the Superior NF.

Informational meetings and open houses were held for state, city and county officials and the general public. Information was distributed to county extension and DNR state park staff to help inform the public about gypsy moth. Press releases have been sent out to radio and television stations as well as newspapers in the affected area. Stories have appeared in the Duluth News Tribune and other local newspapers and segments have occurred on Minnesota Public Radio, local radio and television stations. Website and hotline updates have been made available.

Additional information was provided to the public on the following websites: *www.fs.fed.us/r9/superior* and *www.mda.state.mn.us/gypsymoth* .

Residents are given the option of updated information on the project (including obtaining advance spray notification) by calling the *Arrest the Pest Hotline* (1-888-545-6684).

The public will continue to be informed of project progress through notices in public areas including campgrounds and visitor centers.

2 Alternatives

Because this project is authorized under the Healthy Forest Restoration Act, the Forest Service will study, develop, and describe the proposed action and a no action alternative.

2.1 Alternatives to be Studied in Detail

This EA compares the proposed action to a 'no-action' alternative (Section 1.5 describes the proposed action). Under the no action alternative, no measures to manage gypsy moths would be taken in 2008 in the project

area by MDA or the FS. Both the proposed action and the no action alternatives would not preclude future treatments (of various kinds). MDA and the Forest Service would continue to monitor gypsy moth populations.

2.2 Alternatives Considered but Eliminated from Detailed Study

The Responsible Official and the interdisciplinary team reviewed alternatives that were proposed during collaborative meetings. They determined that some of these alternatives did not meet the purpose and need for the project.

Manage Gypsy Moths with Btk

Btk is a bacterial insecticide that is very effective at managing gypsy moths, but it can also kill other caterpillar species that are feeding in the early spring when Btk applications occur. This alternative was eliminated at this time because, at the current moth densities, pheromone flakes are likely to be equally effective at slowing the spread of gypsy moths as Btk while minimizing negative effects to non-target organisms.

Manage Gypsy Moths with their Natural Predators

This alternative was eliminated because this treatment method is not fully developed at this time and is not a management option. Therefore, this alternative would not meet the purpose and need of slowing the spread of gypsy moths.

Apply Pheromone without Plastic

This alternative was eliminated because this treatment method is not fully developed at this time and is still being studied. Therefore this alternative would not meet the purpose and need of slowing the spread of gypsy moths.

Remove Egg Masses by Hand with Volunteer Labor

This alternative was eliminated because removing egg masses by hand is not a feasible option due to time constraints. In addition, egg masses have not yet been found on the North Shore. Therefore this alternative would not meet the purpose and need of effectively managing the gypsy moth population.

3 Environmental Analysis

In addition to a site-level analysis, the environmental assessment (EA) for this project uses the analysis in the Final Environmental Impact Statement (FEIS): *Gypsy Moth Management in the United States: a cooperative approach* (USDA, 1995) to estimate potential effects. The FEIS is an environmental review and analysis of strategies and treatment options for managing gypsy moths. Analysis contained in the 1995 FEIS is considered in this current project proposal. The current cooperative effort in Minnesota analyzes projects and proposes appropriate local-level treatment.

The EA analysis also consider analysis in the Forest Plan Revision EIS. The Forest Plan EIS analyzed the effects of differing harvest levels and methods on terrestrial and aquatic non-native invasive species, relative fire risk, spruce budworm, and forest tent caterpillar.

Because this project is authorized under the Healthy Forest Restoration Act, the analysis will address the threat from the gypsy moth. This will be done in the discussion of the short- and long-term effects of the proposed

action and the no action alternative. The project record has detailed information on how the specific treatment blocks were developed.

3.1 General Consequences

This analysis is based on experience with gypsy moths in other areas of the United States and from the short- and long-term effects disclosed in the national environmental impact statement on gypsy moth management (USDA 1995). These effects would be expected in the project area.

Effects of the Proposed Action

The national EIS analyzed the risks of gypsy moth treatments. This assessment logically and scientifically studied how pheromone treatments affect human health and the environment (USDA 1995, Appendix F). The analysis concluded that effects to humans have not been documented from exposure to disparlure over the 15+ years it has been used.

During the collaborative meetings, the public and other agencies identified some concerns with the proposal. However most of the concern was with the potential adverse effects from gypsy moths rather than from the proposal. The concerns raised about the proposed action were how effective pheromone flakes would be and the effects of plastic from the flakes on the environment.

There is evidence and experience to indicate that pheromone flakes will be effective at slowing the spread of gypsy moths (USDA, 1998). To reach the goal of reducing the moth catches during monitoring by threefold, it may be necessary to treat the same or similar area in the next few years. Any subsequent treatment would require additional analysis and decision process.

The plastic that the pheromone is embedded in is a laminated polymeric solid dispenser for aerial application. This material can persist in the environment for 10 to 15 years (Reardon et al. 1998). Like most plastics, the flakes are not capable of biodegrading. However, their structure would break down over time and the flakes would turn into even smaller pieces and into dust eventually. At the proposed treatment rates, approximately one to two flakes would be present on each square foot of land, roughly ¼ cup of flakes per acre. The amount of plastic in a 20 oz. plastic drink bottle would be similar to the amount of plastic applied to almost 3 acres.

Disparlure, the synthetic gypsy moth pheromone, is not considered a threat to human health (FEIS, Chapter 4). In acute toxicity tests, disparlure was not toxic to mammals, birds or fish (USDA 1995, Vol. IV, 5-5), therefore no effects to human health are anticipated.

The only documented environmental hazard with this plastic is if it were burned it may produce carbon monoxide (CO), carbon dioxide (CO_2), hydrochloric acid mist (HCl), and chlorine gas (Cl_2). It is not anticipated that the plastic flakes would catch on fire before they are applied because of the safety precautions that would be taken with storing and transporting chemicals. After the flakes are applied they would burn only if the vegetation they are stuck to was on fire, in which case the gases given off from the flakes would be miniscule when compared to the volume of gasses and chemicals given off by forest vegetation on fire.

If pheromone flakes were applied every other year in the same area, they could

accumulate in very small, isolated areas. However, because of their small size and green color, it is not anticipated that they would be noticeable to people. If the flakes were to accumulate in one spot and break down in one spot, that piece of ground would have more plastic in the soil; again, it is not anticipated that this would measurably affect soil or water quality, particularly when compared to soil and water impacts related to large-scale tree defoliation.

