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STATE OF MINNESOTA

GYPSY MOTH
ENVIRONMENTAL IMPACT STATEMENT
1983

Submitted by: Robert Flaskerd, Director
Division of Plant Industry

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INTRODUCTION

Section A

INTRODUCTION

PURPOSE

The attached documents presents the proposed Minnesota Department of Agriculture (MDA), USDA, Animal and Plant Health Inspection Service (APHIS) Cooperative Gypsy Moth Eradication and Regulatory Program nationally and in the State of Minnesota. Activities, success and failures of Gypsy moth eradication, suppression and regulatory programs in other States are discussed. Alternatives of control or no control in Minnesota are examined. Whatever alternative is selected will guide the concerned agencies program until new insecticides or application methods are proposed, or environmental analyses identify unreasonable risks to human health or the environment associated with the proposed project.

The documents were developed to fulfill the requirements of the National Environmental Protection Agency. Four alternatives of dealing with the Gypsy moth are examined.

1. Chemical insecticide treatments to eradicate, suppress or regulate Gypsy moth infestations.

2. Biological insecticide treatments to eradicate, suppress or regulate Gypsy moth infestations.

3. Integrated pest management (IPM) approach to suppress or regulate Gypsy moth infestations.

4. No action.

THE SITUATION

The Gypsy moth, Lymantria dispar (L.) is a native insect to many areas of Europe, Asia and Africa. This pest was introduced and accidently released in Massachusetts during the year 1869. The Gypsy moth became established and slowly spread throughout the northeastern portion of the United States. Outbreak populations periodically occur in Connecticut, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island and Vermont.

Isolated infestations, resulting from the artificial spread of this insect, presently occur in localized areas of California, Illinois, Michigan, Minnesota, Nebraska, North Carolina, Ohio, Oregon, Virginia, Washington, West Virginia and Wisconsin.

The current Gypsy moth outbreak in the Northeastern United States actually began in 1969 when defoliated acreage tripled over the previous year. Defoliation remained at very high levels until 1974 when an apparent population collapse began. In 1977, tree defoliation by Gypsy moth increased again reaching a peak of 1,594,589 acres. In 1979, the number of acres defoliated, once again decreased to 643,509.

During 1980 the number of acres defoliated increased beyond any previously known levels to over 5.1 million acres only to be topped in 1981 with 12,872,725 acres of defoliation. A reduction occurred to 8,171,191 acres of defoliation in 1982.

The extremely high population levels of Gypsy moth in the Northeastern United States overtaxed regulatory efforts in some instances. The presence of this pest in Minnesota can be traced to artificial movement from areas of heavy Gypsy moth activity. Capping years of surveys in Minnesota, two isolated infestations were detected in the cities of St. Paul and Woodbury during 1982. Viable egg magges were located within 100 yards of suspected introduction points and multiple moth catches. See Gypsy Moth Chronology - Minnesota.

MAJOR ISSUED AND CONCERNS

On the national level the general buildup of Gypsy moth populations has focused public attention on efforts to suppress infestations and regulate spread. The current concerns of those state agencies with well entrenched infestations of Gypsy moth and responsible for pest management are the impacts of larval nuisance, tree defoliation, and tree mortality.

Nationally the USDA Forest Service cooperative Gypsy moth suppression projects are focused on the protection of high-use and high value forested areas from excessive tree defoliation and mortality, larval populations and nuisance within the generally infested states.

The USDA, APHIS, PPQP cooperation regulatory program is directed to reducing the risk of natural and long-range spread of the Gypsy moth and eliminating remote infestations. Remote infestations are known to occur in California, Illinois, Michigan, Minnesota, Nebraska, North Carolina, Ohio, Oregon, Virginia, Washington, West Virginia, and Wisconsin.

Minnesota's Gypsy moth regulatory program is directed at protecting the state from introductions, maintaining survey and detection programs for the pest, and to eradicate or limit the spread of infestations as they are found before they become firmly established. Our immediate concern is to inform the citizens of our situation and with their input determine the most effective and safe method to eradicate our two known infestations.

An important factor to consider when discussing Gypsy moth in Minnesota is the "No Control Option." This option was mentioned at both public informational meetings. Dr. Mark Ascerno, Department of Entomology, University of Minnesota addressed this at the St. Paul public informational meeting. The following is a brief summary of the long-range implications of the "No Control Option" of Gypsy moth in Minnesota.

POTENTIAL RANGE OF GYPSY MOTH IN MINNESOTA

We know conclusively that Gypsy moth can survive and reproduce in Minnesota. The two known areas of infestation (St. Paul and Woodbury) resulted from infested material being introduced to the sites at least two years ago. Multiple male moth catches implied reproductive and survival capabilities but viable egg masses found in November 1982 verified them. It was a significant event to find viable egg masses in Minnesota. To discover them after one of the most severe winters on record (1981-82) has great meaning for the potential spread of this pest.

Based on climatic data, Gypsy moth could spread throughout the southern half of Minnesota approximately limited by a line from Washington County in the east to Clay County in the west. This region has winters no more severe than Gypsy-moth-infested areas of New England.

DAMAGE POTENTIAL

In Minnesota the primary timber trees which are also hosts for the Gypsy moth are oak and aspen. The approximate commercial value of the potential mortality of these trees in the projected range of Gypsy moth in Minnesota are $15,700,000 and $2,100,000 respectively. The Gypsy moth, if not controlled, could ultimately cost the Minnesota Forestry Industry $18,000,000 in 1983 dollars. Inflation would drive this figure upwards in the future.

Within the potential range of Gypsy moth are many areas valued for their scenic beauty. Whitewater State Park, the most heavily used southern park, and the Mississippi River along State Highway 61 are two examples. Tourism could be significantly impaired due to Gypsy moth defoliation of hardwoods which make these areas attractive to visit.

If hardwoods are defoliated at a time when other stresses exist, drought for example, they can be killed. If conifers are defoliated they are killed without the necessity of additional stress. While it will take several years for Gypsy moth to spread in Minnesota the metropolitan area, due to its current infestations, will be the first impacted. This area has experienced two extremely dry years within the last seven years. If nothing is done to control Gypsy moth and the Metropolitan area has a summer like 1982, there could be significant hardwood mortality.

In general, when trees die in the urban environment they are replaced. Three nurseries were contacted to obtain cost figures for replacing urban trees with seven or eight inch Marshall's seedless ash. The estimates include removal of a similarly sized tree. The average cost is $1,187 per tree. The average Woodbury lot has five trees. Total replacement would be $5,935 per lot and $712,200 for the proposed treatment area alone within Woodbury.

It is apparent from these figures and examples that if left uncontrolled Gypsy moth will have a significant impact on Minnesota's tourism and forestry industries, municipal forestry departments and, ultimately, citizens.

Not to be overlooked are the ramifications of quarantines from outside and within Minnesota. Regulatory actions are expensive to establish and maintain. These actions restrict the free movement of many commodities essential to the economic well being of Minnesota. While Minnesota will be under Federal and State Gypsy moth quarantines no matter what control actions are taken, the external quarantines will be more severe if no action is taken to control this pest.

All action taken to date by the Minnesota Department of Agriculture has been done to comply with the intent of the National Programmatic Environmental Statement. This document is to be considered an integral part of the Department's report and activity.

EVALUATION AND DECISION

Section B

State of Minnesota
Department of Agriculture
St. Paul, MN.

MINNESOTA's GYPSY MOTH THREAT - EVALUATION AND DECISION

March 16, 1983

The staff of the Department of Agriculture in Plant Industry, following the mandates of our Plant Pest Act, have presented me with details and ramifications of the discovery of the gypsy moth in Minnesota. My obligation to the citizens of Minnesota is to render a decision as to what our immediate action will be. While the gypsy moth is now believed to be in only two very small areas of our State, the aesthetic and economic impact of this pest in our future will depend upon what action we take now.

We have conducted a deliberate evaluation of the gypsy moth and options available in dealing with it. Information has been gathered from the following sources:

(1) public hearings held by the department on February 10 and 15, 1983, preceded by two public informational meetings and several press releases, which provided an opportunity for the public to express their concerns and submit written data;
(2) the preliminary recommendations of the departments Plant Industry Division staff, derived from its own investigations, reviews of scientific data, and contacts with others having similar experiences with the gypsy moth;
(3) contacts with and data from other State's officials dealing with similar gypsy moth infestations in their respective states;
(4) input from an ad hoc committee of persons representing the cities immediately affected, Department of Natural Resources, University of Minnesota, U.S. Forest Service, State and Private Forestry, and USDA, Animal and Plant Health Inspection Service, Plant Protection and Quarantine Programs; and
(5) the contacts with and data from officials of the United States Department of Agriculture, who have been continuously involved in gypsy moth regulatory and control programs throughout the nation.

In making this evaluation and decision, we have utilized all of these informational sources.

Public Hearing Information

Mr. Arthur H. Mason of The Minnesota Department of Agriculture, Division of Plant Industry, served as our public hearing officer to gather information from the public. In St. Paul an informational meeting was held on January 18, 1983 followed by a public hearing on February 10, in Woodbury a public informational meeting was held on February 8, 1983 followed by a public hearing on February 15, 1983. All meetings were held within the proposed treatment areas, In Summary, four areas of concern were expressed by the public. These areas of concern are to be recognized and responded to in this evaluation and decision. The four areas of concern collectively expressed by the public (listed in decreasing level of response) are:

(1) the impact of carbaryl (Sevin) on human health and other non-target organisms in the area;
(2) information concerning the chemical insecticide application procedures, safeguards and public notification of spraying;
(3) the economic impact at municipal and homeowner level of the various gypsy moth control options, including that of taking no action at all; and
(4) the availablility of information on other gypsy moth control programs and other alternatives to chemical insecticides.

Division of Plant Industry Staff Recommendation

The staff of The Division of Plant Industry has accumulated data on the gypsy moth, suppression and control, has made extensive surveys of The State of Minnesota and of the involved area, has had numerous communications with various State, Local, Industry and Federal officials which has been intimately familiar with gypsy moth control. After reviewing and assessing the information The Division of Plant Industry staff recommend that there be limited aerial applications of Sevin 4-oil to the affected area. This recommendation is made with the consideration of the isolation of the infestation which lends itself to eradication rather than suppression, the physical characteristics of the involved area, the effectiveness of various alternatives to the chemical. These alternatives include the use of a biological product or the immediate use of parasites and predators. The chemical insecticide carbaryl (Sevin 4-oil) was selected in full consideration of safety and health factors and all known reports of problems to the contrary.

Information From Other States

Information from certain states was requested and received concerning their gypsy moth infestations and control procedures. These States are located between Minnesota and the generally infested areas in the eastern United States and are actively engaged in controls of isolated infestations. The knowledge of their concern and actions are important in lending justification to our own course of action. (See appendix).

Information From U.S. Department of Agriculture

A constant and continuous dialogue and cooperative working relationship in regulatory matters exists between The Minnesota Department of Agriculture and the USDA, Animal and Plant Health Inspection Service. In these regards it was the cooperative efforts of both agencies that detected and delineated our gypsy moth infestations. Whatever the future brings with gypsy moth we will maintain this cooperative relationship in dealing with it. This is underscored by the financial support received in the past on detection and delimiting surveys and with control efforts proposed to eradicate current infestations. Our control efforts will be compatable with the federal "Programmatic Environmental Impact Statement" prepared and submitted by The Department of Agriculture to comply with The National Environmental Policy Act.

FINDINGS AND CONCLUSIONS

As stated earlier, we have followed a deliberate approach in making this evaluation and decision. Recognizing my responsibilities as the person required to make the final decision extends to all residents of the state, and to all aesthetic, recreation and commercial interests of the state, with particular attention to those in the St. Paul and Woodbury area. With this in mind, the following findings and conclusions are made under the provisions of The Minnesota Plant Pest Act, Chapter 18 Sections 44-61.

(1) the gypsy moth is recognized as the most serious defoliators of trees in The United States. If this pest established itself in our State it can seriously endanger the agricultural and horticultural interests of this state. Since 1950, gypsy moth infestations have gradually spread southward from the northeastern portion of the country to the mid-Atlantic states. In 1981 alone, over 13 million acres were defoliated causing an estimated economic loss of 764 billion dollars as well as substantial adverse environmental impacts. In 1982 nearly 8 million acres were defoliated. This pest is known to feed on over 300 species of trees and shrubs. I believe from the vast majority of opinions expressed most everyone recognizes the gravity of a gypsy moth infestation in our state.

(2) although one person at a public hearing expressed a "do nothing" attitude, the majority recognized the potentials of the problem and were supportive of some form of treatment being accomplished. Informal questions have been raised on whether "eradiaction" rather than suppression of the infestation was necessary. With only 7 egg masses found in Woodbury and 5 in St. Paul and male moth catches rather confined to only 430 acres in both areas it is apparent we have an isolated and local infestation, the only one known to exist in the state at this time. Most of the literature and experienced opinions received by myself and our staff recommend the eradication of these small infestations. If the gypsy moth is allowed to remain, continous and ever-increasing control measures would have to be anticipated during subsequent years. Sound judgement dictates that eradication of these gypsy moth infestations be pursued by the department rather than suppression efforts or no action at all. It is not responsible to accept the view that eradication not be attempted because of the possibilities of future introductions.

(3) Having determined a direction of eradication should be pursued by the Department, the next consideration is to determine what materials and procedures should be utilized. In this regard there are only two viable alternatives currently recognized for gypsy moth control in the specific areas identified in St. Paul and Woodbury: a chemical insecticide carbaryl (Sevin), and the biological insecticide Bacillus thuringiensis (B.t.). Other alternatives such as the introduction of parasites, predators or cultural controls, have not shown a high degree of eradication effectiveness. Of the two choices, B.t. will reduce populations affording foliage protection but has not yet totally proven itself in eradication programs. On the other hand, carbaryl (Sevin) has been shown to be a highly efficient insecticide in gypsy moth control over an extensive period of time. It is the product recommended to me by the ad hoc gypsy moth advisory committee and my staff. It is only prudent to accept this recommendation.

(4) A prinicpal area of public concern expressed before, at and after public hearings is the hazard to human health associated with the chemical carbaryl (Sevin) in its use for gypsy moth eradication. We must rely on the response of the U.S. Environmental Protection Agency, ordained by Congress to pass on the questions of human health effects and other hazard potentials of a pesticide before registering it for use, when posed with the same question of concern. It seems appropriate to accept the content of a letter written by John A. Todhunter, Ph. D., Assistant Administrator for Pesticides and Toxic substances in this matter (see attachment). It would seem to be inappropriate for us to unilaterally attempt to rebut the conclusions reached by the E.P.A.

DECISION

The above summarizes our evaluation of all the information we have seen. The two public informational meetings followed by two public hearings have given us the public input needed. It is my decision the insecticide carbaryl, Sevin 4-oil, should be aerially applied to the described areas of St. Paul and Woodbury, and that the Division of Plant Industry staff should implement this decision by developing a work plan to include the following:

(1) on determining the dates and times when aerial application of the insecticide would be made, the staff should give written notice to all residents in the area by the best practical means available. Any residents who have notified the Department of special sensitivities to the insecticide carbaryl (Seven 4-oil) or have other disabling problems should receive the written notices either by personal delivery or certified mail. The notice should include the dates and hours of application, the type of aircraft utilized, and some suggested procedures that residents could take in order to minimize exposure to themselves. The notice should also provide a means by which residents can communicate with the department.

