NAME OF SPECIES: *Lymantria dispar* (Linnaeus) Synonyms: *Porthetria dispar* (Linnaeus) Common Name: European gypsy moth	
A. CURRENT STATUS AND DISTRIBUTION	
I. In Wisconsin?	1. YES X NO
	2. Abundance: 42 Counties under quarantine
	3. Geographic Range: Counties in the west-central part of the state represent the leading edge of the gypsy moth's westward migration and have scattered populations of the insect.
	4. Habitat Invaded: Natural forests, riparian zones, urban areas
	5. Historical Status and Rate of Spread in Wisconsin: Entered Wisconsin in the late 1980s. Without the STS aerial spray treatments done each spring in the STS zone, all of Wisconsin would be infested with gypsy moth is less than 15 years. With the spray treatments, that won't happen for 40 years or more.
	6. Proportion of potential range occupied: Eastern half of WI
II. Invasive in Similar Climate Zones	YES X NO United States: Connecticut, the District of Columbia, Illinois, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, and Vermont, parts of Illinois, Indiana, Maine, Michigan, North Carolina, Ohio, Virginia, West Virginia Canada: British Columbia, Nova Scotia Ontario, Quebec
III. Invasive in Similar Habitat Types	YES X NO
IV. Habitat Affected	1. Host plants: Over 500 species of trees and shrubs. Preferred: Oak, aspen, willow, apple, crabapple, tamarack, white birch, witch hazel, mountain ash, basswood, linden, pine (older caterpillars), spruce (older caterpillars) Acceptable: maple, walnut, chestnut, hickory, cherry, hemlock, elm, hackberry, black and yellow birch, beech, cottonwood, box elder, ironwood In WI, hardwoods cover approximately 84% total timberland of three main forest types: Maple/Basswood (5.3 million acres), Aspen/Birch (3.4 million acres), Oak/Hickory (2.9 million acres)
	2. Conservation significance of threatened habitats: Extensive mortality of oaks usually occurs following two or more consecutive years of defoliation, though mortality can occur following only one year of defoliation if some other predisposing condition exists (e.g. drought).
V. Native Habitat	1. Countries: Europe
	2. Hosts: Similar to North American species
VI. Legal Classification	1. Quarantined species? YES X NO

	2. By what states, countries? United States: Entire states: Connecticut, Delaware, the District of Columbia, Maryland, Massachusetts, Michigan, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, and Vermont Counties/Cities within: Wisconsin, Michigan, Illinois, Indiana, Ohio, and West Virginia. In addition to these states, APHIS-PPQ regulates parts of North Carolina, Virginia, and Maine and all of Maryland, Delaware, New Jersey, Pennsylvania, New York, Connecticut, Rhode Island, Massachusetts, Vermont, and New Hampshire. Canada, Australia, New Zealand
B. ESTABLISHMENT POTENTIAL AND LIFE HISTORY TRAITS	
I. Life History	1. Type of insect: Lepidoptera: Lymantriidae
	2. Time to Maturity: Native and North American: 1 generation/year
	3. Methods of Spread: Stratified dispersal which is a combination of (1) long-distance dispersal which results in establishment of small isolated colonies beyond the population front, and (2) short-distance dispersal which results in growth of isolated colonies until they coalesce. Long-distance dispersal results mainly from inadvertent transportation of egg masses and other life-stages by humans (e.g., on campers, logs, etc.). Short-distance dispersal results from larval dispersal.
II. Climate	1. Climate restrictions: Eggs depend on insulation from snow to protect them from extreme winter temperatures. However, overwintering eggs will die if temperature dips below 29°C. The survival of overwintering eggs also can be affected by their winter conditioning and long periods of low temperatures.
	2. Effects of potential climate change: Warming trends will encourage northern expansion and may increase overwintering survival rates.
III. Dispersal Potential	1.Invasion pathways: Natural dispersal (local): Late instar larvae may crawl up to 100 m Wind: Ballooning: where newly hatched caterpillars travel to the top of their host tree and winds can carry them to other trees. Young larvae have hairs with small air pockets that may keep them airborne for miles when the wind is strong. Egg masses are tolerant of extremes in temperature and moisture and travel well on logs, lawn furniture, nursery stock, pallets, shipping containers, and on the hulls and riggings of ships. Caterpillars attach to travelers and their possessions. They can hitch rides and travel across the continent this way.
	2. Distinguishing characteristics that aid in its survival and/or inhibit its control: It has a very high potential for reproduction (100 and 1500 caterpillars). It is extremely polyphagous. The preferred host (oaks) is available throughout the region in large areas. The early larvae are able to disperse short ranges. Vehicles can transport both viable egg masses and pupae long distances. The apparent lack of natural predators and parasites in newly infested areas. Extensive amount of hair on larvae make them an undesirable food item for birds. Large outbreaks during the 1970s and 1980s in the northeastern US, along with the decreased use of insecticides (e.g. DDT), enabled further expansion.
IV. Ability to go Undetected	HIGH MEDIUM X LOW

