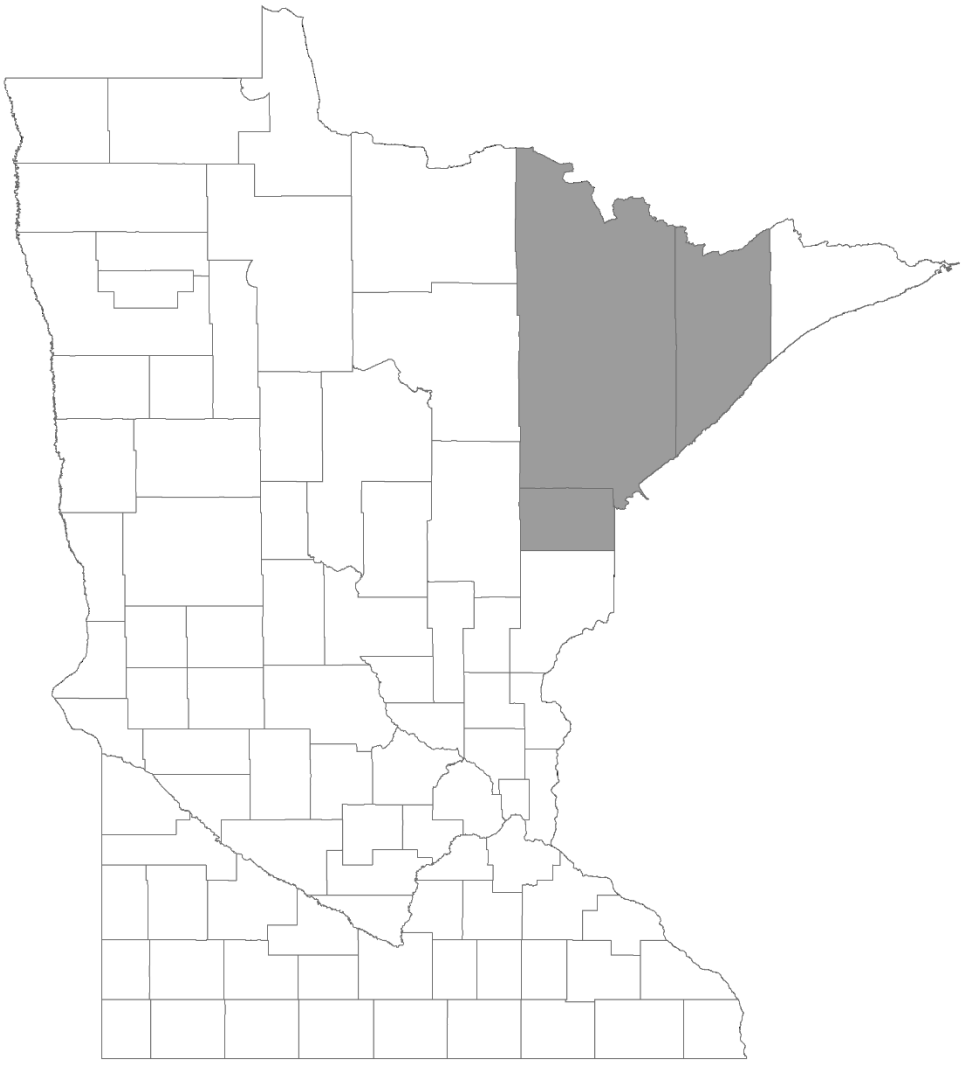
ENVIRONMENTAL ASSESSMENT
Minnesota Cooperative Lymantria dispar (formally gypsy moth) Slow-the-Spread Project

United States Forest Service, State and Private Forestry
United States Forest Service, Superior National Forest
Minnesota Department of Agriculture



CARLTON, LAKE, AND ST. LOUIS COUNTIES OF MINNESOTA

February 2022

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1.0 Purpose and Need for Action

1.1 Proposed Action

As part of the *Lymantria dispar* (*L. dispar*) Slow-the-Spread (STS) program, the Minnesota Department of Agriculture (MDA) proposes a cooperative project with the U. S. Forest Service's State and Private Forestry (Forest Service, S&PF) to treat *L. dispar* populations in Minnesota that are along an area referred to as the STS Action Area (also known as STS Action Zone). The 2022 STS Action Area in Minnesota is shown in Figure 1.

The proposed action is to treat four sites in three counties totaling approximately 45,729 acres in 2022. Two sites (571 acres) would be treated with the bacterial insecticide *Bacillus thuringiensis* subsp. *kurstaki* (Btk), and two sites (45,158 acres) with a mating disruption (MD) treatment (see Table 1 and Figure 1 for specific sites). The Btk would be applied twice—the first application would be in mid-May to mid-June. The second application would be 5-10 days later. Some acres may be retreated if heavy rain occurs soon after application. One aerial application of mating disruptant would be applied between late June and mid-July.

A portion of the proposed Two Harbors mating disruption block, and the entirety of the Upland Trail mating disruption block lie on Forest Service, Superior National Forest lands. The remainder of the Two Harbors block and the two proposed Btk blocks are comprised of private, state, or other public ownership. All of the proposed treatment acres are considered in this Environmental Assessment. However, the ownership status does require two separate decision documents, one for lands within the Superior National Forest, and one for private, state, and other publicly owned lands. See section 1.4 (Decisions to be Made and Responsible Officials) for further clarification.

1.2 Project Objective

The objective of the Minnesota Cooperative Slow-the-Spread (STS) *L. dispar* Project is to slow the spread and buildup of *L. dispar* populations that are located within or in very close proximity to the STS Action Area in Minnesota.

1.3 Need for Action

Lymantria dispar, is an exotic insect to North America. *L. dispar* caterpillars feed on the leaves of a wide variety of trees and shrubs. In the Great Lakes region, highly preferred hosts include oaks, aspens, paper birch, basswood, and willows, all common trees in Minnesota. High numbers of *L. dispar* caterpillars can cause a substantial public nuisance and a reduction in tree growth and overall tree health. Following large outbreaks, some tree mortality can occur, especially when outbreaks persist in any given area for two to three successive years. Widespread caterpillar outbreaks can alter water quality, wildlife habitat, microclimate, and soil fertility (SEIS, Appendix L).

The STS program is a national program that aims to reduce the spread of *L. dispar* from its natural rate of spread of approximately 20 kilometers per year to less than seven kilometers per year. The STS program has identified and recommends the proposed sites be treated. The STS program includes a

detailed protocol for selection and prioritization of treatment sites at the website Slow the Spread of *L. dispar*

MDA completed a "2021 Minnesota *L. dispar* Program, Summary Report" that documents the moth catch and alternate life stage data that was used to support 2022 treatment recommendations. A copy of that report is on file at the MDA. The Minnesota *L. dispar* Program Advisory Committee (GMPAC) reviewed and concurred with the proposed 2022 treatment plan. See Sections 6.0 and 7.0 for GMPAC members.

Table 1. Proposed treatment locations by county, treatment type, treatment dosage, number of applications, and estimated acres for 2022. A total of 571 acres are proposed for Btk treatments by aerial application of *Bacillus thuringiensis* var. *kurstaki.* A total of 45,158 acres are proposed for MD treatment by aerial application of a mating disruptant.

Treatment Site	County	Treatment	Dosage/Acre	Applications	Acres
New Duluth	St. Louis	Btk	24 CLU*	2	75
Cloquet	Carlton	Btk	24 CLU*	2	496
Two Harbors	Lake	MD	6 g	1	38,001
Upland Trail	Lake	MD	6 g	1	7,157
Total Acres					**45,729**

*Cabbage Looper Units (CLU)

2022 Proposed *L. dispar* Treatments

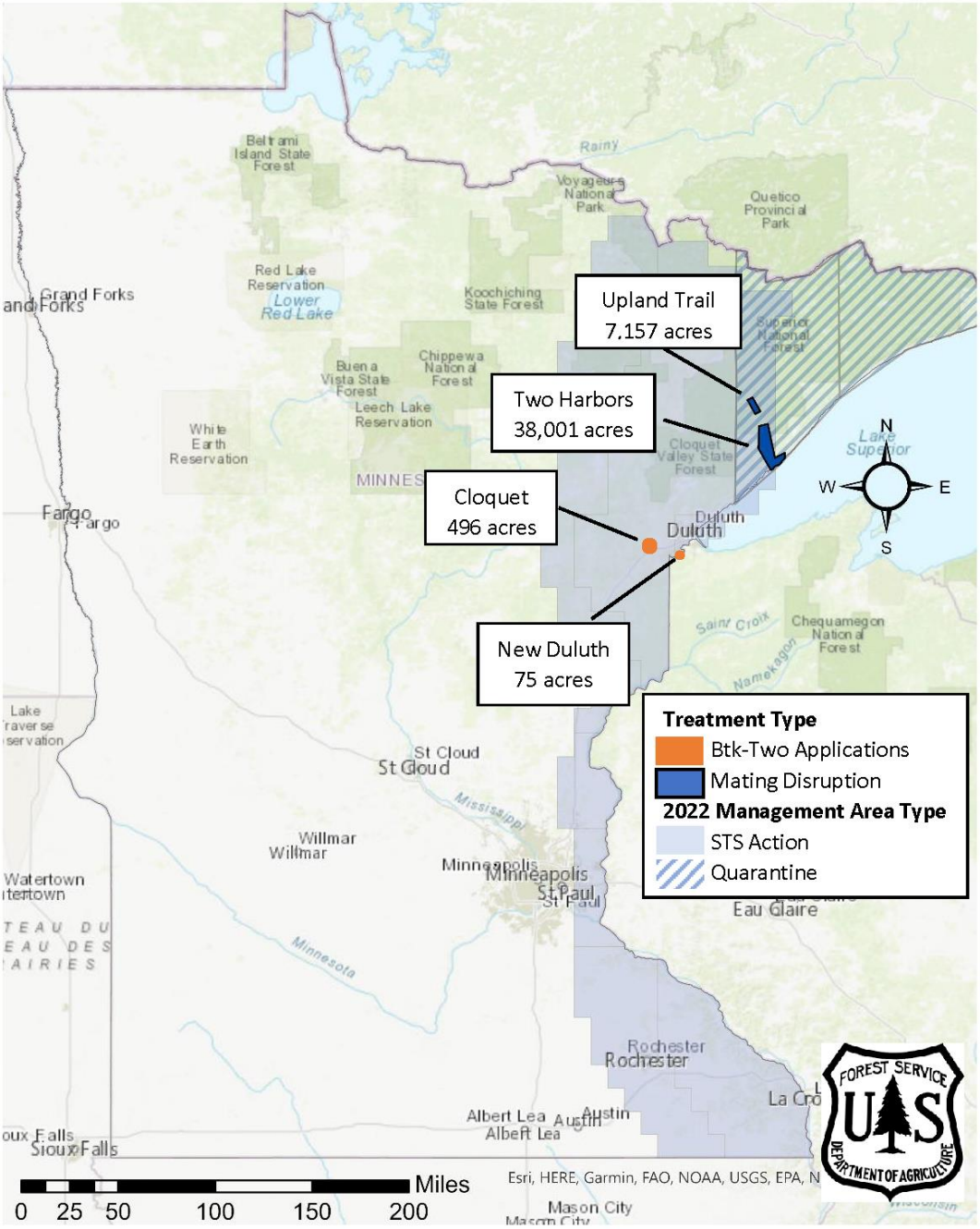

Figure 1. Location of 2022 proposed STS treatment blocks in Minnesota. Blocks highlighted by treatment type; mating disruption (blue) or Btk (orange). The 2022 STS Action Area in Minnesota is shown in gray. Treatment blocks are not drawn to scale.