(2) the same type of written notice should be sent to all registered beekeepers within one mile of each spray area with a suggestion that all beehives be removed from the area prior to the proposed insecticide application times.

(3) the materials, methods and times of application should also be given to all local law enforcement agencies, public health agencies, the area's medical community and schools located in the area.

(4) monitoring should be undertaken during the progress of the program with the local news media utilized in order to advise residents of any relevant information.

(5) the pesticide applicator contract must provide for services in accordance with the product-label instructions and precautions.

(6) after the monitoring and other information is obtained, the staff should determine what follow-up procedures are appropriate and advise me accordingly.

Jim Nichols

Jim Nichols, Commissioner of Agriculture

SITE SPECIFIC ENVIRONMENTAL ANALYSIS

Section C

MINNESOTA - GYPSY MOTH

SITE SPECIFIC ENVIRONMENTAL

ANALYSIS

MARCH 1983

Gypsy moth trapping, egg mass surveys and the detection of viable eggs have identified two gypsy moth infestations in Minnesota. Pertinent information as required by the National Environmental Policy Act (NEPA) is as follows:

LOCATIONS

Ramsey County, St. Paul - 5 viable egg masses located at the southeast corner of Seventh Street E and Clarence on property identified as 1355 Ross Ave. Egg masses were found on November 4, 1982.
Washington County, Woodbury - 7 viable egg masses located at the property identified as 1053 Sprucewood Drive. Egg masses were found on November 8, 1982.

HISTORY

The Minnesota Department of Agriculture (MDA), has the responsibility of regulating plant pests under the state Plant Pest Act, Chapter 18:44-61. Gypsy moth detection surveys have been conducted on a regular basis since 1973 in cooperation with the U.S. Department of Agriculture, Animal and Plant Health Inspection Service, Plant Protection and Quarantine Programs (USDA,APHIS,PPQ) (see attachment 1). Limited assistance in these regards have been provided by The Department of Natural Resources (DNR) in placing detection traps in Forest Parks. The National Campers and Hikers Association (NCHA) placed traps in other areas of the state.

Multiple trap catches for two consective years (1981-82) in St. Paul and Woodbury prompted us to initiate an intensive egg mass survey in the area around the moth finds. Viable egg masses were found in St. Paul on a property next to where nursey stock from the Northeast was held in 1980 prior to planting. In Woodbury, old spent egg masses and pupal skins were found on the underside of a picnic table near a multiple trap catch. Subsequently, viable egg masses were found on a small tree nearby. The picnic table had been moved to Minnesota in the fall of 1978 from Massachusetts, near Boston.

TREATMENT OPTIONS

Four treatment options were considered by the regulatory staffs of USDA, APHIS, PPQ and the MDA. These options were also considered by an ad hoc gypsy moth committee made up of individuals, in addition to the regulatory staffs, from the U.S. Forest Service, State and Private Forestry; University of Minnesota, Entomology Dept.; Minnesota Department of Natural Resources, Division of Forestry; Minneapolis Park Board; St. Paul City Forester; Woodbury City Forester. The four treatment options were the same as presented in the Programmatic Environmental Impact Statement, namely.

1. Chemical insecticide treatment.
2. Biological insecticide treatment.
3. Integrated pest management and
4. No Action.

TREATMENT BOUNDARIES

Saint Paul - The treatment boundary can be delineated as follows:

At the intersection of Ames Ave. and Hazelwood St., south on Hazelwood St. to Margaret St., west on Margaret St. to Duluth St., north on Duluth St. to a point just north of Chicago-Northwestern Railroad tracks then northeasterly to Ames Avenue, following Ames Avenue to Hazelwood.

Woodbury - The treatment boundary can be delineated as follows:

At a point just southeast of the junction of Esther Lane and Upper Afton Road southeast along upper Afton Road to the intersection of Upper Afton Road and School Drive, South on School Drive to property identified as 1201 Pinewood Court then west to State Highway 120, north on St. Highway 120 to a point approximately 200 feet south of junction of Willow Lane, east to the point just southeast of the junction of Esther Lane and Upper Afton Road.

Attachments 2, 3 and 4 are maps and information identifying treatment boundaries, moth catches and egg mass finds.

ADDITIONAL PRECAUTIONS

1. All treatments will be made during early morning hours to avoid pesticide contact with citizens. The traffic will be halted on the streets until the aircraft has passed to avoid the spraying of moving traffic.

2. A written notice will be sent to all registered beekeepers within one mile of each spray area with a suggestion that all beehives be removed from the areas prior to the proposed insecticide application times.

3. The materials, methods and times of application will also be given to all local law enforcement agencies, public health agencies, the area's medical community and schools located in the area.

4. Monitoring will be undertaken during the progress of the program with the local news media utilized in order to advise residents of any relevant information.

5. The pesticide applicator contract must provide for services in accordance with the product-label instructions and precautions.

6. After the monitoring and other information is obtained, the staff should determine what follow-up procedures are appropriate and advise the Commissioner of Agriculture accordingly.

TREATMENT TIMING

The first application of insecticide will be on or after May 18, 1983 with a second application 8 to 10 days following the first.

PUBLIC INVOLVEMENT

Two public informational meetings were held, one in each of the two treatment areas. The first was held in St. Paul on January 18, 1983, the second in Woodbury on February 8, 1983. Two public hearings were held, one in each of the two treatment areas. The first was held in St. Paul on February 10, 1983, the seond in Woodbury on February 15, 1983. Notices were distributed door to door in St. Paul to all residences within the treatment area and to residences immediately outside the treatment area. Approximately 1200 notices distributed. In Woodbury notices were mailed to all residences within the treatment area and those immediately outside the area. Approximately 230 notices mailed. (see attachments 5, 6). In addition to notices to the immediate areas of concern news releases were released on January 4, 1983 and January 14, 1983. (see attachments 7, 8). These releases were published in the two major newspapers of both areas. (see attachments 9, 10, 11, 12). Communications with the local governments were also established (see attachments 13, 14 & 15).

PUBLIC NOTIFICATION OF TREATMENT

On determining the dates and times when aerial application of the insecticide would be made, the staff will give written notice to all residents in the area by the best practical means available. Any residents who have notified the Department of special sensitivities to the insecticide carbaryl (Seven 4-oil) or have other disabling problems should receive the written notices either by personal delivery or certified mail. The notice will include the dates and hours of application, the type of aircraft utilized, and some suggested procedures that residents could take in order to minimize exposure to themselves. The notice will also provide a means by which residents can communicate with the department. These written notices will be distributed in a manner similar to that utilized to distribute the public involvement notices. All properties immediately adjacent to the treatment area will receive written notices. The local media will be utilized to inform others.

CONTINGENCY PLANS

The pesticides section at the MDA's Agronomy Services Division will be notified of the treatments and will be on hand to assist with any unforseen problem that may arise.

The Federal Aeronautics Administration has been informed of the treatment. Any aerial spraying contract will include mandated FAA contacts and approvals.

Site Specific
Environmental Analysis
Attachment 1

GYPSY MOTH

Chronology - Minnesota

1969 - April, 3 egg masses and 7 empty pupal cases recovered from a mobile home, Duluth, St. Louis County.
Trapping results in the area of mobile home - - negative.

1970 - Limited survey - - negative.

1971 - One egg mass recovered from a tent trailer, Minneapolis, Hennepin Co.
Trap placed in the area of the egg mass find - - negative.

1972 - One egg mass recovered from a mobile home, Blaine, Anoka County.
One live female gypsy moth recovered from a tent trailer, Cass County.

1973 - One egg mass removed from a mobile home, Apple Valley, Dakota Co.
550 traps placed in 74 counties - - negative.

1974 - Two thousand six hundred and four (2,604) traps placed in 34 counties at a density of 1 trap per 9 square miles - - negative.

1975 - Eight hundred (800) traps placed in 36 counties - - negative.

1976 - Three thousand fifty four (3,054) traps placed in 39 counties at a density of 1 trap per 9 square miles. One moth recovered, Hennepin County.

1977 - Nine thousand (9,000) traps placed in 34 counties at a density of 1 trap per 3 square miles - - negatives.

1978 - Ten thousand four hundred and thirty nine (10,439) traps placed in 52 counties at a density of 1 trap per 3 square miles. One moth recovered, Dodge County.
Delimiting survey in Hennepin County - - negative.

1979 - Six thousand one hundred and sixty (6,160) traps placed in 36 counties at a density of 1 trap per 3 square miles. One moth recovered, Dakota County.
Delimiting survey in Hennepin County, 1 moth recovered.
Delimiting survey in Dodge County - - negative.

Chronology - 2

1980 - Approximately 5,000 traps placed in 26 counties. Trap density at delimiting survey sites 9 per square mile, others placed at 1 per 3 square miles.

Three hundred twenty five (325) traps were placed in The Twin Cities metropolitan area at 1 trap per square mile.

Gypsy moth recoveries as follows:

Hennepin County - 10 moths from 7 traps (detection survey)
3 moths from 1 trap (delimiting survey)
Ramsey County - 1 moth (detection survey)

Viable egg masses were recovered from nursery stock shipped to The City of St. Paul from 3 Connecticut nurseries. One hundred seventy seven (177) trees fumigated at holding yard.

1981 - Four thousand five hundred and sixty one (4,561) traps placed in 16 counties. General detection survey trap density was 1 trap per square mile in urban areas, 1 per 3 square miles in rural areas. Trap density at delimiting survey sites was as follows: Twin Cities metropolitan area - 16 per square mile; Dakota County - 9 per square mile; Dodge County - 4 per square mile.

Gypsy moth recoveries as follows:

Anoka County	- 1 moth
Dakota County	- 3 moths from 3 traps
Hennepin County	- 43 moths from 28 traps
Olmsted County	- 2 moths from 2 traps
Ramsey County	- 47 moths from 22 traps
Scott County	- 4 moths from 1 trap
Washington County	- 11 moths from 8 traps

Egg mass survey conducted in The Twin Cities metropolitan area - - negative.

1982 - Two thousand seven hundred and seventy seven (2,777) traps were placed in 6 counties. Trap density was 16 per square mile in 4 square mile areas around each 1981 multiple trap catch except for one site in Dakota County where traps were placed at 9 per square mile for 9 square miles. Additional traps were placed in Minneapolis and portions of Ramsey County at a density of one per square mile.

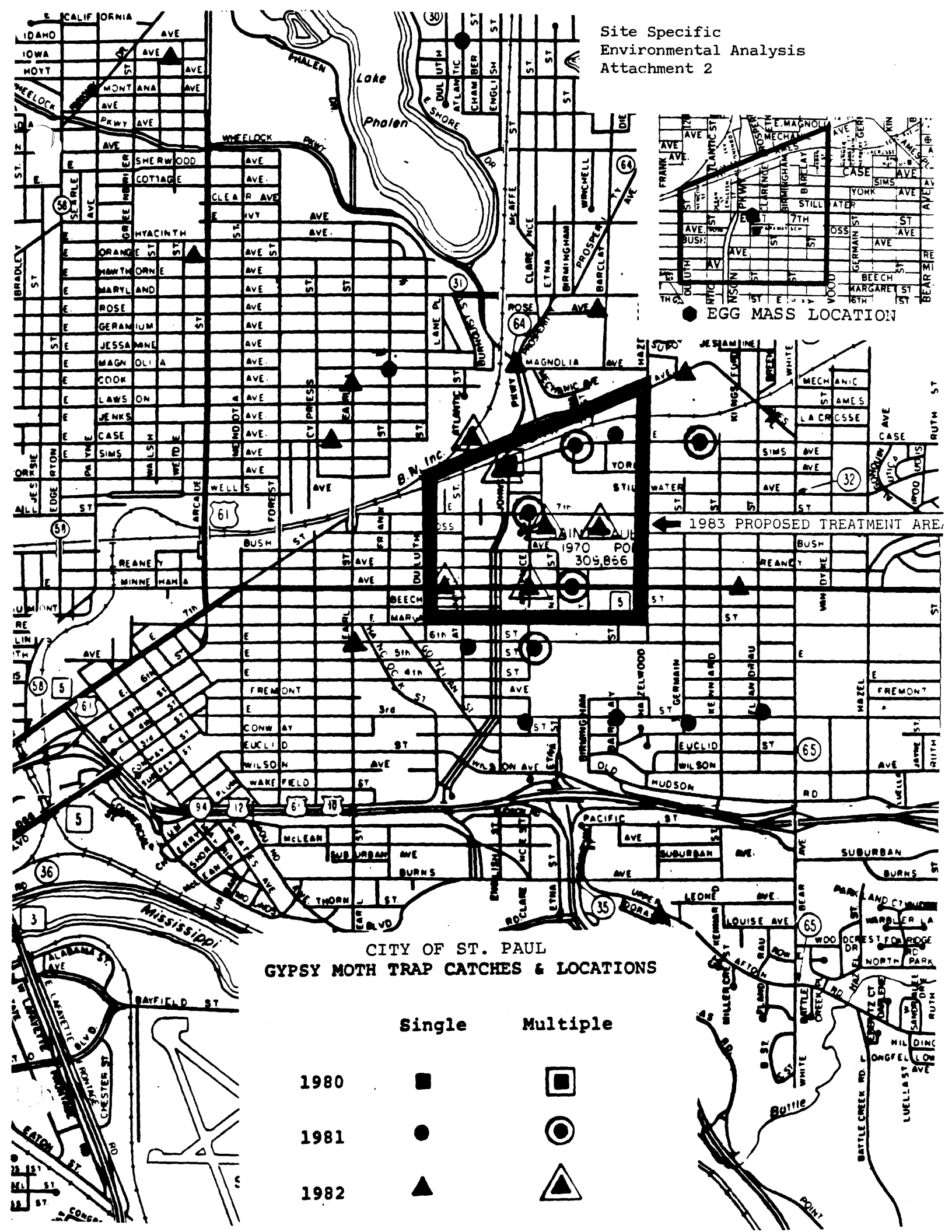
Chronology - 3

Gypsy moth recoveries as follows:

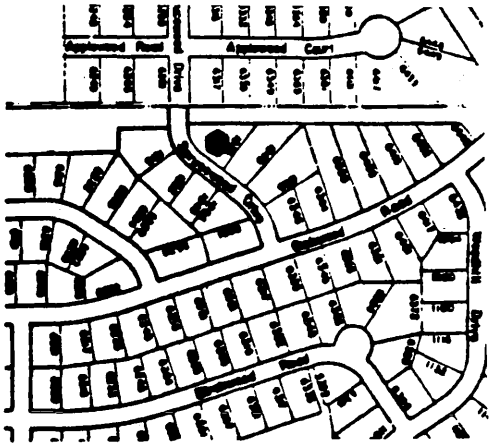
Dakota County	-	3 moths from	1 site
Hennepin County	-	23 moths from	19 sites
Olmsted County	-	1 moth from	1 site
Ramsey County	-	53 moths from	22 sites
Washington County	-	25 moths from	7 sites

Egg mass surveys revealed 5 viable egg masses in St. Paul, Ramsey County, near the southeast corner of Clarence and East Seventh Street and 7 viable egg masses in Woodbury, Washington County, at the southeast corner of Sprucewood Drive and Sprucewood Court.