The pheromone flakes are also mixed with an adhesive agent so that the flakes can stick to foliage or other plant surfaces. The adhesive is a multipolymer resin emulsion. The US Environmental Protection Agency considers these compounds to be inert ingredients and are not studied for their environmental effects (Reardon et al. 1998).

Effects of No Action

The potential effects discussed here may happen in the future even if the proposed action were implemented because it is anticipated that the North Shore will eventually have an established gypsy moth population. Taking no action at this time would likely mean that these effects would occur sooner and be more intense. We would lose the opportunity to postpone and possibly reduce negative impacts.

Pesticide Use

Managing non-native invasive species is most effective when done across ownerships. If the State and the Forest Service were to not manage the gypsy moth population, there is a potential for greater insecticide use on private property. It is anticipated that private property owners would use harsher chemicals than the pheromone in this proposal. This could lead to greater impacts to the environment from pesticides than under the proposed action, potentially adversely affecting non-target wildlife species. This type of piecemeal treatment is not effective in controlling gypsy moth populations.

Quarantine

It is anticipated that there would eventually be quarantine restrictions imposed on logs, firewood, nursery stock, and household items.

Goods can be shipped out of the quarantined area but must be accompanied by documentation that shows that they have been treated or inspected to comply with quarantine regulations. Quarantines prohibit outright movement of regulated articles but put conditions in place to ensure that gypsy moths are not shipped along with the regulated articles.

Federal (APHIS) quarantines set forth the necessary steps to take to move regulated articles to an area that is not regulated. These necessary steps could include inspection and treatment to ensure that the articles do not have gypsy moths. The costs of the treatment would be borne by the party (nursery, mill, etc.) which wishes to ship or move the regulated articles. It is anticipated that Canada will continue to regulate and manage gypsy moths, which would reduce the potential source of gypsy moths coming to Cook County from the north.

Economic Losses

Potential effects to the local economy from gypsy moth defoliation and quarantine could include financial impacts to mills, nurseries, firewood dealers, tourism industry, and real estate interests.

Based on other areas infested by gypsy moth, once an area is infested the cost of

gypsy moth management and gypsy moth-related lost revenue is at least three times more than the cost of gypsy moth management when populations are still low (Leuschner, et al. 1996). Property and business owners would have to pay for treating gypsy moths, removing caterpillars and their droppings, removing egg masses, and repainting buildings.

Some people may spend less time outside recreating or may choose to recreate in areas that do not have noticeable gypsy moth populations. Repeated, heavy defoliation can change the aesthetic character of an area, which could in turn alter the recreation uses of an area, potentially reducing the public's use of recreation-related businesses.

Private woodlots may also lose value due to mortality, which could reduce property values. Homeowners and local governments may also have to replace damaged or dead trees and shrubs.

The forest products that could be harvested could also change. If there were moderate to heavy defoliation and subsequent mortality, the opportunities for salvage harvesting may increase from current levels in the short term. However, in salvage sales, the wood becomes unmerchantable quickly (one to three years). If there were widespread mortality the local market may become flooded with salvage sales, which would likely reduce the price of the wood and reduce income to loggers and mills. There would also be a reduction in live harvests.

Firewood sellers may see similar increases in birch to be taken, but if too much wood were to die too quickly it would rot before it could be gathered. (Mortality in aspen would not be a concern for firewood because it is not typically used in commercial firewood sales.)

For other forest products, it would be expected that maples would increase in number and vigor if moderate gypsy moth defoliation increased the mortality of other species in the maple system. This could result in more maple sugar production.

Effects to Wild, Scenic, and Recreational Rivers

The last 5.1 miles of the scenic Brule River forms whitewater rapids and waterfalls as it makes its descent into Lake Superior. The lower stretches of the river, approximately 2 miles above Lake Superior, are a series of spectacular waterfalls. One of these is in the Devil's Kettle area, a unique geologic formation dividing the river into two sections; one continues on to Lake Superior and the other disappears underground.

Anticipated direct or indirect effects from the proposed treatment are expected to be minimal and could be mitigated with public notification and informational signage being posted at recreation areas within the treatment area. No long term effects from treatment are to be expected.

The no action alternative may result in defoliation of the canopy along the North Shore eventually leading to some tree mortality. This would decrease, to a limited extent, the present and long-term scenic quality and recreation value of the North Shore in Northeastern Minnesota.

Effects to National Forest Research Natural Areas (RNA), Candidate RNAs, Unique Biological Areas and to State of Minnesota Scientific and Natural Areas (SNA)

None of the proposed treatment areas, as described above, include designated or candidate RNA's, Unique Biological Areas or State SNA's.

3.2 Consequences to Forest Type and Forest Health

Indicators of potential impacts of gypsy moth on the landscape are best reflected in changes to vegetation composition, structure, and function. The data used to evaluate these changes will primarily involve forest types.

The analysis will use data that are a combination of the most current and accurate data available for all ownerships.

Analysis Area

The analysis of direct and indirect effects will include the treatment blocks themselves as well as forest vegetation within a one-mile "buffer" around each block. This inclusive area was chosen because it would allow for consideration of forest conditions outside the treatment blocks and provide a more comprehensive "picture" of general forest conditions. The analysis will also look at the potential effects over five years after implementation. Five years was chosen because the effectiveness of the treatment would surely be evident by then.
Cumulative Effects

The cumulative effects analysis will examine how no action and proposed action could affect the State of Minnesota (as this is a regional issue) over the next 10 years (allowing for the spread of gypsy moth). The cumulative effects analysis may consider the following local activities

- Past activities
  - Btk treatment in the Tower, MN area in 2005 on 640 acres (approximately 40 miles to the west of the project area)
  - Pheromone treatment in 2006 on approximately 133,000 acres along the North Shore
- Current activities
  - Tribal proposal to treat approximately 16,958 acres with a combination of Btk and pheromones on the Grand Portage Reservation in 2008
  - MDA proposal to treat approximately 44,000 acres with pheromones along the North Shore in the immediate vicinity of the Little Marais, Grand Marais and Marr Island blocks
  - Treatment to control other non-native invasive species, such as emerald ash borer and non-native invasive plants.
  - Canada's gypsy moth monitoring and management program
  - East Side Thinning and Inga South vegetation management projects
- Reasonably foreseeable future activities
  - Treatment of gypsy moth, by the Forest Service and the State of Minnesota, using other methods including mating disruption (pheromone) and insecticides (Bt, diflubenzuron, and nucleopolyhedrosis virus)
  - Forest Service proposal to treat non-native invasive plants
  - Mid Temperance, Devil Trout, Ham Salvage and Reforestation; Cascade, Clara and Manitou vegetation proposals

Affected Environment

At the present time, trap catches of male gypsy moths indicate that relatively low populations of this insect are scattered over a large portion of the North Shore landscape.