1.4 Decisions to be Made and Responsible Officials

The proposed action involves participation by the Forest Service, S&PF as a cooperator with the MDA. The responsible official for the Forest Service, S&PF must decide the following:

- Should there be a cooperative treatment program, and if so, what type of treatment options should be used?
- Is the proposed action likely to have any significant impacts requiring further analysis in an Environmental Impact Statement (EIS)?

The responsible official for the Forest Service, S&PF is

Gina Jorgensen, Field Representative
Forest Service, State and Private Forestry
1992 Folwell Avenue
St. Paul, MN 55108

The responsible official for the Forest Service, S&PF will decide before early May to ensure timely implementation for an effective program that meets the State's objectives if the action alternative is selected. This decision is not subject to appeal. If there are no significant impacts, this will be documented in a Decision Notice (DN) and Finding of No Significant Impact (FONSI) or other appropriate decision document, issued by the Forest Service, S&PF responsible official. If significant environmental impacts are found and the project is to continue, an Environmental Impact Statement (EIS) would be required.

The responsible official for the Forest Service, Superior National Forest is:

Sunny Lucas, Acting Laurentian District Ranger
Forest Service, Superior National Forest
318 Forestry Road
Aurora, MN 55705

The responsible official for the Forest Service, Superior National Forest will make a decision before May 15 to ensure timely application on National Forest system lands if an action alternative is selected. See section 5.0 for details on the opportunity to object for the portion of the proposed action on National Forest lands.

The responsible state official for implementing the STS *L. dispar* program is:

Mark Abrahamson, Plant Protection Division Director
Minnesota Department of Agriculture
625 Robert Street North
St. Paul, MN 55155-6448

1.5 Scope of the Analysis

Since 1996, the United States Department of Agriculture (USDA) has carried out its *L. dispar* management responsibilities through the U. S. Forest Service, and U.S. Animal and Plant Health Inspection Service (APHIS) and pursuant to a programmatic decision based on a 1995 Environmental Impact Statement (EIS) for *L. dispar* management. The Record of Decision (ROD) for that EIS was signed in January 1996. It allowed three management strategies – suppression, eradication, and slow the spread. The 1995 EIS was updated with a final Supplemental Environmental Impact Statement (SEIS), titled "Gypsy Moth Management in the United States: A Cooperative Approach," dated August 2012. The ROD for the SEIS was signed by the Forest Service in November 2012. It maintains the three strategies of suppression, eradication, and slow the spread. These strategies depend upon the infestation status of the area: generally infested, non-infested, and transition. Counties involved in this environmental assessment (EA) are within areas considered non-infested or transition (Carlton and St. Louis counties) and generally infested (Lake County).

Implementation requires that site-specific environmental analysis be conducted and public input gathered to identify and consider local issues before any federal slow the spread projects are authorized and implemented. Site-specific analyses are tiered to the programmatic SEIS and documented in accordance with agency National Environmental Policy Act (NEPA) implementing procedures. As part of the analyses conducted for the SEIS, human health and ecological risk assessments were prepared (SEIS, Volumes III and IV). The purpose of tiering is to eliminate repetitive discussions of the issues addressed in the SEIS (40 CFR, 1502.20 and 1508.28 in Council on Environmental Quality, 1992).

This EA provides a site-specific analysis of the alternatives and environmental impacts of treating *L. dispar* populations. The four proposed sites for treatment in 2022 include portions of Carlton, Lake, and St. Louis counties in Minnesota.

1.6 Summary of Public Involvement and Notification

The MDA compiled a contact list of local leaders in each proposed treatment block. An email was sent to the local leaders' listserv to inform them of upcoming outreach activities. Printed materials were attached to these emails to provide leaders with the necessary information to answer questions about *L. dispar* treatments. Virtual presentations were requested and made to the County Board of Commissioners for Lake County and the Cloquet City Council. The MDA mailed informational postcards to property owners inside proposed treatment block boundaries. A second postcard will be sent as a reminder to residents as the treatment date approaches. The second postcard will remind residents that there will be low-flying aircraft on the treatment dates. Local law enforcement, emergency care facilities, poison control, and the 911 system will be notified prior to application.

The first of the virtual meetings for each block were advertised on the initial postcards mailed in all blocks. The MDA hosted four virtual meetings in total, with two taking place for each proposed type of treatment; two for blocks to be treated with Btk (Cloquet and New Duluth), and two for blocks to be treated with mating disruption (Two Harbors NE and Upland Trail).

Information gathered from local leaders and residents in 2022 and from public meetings held in previous years, along with material collected from resource professionals, industry, and environmental

groups were used to develop issues and concerns related to this project. Two broad categories were developed: (1) issues used to formulate alternatives, and (2) other issues and concerns.

Additionally, the Laurentian District Ranger sent a letter to all individuals interested in receiving notifications about Superior National Forest proposed activities.

1.7 Issues Used to Formulate the Alternatives

Each of the major issues is introduced in this section. Discussion pertaining directly to each issue as it relates to the alternatives can be found in Chapters 2, 3, and 4.

Issue 1. Human Health and Safety.

Four major concerns exist under this issue: (1) the risk of an aircraft accident, (2) the risk of a pesticide spill, (3) the direct risk of Btk formulations or mating disruption exposure to humans, and (4) the effect of future *L. dispar* outbreaks on people.

Issue 2. Effects on Non-target Organisms and Environmental Quality.

The major concerns under this issue are: (1) the impact of treatment materials to the environment and non-target organisms, including threatened and endangered species that may be in the treatment sites, and (2) the future impacts of *L. dispar* defoliation on the forest resources, water quality, wildlife, and other natural resources.

Issue 3. Economic and Political Impacts of Treatment vs. Non-Treatment.

L. dispar outbreaks can have significant economic impacts due to effects on the timber resources, nursery and Christmas tree producers, and recreational activities. An additional economic and political impact is a *L. dispar* quarantine that can be imposed to regulate movement of products from the forest, nursery, and recreational industries within infested areas to un-infested areas.

Issue 4. Likelihood of Success of the Project and the Minnesota Program.

The major concerns under this issue are: (1) likelihood of success within the treatment blocks, (2) likelihood of slowing the spread of *L. dispar*, and (3) how the likelihood affects the alternatives proposed.

1.8 Other Issues and Concerns

There are issues and concerns that have been expressed by the public both in 2022 as well as in past years. Many of these do not relate directly to the major issues listed in the previous section. More frequent comments and questions are listed below. In some cases, these were used to develop mitigating measures, management requirements, and constraints. Further information on the following bullets can be found in Appendix A.

- How does Btk affect *L. dispar* and what happens to it in the environment?
- How will *L. dispar* treatments affect beekeeping?
- Do Btk *L. dispar* treatments harm monarch butterflies?

- Will *L. dispar* treatments affect pets?
- What does *L. dispar* eat?
- What are they doing for *L. dispar* in Wisconsin?
- What is the Slow-the-Spread program and where do I get more information on that program?
- Are biological control tactics being considered in the Minnesota *L. dispar* Program?
- What is done to maintain privacy for residents during post-treatment trapping projects on private property?
- What is Foray 48B?
- Are Btk and Foray 48B safe?
- Should people with weakened immune systems or people with allergies or asthma be concerned?
- How might I be exposed to Btk?
- Will children going to school be subject to spraying?
- Will Btk or mating disruptant spot car finishes?
- What are the inerts in Btk formulations?
- Will *L. dispar* become resistant to Btk?
- If the establishment of *L. dispar* populations are inevitable, why manage now?
- Is gluten included in the Btk product (Foray) that would be applied?

1.9 Summary of Authorizing Laws and Policies

State

The Minnesota State Statutes Chapter 18G, Plant Protection and Export Certification, authorizes the MDA to conduct detection and eradication projects for plant pests.

The Minnesota Department of Agriculture Pesticide Control Law Chapter 18B provides the state statutes governing pesticide application.

All portions of this project on all state- and privately-owned lands, as well as all Superior National Forest lands, will be conducted in accordance with the National Pollutant Discharge Elimination System (NPDES) requirements and are operating under Minnesota Pesticide General Permit number MNG87B000.

Federal

Authorization to conduct treatments for *L. dispar* infestations is given in the Plant Protection Act of 2000 (7 U.S.C. section 7701 et. seq.).

The Cooperative Forestry Assistance Act of 1978 provides the authority for the USDA and state cooperation in management of forest insects and diseases. The law recognizes that the nation's capacity to produce renewable forest resources is significantly dependent on non-federal forestland. The 2018 Farm Bill (P.L. 11-334, Sec 8[16 U.S.C. 2104]) reauthorizes the basic charter of the Cooperative Forestry Assistance Act of 1978.

The Forest Service and APHIS cooperate on state *L. dispar* projects based on a Memorandum of Understanding between the two federal agencies. USDA Departmental *L. dispar* Policy (USDA 1990) assigns the Forest Service and APHIS responsibility to assist states in protecting non-federal lands from *L. dispar* damage.

The National Environmental Policy Act (NEPA) of 1969 (P.L. 91-190), 42 USC 4321 et. seq. requires a detailed environmental analysis of any proposed federal action that may affect the human environment.