Site Specific
Environmental Analysis
Attachment 2



Site Specific
Environmental Analysis
Attachment 3



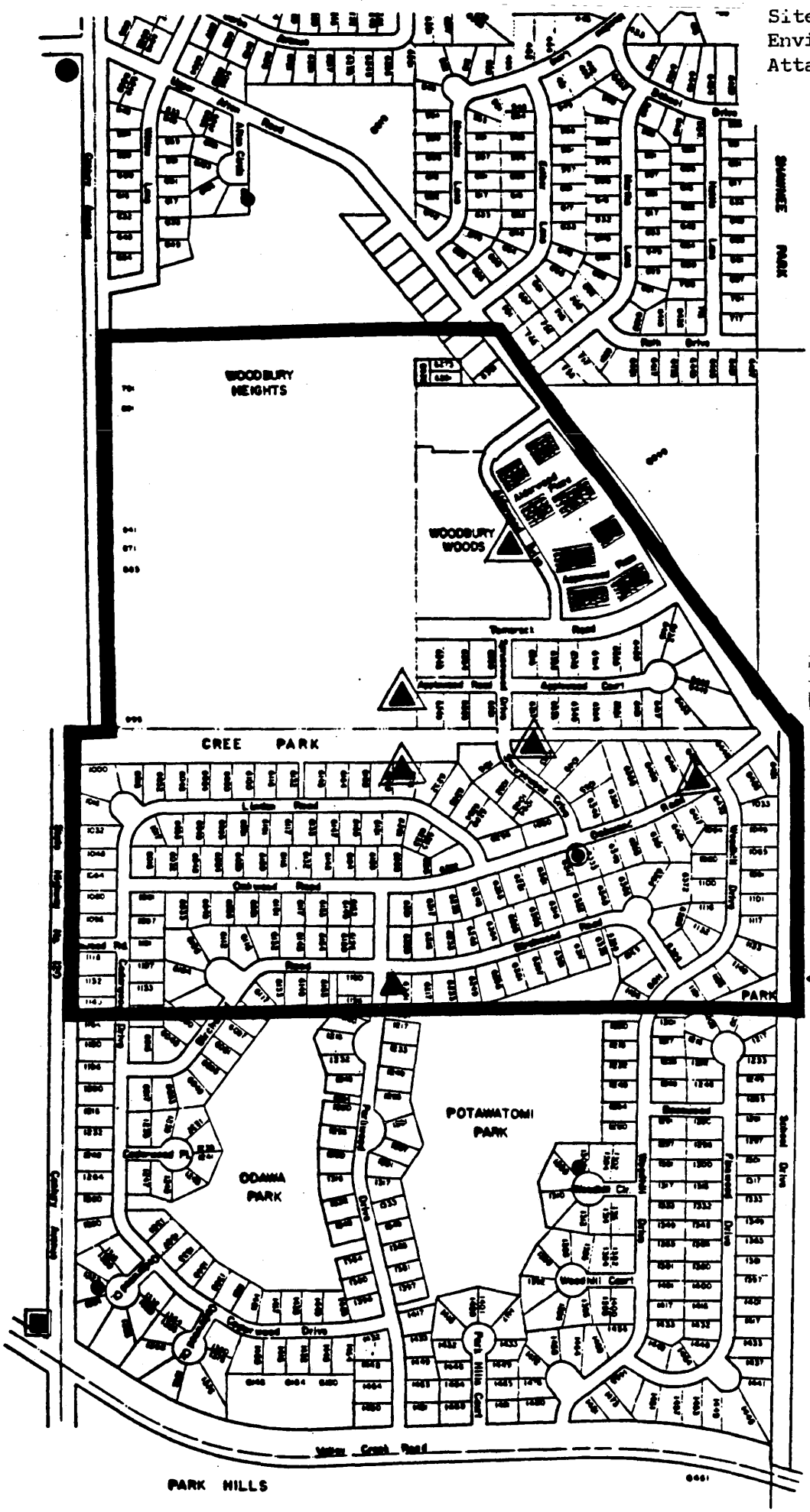
● EGG MASS LOCATION

CITY OF WOODBURY

GYPSY MOTH
TRAP CATCHES & LOCATIONS

	SINGLE	MULTIPLE
1980	■	▣
1981	●	◉
1982	▲	◭

1983 PROPOSED TREATMENT ARE



GYPSY MOTH CATCHES BY COUNTY & REGION

RAMSEY COUNTY

	SINGLE	MULTIPLE
1980	6	2
1981	14	7
1982	16	6
TOTAL	36	14

WASHINGTON COUNTY

	SINGLE	MULTIPLE
1980	0	0
1981	7	1
1982	1	6
	8	8

PHALEN PARK

	SINGLE	MULTIPLE
1980	0	1
1981	8	5
1982	9	6
TOTAL	17	12

WOODBURY

	SINGLE	MULTIPLE
1980	0	1
1981	4	1
1982	1	5
TOTAL	5	7

Site Specific
Environmental Analysis
Attachment 5

IMPORTANT NOTICE

GYPSY MOTH PUBLIC INFORMATION MEETING

Tuesday, January 18, 6:30-9:30 P.M.
Parkway Elementary School
1363 Bush Avenue

Dear St. Paul Resident,

Scientifically conducted trapping, surveys, and yard by yard searches of your neighborhood have confirmed the presence of a major economic pest, the Gypsy Moth in your community.

The Gypsy Moth is the most serious new pest threat to our urban forest environment in more than 40 years. Its established presence and the need to discuss and determine safe, effective control measures, does affect you and deserves your informed consideration.

In cooperation with your local authorities, the Minnesota Department of Agriculture, the state regulatory authority for pest control, has scheduled the above public information meeting to fully inform you and your neighbors of our findings and to involve you in the control determinations that we consider most urgent.

Please try to attend this meeting. The Gypsy Moth threat is of economic and aesthetic consequence for you, your trees, the comfort and value of your property personally and for the community.

The Minnesota Department of Agriculture proposes to eliminate the small but significant Gypsy moth infestation in your community this spring and early summer to prevent a potentially serious spread of the pest throughout our urban forests. A public hearing will be held on February 10 at the same time and place.

If you have any questions not answered in our earlier pamphlets, inspector contacts, or in your local news media, please phone our Plant Industry Division - 296-8328.

Sincerely,

MINNESOTA DEPARTMENT OF AGRICULTURE

Arthur H. Mason
Assistant Director
Plant Industry Division

CITY OF ST. PAUL

Lloyd Burkholder, Superintendent
Maintenance
Parks Department

Dated January 10, 1983

Site Specific
Environmental Analysis
Attachment 6

IMPORTANT NOTICE

GYPSY MOTH PUBLIC INFORMATION MEETING

Tuesday February 8th, 7:00 P.M.
Woodbury Junior High School
(Intersection of Valley Creek Road & School Drive)

Dear Woodbury Resident,

Scientifically conducted trapping, surveys, and yard by yard searches of your neighborhood have confirmed the presence of a major economic pest, the Gypsy Moth in your community.

The Gypsy Moth is the most serious new pest threat to our urban forest environment in more than 40 years. Its established presence and the need to discuss and determine safe, effective control measures, does affect you and deserves your informed consideration.

In cooperation with your local authorities, the Minnesota Department of Agriculture, the state regulatory authority for pest control, has scheduled the above public information meeting to fully inform you and your neighbors of our findings and to involve you in the control determinations that we consider most urgent.

Please try to attend this meeting. The Gypsy Moth threat is of economic and aesthetic consequence for you, your trees, the comfort and value of your property personally and for the community.

The Minnesota Department of Agriculture proposes to eliminate the small but significant Gypsy moth infestation in your community this spring and early summer to prevent a potentially serious spread of the pest throughout our urban forests. A public hearing will be held a week later (February 15) at the same time and place.

If you have any questions not answered in our earlier pamphlets, inspector contacts, or in your local news media, please phone our Plant Industry Division - 296-8328.

Sincerely,

MINNESOTA DEPARTMENT OF AGRICULTURE

Arthur H. Mason
Assistant Director
Plant Industry Division

CITY OF WOODBURY

Howard Radke
Public Works Director/Forester

Dated January 10, 1983

Site Specific
Environmental Analysis
Attachment 7

NEWS RELEASE
MINNESOTA DEPARTMENT OF AGRICULTURE
FOR RELEASE Tuesday, January 4, 1983

90 WEST PLATO BOULEVARD
ST. PAUL, MN 55107
PHONE: 612 - 296 - 9310

Review by state and federal pest management specialists of monitoring activities and an intensive yard by yard inspection campaign this fall has confirmed that one of the nation's most destructive tree insects, the gypsy moth, is established in metropolitan Minnesota, according to Agriculture Commissioner Mark Seetin.

Both immediate and long range control programs were discussed at a meeting last week by officials from eight governmental agencies, who agreed that the most immediate priority will be to fully inform the general public in the confirmed infestation areas in St. Paul and Woodbury.

Public hearings will be scheduled for late January and early February to inform citizens of the inspection results and to consider potential risks and costs of several control options.

USDA, Animal and Plant Health Inspection, Plant Protection and Quarantine authorities assured Minnesota, St. Paul and Woodbury officials that control of the isolated gypsy moth populations here is possible with public understanding of the need for effective action next spring. They cited successful control experiences of similar "pockets" in Indiana, Ohio and Illinois. The current infestations are limited to maximums of 500 acres in St. Paul, South of Phalen Park, and 300 acres in Woodbury.

Commissioner Seetin said that because gypsy moth is of national concern, the U.S. Department of Agriculture has pledged its cooperation and will provide financial and technical support to the control and extended monitoring program.

Gypsy moth establishments here were traced to young trees imported from a northeastern nursery for the reforestation program in St. Paul and possibly to a household move from the New England area to the Woodbury community.

Agencies cooperating in the review and forthcoming information meetings are the Animal and Plant Health Inspection Service and Forest Service of the U.S.

Department of Agriculture, Minneapolis and St. Paul Parks and Recreation Departments, City of Woodbury, Agricultural Extension Service of the University of Minnesota, and the Minnesota Departments of Agriculture and Natural Resources.

Site Specific
Environmental Analysis
Attachment 8

NEWS RELEASE
MINNESOTA DEPARTMENT OF AGRICULTURE
FOR RELEASE (Immediate) January 14, 1983

90 WEST PLATO BOULEVARD
ST. PAUL, MN 55107
PHONE: 612 - 296 - 9310

Four public information meetings have been scheduled by the Minnesota Department of Agriculture, the first this Tuesday in St. Paul, to present findings and plans to control the potentially most destructive tree pest to establish itself in this state in nearly four decades, the gypsy moth, according to Commissioner Jim Nichols.

These hearings, to deal with the confirmed infestations in about 300 acres of residential St. Paul south of Phalen Park, and in 130 acres of the Oak Hills area in Woodbury, will be held:

Tuesday, January 18, 6:30 p.m., at Parkway Elementary School, 1363 Bush Avenue, St. Paul;

Tuesday, February 8, 7:00 p.m., at the Junior High School in Woodbury, 1425 School Drive (intersection of Valley Creek Road and School Drive);

Thursday, February 10, 6:30 p.m., at the Parkway Elementary School, St. Paul;

Tuesday, February 15, 7:00 p.m., at the Woodbury Junior High School.

Municipal authorities in St. Paul and Woodbury have been briefed on the gypsy moth threat, control options, and have expressed support for the state agency's efforts to inform and involve the general public in the control decisions that must be made prior to the spring hatch of a new and larger pest population.

State and federal plant pest control specialists agree that to avoid a potential explosion of the gypsy moth population in the metropolitan area this year that an approved eradication campaign must be implemented between May 23 and June 10.

Gypsy moth egg masses have already demonstrated their survival in Minnesota's severe winter weather conditions. Each egg mass contains up to 500 gypsy moth larvae to emerge in the warm spring temperatures, attack and chew foliage on all types of shade trees, and reproduce more egg masses.

Site Specific
Environmental Analysis
Attachment 9

Hearings set on controlling gypsy moths

Public hearings will be scheduled later this month and in early February to consider the potential risks and the costs of attempting to control the gypsy moth.

The moth, one of the most destructive tree insects in the nation, was found in parts of St. Paul and Woodbury after an intensive yard-by-yard inspection campaign last fall.

The U.S. Agriculture Department has said it will provide financial and technical support for the control program, according to Mark Seetin, former Minnesota agriculture commissioner. Similar infestations in Indiana, Ohio and Illinois have been controlled successfully, he said.

Minn. Star Tribune - Jan 3, '83

State says gypsy moth can be controlled

The gypsy moth has become established in a portion of the Twin Cities area, but control of the destructive tree insect appears possible, state officials said Monday.

Mark Seetin, state agriculture commissioner, said a survey last autumn confirmed that the moth has infested areas of St. Paul and Woodbury in Washington County. The survey showed that the infestations apparently are limited to areas of 500 acres south of Phalen Park in northeastern St. Paul and 300 acres in Woodbury.

Seetin said federal officials believe that control of those isolated moth populations is possible "with public understanding of the need for effective action next spring." Similar pockets of moth infestation have been controlled in other states, and Seetin said the U.S. Agriculture Department will provide financial and technical support for a control program in Minnesota.

He said public hearings will be held soon to inform residents of the affected areas of the results of the autumn moth survey and to consider potential risks and costs of a local control program.

Concern about the gypsy moth stems from its destruction of millions of acres of forests in the eastern United States. The damage occurs during the moth's caterpillar, or larval, stage. It begins in late May and continues through July. During that time the insect devours leaves, particularly those of oak trees.

Seetin said the gypsy moth populations in the Twin Cities were traced to young trees imported from a nursery in New England as part of St. Paul's reforestation program.

Minneapolis Tribune
January 16, 1983

Site Specific
Environmental Analysis
Attachment 10

Need to control moth is stressed

By Dean Rebuffoni
Staff Writer

A program to eradicate the gypsy moth from parts of St. Paul and Woodbury is needed this spring to avert "a potential population explosion" of the leaf-eating insect, the Minnesota Agriculture Department said Friday.

It said the moth is "potentially the most destructive tree pest to establish itself in this state in decades." It proposed four possible control programs, including the spraying of insecticides from helicopters on two known areas of infestation in residential neighborhoods.

"Since the moth just got to Minnesota, we have a real opportunity to get rid of it," said Art Mason of the department. "But we don't want to make any hard and fast decision until we hear from the public. That's why we'll hold public information meetings and hearings before we decide on a control program."

Mason said his department is considering the use of two insecticides: the chemical Sevin and a biological insecticide called Bacillus thuringiensis. He said any spraying of moth-infested areas would be done under regulations set by the U.S. Environmental Protection Agency (EPA) and would not threaten public health or the environment.

Also, state officials would have to prepare an environmental impact study before spraying. That study would have to be approved by the EPA and the U.S. Agriculture Department.

The gypsy moth has stripped millions of acres of forests in eastern states. The damage occurs during the moth's caterpillar, or larva, stage. It begins in late May and continues through July.