Gypsy moth has shown the ability across the Northeastern United States to expand into new areas where natural enemies do not exist, persist at low levels for several years, and then eventually reach outbreak status. It is believed that this same scenario will also occur in northeastern Minnesota (Katovich, 2006).

Forest land in Minnesota consists of approximately 16,195,000 acres (all ownerships) or approximately 32 percent of the State's total land area. Of this, approximately 14,759,800 acres are considered "timberland", or commercial forest (Miles, 2006).

Aspen/birch (6.3 million acres) and oak (0.9 million acres) dominated forest types make up approximately 44 percent of that total forestland in the State (Miles, 2006). Quaking aspen, northern red oak and paper birch rate as numbers 3, 4 and 9 respectively of the top 20 preferred tree species for consumption by gypsy moth within the coterminous United States (Liebhold, 2003). These three species are expected to be most heavily impacted. Minnesota's forests also commonly contain other tree species that are considered "most preferred" hosts for the gypsy moth including alder, tamarack, basswood, and willow. In addition, other tree species termed "intermediate" in their desirability as a food source for the moth occur and include yellow birch, jack pine, red pine and eastern white pine (Classifying Forest Susceptibility to Gypsy Moth Defoliation, 1985). While the above species often dominate the composition of forested areas, they also commonly occur as lesser components in other forested areas that are more mixed in composition.

At least 55% of all forested area in Minnesota is characterized by land area covered by "highly susceptible stands" (>50% of the basal area in tree species preferred by the gypsy moth) (Liebhold, 2003).

The proposed project area is located within the Northern Superior Upland section of the National Ecological Hierarchy (USDA 2004a). The predominant Landscape Ecosystem (LE) is the Mesic Birch/Aspen/Spruce-Fir type of which birch and aspen comprise 60% of the forest types represented. Embedded within this larger LE, in a mid-slope band, is a secondary Landscape Ecosystem namely the Sugar Maple. Within this LE, Northern Hardwoods such as Sugar Maple dominate although a wide mix of other tree species occur.

All three proposed treatment blocks included in this analysis are heavily forested and include many of the trees species considered susceptible to gypsy moth. Table 2 displays the percentages of "preferred" and "intermediate" forest species for the gypsy moth as compared to the total forested areas for each block.

Forested areas within the treatment blocks are currently recovering from the most recent (1998-2004) forest tent caterpillar defoliation which primarily impacted aspen/birch and oak forest types. These forest types saw repeated defoliations, to varying degrees, during that time frame. Widespread outbreaks of forest tent caterpillar occur at intervals of 10 to 20 years. Statewide the outbreaks last for three to five years (Minnesota Department of Natural Resources, Division of Forestry 1990).

Paper birch, a major current component of the forested ecosystem along the North Shore, is in decline and it is anticipated that birch stands will change to aspen over time

with or without gypsy moth damage. This is largely due to a resource that is dominated by older age classes. Birch is also stressed by a variety of factors including alternating cycles of drought and forest tent caterpillar defoliation within the last 30 years, drying of soils due to increased soil disturbing activities such as development (roads, housing, power lines, etc. and harvesting; and damage to reproduction by deer. Attack and subsequent mortality of stressed trees due to insects such as the Bronze Birch Borer has contributed to the decline (Steve Katovich, USDA; Mike Albers, Minnesota DNR 2006).

The Mesic Birch/Aspen/Spruce-fir landscape ecosystem is classified as fire regime condition class (FRCC) 2 , indicating a "moderate" departure from historical fire frequency and severity due to changes in vegetation composition. Currently, there is an over-abundance of the late seral stands of hardwoods, a lack of young-aged, and a lack of mid-aged fir within the landscape ecosystem compared to historic conditions . Within this condition class 2, a moderate risk exists of losing key ecosystem components from fire. The Sugar Maple landscape ecosystem remains classified as FRCC 1 indicating that the historical fire regime remains intact. Some departure has occurred from historical vegetation conditions in that there is an overabundance of mid and late seral stages. Fuel conditions along the North Shore of Lake Superior would be currently classified as low to moderate fuel loadings (1-5 tons/acre) and a low to moderate loading of ladder fuels (balsam fir) (Patty Johnson, 2008).

Table 2. Forest Composition of "Preferred" and "Intermediate"*

	"Preferred" and "Intermediate" Gypsy Moth Food Preferences					
Treatment Block	Aspen/birch	Maple/basswood	Pines **	Tamarack	Oak	Alder/willow
Little Marais	64%	20%	2%	<1%	0	6%
Grand Marais	77%	<1%	2%	<1%	0	7%
Marr Island	83%	1%	4%	<1%	0	5%

* expressed as a percentage of all forest and shrub dominated lands within treatment blocks as well as within a one-mile buffer

** eastern white, red and jack pines

Effects Analysis of the Proposed Action on Forest Type and Forest Health

Direct and Indirect Effects Analysis

The proposed action would reduce the short-term negative effects of gypsy moth defoliation. The current forest condition would more likely remain unchanged and/or continue at the present successional rate (USDA 1995). For the near term, preferred host species such as aspen and basswood would be maintained; the forest would also retain its overall composition and structural diversity.

Adverse effects to fire behavior and risk would still occur due to increased fuel loadings as a result of tree mortality from other causes. However, with treatment these effects would be moderated and occur over a longer period (Patty Johnson, 2008).

Gypsy moth would maintain a presence in the area and would be maintained at low levels. Under this proposal, the rate of spread by gypsy moth to other areas could be reduced by more than 50% (Sharov 2002).

Cumulative Effects Analysis

Long-term, gypsy moth populations will continue to spread away from northeastern Minnesota eventually reaching the more oak dominated areas of the state. However, the rate of spread will be reduced if the gypsy moth is actively treated at this time.