The Federal Insecticide, Fungicide, and Rodenticide Act of 1947, (7 USC 136) as amended, known as FIFRA, requires insecticides used within the United States be registered by the United States Environmental Protection Agency (EPA).

Section 7 of the Endangered Species Act of 1973, as amended (16 USC 1531 et. seq.) prohibits federal actions from jeopardizing the continued existence of federally listed threatened or endangered species or adversely affecting critical habitat of such species.

Section 106 of the National Historical Preservation Act and 36 CFR Part 800: Protection of Historic Properties requires the State Historic Preservation Officer be consulted regarding the proposed activities.

Executive Order #12898. Consistent with this Executive Order, the Forest Service considered the potential for disproportionately high and adverse human health or environmental effects on any minority or low-income populations. The proposed treatment sites have been determined based on *L. dispar* finds using STS protocols. The proposed treatment itself will have minimal effects, and it will not have disproportionate effects to any minority or low-income population.

2.0 Alternatives Including the Proposed Action

Alternatives are developed in this chapter. Some alternatives are eliminated from further consideration, while others are selected for detailed consideration.

2.1 Process Used to Formulate the Alternatives

The Record of Decision (ROD) for the SEIS that this document is tiered to maintains the three strategies for *L. dispar* management (eradication, slow the spread, and suppression) that were allowed in the 1995 *L. dispar* management EIS. Therefore, the Forest Service can assist in funding and carrying out slow the spread projects. The ROD for the SEIS adds the insecticide tebufenozide to the previous list of six approved treatments from the 1995 EIS. Therefore, seven treatments can be considered for use in

developing treatment alternatives under the slow the spread strategy: mating disruption; mass trapping; sterile insect technique; and the insecticides tebufenozide, diflubenzuron, Btk, and Gypchek.

Information pertinent to developing alternatives for managing the *L. dispar* situation in Minnesota was solicited from a number of groups (see 6.0 Persons and Agencies Consulted), including the public (see 1.6 Summary of Public Involvement and Notification). However, the framework for proposing and selecting appropriate treatment alternatives was developed within the STS program.

2.2 Treatment Options Eliminated from Detailed Study

The following treatment options that were available under the SEIS were eliminated from consideration:

Diflubenzuron (Dimilin)

The label for diflubenzuron (Dimilin) prohibits its use over wetlands and directly to water. The 2022 proposed treatment sites contain ponds, lakes, marshes, rivers, and/or wetlands. Therefore, Dimilin is not considered for this project. In future projects, it may be evaluated for use.

Gypchek

Gypchek is a *L. dispar* specific virus product. It has proven effective at reducing *L. dispar* at higher population levels but has not been consistently successful in eliminating low level populations. It is an expensive alternative with a limited supply and is only used in environmentally sensitive areas, generally those with threatened or endangered lepidopterans, which could be impacted by other treatment options, specifically dimilin, Btk, and tebufenozide (USDA 2012a, Vol. II, App. A, pp. 3 to 4). No known rare, threatened, or endangered lepidopterans are in or near the 2022 proposed Btk treatment sites, so gypchek was not considered for this project. In future projects, it may be evaluated for use.

Tebufenozide (Mimic)

The label for Tebufenozide (Mimic) prohibits its use over wetlands and water. Ponds, lakes, marshes, rivers, and/or wetlands are present in some of the 2022 proposed treatment areas. Therefore, Mimic is not considered for this project. In future projects, it may be evaluated for use.

Sterile insect technique.

The SEIS documents the use of sterile insects for elimination of isolated *L. dispar* populations. It also documents the obstacles of using this alternative — the limited release period; need to synchronize production of mass quantities of sterile pupae; and the logistical difficulties of repeated release over a 4-week period (SEIS, Appendix A, pp. 7-8). Based on these constraints, sterile insect release was not considered. In future projects, it may be evaluated for use.

Mass trapping

This option was eliminated for three reasons. First, the cost of mass trapping is significantly higher than Btk or mating disruption applications. Second, the logistics for placing and maintaining nine traps per acre — the recommended number — over large infestations is extremely difficult. And third, control over large areas by this method has not been demonstrated as feasible. In future projects, it may be evaluated for use.

2.3 Alternatives Considered in Detail

Alternative 1. THE NO ACTION ALTERNATIVE

The MDA would not receive funding from the Forest Service, S&PF to conduct *L. dispar* treatments in 2022. Local *L. dispar* populations would likely build and spread to surrounding areas. This is not a proposed action because damage and regulatory action would occur sooner than if other alternatives are selected.

Alternative 2. THE PROPOSED ACTION

The Forest Service, S&PF and the MDA would cost share on four proposed treatment areas in 2022; using Btk on two sites, and mating disruption on two sites (see Table 1). Btk and the mating disruptant would be applied by low-flying aircraft. This alternative proposes that funding would be made available by the Forest Service, S&PF for STS treatments on approximately 45,729 acres at four sites in three counties.

In the two proposed Btk treatment blocks, the product Foray 48B, containing the active ingredient Btk, would be applied twice per treatment site. The Foray 48B applications are at a dose of 24 billion Cabbage Looper Units (CLUs) per acre per application in 64 fluid ounces. Applications would be made in May to late June during the time period when *L. dispar* early instar caterpillars are feeding. A small number of acres (estimated at 10 to 15 percent) may be retreated if heavy rain occurs soon after an application.

The mating disruption applications would use the active ingredient disparlure. Mating disruption treatments would occur in late June to late July, just prior to the flight period of male *L. dispar* moths. Disparlure would be applied at a rate of either 6- or 15-grams active ingredient per acre. The rate used is dependent on available funding and local population density of *L. dispar*. The six-gram rate has been used successfully and is generally selected.

Treatment decisions, mating disruption or Btk, are driven largely by local population levels. A combination of number of male moths caught and the ease of locating egg masses and other life stages can be used to estimate relative population levels and thereby influence the proposed treatment type. Mating disruption works well at low-density populations where male moths have a difficult time locating and mating with widely dispersed females. As local populations build, more and more female moths are around, so male moths no longer need to rely on the pheromone to find females, they can visually locate them. Once this occurs, Btk becomes a more reliable treatment product.

2.3.1 Mitigating Measures that Apply to Alternative 2

Under this alternative, measures would be taken to mitigate possible treatment impacts. Specific safety procedures and guidelines will be presented in a required 2022 Safety Plan.

One of the primary functions of the Cooperative *L. dispar* Program in conducting aerial spray operations is to make sure the safest possible project is conducted and the least possible impact to non-target organisms occurs. To achieve these objectives, the following has been done or would be done if this alternative was selected:

- Public information efforts inform the public about the proposed action, answer questions, and consider input. Notification of meetings are made to different elected officials and

through mailings to affected parties as well as news releases to local media and postings to websites. Just prior to treatment, local safety authorities will be reminded of treatment.

- Residents and businesses with a mailing address within proposed treatment blocks are notified of the proposed action via direct mailing prior to application. The mailing informs residents of the type of program that is planned. Information includes maps of the treatment areas, how low the aircraft will be flying, the type of product to be used, and why treatment is being proposed.

- Residents and other interested parties are given the option of obtaining advance spray notification by calling the toll-free Report A Pest voicemail (888-545-6684), which will be updated frequently with planned treatment activities. Residents and other interested parties may also sign up for email notifications regarding the proposed treatment activities.

- Prior to treatment, notification will be sent and/or posted to the White Pine Picnic Area, a developed picnic area on the Superior National Forest in the Upland Trail block. This will allow for the public utilizing this area to be informed about the proposed work and timing of treatments.

- The MDA and/or Forest Service, S&PF will have personnel at airports and/or helispots to ensure that the pesticides are used in accordance with label directions and other appropriate laws. Mixers, loaders, and pilots will wear protective clothing when required and will have the required pesticide applicator/handler licenses for their role in the project. Prior to the start of treatment, aircraft will undergo a safety review and be calibrated to ensure accurate application rates. A Work and Safety Plan is required before treatments can begin.

- Pilots will be thoroughly briefed on treatment site locations. Pilots are instructed not to treat open water such as lakes, ponds, open water wetlands, and visible rivers. They are instructed to treat forested areas. During treatment applications, applicators will be instructed to turn the booms off when flying over open water.

- Planes will be guided using differential global positioning systems (DGPS). Automatic flight following equipment is also used to monitor aircraft during ferry flight and application to ensure safety.

- Ground personnel will be equipped with cell phones to communicate with the command center. Employees of state and federal agencies monitoring the treatments will receive training on treatment methods and will be provided outreach information to assist with answering questions from the public.

- Weather conditions such as wind speeds, precipitation, temperature, relative humidity, and foliar moisture will be monitored within the treatment areas to ensure that treatment products are applied according to the manufacturer's guidelines.

- During the treatments, ground observers will monitor the application for accuracy within the site boundaries, swath width, and drift. Application information (e.g. swath widths, spray-on and spray-off, acres treated, and altitude) will be downloaded to an operations-

based computer. The treatment sites will be monitored, post-treatment, to determine the effectiveness of the treatments.

- All mix/load areas will be guarded and/or secured to prevent vandalism.
- Consultations with the Minnesota Department of Natural Resources (DNR), Natural Heritage Inventory personnel, and the United States Department of Interior (USDI) Fish and Wildlife Service are done to minimize the likelihood of impacts to state or federally listed threatened and endangered (T&E) species.
- Efforts will be taken to avoid known areas where rare and uncommon butterflies may occur. These areas include the McNair butterfly management area, the Jordan bilberry site, and known bilberry habitat east of Highway 2. These areas are all outside of proposed treatment boundaries and will be avoided during treatments.
- Known bald eagle nest locations will be provided to pilots to heighten awareness of potential conflicts. If deemed necessary, flight lines will be altered to avoid nest disturbance.
- The State Historic Preservation Officer is consulted regarding the proposed activities and possible effects on historic sites.