While the moth is a relative newcomer to Minnesota, its dime-sized egg masses have demonstrated their ability to survive the state's severe winters. While some moths have been found in several parts of Minnesota, a yard-by-yard survey last autumn confirmed that the insect has become established in portions of St. Paul and of Woodbury, in Washington County.

Mason said a control program this spring would be confined to residential areas of 300 acres south of Phalen Park in northeastern St. Paul and to 130 acres in the Oak Hills area of Woodbury. He said four possible control programs will be presented to the public:

■ Aerial spraying of trees with the insecticide Sevin, which Mason said is widely used on home gardens. It would be sprayed twice in 10 days between May 23 and June 10. That's when the caterpillars are leaving their eggs to feed on leaves.

The spraying would be done in the early morning. This program would cost between $8,700 and $13,000, of which about half would come from the federal government. The remainder would be state money.

■ Spraying of Baccillus thuringiensis, a contagious disease organism that kills caterpillars. It would be sprayed twice between May 23 and June 10.

"Unfortunately, it would kill only 80 to 90 percent of the caterpillars," said Mason. "We would have to follow the spraying with a program to trap male gypsy moths, the object being to disrupt the moth's mating cycle and reduce its numbers."

That program would cost $28,600 to $35,000, of which the federal government would pay up to $6,000. The remainder would be state money.

■ Integrated pest management. This would involve trapping male moths, spraying Baccillus thuringiensis and introducing other organisms that are natural enemies of the moth.

"This is an unlikely option," said Mason. "It is almost always implemented when you have a well-established insect population. You need a host insect — in this case, the moth — to support enough of its natural enemies and, in turn, to reduce the moth's population. We don't have that many moths."

■ Do nothing. "That would allow the moth to become well-established here," he said. "That could be as devasting to us as it was on the East Coast. Also, other states or countries that don't have the moth might restrict the importation of Minnesota commodities such as timber and nursery stock."

Public information meetings on the proposed programs will be held at 6:30 p.m. Tuesday at Parkway Elementary School, 1363 Bush Av., St. Paul, and at 7 p.m., Feb. 8 at Woodbury Junior High School, 1425 School Dr.

A state hearing officer will preside over public hearings at 6:30 p.m. Feb. 10 at Parkway School and at 7 p.m. Feb. 15 at Woodbury Junior High.

Hearings set on gypsy moth program

By Jeann Linsley
Staff Writer

The Minnesota Department of Agriculture will conduct hearings beginning Feb. 8 on a proposed chemical spray program to control infestations of gypsy moths in two St. Paul area neighborhoods.

Arthur Mason, assistant director of the department's plant industry division, said 12 gypsy moth egg masses have been found in a 300-acre area south of Phalen Park and a 130-acre area in the Oak Hills section of Woodbury.

Each egg mass has a potential of producing 500 eggs, Mason said. "That many caterpillars could really do a job on a tree," he said.

The insects are most dangerous in their caterpillar stage. They feed on the leaves of oak and other trees, and also can defoliate evergreens. The moth has defoliated an estimated 13 million acres of forests in Northeastern and Mid-Atlantic states.

The small numbers of moths found in St. Paul and Woodbury are thought to have come from trees imported from other states.

Mason said the department favors a chemical spraying program to eradicate the moth. That would consist of two aerial applications at the end of May and beginning of June, he said.

The department proposes to use about 300 quarts of a chemical insecticide known as Sevin 4-Oil, a mixture of a common household insecticide and No. 2 fuel oil, Mason said.

The program would cost from $8,700 to $13,000, he said.

If area residents object to that method, the department would use a biological control program consisting of aerial application of a natural moth disease organism, known under the brand name of Dipel, Mason said.

That program would be four times as expensive, costing about $30,000, and would not be as effective as the chemical spray, he said.

Though the infestation isn't serious at this time, an approved eradication campaign must be started by the end of May to prevent an explosion of the gypsy moth population, he said.

The hearings will be Feb. 8 in the junior high school in Woodbury, Feb. 10 at the Parkway Elementary School in St. Paul, and Feb. 15 at Woodbury Junior High School.

Site Specific
Environmental Analysis
Attachment 11

GYPSY MOTH!

296-8578

December 20, 1982

Mr. Tom Kelley, Director
Community Services
City of St. Paul
545 City Hall
St. Paul, MN 55101

SUBJECT: Gypsy moth infestation in St. Paul and Woodbury

Dear Mr. Kelley:

Our monitoring for gypsy moth in Minnesota has resulted in the discovery of two small established infestations, one in St. Paul and one in Woodbury. The infestation in St. Paul is located at the corner of Clarence and Johnson Pkwy.

As you may know the Gypsy moth, Lymantria dispar is one of the most serious defoliators of trees in the nation. This pest was accidently introduced to Massachusetts in the late 1800's and has subsequently spread throughout the northeastern States. During 1981 over 13 million acres of trees were defoliated, in 1982 over 8 million.

We believe our infestation in St. Paul is the direct result of an accidental introduction of the moth infesting trees shipped from Connecticut to St. Paul on nursery stock utilized in the reforestation project designed to replace Dutch elm diseased trees. At this point in time, based on our extensive and intensive surveys, the infestation in St. Paul is presently confined to a relatively small area (300 acres).

Based on the early detection of this pest and limited land area involved we have the opportunity to eliminate these infestations in 1983. Depending on the final decision, the cost of control in St. Paul will be either $5,900 - $8,900 if Sevin 4-oil is used, and between $16,800 and $21,300 if the biological agent Bacillus thuringiensis followed by mass trapping is selected. The U.S. Department of Agriculture will pick up one half the cost if the recommended Sevin 4-oil is used. Whatever the decision is, we feel the State of Minnesota should bear the costs of control at this time.

Between now and whatever action is taken, we will need a great deal of support from the City of St. Paul. We are responsible for presenting all the facts to

the affected parties including all the ramifications of the alternatives of control - no control proposals. To date Lloyd Burkholder and crew have been tremendously helpful. We hope to continue the close working relationship with them and others in St. Paul.

Sincerely,

MINNESOTA DEPARTMENT OF AGRICULTURE

Arthur H. Mason, Assistant Director
Plant Industry Division

AHM:jml

cc: Robert Piram

296-8578

December 30, 1982

Mr. Al Olson, City Clerk
Room 386 City Hall
St. Paul, MN 55102

SUBJECT: Discussion with the Mayor and Council on January 13, 1983 on the Gypsy Moth in St. Paul

Dear Mr. Olson:

I would like the opportunity to spend about one-half hour on January 13 with the Mayor and Council discussing the recent discovery of the Gypsy moth in St. Paul. I have a 15 minute sound film on this pest and would like an additional 15 minutes to brief the Mayor and Council on what has been done, what has been found and what is being proposed.

For many years we have been searching for this serious insect pest in Minnesota. This pest is one of our Nations worst tree defoliators. Generally confined to the northeastern states since its accidental introduction in the mid-1800's, it was accidently introduced to our State in 1979 and 1980. Last summer we located two very small apparently isolated, established infestations, one in St. Paul and one in the city of Woodbury.

Finding this pest and our decisions in dealing with it are very important to our citizens. Equally important is the communications between all governmental agencies in any proposed action plan.

Sincerely,

MINNESOTA DEPARTMENT OF AGRICULTURE

Arthur H. Mason, Assistant Director
Plant Industry Division

AHM:jml

cc: Tom Kelley
Robert Piram
Lloyd Burkholder

296-8578

January 5, 1983

Mr. James Lacina, City Administrator
Woodbury City Hall
2100 Radio Drive
Woodbury, MN 55125

SUBJECT: Gypsy Moth in Woodbury

Dear Mr. Lacina:

We have been working directly with Mr. Howard Radke, Utilities Superintendent on our search, find, and confirmation of the Gypsy moth in the Oak Hills area of Woodbury. Howard and his people have been extremely helpful to us in our work.

As you have undoubtedly been briefed by now, we have been searching for this serious pest in Minnesota for many years. The Gypsy moth is one of our Nation's worst tree defoliators. Generally confined to the northeastern states since its accidental introduction in the mid-1800's, it was accidently introduced to our State in 1979 and 1980. Last summer we located two very small apparently isolated, established infestations, one in St. Paul and the other in your city of Woodbury.

Finding this pest and our decisions in dealing with it are very important to us all. Equally important is the communication between all governmental agencies and citizens in any proposed action plan.

In the beginning stages we wanted to brief city officials of the situation and our action plan. Mr. Radke informs me that the earliest I could hope to be on a city council meeting agenda would be in February. Because of our time frame in accomplishing the tasks at hand this is too late a date for such a briefing. However, we will be attempting to schedule a public informational meeting in Woodbury during the week of January 24th. I would encourage the Mayor, council members, and yourself to attend this meeting. A more formal public hearing will be held near mid-February.

Sincerely,

MINNESOTA DEPARTMENT OF AGRICULTURE

Arthur H. Mason, Assistant Director
Plant Industry Division

AHM:jml

cc: Howard Radke

PUBLIC INFORMATIONAL MEETINGS

ST. PAUL

Section D

GYPSY MOTH PUBLIC INFORMATION MEETING

St. Paul, Minnesota

Parkway Elementary School
January 18, 1983
6:30 - 9:30 P.M.

S. Olin Phillips brought meeting to order at 6:42 P.M. with approximately 22 persons in attendance. He introduced members of the Gypsy Moth Advisory Council and the council's role in preparing for the possible introduction of Gypsy moth. Mr. Phillips also briefly explained the night's agenda and the purpose of having this meeting (i.e. confirmed Gypsy moth infestation in St. Paul).

Mr. Arthur Mason was introduced and immediately showed the Canadian-made film, "Gypsy Moth - A Dilemma." After the film Mr. Mason described the natural spread of Gypsy moth in the northeastern United States and emphasized the role of man in its spread cross-country.

Mr. Mason briefly summarized the Gypsy moth trapping program in Minnesota culminating with the egg mass survey and actual recovery of egg masses. He then presented a slide set depicting the general survey area, egg mass site, and proposed treatment area.

Dr. Mark Ascerno was introduced and spoke about the potential impact Gypsy moth could have in Minnesota if left uncontrolled. He compared Gypsy moth to the smaller European elm bark beetle in terms of survival capabilities and range. The impact of Gypsy moth on the urban forest would be in terms of visible defoliation and less visible stress. The stress could result in secondary pathogen invasion. With both situations there would be an increase, either to homeowners or municipalities, for tree maintenance. Newly planted trees would be especially vulnerable as they are stressed for about five years until they become established. Again, costs of replacement or increased maintenance would be the result of Gypsy moth infestations.

Gypsy moth would impact the nursery and Christmas tree industries in terms of dollars and/or market due to increased use of insecticides and/or quarantines.

Gypsy moth affects people in terms of the "Ish factor" (i.e. frass, defoliation, webbing and with high populations decaying larvae). Private and/or municipal funds would be spent to contain this.

Gypsy moth could also impact the state tourism industry by reducing the esthetics of our parks thereby reducing the number of tourists.

Mr. Mason then presented the four options available for St. Paul:

1. Chemical insecticides of which Sevin 4-oil is the best available candidate because of its biodegradability, low toxicity lack of non-target organism impact and effectiveness in eliminating small infestations. The cost of using Sevin 4-oil would be $8,700 - 13,000 with the USDA paying for half the costs. It would be applied aerially via helicopter in late May and again 10 days later.

2. Biological control using Bacillus thuringensis (Bt) applied in a similar fashion as Sevin 4-oil. Estimated cost of treatment is $28,600 - 35,000. The USDA would pay the same amount as for the Sevin 4-oil treatment because they believe it to be the treatment of choice in eradication programs. Bt is estimated to kill 80 - 90 percent of Gypsy moth larvae. Mass trapping would augment the use of Bt.

3. Integrated Pest Management (IPM) is usually effective only when the target organism is established and present in large numbers. Since this is not the case in either St. Paul or Woodbury IPM would not be effective at this time.

4. Do nothing. This will obviously save money now but cost more over the next several years for the reasons mentioned by Dr. Ascerno.

Mr. Mason then introduced Ken Kruse of the USDA, APHIS to discuss actual case histories of Gypsy moth treatment with Sevin 4-oil and Bt. Examples cited were Vigo, OH; Lindenhurst, IL; Crystal Lake, IL; Lake Forest, IL all using Sevin 4-oil and Downess Grove, IL using Bt. He felt the use of Sevin 4-oil in the above-mentioned examples eradicated Gypsy moth from the areas treated. Sevin 4-oil is the treatment favored by USDA, APHIS, in eradication efforts.

The meeting was then thrown open to the attending public for questions.

1. What are the theories behind the Gypsy moth population fluctuation out east? Weather, predator, host, parasite interaction not fully understood.

2. If they spray when would it be done - morning, afternoon? Near daybreak. As early as possible to minimize disruption of daily activities.

3. What are the dangers to people outside? People exposed to the spray would receive, assuming 20 percent exposed skin, 1/100,000 of the dose used on research monkies which produced no effects. There would be no affect on a 110 pound person if 1/2 pound of Sevin was dusted on the body.

4. What about kids playing in backyards after the spray? Sevin is not readily absorbed through the skin and will degrade and disappear in 7-10 days. Sevin is commonly used by homeowners in the garden and is considered safe.

5. What should homeowners outside the treatment area do if they find Gypsy moth? Report the location to either the University of Minnesota, Department of Natural Resources or Minnesota Department of Agriculture. Do not move suspected egg masses.

6. How extensive is the trapping system in Minnesota? The whole Metropolitan area is trapped along with cities such as Stillwater and Rochester.

7. Is Sevin used on apple trees? Yes. It is widely used and is cleared for use on forage and food crops because it is biodegradable and not fat cumulative. It will not travel through the food chain.

8. How wide is the spray head? Approximately 80 - 100+ feet. Traffic is halted for a very short time as the helicopter sprays over a street. Often drivers are not aware of anything because the time of delay is so brief.

9. Has Sevin been shown to eradicate Gypsy moth in one treatment (of two applications?) Yes. (See the above-mentioned case histories.)

10. When is the final decision due? Around February 15 or 16, 1983.

11. Will the Environmental Impact Statement be ready by the next meeting? It should be ready before then.

12. Will it be available for inspection? Yes.

The meeting was adjourned at 8:40 P.M.

PUBLIC INFORMATIONAL MEETINGS

WOODBURY

Section E

GYPSY MOTH PUBLIC INFORMATION MEETING

Woodbury, Minnesota

Woodbury Junior High School
February 8, 1983
7:00 - 8:45 P.M.

Mr. Howard Radke, Woodbury Public Works Director/Forester, called the meeting to order at 7:08 P.M. at Woodbury Jr. High School, 1425 School Drive, Woodbury, Minnesota. Approximately 17 members of the community were present.

Mr. Radke introduced the main speaker Mr. Arthur Mason, Assistant Director, Division of Plant Industry, Minnesota Department of Agriculture (MDA). Mr. Mason introduced the individuals in attendance involved in the program.