Past, present and reasonably foreseeable future actions described earlier will help to maintain forest health in a condition provides for resiliency against impacts from the gypsy moth. These can be logically grouped into three categories: 1) active treatment of gypsy moth; 2) active treatment of other non-native invasive species; and 3) vegetation manipulation for a variety of resource reasons.

All will serve to enhance forest productivity and ability to successfully withstand and recover from impacts from gypsy moth.

Effects Analysis of No Action on Forest Type and Forest Health

Direct and Indirect Effects Analysis

If the current infestation were not treated and allowed to become established, it could spread faster than with treatment. Gypsy moth levels could increase to the point where noticeable pockets of defoliation could occur within five to ten years. Soon after that more widespread defoliation could occur (Katovich, 2006). It is likely that some trees would be killed during the first outbreak in an area and quite possible that others would die in subsequent outbreaks. High-quality canopy trees may die, but mortality is usually heavier among already stressed or weakened trees. If defoliation were heavy for two years in a row or if severe defoliation coincided with drought, 50% mortality of oak, aspen, and birch would be expected (Schweitzer 2004). However this would be an extreme situation.

Impacts to trees would vary by amount of defoliation, tree vigor and species. If less than 50% of a tree crown is defoliated, most hardwoods will experience only a slight reduction (or loss) in radial growth. When more than 50 percent of the foliage is consumed, oaks and most other hardwood species will refoliate in mid-summer. This refoliation will stress and weaken trees as they are forced to use stored starch reserves that would normally be used for protection, seed production and growth. Conifers that are completely defoliated would most likely

die since they are unable to refoliate (Forest Insect/Disease Leaflet 162).

While aspen is anticipated to be relatively tolerant to defoliation, at least initially, older aspen stands are likely to deteriorate more quickly as gypsy moth joins forest tent caterpillar as a major aspen defoliator in the region (Katovich 2006).

The decline of paper birch, already a forest health concern, would be accelerated.

Preferred food sources, described above, would be most vulnerable with other, less desirable, food sources being more readily affected as the gypsy moth population increases and spreads. Less desirable food sources, such as mountain maple and balsam fir, could be expected to benefit from gypsy moth activity. In most locations where gypsy moth has been active and maple is present, an increase in the abundance and size of the maple at the expense of oak and aspen (dependant on site quality) can occur (Katovich 2006).

Gypsy moth is generally viewed as an agent that increases the rate of forest succession or moves the vegetation to a more climax condition (Katovich, 2006).

Increases in standing and downed woody fuels due to mortality from gypsy moth activity would further contribute to current fuel loading and ultimately to fire frequency and severity as described for condition class 2 (Patty Johnson, 2008).

Cumulative Effects Analysis

In the long term, and at a higher rate than if the population were treated, gypsy moth populations along the North Shore will spread slowly away from the area eventually reaching the more oak-dominated regions in Minnesota. This spread into other portions of the state will occur with or without established populations along the North Shore. However, the rate of spread could be strongly influenced by the presence of an extensive gypsy moth population in this portion of Minnesota (Katovich 2006).

Figure 5 Paper birch defoliated by gypsy moths, Groveland, Mass. USDA Forest Service Archives, www.forestryimages.org

3.3 Consequences to Wildlife

This section addresses potential impacts to terrestrial and aquatic animals that are known to occur or could potentially occur in the project area.

The key analysis indicators for wildlife are those forest vegetation-based "management indicator habitats" defined in the Forest Plan (pp. 2-63 to 2-77, Table 4 for each Landscape Ecosystem) and other habitat types that may be most affected by gypsy moth defoliation:

- northern hardwood forest;
- aspen-birch dominated forest;
- red, white, and jack pine forest
- alder and willow shrublands

In addition to the above analyses, a more detailed Biological Evaluation and Assessment address the potential impacts to Canada lynx and Regional Forester sensitive species (available in project file).

The potential for collision between low-flying aircraft and bald eagles and northern goshawk is also considered.

Affected Environment

The project area currently provides diverse habitats for a wide variety of wildlife, including numerous species of terrestrial and aquatic mammals, birds, amphibians, reptiles, fish, invertebrates, insects, and other organisms. Habitats present in the project area range from aquatic lake, stream, and riparian habitats to young to mature and older deciduous, coniferous, and mixed forests to non-forest grass, sedge, moss, or shrub wetlands and uplands.

The federally threatened Canada lynx is known to occur in the area. Regional Forester Sensitive Species documented in area include bald eagle, gray wolf, peregrine falcon, northern goshawk, black-throated blue warbler, yellow rail, creek heelsplitter (a mussel), and shortjaw cisco.

Table 3 below shows the percent composition of the habitats most likely to be affected by gypsy moth in each treatment block. Other habitats that occur in the project area but that have a low potential to be affected by gypsy moth (such as spruce-fir forest, lakes, streams, bogs, fens, or grasslands) are not included.

Table 3: Percent composition of habitats most affected by gypsy moth.

Habitat	Treatment Blocks		
MIH = Forest Plan management indicator habitat	**Little Marais**	**Grand Marais**	**Marr Island**
MIH 4: Aspen/Birch-dominated Forest	64%	77%	83%
MIH 3: Northern Hardwood Forest	20%	<1%	1%
MIH 6 & 7: Red, White and Jack Pine Forest	2%	2%	4%
Alder/Willow Shrubland	6%	7%	5%
Tamarack Forest	<1%	<1%	<1%
Total	92%	87%	93%

All treatment blocks are dominated by aspen-birch forest habitat. These habitats occur in a range of ages, from young to old. Depending on their conditions they provide habitat to numerous species. Examples of species known or with the potential to occur in this habitat – and in northern hardwood forest habitat - include: blue-spotted salamander, red-tailed hawk, pileated woodpecker, ruffed grouse, boreal owl, rose-breasted grosbeak, black-and-white warbler, black-throated blue warbler, and white-tailed deer, moose, snowshoe hare, beaver, and marten.

In the pine forest habitat examples of species that may be found include: heather vole, red squirrel, Nabokov's blue butterfly, Blackburnian warbler, pine warbler, eastern wood pewee, gray jay, white-tailed deer, moose, Canada lynx, and snowshoe.