2.4 Comparative Matrix of the Environmental Consequences of the Alternatives

ISSUE	ALTERNATIVE 1	ALTERNATIVE 2
ISSUE 1 Human Health and Safety	*L. dispar* itself can create health problems. With no federal funding, the state would still likely have a treatment program, though reduced in size. Therefore, the discussion under Alternative 2 would apply here as well.	Risk to human health from Btk or mating disruptant is minimal. The risk of an aircraft crashing and/or a serious pesticide spill occurring does exist, but it is slight. Measures will be taken to minimize the chance of an accident.
ISSUE 2 Effects on Non-target Organisms and Environmental Quality	Future outbreaks would change some local forest ecosystems by reducing the oak component and opening stands to periods of increased light penetration. Some native insects would be directly impacted by loss of food and habitat due to leaf loss caused by *L. dispar* feeding.	Mating Disruption is highly specific to *L. dispar*. Btk would likely kill some non-target lepidopteran species in the treatment areas. However, this impact would likely be short-term since the proposed treatment areas should be re-colonized from neighboring untreated areas. No other non-target impacts should occur.
ISSUE 3 Economic and Political Impacts of Treatment vs. Non-Treatment	Regulatory activity would need to be considered in infested counties. More widespread infestations would result in economic losses to the forestry and tourism industries. Funds will need to be obtained to deal with future suppression projects.	Since known infestations are being treated, the need for quarantine restrictions for Carlton and St. Louis counties would not be considered at this time. Lake County is already quarantined. Future projects are still likely and funding sources will need to be developed. Spray projects are often controversial, and some complaints, comments, and questions will circulate into the political and economic arenas.
ISSUE 4 Likelihood of Success of the Project and the State Program	*L. dispar* populations would likely expand in any untreated area making future control more difficult and costly.	Treatments should result in success in the treatment sites. However, more infestations are likely to be found and new infestations will occur. This would likely result in future projects. Eventually *L. dispar* will become widely established across Minnesota even if Alternative 2 is followed. However, statewide spread and buildup should be significantly delayed by following this alternative.

3.0 Affected Environment

3.1 Description of the Proposed Treatment Sites

All sites are evaluated to characterize land type, identify aerial hazards, and identify potential site issues, especially as they pertain to major issues. Table 2 summarizes the 2022 treatment sites. Any of the treatment areas could have recreational activities underway at the time of treatment, including walking, hiking, fishing, and camping. Maps of proposed treatment areas are shown in Appendix B.

Table 2. Description of the 2022 proposed Btk and mating disruption sites. Land use is divided into six general categories: agriculture (AG), forest (F), rural residential (RR), industrial (I), public land (PL), and urban (U). Population density at each site is generalized as high, medium, or low. Each site is defined as urban or non-urban, and schools within treatment blocks are noted.

Block Name	Treatment Type	Land Use	Population Density	Urban (Y/N)	School (Y/N)	County	Municipality
New Duluth	BtK	F/U	Medium	Y	N	St. Louis	Duluth
Cloquet	BtK	I/U/F	Medium	Y	N	Carlton	Cloquet
Two Harbors NE	Mating Disruption	F/RR/PL	Low	N	N	Lake	Silver Creek
Upland Trail	Mating Disruption	F/RR/PL	Low	N	N	Lake	Silver Creek

Cloquet (Carlton County, Btk, 496 acres)

Overview of Block: For a detailed map of the block see Appendix B. The Cloquet treatment block covers the SAPPI North America mill site (ca. 338 acres) along with an area characterized as urban development (ca. 158 acres) though with few residences.

The northern portion of the proposed treatment block has fairly continuous plant cover with a mix of deciduous trees. The southern border of the block is Avenue F, western border is 13th Street North, and the eastern border is mill property. The mill area is a heavily industrialized zone that has few trees or shrubs. The Saint Louis River roughly bisects the treatment block from west to east.

There are no known schools, childcare facilities, or health clinics located within the proposed block.

New Duluth (St. Louis County, BtK, 75 acres)

Overview of the Block: For a detailed map of the block see Appendix B. The New Duluth treatment block is in the city of Duluth. The treatment block is 75 acres, square in shape. The block area includes urban residential and deciduous forested areas. The western edge of the block is 98th Street, the southern edge is close to McCuen Street, the northern border is Bowser Street, and the eastern edge does not have roads, however a railroad track runs north to south near the eastern border of the block.

There are no known schools, childcare facilities, or health clinics located within the proposed block.

Two Harbors NE (Lake County, mating disruption, 38,001 acres)

Overview of the Block: For a detailed map of the block see Appendix B. Silver Creek Township is the primary municipality in the treatment block. The block is a large "L" shape, with the bottom border running along Lake Superior for approximately 6.3 miles. The block extends approximately 15 miles north in a 3.75 mile wide path. The northern quarter of the treatment block is in the Superior National Forest. The entire block is within the 1854 Treaty Authority area. Gooseberry State Park is entirely in the treatment block.

The vast majority of the treatment area is covered in deciduous forests. This block has a low population density, as this area has few primary residents, with most of the land state or federal forest. The privately owned land has second homes used as cabins and for recreation. There are four aquatic management areas (AMA's) located within the block; Gooseberry River, Skunk Creek, Stony Creek, and Mink Creek.

There are no known schools, day care providers, or health clinics within the treatment area. There is a visitor center at Gooseberry State Park operated by the Minnesota Department of Natural Resources.

Upland Trail (Lake County, mating disruption, 7,157 acres)

Overview of the Block: For a detailed map of the block see Appendix B. The block is entirely in the Superior National Forest and within the 1854 Treat Authority. It is just to the north of the Two Harbors NE block described above. The majority of the treatment area is covered in deciduous forest. Upland lake, a small 75 acre natural lake occurs near the northeast corner of the block. The block has a low population density, with few primary residents. There are 36 individual parcels with private taxpayer addresses.

There are no known schools, day care providers, or health clinics within the treatment area.

3.2 Threatened and Endangered Species

The Minnesota Department of Natural Resources (DNR) Division of Ecological and Water Resources has been requested to review the proposed activities. The DNR evaluates the program regarding state listed threatened and endangered species, as well as species considered rare or of special concern by the state. Through the licensed use of the DNR's Rare Features database, the MDA has analyzed the 2022 proposed treatment sties to determine the proximity of state-listed threatened and endangered species identified within one mile of the proposed treatment sites. The MDA has made an initial determination of "no effects" for this project on state listed threatened and endangered species. We are requesting DNR concurrence with this determination.

Section 7 of the Endangered Species Act prohibits federal actions from jeopardizing the continued existence of federally listed threatened or endangered species or adversely affecting critical habitat of such species. This project is considered a federal action. To avoid any negative impacts to federally listed species, or their critical habitat, the Forest Service, S&PF did consider possible treatment effects to Listed Species in counties with treatment blocks. An informal Section 7 consultation between the Forest Service S&PF and the USDI Fish and Wildlife Service (FWS) was completed. FWS concurred with the finding that the 2022 Slow-the-Spread *L. dispar* Program in Minnesota, may affect, but is not likely to adversely affect the northern long-eared bat. In addition, the Forest Service S&PF determined that the

2022 Slow-the-Spread will have no effect on Canada lynx; gray wolf; rufa red knot; and piping plover. Copies of the correspondence with the Forest Service, S&PF and FWS are on file at the MDA.

3.3 Cultural and Historical Resources

The National Historic Preservation Act provides specific guidance for the preservation of prehistoric and historic resources when federal actions may have an adverse impact on these resources. In Minnesota, the State Historic Preservation Officer (SHPO) was informed of the proposed action. The Minnesota State Historic Preservation Office has agreed that no historic properties would be affected by the proposed undertaking. Correspondence regarding this consultation is on file at the MDA.

4.0 Environmental Consequences

This section is the scientific and analytic basis for the comparison of alternatives. It describes the probable consequences (impacts, effects) of each alternative on selected environmental resources. We assume federal and state agencies act in agreement in selecting the same alternative.

4.1 Comparison of Environmental Consequences of Alternatives Considered in Detail

Issue 1. Human Health and Safety

Alternative 1. THE NO ACTION ALTERNATIVE

For this alternative, there would be no cooperative project, therefore risk of an aircraft accident or human contact with the mating disruptant or Btk would not exist. However, future impacts by *L. dispar* to human health will occur sooner under Alternative 1 than if treatments are used to slow the spread of these *L. dispar* populations. *L.dispar* outbreaks have been associated with adverse human health effects, including skin lesions, eye irritation, and respiratory reactions (SEIS, Appendix L, pp. 3-1 to 3-4). *L. dispar* caterpillars can become a serious nuisance that can cause psychological stress or anxiety in some individuals (SEIS, Appendix L, pp. 3-4 to 3-5).

Alternative 2. THE PROPOSED ACTION

Human exposure to Btk provides little cause for concern regarding health effects. “There is no information from epidemiology studies or studies in experimental mammals to indicate *B.t.k.* will cause severe adverse health effects in humans under any set of plausible exposure conditions” (SEIS, Appendix F, p. 3-19). The only human health effects likely to be observed after exposure to Btk involve irritation of the skin, eyes, or respiratory tract (SEIS, Appendix F, p. 3-19 to 3-32). “Given the reversible nature of the irritant effects of *B.t.k.* and the low risks for serious health effects, cumulative effects from spray programs conducted over several years are not expected” (SEIS, Appendix F, p. 3-32). A detailed analysis of the risks posed to humans by Btk, called Human Health Risk Assessment, was conducted for the SEIS (Appendix F). Glare and O’Callaghan (2000) provide a comprehensive review of *Bacillus thuringiensis*, including Btk. Glare and O’Callaghan concluded with this statement, “After covering this vast amount of literature, our view is a qualified verdict of safe to use.”

Btk formulations contain a large percentage of bacteria and fermentation medium. They also contain additives that improve product stability and other desirable traits such as flowability. The additives are often referred to as inerts. Most of the inerts are product specific and are considered proprietary

information by the manufacturers of Btk products. Though not made public, the inerts are reviewed by the US EPA for safety purposes. Btk inerts are discussed in the SEIS, appendix F (p. 3-14 and 3-15).

The toxicity of insect pheromones used in mating disruption to mammals is relatively low and their activity is target specific. Therefore, the EPA requires less rigorous testing of these products than of conventional insecticides. Risk to human health due to exposure to disparlure, the active ingredient used in mating disruption applications, is discussed in the Disparlure Human Health Risk Assessment in the SEIS (Appendix. H, pp. 3-1 to 3-10). Once absorbed through direct contact, disparlure is very persistent in humans, and individuals exposed to disparlure may attract adult male *L. dispar* moths for prolonged periods of time. This persistence is viewed as a nuisance and not a health risk (SEIS, Appendix. H, pp. 3-9). In acute toxicity tests, disparlure was not toxic to mammals (SEIS, Appendix H, pp. 4-1 to 4-8) therefore no effects to human health are anticipated.