The program was as follows:

As an introduction to the Gypsy moth, the film "The Gypsy Moth - A Dilemma" was shown. In the 1960's single catches of Gypsy moths began to appear in randomly placed pheromone traps throughout the Twin Cities. A regular trapping program started in 1973. This was accomplished jointly by the U.S. Department of Agriculture, Animal & Plant Health Inspection Service, Plant Protection and Quarantine Programs (USDA, APHIS, PPQP), placing the traps out in a grid pattern and checking them at regular intervals. We believe infestations may have started as early as 1980 when multiple numbers of moths were caught in one trap and egg masses were found on nursery trees from Connecticut. The eventual discovery of viable egg masses in two locations in 1982 established the presence of the Gypsy moth in Minnesota.

Slides were shown of maps locating the trap sites and delineating the areas to be sprayed. Additional slides showed where the egg masses were found and their proximity to the traps.

Mr. Jim Hanson, a forester with the USDA Forest Service, State and Private Forestry, showed a number of slides of Gypsy moth damage in the Pocono Mountains. This area is a highly popular tourist area. His slides showed the efforts made by both individuals and governmental agencies to control the Gypsy moth in areas critical to the tourist industry. Besides the loss of revenue from the declining tourist industry, Jim pointed out the increased traffic hazzard due to larvae migrating across roads, and respiratory diseases and allergies contracted by inhaling the larval hairs.

Mr. Mason went on to explain, as seen now, there are four treatment options: 1. Treat a limited area with the insecticide Sevin 4-oil, 2. Treat a limited area with the biological control spray - Dipel, 3. Use an integrated pest management scheme, and 4. Do nothing.

The Sevin 4-oil spray would be done with two helicopter applied sprays costing $8,7000 - $13,000. The USDA, APHIS, PPQP would pick up 50% of this cost. The objective would be to eradicate the insect, not control it. This method has proven successful in other areas of the United States. Sevin has a moderately low acute toxicity, is short lived in the environment, and does not accumulate in the food chain.

Dipel has been used, with good success, to lower Gypsy moth populations. It is about 85 - 89% effective in larvae reduction. Dipel would need two helicopter applications and must be followed with an intensive mass trapping program to try and catch the remaining male moths. The cost of the program is $28,600 to $35,000. The USDA would pay for $6,000 of that amount.

The integrated pest management program is utilized after a pest has become firmly established. This system involves bringing in predators and parasites and using site management techniques.

The "do nothing" approach would probably leave us with visible infestations within eight years. Mr. Doug Rau, Minnesota Department of Natural Resources Forestry Section, went over the positive and negative aspects of Sevin 4-oil and Dipel.

At this time, all of the agencies involved are recomminding the Sevin 4-oil treatment both for its effectiveness and its cost. Funding will be sought from the Legislative Advisory Committee to help fund the control program chosen. Application for this money will be submitted in the near future.

The next step in the process of determining which method of control is the holding of public hearings. They will be held February 10th at Parkway Elementary School, 1363 Bush Avenue, St. Paul, 6:30 P.M., and February 15th at Woodbury Jr. High School, 1425 School Drive, Woodbury, Minnesota, 7:00 P.M.

Questions asked by the citizens present were:

- Would it save money to have the homeowners do the trapping?
- How does the chemical get into the nooks & crannies to become effective?
- Who applies for the LAC funding?
- What difficulties do you anticipate in getting LAC funding?
- When will the application process start?
- If we don't get funding this year, how bad will the infestation be next year?
- If we can't get LAC and Federal funding, can the city afford to spray?
- Can we start a fund and start soliciting through the various news media?
- Is there any plans for intensifying the spraying at the multiple catch sites?
- What can citizens do to help get the LAC funding?
- What would be the cost per household if no funding was available?

The meeting was adjourned at 8:45 P. M.

REPORT OF PUBLIC HEARINGS

Section F

In the Matter of the Recommended
Eradication of the Gypsy Moth from
Areas in St. Paul and Woodbury
With the Aerial Application of the Insecticide
Carbaryl (Sevin 4-oil)
Pursuant to the Plant Pest Act
Minnesota Statute Chapter 18
Section 48

REPORT OF ARTHUR H. MASON
SERVING AS HEARING OFFICER
FOR THE PURPOSE OF RECEIVING
TESTIMONY FROM THE CITIZENS
TO BE USED IN THE DECISION
MAKING PROCESS

The insect pest known as the gypsy moth was found in an area of St. Paul and Woodbury in November 1982 by the staff of The Minnesota Department of Agriculture. The gypsy moth was not known to occur in Minnesota prior to its discovery in these two areas. It is not known to occur in other areas of the state. Under the Plant Pest Act, Minn. Stat. Chap 18:48 the Commissioner of Agriculture is charged with the responsibility of taking measures necessary to eliminate or alleviate the danger threatened by a dangerous plant pest infestation. It was deemed prudent to inform the public of the presence of gypsy moth and receive input from the public in the decision making process. Both public hearings were preceeded by public informational meetings one in St. Paul, one in Woodbury.

On February 10, 1983 a public hearing was held in St. Paul at the Parkway Elementary School, 1363 Bush Avenue. The hearing was opened for testimony at 6:30 P.M. No citizens attended, no testimony provided. The hearing was closed at 7:00 P.M.

On February 15, 1983 a public hearing was held in Woodbury at the Woodbury Junior High School. The hearing was opened for testimony at 7:00 P.M. The acting hearing officer, Arthur H. Mason presented opening comments followed by public testimony. All comments were recorded and transcribed for the record (see attachment 1). The hearing was closed at 7:40 P.M. Additional testimony was received by phone and mail and are included in this report. (see attachments 2-9). A group known as Citizens for a Better Environment represented by Robert Ginsburg, PhD requested a written point by point response by The Minnesota Department of Agriculture. The response is included in this report (see attachments 10, 11). Documentation supporting the statements made by Dr. Ginsburg was requested. This documentation was not received.

Telephone calls received from citizens concerned about insecticide treatment with carbaryl (Sevin 4-oil).

February 16, 1983 - Mrs. Victor H. Meysenburg, Woodbury, address and phone No. on file - Heard of petition's against the use of carbaryl (Sevin 4-oil) started in the community. Questioned their content and aim. Expressed no position.

February 17, 1983 - Sue Swanson, Woodbury - Inquired about the chemical Sevin and use of it. Heard rumors that it wasn't good. No opinion expressed.

February 18, 1983 - Linda Smith, Park Hills area of Woodbury, no address or phone # provided - Uncomfortable about the use of carbaryl (Sevin), would prefer alternate control strategy utilized.

February 22, 1983 - Roberta Gutzke, Woodbury - Uncomfortable about the use of carbaryl (Sevin).

TRANSCRIPTION OF TESTIMONY - WOODBURY, MINNESOTA - FEBRUARY 15, 1983

HEARING EXAMINER: My name is Arthur Mason, I will be serving as the hearing officer this evening.

This public hearing is being conducted to receive public input for use by the Commissioner of Agriculture in reaching a decision on what action to take in controlling the gypsy moth in Minnesota, specifically in the cities of St. Paul and Woodbury. Two public informational meetings have been held, one here on January 18 and one in Woodbury on February 8. You are asked this evening to render your opinion and input on whether the Commissioner of Agriculture should attempt the eradication of known gypsy moth infestations in St. Paul and Woodbury as recommended by his staff and the Ad Hoc Gypsy Moth Committee. The Commissioner has the authority to make the decision under the Plant Pest Act Chapter 18, Section 48.

Specifically, the regulatory staff recommends an attempt at eradication with a high degree of success expected through the aerial application by helicopter of the insecticide carbaryl under the trade name and formulation of sevin 4 - oil, to 300 acres of St. Paul, 130 acres of Woodbury during late May, followed by second application in ten days. The dates subject to weather conditions. Other alternatives available but not recommended at this time include an attempt at eradication with a low degree of success expected through the:

1. aerial application of the biological insecticide Bacillus thuringiensis (Bt) sold under the name of Dipel followed by a mass trapping program.

2. The acceptance of living with gypsy moth but implementing integrated pest management strategies to keep populations down and retard spread, or

3. No action at all.

To allow everyone a fair and equal opportunity to speak to the issue, three minutes will be granted to each person caring to express themselves. Five minutes will be granted to those representing organizations or persons other than themselves. Written statements will be accepted for the record until 4:30 p.m. February 22, 1983. Send all statements to Robert Flaskerd, Director, Division of Plant Industry, Minnesota Department of Agriculture, 90 W. Plato Boulevard, St. Paul, MN 55107.

When you speak to the issue please start by stating your name and address, and who you represent. I will signal when your time is running short. I'd like it if you would step up to table somewhere near the microphone so that we can be sure to pick up your comments.

Dr. Robert Ginsberg, Chemist and Toxicologist, Citizens for a Better Environment, 127 7th St. No., Suite 204, Minneapolis, MN. I am the staff chemist and toxicologist for Citizens for a Better Environment. CBE is a public interest environmental group of over 24,000 members nationally and over 2,400 members in Minnesota. The following comments specifically address the proposed aerial spraying program for gypsy

moth in Woodbury. However, the recommendations I will make are equally applicable to the approved proposed aerial spraying program in St. Paul. My comments are divided to three major topics: 1. The toxicity of carbaryl and the history of its use. 2. The need for long term regional or county-wide planning and monitoring for the gypsy moth problem, and 3. Alternatives to the aerial spraying of carbaryl. Historically, attempts to control large-scale gypsy moth infestations have not been very successful. Carbaryl, the active ingredient in one of the pesticides frequently used in control efforts (sevin 4 - oil) was originally introduced in 1958 as a "safe" substitute for DDT because of its moderate acute toxicity in mammals and because neither carbaryl nor its decomposition products were believed to accumulate in the food chain, environment, or organisms. However, there were no data at that time on its chronic or long term toxicity, and recent research indicates that the pesticide may not be as safe as is claimed by the Minnesota Department of Agriculture. In fact, the Department has not told the citizens the whole story of carbaryl and its potential for adverse effects.

The United States EPA placed carbaryl on pre-RPAR review. That's Rebuttable Presumption Against Registration for a number of reasons. One reason was concern for possibly teratogenic effects of carbaryl. This concern is based on several studies indicating that carbaryl can cross the placental barrier in mice and rats, induce teratogenic activity in guinea pigs, increase fetal mortality in hamsters, and cause teratogenic effects in chickens, pheasants and quail. There were also significant miscarriages in Cape May, New Jersey, which are thought to be related to the spraying of carbaryl for gypsy moth control.

In addition to possible teratogenic effects carbaryl went through pre-RPAR review because of the potential for significant neurological effects from exposure to carbaryl. Research has shown that weanling and young rats exposed to as little as ten parts per million of carbaryl developed permanent learning disabilities and possible permanent EEG changes.

More recent research has also shown that carbaryl is a potent viral enhancer, in other words, it increases the susceptibility of human cells to viral growth. Thus any person in an immune depressed condition -- i.e., with allergies or old age or some sort of pre-existing conditions -- could be far more susceptible to viral disease following exposure to carbaryl. These results were deemed so significant that the State of Maine restricted the aerial spraying of carbaryl to non-populated areas in the northeast part of that state during 1980-81 spraying season. In June, 1980 the U.S., EPA recommended guidelines for the use of carbaryl in the Maine spraying program which restricted the application of carbaryl. These guidelines require buffer zones for spraying carbaryl 250 feet from rivers, streams, ponds and lakes; one-half mile from any human habitation; and one mile from public drinking water supplies.

Finally, the State of Connecticut does not apply carbaryl at all in residential areas for gypsy moth control. Pennslyvania no longer sprays carbaryl for gypsy moth control either.

Given the nature of the potential health effects, the size and variety of particularly susceptable portions of the population (the young children, the elderly, allergy sufferers and pregnant women) the spraying guidelines recommended by the U.S., EPA, CBE would opposed to the aerial spraying of carbaryl in Woodbury or any residential area.

While we are opposed to aerial spraying of carbaryl, we believe that some action is necessary to control this outbreak of gypsy moth and to plan to future outbreaks.

The experience with isolated outbreaks or infestations of gypsy moth in the East and Midwest indicates that they will reoccur. By proposing a control program, the Department has acknowledge that gypsy moth will adapt to Minnesota and become a significant problem -- even though infestations are currently small. However, the Department has not come forward with a long-range plan. Instead the public has been offered a "this year carbaryl and next year who knows?" approach to the problem. At a public meeting held February 8 two different plans to control future outbreaks were presented. In order to formulate a reasoned response to the disease control program, residents need to known precisely what the proposal entails. They further deserve a rational comprehensive presentation of the long-term costs and benefits of various control options.

In the lack of a long-term plan from the Department one may suppose they will follow precedent with each year's gypsy moth outbreak as a separate crisis. Given this narrow perspective, carbaryl may be seen as the easy answer. However, experience shows this to be an ineffective response. The citizens will ultimately fund control strategies, and those people who bear the risks, deserve an effective control program. Further, CBE believes that no plan be evaluated in isolation and a region-wide or county-wide strategy is essential. The Department's program fails on this count as well. By ignoring these larger issues, the Department has not adequately examined the economic impact on the continuing course of control on a program lasting several years, nor has the Department examined the enviornmental and health impacts of any spraying program (aerial or otherwise) over a period of several years. The public cannot properly evaluate the various options, let alone choose one or a combination of options, without such a regional study. We strongly urge that such a study be prepared. Furthermore, we urge the Department to publish the details of the control program. The public has the right to see, in printed form, exactly what the Department is planning and why, instead of listening to conflicting verbal presentations.

Now in terms of alternatives, the public cannot evaluate any program for control option until they get detailed and realistic cross data. We urge the Department to provide such information prior to any further decisions. This is particularly relevant in light of CBE's cost estimates

which are substantially at odds with Department statements. Based on data provided by USDA at public meetings in Illinois and Wisconsin, CBE has calculated the costs (for programs in both St. Paul and Woodbury) as follows: Carbaryl $11,250-$18,000 Bt and Mass Trapping $15,600-$21,000. Yet the Department of Agriculture as reported at the February 8 meeting in Woodbury said that carbaryl would cost $8,700-$13,000 and Bt and Mass Trapping $28,000-$30,000. Attached to these comments are more detailed analysis of those calculations.

Given the toxicity of carbaryl and the failure of aerial spraying of carbaryl and other chemical pesticides to control the spread of gypsy moth in other areas, we believe that the long term interests of Woodbury would best be served by the development and implementation of an alternative program.

The basis for any effective gypsy moth control program has to be the use of a variety of techniques. These can include: 1. Aerial and ground applciation of the biological pesticide Bt Bacillus thuringiensis in conjunction with banding of trees and intensive trapping; 2. An extensive networks of traps for monitoring; 3. A public education program which encourages public participation in gypsy moth control; and 4. Inspections to detect "hitch-hiking" moths on trailers, nursery shipments and mobile homes.