In non-forested shrub lands species such as moose, watershrew, northern harrier, and American woodcock may be found.

Analysis Area

The analysis for direct and indirect effects includes all ownerships within the treatment areas, including a mile buffer around the planned treatment boundaries. This is an appropriate analysis area because this is where gypsy moth is concentrated and where treatments would occur, thus allowing for effects analysis to identify potential changes to habitat.

The analysis examines effects to habitats that could occur immediately after treatment until ten years after. This timeframe is used because, even though defoliation from gypsy moth varies by year in intensity or duration of defoliation, the effectiveness of the treatment would likely be evident by then. The analysis is qualitative because the potential for changes to forest and shrubland vegetation is unlikely, in the next ten years, to cause a conversion from one forest management indicator habitat type to another. In other words, current acres of management indicator habitats shown in Table 3 above are not likely to change, though the within-stand biological diversity of the management indicator habitats may change.

For potential effects from low level flights, the analysis considers only the implementation, since any disturbance would occur only due to flights over habitat.

The analysis of cumulative effects includes lands of all ownerships within the Northern Superior Uplands since if treatment is not successful, the populations here would serve as a source for continued spread to other parts of Minnesota. Changes to vegetation are key indicators of potential cumulative impacts to habitat and species.

In the cumulative effects analysis for wildlife, the same timeframe (ten years) and actions listed under forest type and health (Section 3.2 above) are considered.

General Effects Analysis Common to Both Alternatives

Gypsy moth defoliation and subsequent tree mortality, which may occur with or without treatment, can affect non-target organisms (all species other than gypsy moth) by changing habitats on a local scale. The extent of this depends on the extent and severity of the infestation. Heavy defoliation can limit food for other leaf feeding species, including other lepidopterans (butterflies and moths). However, it can also create new habitat for some species by creating snags (dead trees or large dead branches) and increasing understory plant development through increased light penetration into defoliated areas. Short- and long-term changes in non-target species have been shown for moderate and heavy defoliation (USDA 1995, 4-47 and 4-50). An Ecological Risk Assessment (USDA 1995, Appendix G) examined gypsy moth impacts on a wide variety of species including mammals, birds, reptiles, amphibians, fish, insects, 16 mollusks, crustaceans, and other invertebrates. Further discussion of gypsy moth and its impact on forest conditions can be found in the FEIS (USDA 1995, p. 4-41 and 4-74).

Effects Analysis of the Proposed Action on Wildlife

This discussion includes threatened, endangered, and sensitive species.

Direct and Indirect Effects Analysis

The likely effect of the proposal is that alteration of wildlife habitats listed in Table 3 above would be slowed. Although low levels of defoliation of wildlife habitats could occur with or without disparlure treatment, current habitat conditions would likely remain unchanged and/or continue at the present successional rate. No other direct or indirect impacts are expected because, as used in mating disruption, disparlure is not likely to impact non-target wildlife: it is specific and detectable only to gypsy moth and has low toxicity to vertebrates. It does not affect or alter vegetative habitat conditions, water quality, microclimate, or soil productivity and fertility.

Since there are no ground-disturbing activities associated with this project, there would be no effects to species impacted by human disturbances on the ground.

The Proposed Action would not affect Canada lynx or proposed critical habitat since disparlure has no documented effect on vegetation (lynx habitat and primary constituent elements of proposed critical habitat) or non-target species (lynx). Forest habitat for lynx, including habitat for prey species snowshoe hare and red squirrel, would remain unchanged and/or continue at present successional rate. Habitat would continue to be sufficient for lynx. Because there would be no direct or indirect effect on lynx forest habitat there would also be no effect on proposed critical habitat (the primary constituent elements of critical habitat with potential to be affected by this project are addressed by evaluating forested lynx habitat).

For the above reasons and because the Proposed Action would comply with all applicable Forest Plan management direction related to Canada lynx and its habitat., this alternative also would have no effect on Canada lynx (see Biological Assessment, project file).

Aircraft flying 100-200 feet above tree tops to apply disparlure has potential to disturb roosting or nesting eagles and northern goshawk that have been documented in the project area. However this potential is very low because the flight over the nest would be very short in duration (less than a minute in the direct vicinity) and would occur during a time in the nesting season when the young of both the eagle and goshawk would have fledged. Once the young have fledged, both eagles and goshawk are less territorial or defensive of their nests and thus less likely to be disturbed by aircraft. Additionally, pilots would be provided GPS locations of known eagle and goshawk nest to heighten their caution in such areas.

Cumulative Effects Analysis

In the short term (1-2 years) the spread of gypsy moth, associated defoliation, and potential for alteration of forest habitats should result in no cumulative effects or measurable changes to wildlife. This is because disparlure is specific to gypsy moth and is unlikely to affect habitat.

Over the next ten years it is likely that gypsy moth will spread into Minnesota with or without established populations along the North Shore. But the speed at which the spread could occur could be strongly influenced by North Shore populations. Thus, if this alternative successfully slows the spread, it would have beneficial

cumulative effects to wildlife from maintaining habitat.

Effects Analysis from No Action on Wildlife

Direct and Indirect Effects Analysis

There would be no action taken and therefore there would be no direct effects to any wildlife species.

In the short term (1-2 years), it is likely that there would be no measurable or very minor indirect effects to wildlife from forest habitat defoliation in mid-summer. Any changed condition of the vegetation would alter habitat conditions for wildlife, mainly through increased sunlight in the understory and a decrease in shade. This is unlikely to alter wildlife composition in the short term since the area is unlikely to become completely defoliated and wildlife in the area are adaptable to similar changed conditions that in the native ecosystem would have occurred from fire, windthrow, and other native insect defoliation events (such as forest tent caterpillar). Since few species feed on forest tent caterpillars, the increased populations of caterpillars are unlikely to affect insectivorous species such as birds or small mammals.

Longer term (3-10 years) the potential for indirect impacts to species would increase and may become measurable depending on the extent and severity of defoliation. This is described in more detail in Section 3.2. above. Repeated years of defoliation may result in altered habitat conditions in all management indicator and other habitats (Table 3 above).
There may be noticeable pockets of defoliation and subsequent loss of vigor or death of both canopy and sub-canopy tree layers and increase in down and standing woody debris in all habitats.