Both Btk and mating disruptant applications would be conducted using spray aircraft. A slight risk of an accident or spill always exists when conducting aerial application programs. Considerable planning and training are done annually to mitigate this risk. Since the beginning of the MDA *L. dispar* Program in 1973, more than 1 million acres have been treated aerially. During that time period, no aircraft accidents or treatment product spills, and no emergency landings or crashes of application or observation aircraft have occurred. There were no injuries, no property damage, and no damage to the environment. To further reduce any risk associated with aerial spraying, a work, safety, and security plan is required prior to program implementation. These detailed plans are prepared annually and outline all safety and emergency procedures to be used.

Further, aerial applicators meet Federal and Minnesota Department of Agriculture Pesticide Law requirements to provide safe, efficient, and acceptable applications of pesticide. See section 2.3.1 for additional safety and mitigation measures for this project.

The effect of *L. dispar* outbreaks on humans would be delayed using this alternative.

Issue 2. Effects on Non-target Organisms and Environmental Quality

Both alternatives would have impacts on forest ecosystems in Minnesota.

Alternative 1. THE NO ACTION ALTERNATIVE

The “no action alternative” would likely result in a more rapid build-up of *L. dispar* populations and defoliation of susceptible forested areas, especially oak and aspen dominated forests. In other parts of the northeastern U.S., *L. dispar* outbreaks have changed the structure of some forest ecosystems by killing a portion of the oak component and encouraging tree species that *L. dispar* caterpillars avoid, such as red maple (SEIS, Chapter 4, pp. 4-10). *L. dispar* outbreaks in North America have not resulted in widespread loss of oak, rather a subtle change in many locations towards a more mixed forest. In Minnesota forests, maples and white pine should become more prevalent as *L. dispar* caterpillars focus their feeding on oaks and aspen. The SEIS notes that *L. dispar* infestations generally result in tree mortality losses of less than 15% of total basal area, with much of this occurring in oaks that are suppressed or intermediate in crown position at the time of widespread defoliation (Appendix L, p. 4-1).

L. dispar defoliation and subsequent tree mortality can affect non-target organisms. This is discussed in some detail in the SEIS (Appendix L, and Chapter 4, Section 4.3). Widespread leaf loss caused by the

feeding of millions of caterpillars and the loss of some trees, especially oak trees, has a variety of impacts on the environment. Some of these changes are detrimental to certain species and other species are favored by what occurs during and after *L. dispar* outbreaks. SEIS Chapter 4 (Section 4.3) discusses changes to soil condition, microclimate, water quality, water yield, acorn production, and other environmental factors that are impacted by the loss of leaf tissue, the waste material produced by large number of feeding caterpillars, and the tree mortality that can follow outbreaks. Some species of mammals, birds, terrestrial invertebrates, fish, and aquatic invertebrates are negatively impacted by *L. dispar* related feeding. Other species however, are either not impacted or find conditions altered to their benefit. As an example, acorn production can drop during and immediately following an outbreak, and this can reduce populations of white-footed mice. But, dead trees favor some species of birds that use dead wood as nesting sites or locations to forage for wood or bark-infesting insects that thrive in dead and dying trees.

It should be noted that in 2022 defoliating populations are not expected in any of the proposed STS treatment sites in Minnesota. The STS program targets treatments at very low *L. dispar* population levels. It may be several years before local *L. dispar* numbers rise to damaging levels, with or without treatments in 2022.

Alternative 2. THE PROPOSED ACTION

Using Btk and mating disruption is likely to maintain the forest condition in the short-term (5 to 10 years) by eliminating *L. dispar* populations in the treatment sites, thus keeping populations from expanding and causing defoliation. However, in the long term (10 to 15 years), *L. dispar* will likely become more widely distributed in Minnesota even if this alternative is followed (See Issue 4).

Btk may indirectly help in maintaining existing forest conditions, water quality, microclimate, and soil condition by delaying *L. dispar* population increases (SEIS, Chapter 4, p. 10). The risk of Btk to nontarget organisms is discussed in the SEIS in a risk assessment found in Appendix F, and in Chapter 4 (pp. 10-15). Adverse effects due to Btk are unlikely in mammals. Btk effects in birds, plants, soil microorganisms, or soil invertebrates other than insects are not of plausible concern. The U.S. EPA classifies Btk as virtually nontoxic to fish. No toxicity data are available on amphibians, though other strains of Bt appear to have low toxicity to this group. Btk does not harm garden plants. In fact, it is a common garden insecticide used against caterpillars such as the cabbage looper.

Btk has been shown to be toxic to several species of target and nontarget Lepidoptera (SEIS, Appendix F). Btk selectively kills members of the insect order Lepidoptera that are actively feeding as caterpillars at or soon after the period of application, though not all non-target Lepidoptera are as sensitive to Btk as is *L. dispar* (SEIS, Appendix F). Outside of the Lepidoptera, the negative impact of Btk on other insect orders is minor (SEIS, Appendix F). It is, therefore, more “selective” than many insecticides that kill a wider array of insects. However, concerns do exist over its possible negative impact on native caterpillars, which may occur in the proposed treatment areas. A detailed discussion of Btk and non-target Lepidoptera is presented in the SEIS (Appendix F).

Disparlure may indirectly help in maintaining existing forest conditions, water quality, microclimate, and soil condition by delaying *L. dispar* population increases (SEIS, Chapter 4, p. 19).

The Ecological Risk Assessment for disparlure (SEIS, Appendix H) notes that there is limited data available on the toxicity of disparlure but based on available data the toxicity profile in terrestrial animals does not suggest that disparlure is likely to cause adverse effects at plausible levels of exposure. Disparlure appears to be essentially nontoxic to mammals and birds. In addition, it is not likely to cause toxic effects in aquatic species. Disparlure is able to disrupt mating in some closely related species of moths other than *L. dispar*. However, these species are Asian or Eurasian, and not known to be from North America. There is no basis for asserting that mating disruption would occur in other nontarget species in North America, including nontarget insects, specifically native Lepidoptera.

Issue 3. Economic and Political Impacts of Treatment vs. Non-Treatment

Alternative 1. THE NO ACTION ALTERNATIVE

If no treatments were applied, the likely action would be to implement quarantine in the 2022 counties in the near future. Lake County is already under a *L. dispar* quarantine. Quarantine would regulate movement of firewood, logs, other timber products, mobile homes, recreational vehicles, trees, shrubs, Christmas trees, and outdoor household articles. This could create a financial impact to industries that deal with these products.

If current populations are not treated, they will continue to reproduce and grow in size. Defoliation is likely to become noticeable in the future, but it would be difficult to predict exactly when noticeable defoliation would occur. Requests for federal assistance to suppress *L. dispar* would be likely when defoliation occurs. Suppression projects are generally more expensive in total dollars than eradication projects because much larger areas are treated. The economic impact to state budgets would increase, as responsible agencies would need to administer and fund these suppression projects.

Following defoliation, negative financial impacts are likely to occur for recreational industries such as resorts and campgrounds. Homeowners, private woodland owners, and forest-based industries could be impacted by *L. dispar* treatment costs, tree mortality, and adverse human health effects.

Alternative 2. THE PROPOSED ACTION

If treatments are applied, regulatory action is not likely during the near future and the impacts listed under Alternative 1 would be delayed. Lake County would remain under quarantine, with or without the proposed treatments. Economic analyses from the Slow-the-Spread Program (STS) demonstrated the use of Btk, mating disruption and other STS technology reduced the spread of *L. dispar* by as much as 60 percent (Sharov et al. 2002, p. 32). Assessment of the economic feasibility of STS shows that over a 20-year period, the Benefit-Cost Ratio is 3:1, under conservative assumptions (Sills 2007).

Issue 4. Likelihood of Success of the Project

Alternative 1. THE NO ACTION ALTERNATIVE

Male moth trapping results and other surveys do indicate that *L. dispar* populations are spreading into previously un-infested areas of Minnesota, western Wisconsin, and Iowa. These populations are very likely to persist and expand if no treatments are done.

Alternative 2. THE PROPOSED ACTION

Substantially reducing *L. dispar* populations within the treatment blocks using Btk and mating disruption, as proposed in Alternative 2, is likely. Complete and permanent eradication of *L. dispar* from Minnesota is not feasible. This is due to many factors, but mainly to the fact that widespread *L. dispar* populations exist in Wisconsin and Michigan counties that are not far removed from the eastern counties of Minnesota. Further, repeated trap catches over a number of years across Cook and Lake counties indicate that *L. dispar* is established in those two counties. There will be continued unintentional introductions from humans moving *L. dispar* life stages from these and other infested areas. Continued reintroduction would likely result in future projects. However, this alternative is much more likely to slow the spread and buildup of defoliating populations across the state than the "no action alternative".

Btk and mating disruption have proven to be very effective in slowing the spread of the *L. dispar*. The STS program has been evaluated since 1990 and has reported substantial declines in spread rate (Sharov et al., 2002; Sharov and Liebhold, 1998), further evaluation of spread rate is reported in annual STS reports found at: STS Web Site

The STS program has been very active in Wisconsin where numerous treatment blocks using both Btk and mating disruption have occurred since the year 2000. The Wisconsin *L. dispar* program has reported on treatment success and failure by treatment block over the last several years. Success rates in excess of 90 percent have been the norm for Btk and mating disruption treatments (as reported in Wisconsin *L. dispar* STS EA's from 2013-2021).

4.2 Summary of Alternatives Considered in Detail

Btk and mating disruption applications are not viewed as posing any significant risk to human health or safety. A slight risk of an aircraft accident does exist, but this is very small, and safety and mitigation measures will be implemented.

Under Alternative 1 (no action) *L. dispar* populations are likely to continue to persist, reproduce and expand in population size. Local and eventually long-distance spread from these areas would be likely. Some tree mortality, especially of oak species, is anticipated if *L. dispar* becomes established. The long-term trend in future stands with *L. dispar* present would be away from oaks toward forests containing species less preferred by *L. dispar* caterpillars. This would most likely mean more red maple, sugar maple, and pine in many areas. It is predictable that change is likely. In some areas this change may be positive, and in other areas, negative. Regulatory activity (most likely a county-based quarantine) would need to be considered in Carlton and St. Louis counties under this alternative.

Alternative 2 (proposed action) offers the greatest probability of meeting the stated objective (see section 1.2). No non-target impacts are anticipated in the mating disruption blocks. The short-term impact that applications of Btk might have on local non-target Lepidoptera populations should be very minimal since there are only two blocks, both are relatively small and isolated. No unique or rare species are known to occur in the vicinity of the Btk treatment areas and we would anticipate that native moth and butterfly species would rapidly recolonize the Btk treatment blocks from the surrounding untreated areas.