The extensive use of traps to monitor infestation before and after treatment, combined with the multiple control measures after an infestation is well defined, have been effective in other communities. Seattle, Washington; Appleton, Wisconsin; Monona, Wisconsin have successfully treated their low-level infestations through intensive trapping. These examples refrute the Department's contention that carbaryl application is the only effective control for low-level infestations. McHenry, Illinois has eradicated its infestation over a two year period by a combination of aerial and ground application of Bt, intensive trapping, and banding of trees in the infested area. The program in McHenry was distinguished by effective mapping of the infestation and widespread citizen participation. Last year a major infestation elsewhere in Illinois was similarly treated with equal success. All communities which used the Bt program have elected to use it again this year. The programs enjoyed widespread public support. In conclusion, we believe that a variety of options exist to control and eradicate the gypsy moth. CBE will be glad to meet with the Department, residents, and other environmental groups to develop detailed alternative control strategies for Woodbury and for the State of Minnesota. CBE further believes that the community must participate for any control program to be truly effective and to last for more than one year. The current infestations can be dealt with by a combination of equally effective techniques less disruptive to the environment and of less hazard to human health than carbaryl. Given the toxicity of carbaryl, even at low doses, and the availability of alternative strategies, CBE concludes the proposed aerial application of carbaryl to control gypsy moth in Woodbury would pose an unreasonable threat to the health of all residents who might be exposed. The citizens of Minnesota deserve better than the alarmist claims of the Department of Agriculture and must demand more than short-sighted management plans presented so far. In conjunction with these comments we had a proposal that had

3 points to it. CBE makes the following recommendations: 1. That there should be no aerial spraying of carbaryl in residential areas. 2. That the control infestations in Woodbury and St. Paul should be accomplished through: a. two aerial applications of Bacillus thuringiensis Bt b. mass trapping at 3 traps per acre, and c. establishing an active public education/community participation program. 3. A long-term control program should be developed based on a regional study of the gypsy moth problem. This study should include (but not be limited to) a. An assessment of the environmental effects and human health risks of each control option. b. A determination of which tree species in Minnesota are most susceptable to gypsy moth damage, and c. A discussion of the probable effect of Minnesota winters on gypsy moth populations. Thank you.

HEARING EXAMINER: "Mr. Ginsberg, if your statements are correct, and I assume they are, under the toxicity carbaryl, I urge you to get the documentation to support those statements.

Mr. Ginsberg: Their are references contained in this document.

S.O. Phillips, Chairman of the Ad Hoc Committee. My name is Olan Phillips, Forest Insect Disease Supervisor, Minnesota Department of Natural Resources. I am here tonight representing the Gypsy Moth ad hoc Advisory Committee. This committee was formed in 1980 following our first indications that we might be dealing with a gpysy moth infestation in the State of Minnesota. The committee contains representatives from federal and state and city agencies that would be involved in possible control or management programs of the gypsy moth if it was introduced into the state. Presently, the committee contains representatives from the Minnesota Department of Agriculture; the Minnesota Department of Natural Resources; the University of Minnesota Cooperative Extension Service; the U.S. Forest Service, State and Private Forestry branch; the Animal Plant Health Inspection Service of the USDA; and the city representatives from St. Paul, Minneapolis and Woodbury where the initial moth catches were occurring. I forgot to give my address: My address is Box 44, Centennial Office Building, St. Paul, MN 55155. The committee has been involved with and reviewed the gypsy moth situation since it first start occuring within the state. We've monitored the trap catches, the survey activities and we have been involved. Once we found egg masses in both St. Paul and Woodbury, this began to spur us to look at what options we had available to us. What techniques could we utilize toward the program. After reviewing this we found that we had the potential to attempt eradication of the insect. Dr. Ginsberg just spoke of some programs in which he brought forth the concept of long-term management of the pest of gypsy moth which their dealing with in northeastern United States. Right now we have the potential to avoid that situation or at least greatly postpone it for a long time. This ability comes from the fact that we have two very small infestations within two localized areas. If we can attempt to eliminate this insect present within these areas, we will then deal with it as it comes in on a small term basis and will not have to deal with the long-term management program. Therefore, with this

potential possibility of elimination of the insect we took it as our first stance for taking a management approach to this insect, to attempt to eliminate it from within Minnesota and areas where we knew it could exist. In reviewing the opportunities for so doing, we found that the best technique available to us. It was recommended to us by the experts in the field - the use of sevin or carbaryl by aerial spraying in the infested areas. This mechanism has been used in other areas and has been tested and has been followed up.It offers us our best effort. Dr. Ginsberg brings up that sevin does not give you the desired activity. I can't promise that it will. I am saying that right now it is our best technique to address it. Therefore, we chose seven as our first alternative. At the public informational hearings we also discussed the use of Bt. Right now the potential biologicals are improving in the field of insect disease control and therefore, Bacillus is coming along, but presently is a very eratic technique, with eratic results no matter how well its done, we see action where it has completely failed. Therefore, we put our faith in what is the best and securest alternative if we are going to attempt control as with the sevin 4 -oil sprays. Therefore, it was the concensus of the committee that our first alternative be the use of sevin for the elimination of pests from these two sites. Dr. Ginsberg brought forth some information on the toxicity of carbaryl. Carbaryl is one of the most commonly used insecticides in the United States at this time. It has been on the market for over thirty years or better and during that time has been tested extensively. A lot of the information that Dr. Ginsberg brought forth and the Citizens for the Concern for Better Environment, Citizens for Better Environment, sorry, have brought out, are definite, we need to be aware. There are studies that we need to be aware of. The fact is, these studies have been brought forth before. EPA did review sevin for Rebuttable Presumption Against Registration process. The only problem is, after their review they determined two things: First of all, that further evaluations of the chemical showed no unnecessary health risk. Second, they found that the preponderance of the studies already conducted with sevin held up for safety and use. These studies covered both urban areas as well spraying in forest areas for insect control. Therefore, when the committee was going through choosing this recommendation as its first alternative, we felt secure in the use of sevin from its safety standpoint. Therefore, we presented it to you. Had we had any questions or qualms about this insecticide we would have been concerned and we would have so noted that it would not have been our first alternative. In restating a couple of points. First of all, remember, that presently within Minnesota we are dealing with spot locations of an insect. In the northeast they are beginning to phase out the use of sevin and I whole heartedly support many of the comments that were brought forth here on long-term management of the pests. It is not feasible to spray it in a forest environment. I as a Forest and Insect Disease Supervisor recognize that. My potential is to try to control it before it has a chance to spread within our state. Therefore, if we can control the gypsy moth now we don't get into that long-term management where we are faced with an also hopeless situation. To control a

very uncontrollable insect once it has reached that level. But right now, we are presently dealing with small localized infestations. We will attempt to eradicate them as the committee suggested to you and supports the activities of the Department of Agriculture in attempting to eliminate this pest. Thank you.

HEARING EXAMINER: Is there any one else that would wish to speak at this point?

I'm Gorden Bailey, resident of Newport with Bailey Nurseries in Newport and Woodbury and I'm representing also the Minnesota Nurserymen's Association. I'd like to speak in favor of the program as proposed by the Minnesota Department of Agriculture. The potential devastation from the gypsy moth would affect not only our industry but it would affect every resident of the area. This insect devasted 13 million acres of forest and urban forests in the eastern part of the United States two years ago so it has the potential to be terribly devastating. That affects everyone. As far as the nursery industry is concerned it would be very costly to us if the potential infestation isn't eradicated at once. If it were to be spread throughout the area the cost of control would be terribly large compared to the cost of controlling it at the present stage. Not only to our industry but to everyone affected, all communities. Nursery industry involves a lot of inter-state and international commerce. For example, in our own business - over half of the business is done outside the State of Minnesota. Gypsy moth infestation and resultant guarantine would be very disruptive to the industry and so we are most concerned that the problem be elimianted before it becomes a real problem. The program as proposed by the Department of Agriculture with the use of sevin has proven to be an effective program. We think it is the best choice of the four alternatives that they have proposed. The chemical has been proven to be safe and there is no need to repeat what has already been said. However, I might say that in our business we use a great deal of sevin and we find it to be one of the safer chemicals that we use, both for the operators and for the crops that it is sprayed on. It is used a great deal in the vegetable and fruit business. I might point out that it can be sprayed the day before harvest on vegetables and fruits. This is on the label and is approved by EPA. So it is a relatively safe chemical. We think that the program as proposed is cost effective. There is no other alternative that would be less costly. So we urge the Department to proceed with the program. We would hope that we might profit from the experience that Governor Brown had in California with the med fly. Although this isn't exactly the same thing, I think it illustrates the fact that if action isn't taken now on a timely basis it could grow to be a much larger more expensive problem.

HEARING EXAMINER: Anyone else care to speak? No one? I believe that concludes the testimony to be presented this evening unless someone cares to step forward. Thank you all for being here. This concludes the public hearing.

Arthur Mason

1366 Cedarwood Circle
Woodbury, Minnesota
February 20, 1983

Robert Flaskerd
Director, Division of Plant Industry
Minnesota Department of Agriculture
St. Paul, Minnesota

Mr. Flaskerd

Subject: The spraying program for gypsy moths in the Park Hills section of Woodbury.

I object to the proposed spraying of Sevin-4-oil (Carbaryl) to control the gypsy moth infestation in the Woodbury area. Based on the informational readings I have done, Sevin-4-oil would be toxic to the environment, kill more types of insects than just the gypsy moths and endanger the balance of natural predators versus gypsy moths; besides its toxic effect on humans.

I heartily favor the alternative biological control program, consisting of aerial application of Dipel. This, along with the banding of trees, trapping, and public education programs which encourage community participation in gypsy moth control, is a much more logical environmental approach to the problem. These methods have worked for other communities such as McHenry, Illinois, Appleton, Wisconsin, Seattle, Washington, and the state of Connecticut.

As a parent and concerned citizen of Woodbury, I do not want Sevin-4-oil sprayed on myself, my neighbors and my parklands.

Gail Ahrens
Gail Ahrens

Minnesota Herbicide Coalition

Contact Person,
Bette Kent

Feb. 19,1983

Robert Flaskerd, Director
Division of Plant Industry
Minnesota Dept. of Agriculture
90 West Plato Blvd.
St. Paul, Mn. 55107

This is to comment on the program presented by the Minnesota Dept. of Agriculture in the control of Gypsy Moths in the Oak Hills area of Woodbury and the Phalen Park area of St. Paul, Mn.

The Minnesota Herbicide Coalition is of the opinion that the third program, the trapping of male moths and the spraying of Bacillus Thuringiensis with the introduction of other organisms as natural enemies of the moth would be an appropriate and safer method of control.

Research indicates that Sevin has a potential for teratogenic effects, and is possibly a potent human viral enhancer, effecting allergies in people, adverse effects on the elderly, and causing learning disabilities in the young.

Studies on animals indicate its potential to cause birth defects and since the effects on humans is questionable and unproven as safe, the citizens of Minnesota deserve the safest possible methods.

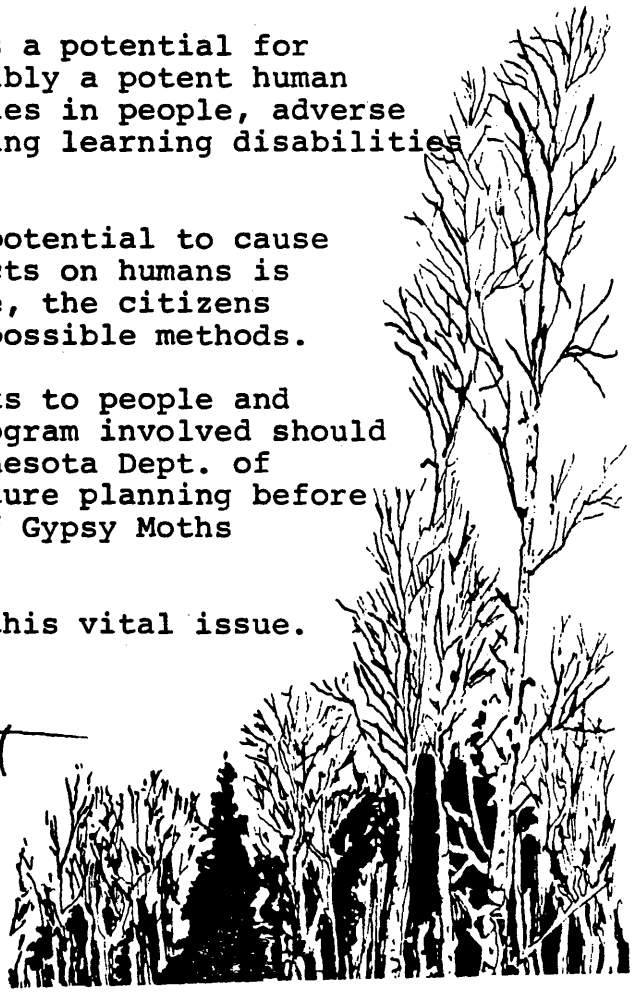
A study of overall costs and risks to people and expense and the safety of the program involved should be presented in print by the Minnesota Dept. of Agriculture statewide for any future planning before a finalization for the control of Gypsy Moths is conducted in the state.

Thank you for your attention in this vital issue.

Sincerely,

Mrs. Bette Kent

Mrs. Bette Kent
5913 Ewing Ave. So,
Mpls.,Mn. 55410



Dear mr. Flaskerd, Feb 21, 1983

In response to the article entitled "moth spray fought" which appeared in the Feb. 18 edition of the St. Paul Dispatch, I started a petition against the use of carbaryl in the Phalen Park area. In the little time I had to get out and get residents to sign the petition I found that almost everyone I asked agreed that a safer method should be used.

I regret I had not learned of the proposal to use carbaryl earlier. I know that many more residents would agree that a safer method should be used which would be equally effective.

I am very frightened of the consequences which the use of carbaryl would create.

Please take the enclosed petition into consideration.

thank you,

Sandy Wesley
890 Forest St. #2
St. Paul, mn 55106
774-6937

We, the undersigned, are very much against the spraying of Sevin 4-Oil in the Phalen Park area to control gypsy moths. We feel there are other alternatives which are equally effective and less disruptive to the environment and which are much less hazardous to human health.

NAME	ADDRESS	PHONE
Sandy Wesley	890 Forest St.	774-6937
David Wesley	890 Forest St.	774-6937
Terry Nabenish	848 Cook Ave.	
[illegible]	1176 E. Hawthorne	771-7405
Mr & Mrs. Carl Haman	890 Forest #1	776-80[illegible]
[illegible] - Mrs Barbara Mooney	890 Forest St #3	774-9642
Mr & Mrs Jim Conlon	890 Forest #7	771-1531
Dan Koenig	890 Forest #5	776-6687
Mr & Mrs. Floyd Hermann	890 Forest #2B	776-6647
Mr & Mrs Leroy Mahan	1143 Burgundy	776-6549
[illegible] & Mrs Howard Peden	1151 Burgundy	776-5514
Jay Lampe	1154 Burgundy	776-5233
Mr & Mrs Ed Mathy	1171 Burgundy	776-7734
[illegible] Johnson	1175 Burgundy	776-3[illegible]1
[illegible] & Mrs [illegible] Arneson	1179 Burgundy	774-5603

February 11, 1983

Mr. Mason,

The enclosed copies of article dealing with the gypsy moth were brought to my attention as an interested citizen of Woodbury. I understand you are the public hearing officer at the hearings being held in Woodbury on the gypsy moth spray program. As hearing officer you are to receive the same materials sent to the Woodbury mayor and Councilmen; this has been done. Please read them over and give the information dealing with the biological approach your utmost consideration.