	Signs and symptoms: Gypsy moth damage is caused exclusively by the caterpillars, which feed on developing leaves in May. Newly hatched larvae are hairy and black and feed by chewing small holes in the surface of the leaves. Older larvae devour entire leaves. The body of the larvae is dark-colored and hairy, with red and blue spots on the back. Full-grown larvae can be up to 65 mm long. In late July, spongy egg masses covered with tan or buff-colored hairs from the female's abdomen are laid on the trunks and branches of trees or in forest debris near defoliated trees.
C. DAMAGE POTENTIAL	
I. Competitive Ability	1. Presence of Natural Enemies: Predators: deer mice, *Peromyscus* spp. and shrews, *Sorex* spp., birds (low); Ants, Carabidae. Parasitoids: Braconidae: *Cotesia melanoscelus, Glyptapanteles. flavicoxis*, *G. porthetriae* and *G liparidis* Encyrtidae: *Ooencyrtus kuvanae* Chalcididae: Brachymeria intermedia Ichneomonidae: *Gelis* spp. (hyperparasitoids on *C. melanoscelus*) *Coccygomimus disparis* Tachinidae: *Compsilura concinnata*, *Parasetigena silvestris*, *Ceranthia samarensis* Entomopathogens: *Bacillus thuringiensis* var. kurstaki, Nucleopolyhedrosis Virus , *Entomophaga maimaiga*, *Nosema* sp.
	2. Presence of Competitors: Northern tiger swallowtail, *Papilio canadensis*
	3. Rate of Spread: about 21 miles per year. But egg masses on travel trailers and campers have helped speed up the process, creating pockets of infestations.
II. Environmental Effects	1. Alteration of ecosystem/community composition? YES X NO Notes: Gypsy moth is an extensive defoliator, especially of oak spp. They especially affect oak regeneration following a disturbance, such as clear-cutting. Similarly to both the forest tent caterpillar and the spruce budworm, this can decrease leaf area, outright kill individual trees, decrease growth, make trees more susceptible to secondary infections, change the quality of the wood, and/or contribute to a change in stand structure. For example, stands that experience repeated gypsy moth infestations were found to have fewer trees per acre and a decrease in the number of oaks. Gypsy moths also can significantly impact species in the understory and forest floor because larvae will feed on preferred species within the understory. In addition, the opening of the canopy from both defoliation and death of individual trees increases the amount of available light, nutrients, and moisture on the forest floor, and thereby increases the populations of both herb and shrub species. Defoliation by gypsy moths also can lead to stream-water acidification and thus, a change in the biogeochemistry within stream-water catchments. In addition to the plant species within an area, the animal and insect population could be impacted as the gypsy moth moves into new areas. For example, beetle predators of the gypsy may follow infestations and invade different forest communities.
	2. Alteration of ecosystem/community structure? YES X NO Notes: Extensive defoliation by larvae that changes forest structure may indirectly affect birds. Mortality in the canopy leads to a