Alternative 2 does delay the immediate economic and political impacts created by any expansion of a federal *L. dispar* quarantine, and it does offer the best chance for slowing the spread and buildup of *L. dispar* populations in the state. Thus, the economic and nuisance impacts associated with *L. dispar* should be delayed over a longer time period. This should allow the orderly development of a well-balanced program. The STS program has documented slower spread rates nationwide since its inception compared to historical rates of spread.

4.3 Cumulative Effects

Cumulative effects are the incremental impacts of the action when added to past, present, and reasonably foreseeable actions.

No cumulative effects are anticipated with mating disruption treatments, since disparlure is very specific to *L. dispar.* In 2022, about 99 percent of the proposed Minnesota treatment acres would use mating disruption.

Cumulative effects could occur under some scenarios that include widespread Btk applications over very large areas and repeated Btk applications over the same areas within a few years. To date, Minnesota has not had widespread Btk treatment activities. In 2021, Btk was applied to only two Btk treatment blocks statewide. One block was in Winona County (1,144 acres) in southeast Minnesota; the other was in St. Louis County (631 acres) in northeast Minnesota. This level of annual Btk treatment makes cumulative effects very unlikely.

In 2022 there is a Btk treatment within the New Duluth block in St. Louis County that was treated in 2021. In 2021, a 651 acre block also referred to as New Duluth was sprayed with Btk. In 2022, 75 acres of that 2021 block would be retreated. This retreatment does increase the likelihood of cumulative effects. However, the treatment area is very small when compared to the local forested area and is occurring over an urbanized landscape. It is very unlikely that cumulative effects would occur under this scenario. If overlapping or adjacent Btk blocks are proposed nearby in future years, cumulative effects in the area may become more likely.

Based on the discussion above, no cumulative effects would be anticipated. Cumulative effects may become more likely if *L. dispar* treatment activity, especially Btk treatment, increases in frequency and scale in future years in Minnesota.

4.4 Irretrievable and Irreversible Commitment of Resources

Irreversible commitments are those that cannot be reversed, except perhaps in the extreme long term. The classic example would be extinction of a species. Irretrievable commitments are those that are lost for a period of time.

It is doubtful either alternative would lead to any irreversible commitment of natural resources. However, if Alternative 1, the no action alternative, is selected, some tree mortality will probably occur in the near future. This could be considered irretrievable, especially if it occurs in residential areas and parks.

5.0 Pre-decisional Objection Process Applying to the Superior National Forest

The portion of the proposed action on the SNF is authorized under Title IV, Insect Infestations and Related Diseases, of the Healthy Forest Restoration Act (HFRA) because the proposed action is consistent with the SNF Forest Plan, is not in a wilderness area, is being identified through a collaborative process, and is on Federal land on which 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.

As such, there may be a pre-decisional 30-day objection period under 36 CFR 218. This would just entail that portion of the proposed project that overlaps with SNF ownership. A decision will be made on the treatments on national forest lands by the Forest Supervisor after considering this Environmental Assessment and other project information. This decision will be posted to the Superior National Forest Website.

6.0 List of Preparers

Kimberly Thielen Cremers, Pest Mitigation and Regulatory Response Unit Supervisor, Minnesota Department of Agriculture, St. Paul, MN. GMPAC member.

EA Responsibility**:** Prepared information and reviewed the EA.

Experience and Education**:** 20 years of experience in *L. dispar* management with the Minnesota Department of Agriculture. Geographical Information Systems (GIS) Certificate and B.S., St. Cloud State University, General Biology.

Erich Borchardt, Invasive Species GIS Coordinator, Minnesota Information Technology Services Department, St. Paul, MN.

EA Responsibility: Participated in data analysis and map creation.

Experience and Education: 18 years of experience at the Minnesota Department of Agriculture as invasive species GIS survey and management support. B.A., St. Cloud State University, Geography.

Danielle DeVito, Pest Mitigation and Regulatory Coordinator, Pest Mitigation and Regulatory Response Unit, Plant Protection Division, Minnesota Department of Agriculture, St. Paul, MN.

EA Responsibility: Prepared information and reviewed the EA.

Experience and Education: 11 years at the Minnesota Department of Agriculture with experience in invasive pest detection and management. B.S., Minnesota State University, Mankato, Ecology and Environmental Science.

Patrick Engelken, Forest Entomologist, US Forest Service, Region 9 State and Private Forestry, Forest Health Protection, St. Paul, Minnesota.

EA Responsibility: Participated in writing and reviewing the EA.

Experience and Education: Two years of experience with the Forest Service as an entomologist, one year experience as a research technician at Michigan State University, M.S., Michigan State University in entomology; B.S., Washburn University, Biology.

7.0 Persons and Agencies Consulted

A number of people, groups, and agencies have been contacted in years prior to 2022. The information, comments, and concerns obtained in past years are still valid in many cases. Therefore, some of the names listed below were not necessarily contacted in 2022. GMPAC members are noted with a * (four additional members are noted in section 6.0).

Individuals and Organizations Consulted for Technical Information

- Lisa Joyal, Minnesota DNR-Natural Heritage and Nongame Research Program, St. Paul, MN
- US Department of Interior, Fish and Wildlife Service, Ecological Services, Minneapolis, MN
- US Department of Interior, Fish and Wildlife Service, Upper Mississippi River NWR
- US Army Corp of Engineers (Property manager Upper Mississippi River NWR)
- Minnesota State Historical Society St. Paul, MN
- Erin Stiers*, USDA State Plant Health Director
- Ed Quinn*, Minnesota DNR, Division of Parks, St. Paul, MN
- Val Cervenka*, Minnesota Department of Natural Resources, Forestry, St. Paul, MN
- Laura Van Riper*, Minnesota DNR, Division of Ecological & Water Resources, St. Paul, MN
- Robert Dana, Minnesota DNR, Division of Ecological and Water Resources, St. Paul, MN (retired)
- John Hiebert, Minnesota DNR, Division of Fish and Wildlife, St. Paul, MN
- Donna Leonard, USFS State and Private Forestry, Asheville, NC (retired)
- Tom Coleman, USFS State and Private Forestry, Asheville, NC (STS Program Lead)
- Linda Merriman, USFS NEPA Coordinator, Superior National Forest, Ely, MN
- Stephen Nicholson, Valent BioSciences, Elginburg, Ontario, Canada
- Deanna Scher, Minnesota Department of Health, St. Paul MN
- Brian Aukema*, University of Minnesota, St. Paul MN
- Tylor Kasper, 1854 Treaty Authority

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USDA. 2014. Gypsy Moth Management in the United States: A Cooperative Approach. Record of Decision. USDA-Forest Service and USDA-APHIS. NA-MB-01-13.

APPENDIX A - Other Issues and Concerns (see section 1.8)

How does Btk affect *L. dispar* and what happens to it in the environment? Btk is a gram-positive spore-forming, crystal-producing member of the bacterial genus Bacillus. The mode of action is complex. The larvae must ingest the Btk delta-endotoxin. The crystalline protoxin is dissolved and activated in the insect gut before exerting its effects. The high pH of the insect's gut and the insect's gut proteases dissolve and convert the inactive protoxin to an active toxin. The toxin then binds to specific receptors on the cells in the insect's gut. This disrupts the gut integrity and leads to the death of the insect from starvation and septicemia. A combination of bacterial infection and starvation usually cause the death of the larvae in seven to 10 days. For a summary on Btk, there is a review article by Reardon and others (1994) that specifically discusses Btk for managing *L. dispar*.

Studies indicate that Btk spores can persist in soil for several months depending on the soil type, soil flora, and other factors such as pH, moisture, and solar radiation. Under favorable conditions, formulations of Btk that are presently available can remain viable against *L. dispar* on foliage for seven to 10 days. Normally, however, Btk is quickly degraded by ultraviolet light and loses potency after three to five days. Btk rarely persists in aquatic environments for longer than a few weeks. A Btk environmental risk assessment can be found in the SEIS (Appendix F).

How will Btk treatments affect organic farms? Foray 48B is OMRI (Organic Material Review Institute) listed. It may be used in certified organic production or food processing according to the USDA National Organic Program Rule.

How will *L. dispar* treatments affect beekeeping? Neither treatment product will have any detrimental effect on bees.

Do Btk *L.dispar* treatments harm monarchs? Btk would not harm an adult monarch. However, Btk could kill a monarch caterpillar if the caterpillar eats Btk soon after application. Most of the monarch caterpillar production in Minnesota is occurring much later in the summer than the planned Btk treatments. In most instances, Btk treatments occur before most monarchs arrive, lay eggs, and egg hatch occurs in the spring. So, some risk does exist, but it should be minimal.

Will Btk harm garden plants? Btk does not harm garden plants. In fact, it is a common garden insecticide used against caterpillars such as the cabbage looper.

Will *L. dispar* treatments affect pets? Btk and mating disruptant would not be expected to have any adverse impacts on pet animals such as dogs, cats, all mammals, birds, or fish.

What does *L. dispar* eat? *L. dispar* caterpillars eat the leaves on a wide variety (over 500 species) of trees and shrubs. However, certain species are favored and fed on more readily than others. Favored hosts include oaks, trembling aspen, and willows. See a list of L. dispar food preferences

What are they doing for *L. dispar* in Wisconsin? Wisconsin has well established *L. dispar* populations across the eastern 2/3rds of the state. They have been an active participant with the STS program since its inception. Wisconsin has treated in excess of 200,000 acres annually in recent years, mostly using mating disruption and Btk treatments. For background on the Wisconsin L. dispar Program visit their L. dispar website

What is the Slow-the-Spread program and where do I get more information on that program? See the following web site: STS website

Are biological control tactics being considered in the Minnesota *L. dispar* Program? Biological control is not a major effort in the STS program because natural enemies are not considered a viable technique in eradication (eliminating) and slowing the spread of *L. dispar* populations.

As *L. dispar* numbers expand in the state, the use of biological control agents will be evaluated, and some will very likely be proposed as a functioning part of an integrated pest management program against *L. dispar*.

What is done to maintain privacy for residents during post-treatment trapping projects on private property? Pheromone baited traps are used within the treatment sites to monitor success or failure. In many cases, this would entail entering private property to place and monitor traps.

Trappers will attempt to meet with residents at their door prior to setting traps. If a homeowner is adamant in not wanting a trap on their property, every effort will be made to locate the trap in another location.