Thank you,

Gail Ahrens
1366 Cedarwood Circle
Woodbury, Mn. 55125
739-1551

Comments on the Proposed aerial spraying Program to Control Gypsy moth in Downers Grove and DuPage County

by Robert Ginsburg, Ph.D.
Research Director, Staff / Toxicologist for Citizen for Better Environment - CBE -

@CBE COMMENT
82139

My name is Dr. Robert Ginsburg. I am the Research Director and Chemist/Toxicologist for Citizens for a Better Environment (CBE). CBE is a public interest environmental organization with 5,000 members in Illinois, many of whom reside in DuPage County. The following questions and comments about the Illinois Department of Agriculture's (IDA) proposed aerial spraying program for gypsy moth in Downers Grove and other parts of DuPage County are submitted on behalf of both CBE, which has 135 members in Downers Grove, and the Chicago Council of Lawyers. We would appreciate a response to these questions as soon as possible in order to properly evaluate the IDA program. This is especially necessary given the failure of the IDA to provide a detailed and written description of its gypsy moth program. These questions will also be submitted to the Interagency Committee on Pesticides, prior to their next meeting.

My comments will address three main areas:

(1) The toxicity of carbaryl and the history of its use;

(2) The need for long-term regional or county-wide planning and monitoring for the gypsy moth problem;

(3) Alternatives to the aerial spraying of carbaryl.

Citizens for Better Environment
(CBE) 59 East Van Buren
Suite 1600
Chicago, Illinois 60605
(312) 939-1530

Call!
Mpls. address
CBE - Suite 204
127 No. 7th St.
Mpls. 55403

March 2, 1982

Toxicity of Carbaryl

Historically, attempts to control large-scale gypsy moth infestations have not been very successful. Carbaryl, the active ingredient in one of the pesticides frequently used in control efforts (Sevin-4-Oil), was originally introduced in 1958 as a "safe" substitute for DDT because of its moderate acute toxicity in mammals and because neither carbaryl or its decomposition products were believed to accumulate in the food chain, environment, or organisms. However, there was no data at that time on its chronic or long-term toxicity, and recent research indicates that the pesticide may not be as safe as is claimed by the IDA. In fact, their discussion on the toxicity of carbaryl is not only inadequate but contains very misleading statements. Principally, IDA misrepresents the conclusions made by US EPA in its Carbaryl Decision Document.[3] That report concluded that there was significant evidence of carbaryl toxicity but that more research was necessary before they could ban the use of that pesticide.

US EPA reviewed carbaryl for a number of reasons, not just because of a single test indicating birth defects in dogs, as the IDA has implied in previous meetings. Concerns about teratogenic effects are based on several studies indicating that carbaryl can cross the placental barrier in mice and rats[1],

induce teratogenic activity in guinea pigs[2], increase fetal mortality in hamsters[3], and cause teratogenic effects in chickens, pheasants and quail.[3] There were also a significant number (over 100) of miscarriages in Cape May, New Jersey, which might be related to spraying of carbaryl for gypsy moth control.

In addition to possible teratogenic effects, there is a clear potential for significant neurologic effects from exposure to carbaryl. Research[4,5] has shown that weanling and young rats exposed to as little as 10 mg/kg (10ppm) of carbaryl develop permanent learning disabilities and possibly permanent EEG changes.

Recent research has also shown that carbaryl is a potent viral enhancer[6], i.e., increases the susceptability of human cells to viral growth. Thus, any person in an immune depressed condition, i.e., with allergies, the elderly, or pre-existing conditions, would be far more susceptible to viral disease following exposure to carbaryl. These results were deemed so significant that the state of Maine restricted aerial spraying of carbaryl to non-populated areas in the northeast part of that state during the 1980-1981 spraying season. Finally, in June, 1980, the US EPA recommended guidelines for the use of carbaryl in the Maine spraying program which restricted the application of carbaryl. These guidelines would require buffer zones, for spraying carbaryl, of 250 feet from rivers streams, ponds and lakes, one-half mile from any human habitation and one mile from public drinking water supplies.

Given the nature of the potential health effects, the size and variety of particularly susceptible portions of the population (i.e. young children, the elderly and pregant women) and the spraying guidelines recommended by US EPA, CBE cannot support the aerial spraying of carbaryl in Downers Grove.

Long-Term Planning and Detection

While we are opposed to aerial spraying of carbaryl, we believe that some action is necessary to control this outbreak of gypsy moth and to plan for future outbreaks.

The experience with isolated outbreaks or infestations of gypsy moth in Midwest and East indicates that they will reoccur. There may be a period of time, especially with the first few, small infestations in an area, when "crisis management," i.e., short-term decisions and control strategies, seem reasonable. However, as the number of outbreaks increase, resources get spread too thin. As a result, a small infestation may be allowed to get too large, generally by inaction. This is the situation in Illinois where the IDA has been treating small outbreaks with aerial applications of Sevin for several years in futile attempts to eradicate the moth from Illinois. This is akin to putting out a kitchen fire with an eyedropper--it may work once but eventually the kitchen will burn down. Now the department is faced with the task of treating an infestation of over 6000 acres in DuPage County. The "old techniques," i.e. aerial spraying, we believe, will not be effective over such a large area and the

Department has no plans or money for future spraying or any type of integrated control plan beyond this year. Their long-term planning consists of blackmailing communities to use carbaryl or the department will do nothing. There is no discussion of what to do next year if another part of Downers Grove finds gypsy moths or how to control the influx of gypsy moths into the entire county or state. Crisis management has gotten out of hand.

The moral of this moth-eaten (sic!) plan is that no program can be evaluated in isolation and that a regional or county-wide strategy is essential. That is the failure of the IDA "program." By ignoring those larger issues, the IDA does not adequately examine the economic impact (i.e., the continuing costs of control) of a program lasting several years, nor does the IDA examine the environmental and health impacts of any spraying program (aerial or otherwise) over a period of several years. The public cannot properly evaluate the various options, let alone choose one or a combination of options, without such a regional study. We strongly urge that such a study be prepared. Furthermore, we urge the IDA to publish the details of the spraying and control program. The public has the right to see, in printed form, exactly what the IDA is planning and why, instead of listening to verbal presentations which change from meeting to meeting.

aCBE COMMENT

Alternatives to Aerial Spraying with Carbaryl

Given the toxicity of carbaryl and the failure of aerial spraying of carbaryl and other chemical pesticides to control the spread of gypsy moth in other areas, we believe that the long-term interests of Downers Grove will best be served by the development and implementation of an alternative program.

The basis for any effective gypsy moth control program has to be the use of a variety of techniques. These can include:

(1) an extensive network of traps for monitoring:

(2) inspections to detect "hitch-hiking" moths on trailers, mobil homes, etc.;

(3) aerial and ground applicaiton of the biological pesticide, BT, in conjunction with banding of trees, intensive trapping and/or the use of gypsy moth pheromone (Disparlure).

The extensive use of traps to monitor an infestation before and after treatment, combined with the use of multiple control measures after an infestation is well defined, have been effective in other communities. Both Seattle, Washington, and Appleton, Wisconsin have successfully treated their low-level infestations through intensive trapping. McHenry, Illinois seems to have eradicated its infestation over a two year period by a combination of aerial and ground applications of BT, intensive trappying and banding of trees in the infested area. The program in McHenry was distinguished by effective mapping of the infestation and

widespread citizen participation.

In conclusion, we believe that a variety of options exist to control and eradicate the gypsy moth. We cannot propose more detailed and explicit alternatives for Downers Grove because detailed information on the extent of the infestation is not available, nor has any member of the public been included in agency decision making.

It should be pointed out that the initial costs of the alternative control methods may be greater than those for the use of carbaryl, or other pesticides. However, the implementation of a long-term integrated pest management program coupled with extensive public education will most likely lead to decreased costs in future years through earlier detection and faster response to the problem. We believe that, in the long-run the most effective and least expensive option is to develop and implement alternatives which do not rely on aerial spraying of chemical pesticides such as carbaryl.

REFERENCES

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URBAN ECOSYSTEM MANAGEMENT: THE GYPSY MOTH

A Review of Current Gypsy Moth Control Recommendations

The gypsy moth, *Lymantria (Porthetria) dispar*, has been a periodic problem in northeastern United States since 1869 when it escaped from cultures maintained by a scientist trying to establish a "native" silk industry. Today, it occurs commonly in the region north and east of Pennsylvania, including Michigan, Ohio, Delaware, Maryland and some parts of Canada. Elsewhere in the United States there are small pockets or scattered isolated infestations under quarantine and subject to eradication efforts. This review concerns efforts to suppress the gypsy moth within established areas.

Countless dollars have been spent in regular spraying of millions of acres of forests but the moth continues to be pestiferous and to spread. Large scale biological control importation efforts have also been made, but in comparison to the amounts spent on large treatment programs, expenditures on importation have been small. Recently, however, there has been a significant shift in control tactics. This review offers an overview, with suggested approaches for the professional arborist and the homeowner.

Gypsy Moth Damage

The gypsy moth is native to the temperate regions of Europe, southern Asia and Africa, where it does less damage than in North America. In the United States, the gypsy moth has been reported feeding on 458 plant species. In the initial years of an outbreak, the gypsy moth feeds mainly on oaks and, as its density increases, on many other species. A single complete defoliation rarely results in the death of a tree.

Repeated severe defoliations can result in stress through depletion of carbohydrate reserves. Thus weakened, the trees are susceptible to attack by borers (on oaks the two-lined chestnut borer *Agrilus bilineatus)* and the oakroot or shoestring fungus, *Armillaria mellea*. Trees may be further weakened by construction, wounds, drought, winds, snow, frosts, diseases, parasites and predators.

The Gypsy Moth Life Cycle

Eggs are deposited in masses in June or July; subsequently, the female dies. An egg mass may contain from 75 to 1000 eggs; during declining outbreaks, there are

The Gypsy Moth Caterpiller

many smaller masses that contain as few as 75 to 100 eggs. In static or growing populations, masses are fewer but larger, with 700 to 1000 eggs each. Large masses are about 1½" by ¾". New masses are firm and buff-colored; older masses are darkened Hatched masses are spongy: small pin-sized holes indicate that parasites have emerged. Masses may be found anywhere — in the leaf litter beneath trees, at the tops of trees, on vehicles and lawn furniture, in woodpiles, in rockwalls, and beneath roof shingles, but most eggs are laid on the trees in protected refuges such as bark flaps, crevices, and holes.

Gypsy moths overwinter as diapausing eggs within the mass. Young larvae hatch from overwintering eggs when the weather warms in April or May. Eggs in an individual mass hatch over a three to five day period, or over two to three weeks, depending on location of the mass and its exposure to sunlight. These small larvae may remain in the mass for several days if temperatures are below 40°F or if it is raining. In favorable conditions, the larvae climb trees, leaving a trail of silk as they go. From the tops of the trees or at branch ends, they drop on the silken threads. These threads are easily broken by slight gusts of wind; both the long hairs of the larvae and the silk add buoyancy to the wind-blown insect. Several wind-blown dispersals can occur before larvae settle to feed. Although some dispersals can take place over many miles, most occur within smaller areas.

First-stage larvae chew small holes within the leaf; when not feeding, they rest on a mat of silk constructed on the undersides of a leaf. Second and third stage larvae feed at the edges of leaves in tree tops, moving to the undersides of branches and twigs when not feeding. Larval stages last from four to ten days, depending on temperature. Male larvae molt through five stages; females through six.

Large larvae, after molting to the fourth stage, feed during the night and descend the trees at dawn in search of shelter. At dusk they climb the trees again to feed. (The movement is triggered by the intensity of light.) These larvae prefer to hide under bark flaps or other places on trees, but if no hiding place is available, they will seek hiding places on the ground. During this stage of development, defoliation can be severe. At very high densities the larvae feed continuously day and night. Mature caterpillars are one and one-half to two and one-half inches long.

Pupae are formed in late June or early July when larve begin to attach themselves to the substrate, usually where they rested as late stage larvae. Pupation lasts about two weeks. Male pupae take slightly less time, and are smaller than female pupae.

Adult males are strong fliers; females, although they have well developed wings, cannot fly. Females release a strong sex attractant that lures the males. After mating, the female deposits her eggs in a single mass, usually in the same location where she pupated. Adult wingspans are from one and one-half to two inches.

Table 1

Parasites and Predators of the Gypsy Moth Establsbed in the U.S.

Anastatus disparis (egg parasite)
Apenteles melanoscelus (larval parasite)
Brachymeria intermedia (pupal parasite)
Calosoma sycophanta (larval predator)
Carabus auratus (larval predator)
C. nemoralis (larval predator)
Compsilura concinnata (larval parasite)
Exorista larvarum (larval parasite)
Ooencyrtus kuwanai (egg parasite)
Parasetigena agilis (larval parasite)
Phobocampe disparis (larval parasite)
(This list adapated from reference 5)

Natural Enemies

The above table lists the important parasites which are common during population declines. (Note that these are all the result of previous biological importation projects.) Predators

This column, developed by the staff of the Center for the Integration of the Applied Sciences, a division of the John Muir Institute, under a Cooperative Agreement with the U.S. Environmental Protection Agency (EPA), is a regular feature of the *IPM Practitioner*. Information contained in this column was not reviewed in advance by the EPA, and the authors are solely responsible for its contents.

are also common during decimes; they help greatly to keep low populations subject to high mortality. Among the important predators are the whitefooted mouse (*Peromyscus* spp.), birds, and other vertebrates. For a more complete list, excellent photographs, and a fuller discussion of the role of predators, consult Smith and Lautenschlager (1974).

The gypsy moth is also attacked by several bacterial, protozoan, fungal and viral pathogens. The most important pathogen is the virus, *Borralinavirus reprimens*, which often produces spectacular epizootics at peak populations. Consult Leonard (1974) for a review of the literature on these pathogens.

Management Options

Aerial application of insecticides to large areas of infested forests has now been abandoned. Suppressive efforts are more likely to be attempted within and around urban areas or small residential developments within forested areas. In such cases, tree species selection (Table 2) and reduction of stress to existing vegetation should become part of the management plan; even more important is detailed monitoring to determine pest and natural enemy existing densities in the areas to be protected. Measures of egg mass densities and forest conditions (coupled with good judgement) are required for a prognosis that can justify successful treatment.

Table 2
Species Not Favored by the Gypsy Moth

Ash
Balsam Fir
Butternut
Black Walnut
Catalpa
Red Cedar
Dogwood
Holly
Locust
Sycamore
Tulip Poplar

Table 3 outlines the treatments usually considered. The use of Seven® (carbaryl) is not listed because its detrimental effects on natural enemy populations are widely acknowledged. The use of the attractant Disparlure® is omitted because there is not yet enough evidence that it can effectively reduce the gypsy moth numbers, even in low populations; work to determine this is continuing. Disparlure® is useful for monitoring; it can be purchased in a trap or as a tape (Luretape®) from Summit Chemical Co., 117 W. 24th St., Baltimore, MD 21218; (301) 467-1233.

Table 3

"Management Options for Communities.."

Management Options for Communities and Individual Homeowners

Treatments	Foliage	Outcome of Epizootic
no treatment	possible complete defoliation	does not prolong outbreak
physical controls banding egg mass distribution	partial or complete defoliation possible	unlikely to prolong outbreak
Bacillus thuringiensis Dipel®, Thuricide®	*foliage protection* with 2 treatments	*may prolong outbreak*
chemical control trichlorofon (Dylox®)	foliage protection with 1 treatment	likely to prolong outbreak

Mention of trade names does not constitute a recommendation

At present, the best approach is most cases is no treatment at all; this approach maximizes the natural enemy populations which will shorten the outbreak and lengthen the periods between outbreaks. In many areas this approach may cause changes in the composition of the forest. The physical controls suggested are for use on special trees or groups of trees surrounding homes or other areas either advised for the homeowner or offered as a service by the arborist.