Aspen forest habitat is likely to be relatively tolerant to defoliation, at least initially, while older stages may deteriorate more quickly. Birch forest decline may be accelerated. In most locations where gypsy moth has been active and maple is present, an increase in the abundance and size of the maple at the expense of aspen (dependant on site quality) can occur (Katovich 2006). Conifers that are completely defoliated would most likely die since they are unable to refoliate (Forest Insect/Disease Leaflet 162). Shrublands could also become defoliated.

These potential changes are unlikely to result in a conversion of management indicator habitats from one type to another (see Table 3 above), but locally the quality of habitat may change. Habitats may become more open to sunlight and there may be increases in young trees, shrubs, and forbs in these pockets. There may be also an increase in standing and downed woody debris. In the first ten years, these changes would have subtle beneficial or negative effects on wildlife, but would be unlikely to be wholly negative or beneficial since it is unlikely that there would be loss of entire stands. On a larger landscape scale effects could be more subtle, gradual, and noticeable only after many years or even decades.

Over a longer period of time (greater than ten years) a gradual change from aspen-birch or northern hardwood forest habitats to red maple or conifer habitats would result in local beneficial impacts to species associated with young forest and mixed conifer-deciduous forest and local negative impacts to species associated with mature aspen-birch and northern hardwood forest

habitats. Species that use downed and standing woody debris, such as woodpeckers, amphibians, and some insects may benefit from increased forage habitat components. Species associated with alder-willow shrublands may be negatively affected if defoliation is severe. Defoliation and mortality in riparian areas or fisheries could cause short-term temperature changes which could adversely affect stream fauna for a generation (often a year) or more (Schweitzer 2004), though increased down woody debris in streams may benefit aquatic species as well.

For Canada lynx, the No Action alternative is expected to have no measurable effect during the first ten years. There may be an increased amount of upland browse habitat for snowshoe hare (the lynx's primary prey) created by defoliation and tree mortality. There would be no change to lowland forest habitat. There may be a decrease in amount of denning habitat or travel habitat through loss of canopy cover in the uplands. On balance, though hare and thus lynx habitat would likely change, the extent of these changes is not likely to measurably change hare populations in the next five years or affect lynx.

Sufficient habitat would continue to be available for lynx and its prey. Because there would be no direct or indirect effect on lynx forest habitat there would also be no effect on proposed critical habitat. (The primary constituent elements of critical habitat with potential to be affected by this project are addressed by evaluating forested lynx habitat.)

For the above reasons and because the Proposed Action would comply with all applicable Forest Plan management direction related to Canada lynx and its habitat., this alternative also would have no effect on Canada lynx (see Biological Assessment, project file).

Since there would be no action taken, there would be no direct, indirect, or cumulative effects from low-level flights to eagles, northern goshawk, or any other species.

Cumulative Effects Analysis

In the short term (1-2) years, it is unlikely that any cumulative effects would occur since habitat alteration would not be extensive and gypsy moth populations have not yet significantly invaded other parts of the Northern Superior Uplands.

In the long term (2-10 years), as described under Section 3.2, gypsy moth populations are likely to continue to spread through much of the area. Since this alternative is unlikely to slow the spread, future defoliation events and resulting tree mortality and changes in habitat composition would be likely to occur sooner and may be greater in magnitude, duration, and intensity. Many forest-dependent species may be negatively affected by future defoliation events and the resulting tree mortality and changes in forest habitat composition. Other species may benefit from changes in the understory brought about by defoliation and tree mortality.

Other past, current, and reasonably foreseeable future activities (Section 3.2) all have the potential to influence future gypsy moth populations and rates of spread. The magnitude, duration, and intensity of the cumulative effects of these activities on wildlife species and habitats is difficult to predict, but they would be likely to have greater effects on wildlife since defoliation events would likely be greater than if attempts were made to slow the spread of the moth.

3.4 Consequences to Non-native Invasive Plants and to Sensitive Plants

The analysis of the potential effects to plants will use the same indictors as the analysis of effects on forest type and health.

Analysis Area

The spatial boundary for the direct and indirect effects analysis for non-native invasive plants (NNIP) and TES plants is National Forest land under Forest Service ownership within the Little Marais, Grand Marais, and Marr Island treatment blocks because this is where gypsy moths are concentrated and where treatments and potential impacts will occur. The timeframe for analysis of direct effects is during implementation of the project since this is the only time any potential disturbance could occur. For indirect effects, the time frame for analysis is from project implementation to 5 years after implementation. Five years was chosen because, even though defoliation from gypsy moth varies by year in intensity or duration of defoliation, the effectiveness of the treatment would likely be evident by then.

The geographic boundary for the cumulative effects analysis includes lands of all ownerships within the North Shore Highlands since, if treatments are not successful, adjacent areas in the North Shore Highlands would likely become infested. This could potentially affect NNIP or TES plants that occur on other adjacent ownerships. The timeframe for this analysis is the same as for the analysis of effects on forest type and health (Section 3.2).

The cumulative effects analysis for plants considers the same activities as listed in the effects analysis for forest type.

Affected Environment

The project area is composed of a wide variety of sites ranging from non-forested wetlands to heavily forested stands. See Section 3.2 for a breakdown of forest and shrub types. These sites occur on a variety of Ecological Landtypes (ELTs – ecological units that have a distinct combination of natural, physical, chemical and biological properties. ELT's respond in predictable ways to different management practices and are therefore used in environmental analyses).

About half of the National Forest lands in the project area occur on ELTs that are fairly resistant to invasion by most NNIP. NNIP that disperse into such plant communities tend to get outcompeted quickly by native shrubs, forbs, and trees. However, some NNIP are exceptions to this general observation. For example, common buckthorn and Siberian peabush can thrive in the understory of mesic native plant communities. There are no known occurrences of such NNIP in the 2008 Gypsy Moth Slow-the-Spread Project area.

The other half of National Forest lands in the project area is composed of native plant communities typical of well-drained, shallow-soiled sites that are more susceptible to invasion by NNIP. These sites have less abundant shrub and forb layers, and as a result are more likely to be invaded by NNIP especially if some ground disturbance occurs. These types of sites correspond to Ecological Landtypes 7, 9, 11, 16, 17, and 18 (see the project record for descriptions of these ELTs).
In general, the 2008 Gypsy Moth Slow-the-Spread Project area has a fairly low level of NNIP infestation. Orange hawkweed, yellow hawkweeds, and oxeye daisy are the most abundant NNIP. They are found along

most classified roads in the project area and pose a moderate ecological risk to native plant species. The only high ecological risk species known in the project area, Canada thistle, is much less abundant, totaling less than 1 acre of infestation. There are no other documented occurrences of NNIP in the project area.