What is Foray 48B? Foray 48B is the commercial product containing Btk. The inert, or inactive, ingredients used in Foray 48B are certified organic food-grade ingredients and contain no petroleum solvents. The product is certified organic by the Organic Materials Review Institute (OMRI). The Foray 48B Btk is not genetically engineered, and the product is gluten free.

Is Btk and Foray 48B safe? Btk has a proven safety record with people, pets, birds, fish, livestock, and other insects such as bees; and has been registered and re-registered many times by the Environmental Protection Agency (EPA) for use in the U.S., to use on more than 200 food and fiber crops

Should people with weakened immune systems or people with allergies or asthma be concerned? Although we don't have evidence that Btk will affect any given group of people, individuals with a weakened immune systems or serious food allergies may choose to avoid any potential for exposure by staying indoors during and at least 30 minutes after the treatment, or leaving the area during the application.

How might I be exposed to Btk? Day to day, people are exposed to Btk through contact with soil in the natural environment or through their diet, at very low levels. If you eat fresh fruits or vegetables, you probably have already ingested this bacterium. It is commonly used on commercial and organic food crops. In this project you could be exposed during the application process, via the air during and very soon (first 30 minutes) after application. After application Btk dries and adheres to leaf and other surfaces, it is likely to persist on outside surfaces for several days before degrading. People could be exposed during this time period if they rub or directly contact a surface where Btk was deposited.

Will children going to school be subject to spraying? As discussed in the SEIS and in Section 4.1 of this document, Btk and mating disruption are considered to be of no threat to human health. However, since the potential for possible application onto school children exists, especially in urban areas during the time period when school buses are collecting students, measures have been prepared to reduce the likelihood of this occurring.

Btk treatments in northern Minnesota may occur as late as mid-June, after schools have completed their school year. Mating disruption treatments occur in mid-summer when schools are not in session. If schools are not in session the following mitigating measure would not be implemented.

Mitigating measure: During the month of May and the first week of June, project personal will work with the local school district to determine school start times and bus routing. All efforts will be taken to assure spraying will not occur while children are in school or at bus stops awaiting pick up. School properties, if necessary, will be treated during times school is not in session, nor 30 minutes prior or after school starts or is dismissed.

Will Btk or mating disruptant spot car finishes? There is nothing in the Btk product proposed for use that would cause damage to automobile finishes. The product is formulated to stick to the surface of leaves when it dries.

Therefore, it is easiest to remove from any surface while it is still wet. To remove dried Foray from any surface, soak the dried droplets with water and then sponge or wipe with a soft cloth. A cleaning product normally labeled for car washing may be needed if the dried spray has been on the surface for a while. Mating disruptant treatment products use a waxy substrate embedded with *L. dispar* pheromone. The product will not harm the paint of your car. If you notice mating disruptant droplets on your car, wash it with a mild detergent and water like you would with road grime.

What are the inerts in Btk formulations? Products based on Bt contain a large percentage of bacteria and fermentation medium. However, they also contain additives that improve product stability and other desirable traits such as flowability. The additives are often referred to as inerts. Most of the inerts are product specific and are considered proprietary information by the manufacturers of Bt products. Though not made public, the inerts are reviewed by the US EPA for safety purposes. Btk inerts are discussed in the SEIS, appendix F (p. 3-14 and 3-15).

Will *L. dispar* become resistant to Btk? It is very unlikely that forest insects will build up resistance to Btk. In forestry, only a very small area of the total forest is sprayed, and that area will likely not receive more than two or three treatments over the entire lifespan of the trees. The pest population exposure to Btk is, therefore, extremely low.

If the establishment of *L. dispar* populations are inevitable, why manage now? See section 1.3 Need for Action.

Is gluten included in the Btk product (Foray) that would be applied? Foray contains water, residues of food crops that are used to grow the Btk, and food additives. The additives are approved for use in food by the US Food and Drug Administration (FDA) and are found naturally in foods or made for use in food products. Most people encounter these additives in beverages, foods, and cosmetics. According to the company that makes Foray there is no wheat or gluten in the product.