	reduction in suitable nesting sites for canopy-nesting birds and to an increase in the amount of interior edge. This could augment nest parasitism and predation. However, the increase in shrub and herbaceous species after defoliation of the canopy also can lead to an increase in shrub- and ground-nesting bird species.
	3. Alteration of ecosystem/community functions and processes? YES X NO Notes:
III. Socio-economic	1. Effects of Restricting Entry: No negative effects predicted.
	2. Effects on Human Health: Hairy caterpillars and eggs aggravate respiratory ailments.
D. PREVENTION AND CONTROL	
I. Detection Capability:	Notes: Gypsy moth trapping (population measurement) and egg mass surveys (reproduction sites). Data are analyzed to determine where defoliation may occur the following spring and where aerial spraying may be necessary. In quarantine counties (eastern half WI), traps are set at 1 trap per 4 square miles or 1 trap per 9 square miles. In non-quarantine counties (western half WI), trap densities are 1 trap per 1 square mile or 1 trap per 2 square miles.
II. Costs of Prevention :	Notes: Public awareness of the consequences of transport and establishment of this insect. Effective detection and monitoring and adherence to regulations.
III. Responsiveness to prevention efforts:	Notes: The STS program is estimated to reduce the rate of spread by 50% or more.
IV. Control tactics:	1. Cultural: Egg Mass Scraping and Spraying; Burlap banding (trap caterpillars as they head back up the tree to feed in the evening); Sticky banding (traps caterpillars coming down, or going up tree trunk). mass trapping, mating disruption with pheromone flakes (disparlure), sterile insect release Silviculture: High-risk forests can be harvested before outbreaks occur to prevent some economic loss. Thinning stands of medium to high quality can increase the vigor of surviving trees, reducing the risk of major outbreak. Thinning to reduce the proportion of primary hosts can also reduce the frequency and intensity of defoliation. After defoliation has occurred, salvage logging can be carried out within 6 to 12 months of tree death to prevent complete economic loss and to advance regeneration. Slow the Spread: Scientists believe that it is impossible to stop gypsy moth spread but evidence to date indicates that it is possible to reduce the rate of spread by 50% or more. This is accomplished by using grids of pheromone traps along the expanding front to detect isolated colonies. These colonies are then suppressed or eradicated using environmentally benign methods 2. Biological: No predators or parasitoids have ben released to control gypsy moth. Entomopathogens: *Bacillus thuringiensis* var. kurstaki, Nucleopolyhedrosis Virus (Gypchek). 3. Chemical: Aerial spraying of populations is the most common method for eradicating new isolated populations and is also used to suppress outbreaks in well established populations. Aerial applications of synthetic insecticides such as diflubenzuron, carbaryl, tebufenozide. 4. Regulatory: Quarantine: prohibit the movement of certain articles

	from those parts of the county regulated for gypsy moth to any unregulated part of the United States. Regulated material include nursery stock and Christmas trees; logs, pulpwood, and wood chips; mobile homes and associated equipment; and outdoor household articles, such as outdoor furniture, barbecue grills, firewood, doghouses, boats, recreational vehicles, trailers, garbage containers, bicycles, tires, tents, awnings, garden tools, etc
V. Minimum Effort:	Notes: Early detection isolated pockets has resulted in eradication in these areas.
VI. Most Effective Control:	Notes: *Bt.k* and diflubenzuron.
VII. Cost of prevention or control vs. Cost of allowing invasion to occur:	Notes: Without the STS aerial spray treatments done each spring in the STS zone, all of Wisconsin would be infested with gypsy moth is less than 15 years. With the spray treatments, that won't happen for 40 years or more. Oak is valuable to the forestry industry. Invasions are detrimental to National Parks and associated service industries because they destroy the aesthetic and recreational value of these areas.
VIII. Non-Target Effects of Control:	Notes: Gypchek may cause irritation of the eyes, skin, and respiratory tract; parasitoids may be indirectly affected by loss of their host. Some non-target Lepidoptera larvae present in the proposed spray area would likely be killed by the application of B.t.k. The insecticide DDVP as used in milk carton traps would pose more than a negligible health risk to humans only if an individual were to disassemble a trap and tamper with the DDVP-impregnated strip. No human health effects are likely from exposure to diflubenzuron as it is used in gypsy moth projects. Diflubenzuron is persistent on vegetation throughout the growing season and may remain in leaf litter at least 1 year after spraying.
IX. Efficacy of monitoring:	Notes: Early detection has slowed the progress of the expansion and eradicate spot infestations.
X. Legal and landowner issues:	Notes: Enforcing the Federal Domestic Quarantine to slow down the artificial spread of the gypsy moth by monitoring and/or restricting interstate transport of the gypsy moth, especially by restricting transport of products known to harbor eggs or pupae (e.g. nursery stock, firewood, or timber products) and/or immediately responding to accidentally introduced populations with the use of insecticides. Educate the public about the biology and spread of the gypsy moth to help prevent accidental introductions into new areas.

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