No surveys for Regional Forester Sensitive plants were conducted as part of this project. Comparison of project area boundaries to the Minnesota Department of Natural Resources' rare features database (MN DNR 2007) showed that there are known occurrences of the following sensitive plants in the project area: common moonwort, Douglas hawthorne, auricled twayblade, Braun's holly fern, Canada yew, and false asphodel. The project area has suitable habitat for the majority of species on the sensitive plant list. The only sensitive plants without suitable habitat in the project area are: alpine milkvetch, Ross'sedge, creeping rush, American shoregrass, sticky locoweed, western Jacob's ladder, and awlwort. All the remaining Regional Forester's Sensitive plants are considered in the following analysis.

Effects Analysis of the Proposed Action on Plants

Direct and Indirect Effects Analysis

Because no ground disturbance would occur, the proposed action would not directly contribute to the spread of non-native invasive plants. Habitat conditions would likely remain unchanged over the analysis timeframe. It is expected that NNIP would continue to invade new areas at their current rate of spread. Because relatively small levels of defoliation would occur, the proposed action would also not directly contribute to the spread of non-native invasive plants. The lack of ground disturbance and small anticipated levels of defoliation would result in no direct or indirect effects to Regional Foresters Sensitive plant species. Because *disparlure* is an insect pheromone and is not expected to affect forest conditions or soil productivity (USDA 1995, p. 4-67), this chemical would have no direct or indirect effects on NNIP or sensitive plants.

Cumulative Effects Analysis

Because there are no direct or indirect effects of the proposed action on non-native invasive plants or Regional Forester Sensitive plants, there would be no cumulative effects on these species either.

Effects Analysis of No Action on Plants

Direct and Indirect Effects Analysis

If no action were taken, non-native invasive plants would likely keep spreading in the project area, but the contribution of gypsy moth defoliation to non-native invasive plant spread would be small. There would be no direct effects of this alternative. Non-native invasive plants would likely spread the most on Ecological Land Types most at risk to weed invasion. Where pockets of defoliation and tree mortality occur, the risk of weed spread on these ELTs would be greatest. Over the long term, noxious weed spread due to gypsy moth would be minimal because tree mortality from gypsy moth would leave openings that would eventually be occupied by other tree species which would shade out noxious weeds.

Except for Douglas hawthorne, there would be no direct effects of the no action alternative to Regional Forester Sensitive plants. Minor indirect adverse effects to some Regional Forester Sensitive plant

habitats are possible. The impacts depend on the extent and severity of defoliation of the tree canopy. For the sensitive plants that favor shady upland deciduous forest habitats (Canada yew, moschatel, triangle grapefern, goblin fern, New England sedge, Chilean sweet cicely, ram's head ladyslipper, rough fruited fairy bells, and Braun's holly fern), tree canopy defoliation and potential overstory mortality could increase light on the forest understory. This could cause short term lack of vigor (e.g. decreased flowering or growth) in these species but no long term consequences since other overstory species (less desirable gypsy moth food sources) would eventually occupy the canopy.

Douglas hawthorne occurrences in the project area could in the short term be directly affected by defoliation, since Douglas hawthorne, like oak and aspen, is a preferred gypsy moth food source (Liebhold et al. 1995). If defoliated repeatedly over the long term, these Douglas hawthorne individuals could decline in vigor, decrease in reproductive output, and possibly die. There would still be a sufficient number of occurrences outside the project area to maintain the presence of Douglas hawthorne on the Superior National Forest.

Cumulative Effects Analysis

There would likely be some net beneficial cumulative effects from taking no action on non-native invasive plants. Past and present vegetation management projects in the analysis area would probably contribute to the spread of invasive plants. However, ongoing management of NNIP (analyzed in the EA for the Non-native Invasive Plant Management Project USDA Forest Service, 2006) would probably help to reduce the levels of existing weed infestations and thus minimize the potential spread of non-native invasive plants within the cumulative effects analysis area.

There would be minor cumulative effects of the No Action Alternative on RFSS plants. Canada yew, moschatel, triangle grapefern, goblin fern, New England sedge, Chilean sweet cicely, ram's head ladyslipper, rough fruited fairy bells, and Braun's holly fern in the cumulative effects analysis area would experience minor cumulative effects resulting from overstory defoliation caused by gypsy moth. The No Action alternative could also defoliate Douglas hawthorn in the cumulative effects analysis area, causing this species to decline, thus resulting in minor cumulative effects to this species, but there would still be a sufficient number of occurrences outside the project area to maintain the presence of Douglas hawthorn on the Superior National Forest.

4 Pre-decisional Objection Process

The pre-decisional objection process is applied to projects authorized under the Healthy Forest Restoration Act, such as this project. This process differs from the regular Forest Service appeal process in that it takes place prior to the issuance of a decision document (36 CFR 218). We are mailing the EA to those who provided written comments and notifying them that the objection period has begun.

Objections will be accepted only from those who have previously submitted written comments specific to the project. An objection must provide sufficient narrative description of those aspects of the project addressed by the objection, specific issues related to the project, and suggested remedies that would resolve the objection. Incorporation of documents by reference is not allowed.

Objections must be filed with the Reviewing Officer in writing. An objection, including attachments, must be filed (regular mail, fax, email, hand-delivery, express delivery, or messenger service) with the appropriate Reviewing Officer (36 CFR 218.7) within 30 days of the date of publication of the legal notice for the objection process. The objection must contain the name of the project, the name and title of the Responsible Official, and the name of the National Forest where the project will be implemented.

Submit objections to:
Reviewing Officer Kent P. Connaughton, Regional Forester
USDA Forest Service, Eastern Region
626 East Wisconsin Avenue, Suite 700
Milwaukee, WI 53202
Fax: (414) 944-3963
Email: *objections-eastern-regional-office@fs.fed.us*

All communications should include the following:

Subject: 2008 Gypsy Moth STS Project

Electronically submitted objections shall be in one of the following formats: text (.txt), MSWord 6.0 or higher (.doc), portable document format (.pdf), or rich text format (.rtf). Business hours for hand-delivered objections are Monday-Friday, 8:00 am to 4:30 pm local time.