APPENDIX B - Maps of Treatment Blocks

Alphabetical by Block Name

Cloquet– Carlton County

New Duluth – St. Louis County

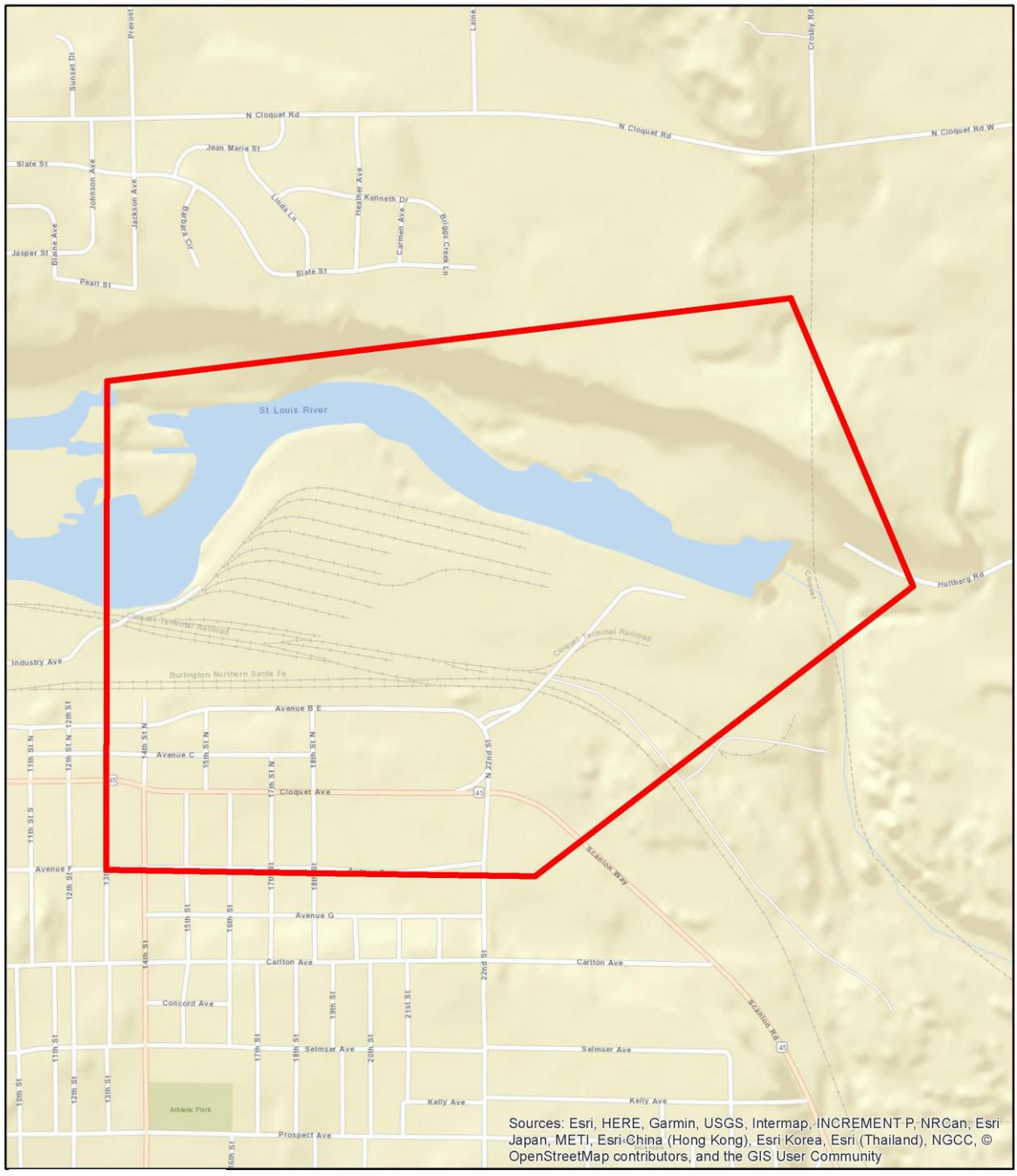
Two Harbors – Lake County

Upland Trail – Lake County

Proposed Gypsy Moth *(Lymantria dispar)* Treatments 2022

Treatment: Btk
Acres: 496

County: Carlton
Block Name: Cloquet



DEPARTMENT OF AGRICULTURE

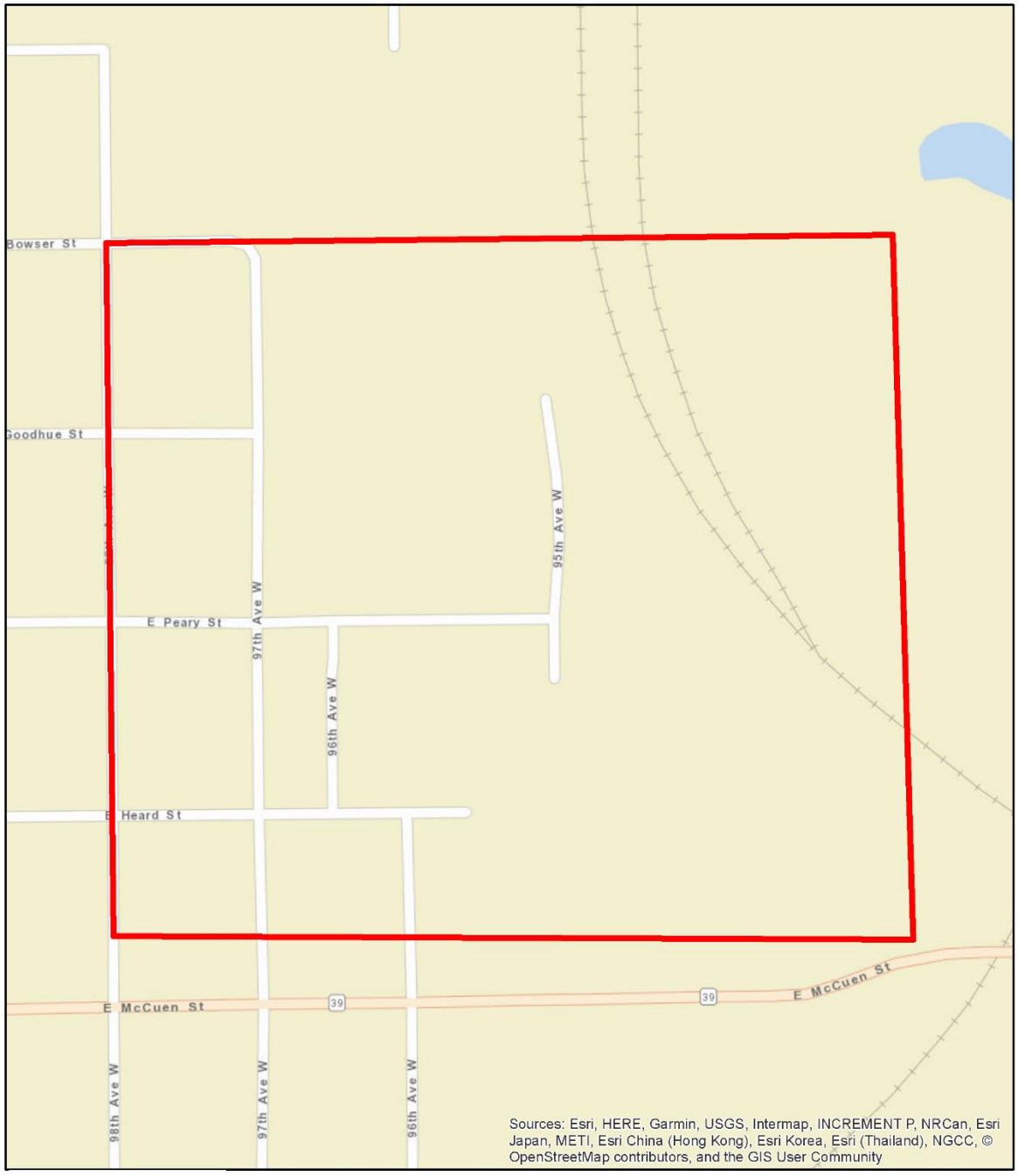
0.4 Miles

Author: E. Borchardt
Date: 2/2/2022
MN Dept. Ag, STS Foundation

Proposed Gypsy Moth *(Lymantria dispar)* Treatments 2022

Treatment: Mating Disruption
Acres: 75

County: St. Louis
Block Name: New Duluth



DEPARTMENT OF AGRICULTURE

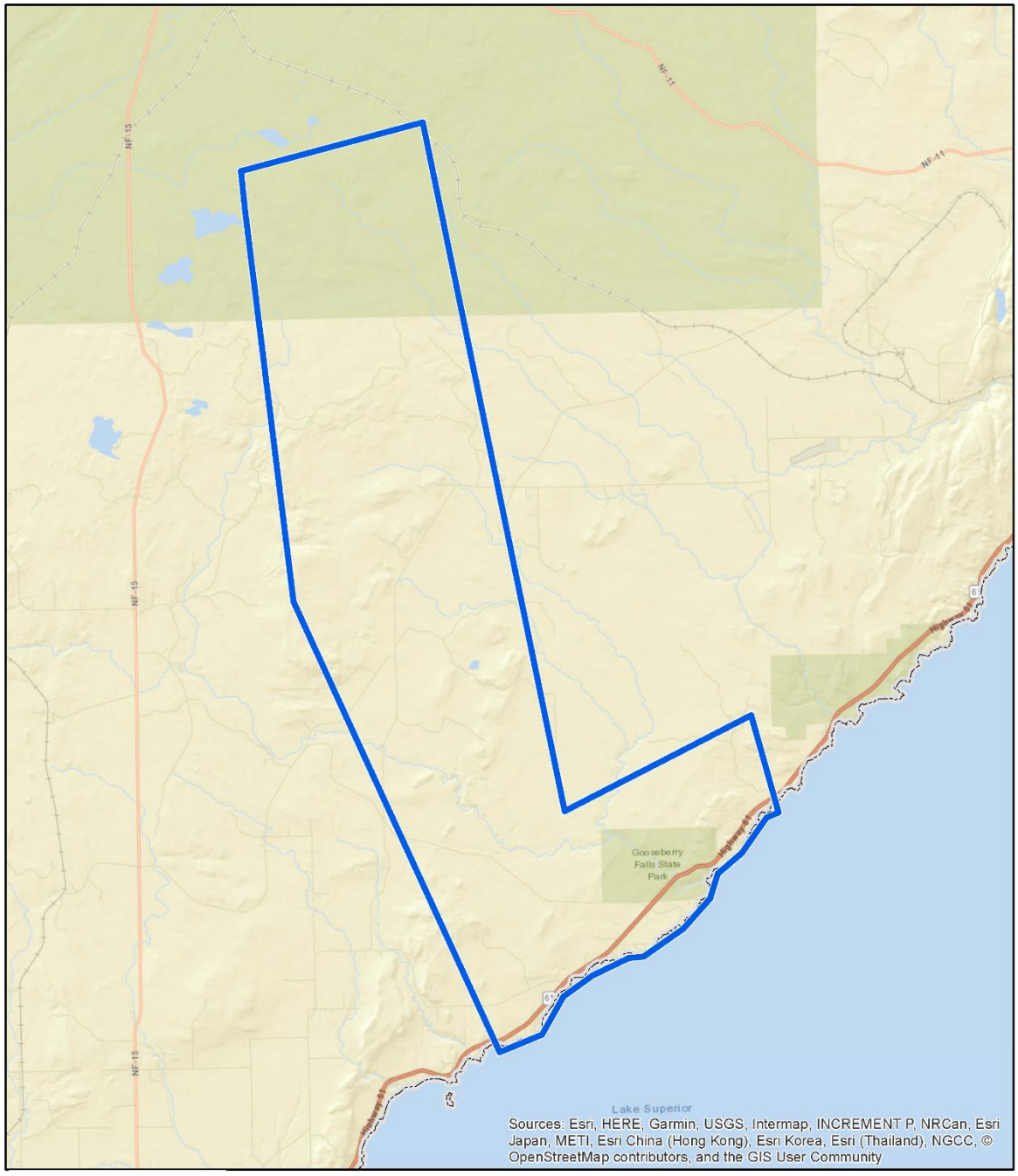
0.13 Miles

Author: E. Borchardt
Date: 2/2/2022
MN Dept. Ag, STS Foundation

Proposed Gypsy Moth *(Lymantria dispar)* Treatments 2022

Treatment: Mating Disruption
Acres: 38001

County: Lake
Block Name: Two Harbors NE



DEPARTMENT OF AGRICULTURE

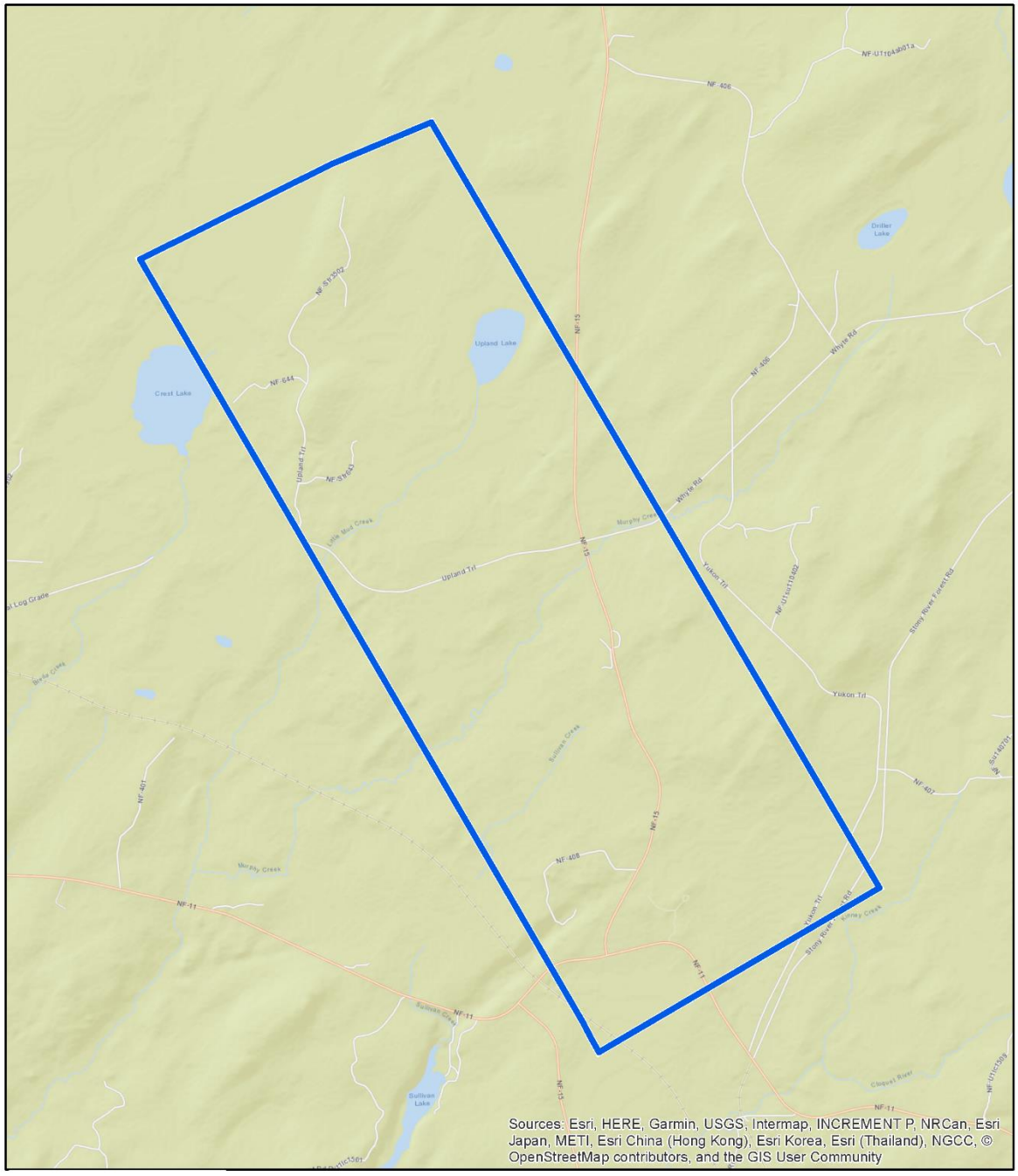
4 Miles

Author: E. Borchardt
Date: 2/2/2022
MN Dept. Ag, STS Foundation

Proposed Gypsy Moth *(Lymantria dispar)* Treatments 2022

Treatment: Btk
Acres: 7157

County: Lake
Block Name: Upland Trail



DEPARTMENT OF AGRICULTURE

1.7 Miles

Author: E. Borchardt
Date: 2/2/2022
MN Dept. Ag, STS Foundation