The publication date of this legal notice in the newspaper of record is the exclusive means for calculating time to file an objection (36 CFR 219.9(a)) and those wishing to object should not rely upon dates or timeframe information provided by any other source.

An objection should include: the objector's name and address with a telephone number if available; and signature or other verification of authorship upon request (a scanned signature for electronic mail may be filed with the objection). When multiple names are listed, a lead objector must be identified. Verification of the identity of the lead objector shall be provided on request.

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Appendix A

Public Comments and Agency Responses

The table provides the last name, city, and state of each commenter. Eight individuals and one agency commented on the Public Involvement Package.

Individuals	
Dodson, Waseca, MN	I have heard of the project indirectly through some other cabin owners in the Grand Marais area. I'm not currently on the mailing list. I have private properties in the Grand Marais area and ask to be brought up to date on previous mailings. I'm especially interested in the treatment date(s) and want to know how I'll be affected as a cabin owner. Please send copies of previous mailings to my son.
FS/MDA Response	*MDA was contacted, added the commenter to the mailing list and sent copies of previous mailings to her.*
Latham, Grand Marais MN	I live within the Marr Island treatment block and have multiple allergies and am concerned about the pesticide spray. Also, I am painting the house this summer (in July) and want to know if the flakes will affect the paint.
FS/MDA response	*MDA contacted the individual and suggested the person stay outside the treatment block during spraying to avoid possible allergy issues. Regarding the paint, as long as the paint wasn't wet it should be fine.* *She was provided with the website address (www.mda.state.mn.us/gypsymoth) or call 1-888-545-6684 (Arrest the Pest Hotline) for up-to-date treatment information.*
Mundt, Duluth MN	I have reviewed your covering letter of March 3, 2008 together with a variety of attachments, including maps, diagrams, and information on gypsy moths and related materials. As all of us who have any experience with the gypsy moths know that whatever we can do with any rational reason at all we must do to either totally eradicate or certainly limit as best we can the gypsy moth invasion of our area. The damage caused by the gypsy moth is one that simply is intolerable. Having experienced gypsy moth in Wisconsin and Minnesota and having read your materials, I am strongly of the opinion that what you are proposing is not only important and should be supported, but is critical and under any circumstances cannot be avoided or minimized. I fully support your efforts in working to eradicate, quarantine, reduce, or eliminate if at all possible gypsy moth activities and invasion. The project you have developed, in my opinion, is one that has been carefully thought out and hopefully will prove to be successful.

	Please record my strong support for what you are proposing to do relative to the gypsy moth non-native insect, which has not only threatened, but is now threatening even more forest along the North Shore of Lake Superior. Thank you for the effort that you make and commending you for this project…
FS Response	*Thank you for commenting.*
O'Dell, Grand Marais	Three homes in the O'Dell's neighborhood will be painted this summer starting June 1st. Will the treatment damage/impact the paint?
FS/MDA Response	*Lucy Hunt of MDA responded to the call and told Mr. O'Dell that the pheromone flakes should not impact the house painting at all except that they might get stuck in the wet paint but should not be noticeable. Mr. O'Dell said that he'd contact the housepainter who lives in the Grand Marais area to call the MDA hotline or listen to the radio/TV for more detailed information about application timing as we get closer to July. The painter should then refrain from painting until the flakes have settled.*
Olsen, New Brighton MN	This comment will be short. No where in the printed material (Forest Service Public Involvement Package) have I been able to read or find any information on the chemical used and method used in this program. My concerns are, are there any chance of this chemical getting into the food chain; spraying fruit trees or leaf vegetables?
FS Response	*Steve Katovich (NA S&PF) contacted Mr. Olsen and stated "No evidence that this accumulates in the food chain. It is applied via a spray plane in tiny plastic chips (flakes). These could adhere to apples or vegetables. Washing should remove the chips. We expect about 1-2 chips per square foot of surface area. So, apples that are under a leaf canopy would probably not have the flakes or chips land on them. An exposed garden would have some. The material is not considered toxic. Please look over the enclosed material and call if you have questions." Note: The following documents were sent to Mr. Olsen – "Control/Eradiation Agents for the Gypsy Moth – Human Health and Ecological Risk Assessment for Disparlure" prepared for the Forest Service; also, Slow-the-Spread Bulletin No. 2 – April 2004 Fact Sheet which discusses the makeup of the pheromone and carrier.*
Peterson, Grand Marais MN	I am extremely chemically sensitive and would like more information on the treatment products
MDA response	*Lucy Hunt (MDA) responded that the flakes should not impact her health and sent her MSDS sheets and labels for the product as well as the USFS publication about Human Health and Ecological Risk Assessment for the product (referenced in response to O'Dell's comment – toxicity).*
Rude, Walker MN	I am supportive of the proposed project. Your documentation indicates it is based on sound science and has been proven to have worked before. Go ahead

	with the project. If you need positive support in going forward, or at public meetings, give me a call.
FS response	*Thank you for commenting.*
Goverment	
Minnesota Department of Natural Resources (sent to Gene Hugoson, Commissioner, MDA with a copy to the Superior NF)	Thank you for the opportunity to review and comment on your proposed treatments to slow the spread of gypsy moths in Minnesota. We greatly appreciate the hard work and diligence that you and your staff have demonstrated in managing invasive species. Your partnership is vital in our mission to protect and enhance Minnesota's natural resources. Our managers have received and reviewed the proposed treatment plan and supporting documentation. The information was clear and concise. They have found no reason for concern. DNR Heritage Program managers have reviewed the proposed site data and have found there to be no likely environmental impacts. As such, we support the treatments as planned and offer our assistance in their implementation. I understand an incident command system has already been developed and the Department of Natural Resources is well represented. To complement your efforts in public information, our staff has developed communication plans for our employees and park users. Among the products planned, are posters with the proposed treatment dates to be posted at all affected DNR parks and trail heads. We also plan to make available the fact sheets your staff has developed. We will coordinate our efforts and share any products produced with the appropriate staff within the Department of Agriculture. If there is anything else we can do to support treatment efforts, please let us know.
MDA/FS Response	*Thank you for your comments.*