There is controversy currently between the use of BT (*Bacillus thuringiensis*) and trichlorofon (Dylox®). Some maintain that BT requires two treatments whereas trichlorofon requres only one, and that trichlorofon is cheaper. But although trichlorofon has a smaller range of toxicity to natural enemies and other members of the forest community than carbaryl, BT is still a far superior product because it has fewer side effects. It is nontoxic to wildlife, people, and the natural enemies of the gypsy moth, and leaves no environmental residues. In counting the cost of trichlorofon treatments, we should include not only the costs of purchase, but also the costs of the side effects, of environmental stresses, and of the time lost at public meetings trying to calm a public worried about toxic materials. Further, if BT were used more widely, its price might drop. Also worth considering is the importation of additional natural enemies: only a small number of known possibilities has been tried.

Bacillus thuringiensis—mature cell with spore and crysta

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GYPSY MOTH ERADICATION USING BACILLUS THURINGIENSIS AND PHEROMONES

~~McHENRY, ILLINOIS~~ McHENRY, ILL.

~~In 1978, eight~~ Gypsy moths were trapped in McHenry, Illinois, a small town about 50 miles northwest of Chicago. ~~One hundred and sixty-five moths were trapped in 1979~~ and the United States and Illinois Departments of Agriculture proposed the aerial application of carbaryl. Residents and local officials were concerned about the potential adverse effects of exposure to carbaryl, but the agricultural agencies persisted with their spray plans. However, with the assistance of Citizens for a Better Environment's Chicago office, McHenry residents were able to obtain an injunction against the spraying of carbaryl. McHenry residents forced the state and federal governments to implement an alternative Gypsy moth eradication program relying upon the use of traps and the bacterial insecticide Bacillus thuringiensis. B.t. was applied in the spring of 1981. ~~In the summer of 1981, no moths were trapped within the City of McHenry for the first time in four years.~~ Moths are still being found in neighboring communities which were sprayed with carbaryl.

APPLETON, WISCONSIN

In Appleton, Wisconsin, eight moths were trapped in 1976 and 26 were discovered in 1977. Beginning in 1979, high density trapping was carried out at a rate of 3 traps per acre. Seven moths were captured in 1979 during the first year of this program. No moths were found in 1980 and 1981 and the infestation has been declared eradicated. The Appleton program, which relied soley upon the high density use of pheromone (sex attractant) baited traps, marks the only Wisconsin infestation that has been declared eradicated.

SEATTLE, WASHINGTON

Thirty-one Gypsy moths were trapped on Mercer Island in Seattle, Washington, in 1980. In the spring of 1981, a high density trapping program and ground applications of B.t. were begun. Only ten moths were trapped in 1981 inspite of the presence of many more traps. Seattle plans to repeat this apparently successful program in the spring of 1982 and no applications of toxic pesticides such as carbaryl are contemplated.

citizens
for
a
better
environment

Suite 600/88 First Street/San Francisco, California 94105

Let Us (S)pray?!

by Robert Ginsburg

A fly bit the bare pate of a bald man, who in endeavoring to crush it gave himself a hard slap. Then said the fly jeeringly, "You wanted to revenge the sting of a tiny insect with death; what will you do to yourself, who have added insult to injury?"
The Bald Man and the Fly—Aesop

There was a time as I was growing up when I (and most of the people around me) believed that the government wouldn't do anything to harm the public. Thus when the "bug-spraying-truck" came down the street, all the children ran to greet it. It smelled kind of funny, but if there was something wrong surely someone would have told us. Such childhood trust was soon destroyed and many children (including myself) started hiding under their beds. Only later did we learn that the spray was DDT.

Since the publication of *Silent Spring* by Rachael Carson in the early 1960s and the activities of the environmental movement in the '60s and '70s, many people have come to think that the excesses of wholesale pesticide spraying are passed. In some ways, things *have* changed in the past 15 or 20 years. DDT and several other pesticides have been banned in this country because they are toxic to humans and animals and because they do not decompose to less harmful substances in the environment. Several laws regulating the manufacture, use, and disposal of pesticides have been passed. The halcyon days of unfettered pesticide use have passed . . . or have they?

Aerial spraying of pesticides has become a major and unrecognized source of health problems in urban areas.

Today if you visit any drugstore, supermarket, hardware store, or garden supply store in this country, you will find a disturbing array of highly toxic pesticides.* Pesticide spraying programs that use trucks, planes, or helicopters are still widely used to control pests such as mosquitoes, gypsy moths, and weeds along rights-of-way. The chemicals are newer; however, the arguments justifying their use haven't changed much. Alternatives to chemicals are rarely considered by the US Department of Agriculture, state departments of agriculture, city councils, weed abatement districts, and other organizations charged with pest control.

For example, to educate the public, village boards, town councils, etc. about gypsy moth control, a representative of the Illinois Department of Agriculture (IDA) travels around the state showing a film. The climax of the film, with dramatic music, shows thousands of moths enveloping a garage. The IDA official concludes that the area (and the local residents) must be sprayed with the pesticide carbaryl from helicopters. Many communities accept the "impartial" government advice, although there are notable exceptions, such as McHenry, Illinois, where the residents rejected carbaryl and instituted a program of biological controls.[1]

In another case, a private spraying company occasionally makes presentations to city councils, village boards, and others in northeast Illinois in attempts to get contracts for mosquito control. The presentation is designed to convince the viewers that spraying with pesticides is the safest, most effective way of controlling mosquitoes. The consequences of not spraying, as this company describes the problem, are mosquito-borne diseases such as encephalitis. While there was an outbreak of encephalitis in 1975 and it is something for public health officials to keep track of, the presentation fails to note that many of the mosquitoes found in that area do not carry diseases. More importantly, there are equally effective and safer, though perhaps more time consuming, ways of controlling the mosquito population. Spraying is better only for the public officials because they have less to think about and less to oversee, and for the spraying companies because they have a product to sell, profit to make.

Urban areas have become a major target for pesticide application. Studies have shown that more pesticides are applied per acre in urban areas than in agricultural areas. Even though a significant amount is applied in homes and garde one of the largest single sources of hum exposure in cities is through spray programs. For example, street spray from trucks is still the principal form mosquito control in many American c es. Aerial spraying and fogging has t come a major and unrecognized source health problems in urban areas.

Aerial application of pesticides w originally developed for agricultu where large areas need to be sprayed a few people are likely to be directly e posed. However those that are expose such as farmers and spray pilots, a thought to suffer higher rates of canc and other disease because of large pa of pesticide exposure. Agricultural us do not require that the pesticide be a plied to a precise location, and frequent significant excesses of pesticide are a plied because only a very small percen age ever reaches the pest (see figure 1 Such imprecision is not permi urban areas, where homes, stream wells, and schools are close to any spra area. However, pesticides applied aeriall will inevitably drift from their targets.

Drifting occurs because the droplet formed in the spray do not fall straigh down but fall at an angle, even without an wind. Wind will scatter the drops ever farther. The smaller the drops, the slowe they will fall and the more easily they wil

Aerially applied pesticides inevitably drift from their targets.

be picked up by the wind and carried far past the desired target. A good analogy is a fountain on a windy day: the water does not fall directly back into the pool but far off to one side. One side is very wet and the other is fairly dry. During aerial spraying, pilot error and turbulence from the plane exacerbate the problem. The net effects are inequities in the application rate, variability in drop size (the larger the drop the greater the potential exposure and the greater variability in distribution), and drifting of the pesticide spra "nonspray areas." Even when the procedures are used, aerially applied pesticides are found *one-quarter mile* beyond the spray boundary.[2] Unwanted and unnecessary exposure of nontarget species and large sections of the population in

*"Pesticides" include herbicides, insecticides, fungicides, rodenticides. "Pest" refers to any organism that humans find detrimental or annoying, including weeds, insects, fungi, rats.

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If Let us S(pray)?

urban and suburban areas becomes inevitable. Such exposure can only lead to increased health problems.

Pesticides are toxic chemicals. Regardless of how or where they are applied, they are lethal to broad classes of pests. Unfortunately, they are also toxic to other animals and humans. The term "toxicity" includes "acute toxicity," which includes immediate effects such as visible illness and death, and "chronic toxicity," which includes adverse health effects that occur weeks, months, or years after exposure. Chronic effects often result from exposure to levels far below those that cause immediate sickness.

Although DDT was banned, the DDT substitutes are not necessarily safer.

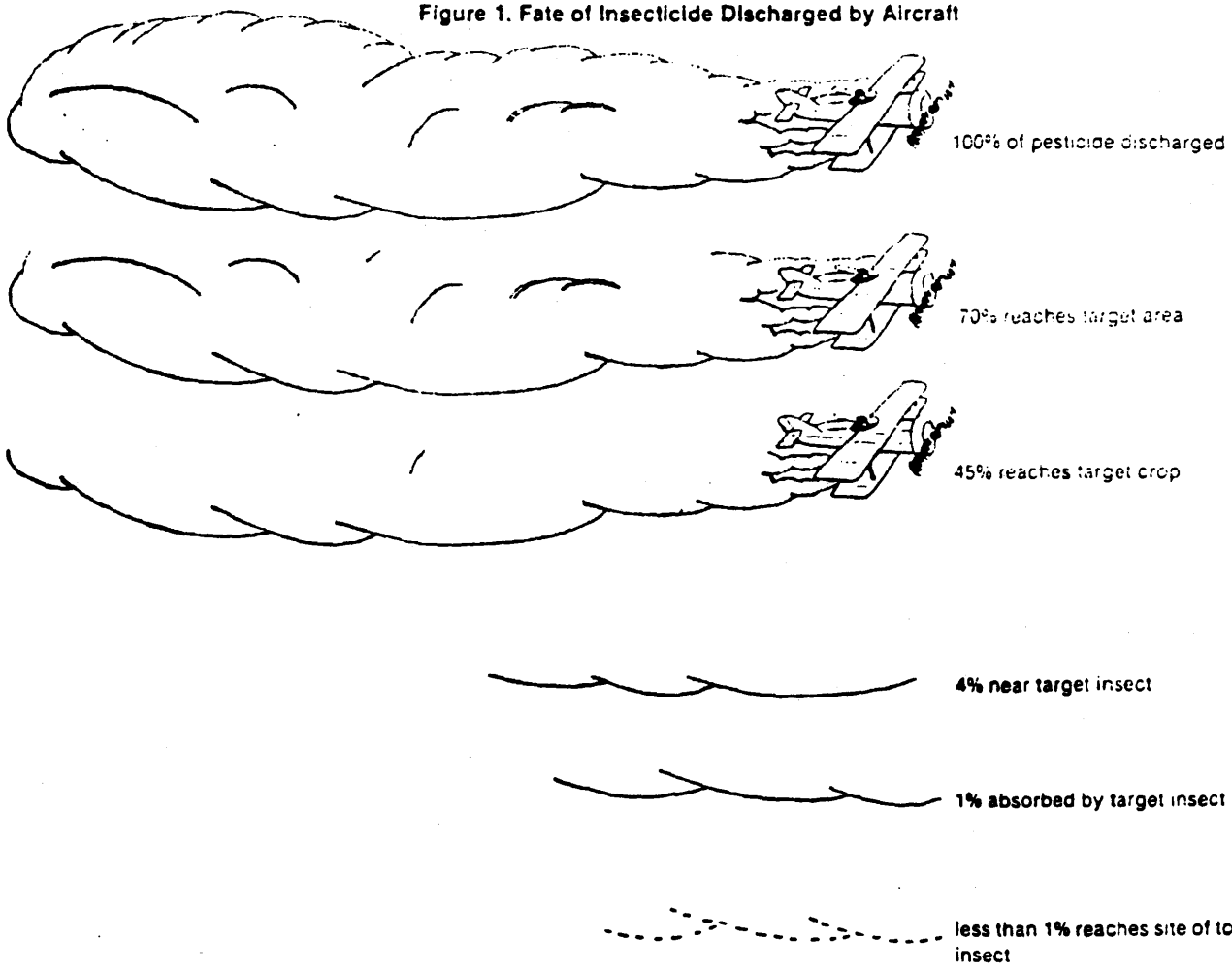
Chemical pesticides are used for their acute toxicity. As the commercial goes, they "kill them dead." In the '50s and '60s, scientists, public health officials, and others began realizing that the chronic effects (on both humans and the environment) could be quite severe. The problems with DDT are perhaps the best known and are generally applicable to many other pesticides. When DDT was first introduced, it was unbelievably effective and useful, which prompted its ever expanding use. Regrettably, once released into the environment, DDT didn't break into simple, harmless chemicals. Nature had not developed any processes to degrade DDT, so it accumulated in the environment. Furthermore DDT was not water soluble but fat soluble, a fact that contributed to its accumulation in ever increasing concentrations as the chemical moved through the food chain. This process, called biomagnification, occurs with many pesticides (see figure 2). DDT was finally banned when research demonstrated chronic health effects, such as the ability to cause cancer in animals, could arise from exposure to the pesticide.

The problems with DDT and related pesticides (such as aldrin, dieldrin, toxaphene) led to the development of new chemicals. Unfortunately, problems with the new pesticides (such as malathion, carbaryl, and Temik®) have received much less attention. Ignored is the fact that, in general, the acute toxicity of these compounds is much higher than the acute toxicity of DDT and its relatives. And these pesticides have been billed as "safer" because they are thought to break down quickly in the environment, thus avoiding long-term exposure and chronic effects.

Malathion is a derivative of nerve gas.

Recent research paints a far different picture on all counts. In 1980, the pesticide Temik® was found in a number of water wells on Long Island.[3] Temik® is used in potato farming and was considered "biodegradable." However, the studies showing biodegradability were done in sunlight. In normal use, the pesticide was put in the ground along with the seeds, where it didn't see much sunlight and didn't biodegrade. Consequently several water supplies have been contaminated by a "safe" pesticide. Such problems with biodegradability are not unique

Figure 1. Fate of Insecticide Discharged by Aircraft



Two of the most common pesticides used for aerial spraying, carbaryl and malathion, have been sold as "safe substitutes for DDT." Such optimism is unfounded. Malathion and numerous other pesticides are derivitives of nerve gases developed in Germany and Britain in the 1930s. Both malathion and carbaryl produce immediate toxic effects by interfering with the transmission of nerve impulses, thus short-circuiting an insect. Mammals (including humans) can generally detoxify (ie, metabolize and excrete) these two compounds fairly quickly, which minimizes their acute toxicity to mammals. However, to conclude that these chemicals are safe (as the chemical industry has done) is irresponsible.

Recently CBE has reviewed the scientific literature on carbaryl[1]—the most widely used pesticide in the country and the principal chemical used in spraying millions of acres of forest land and residential areas to control spruce budworm and gypsy moth—and malathion[4]—which is heavily used in agriculture, in home and garden products, and in spraying for mosquito control. These reviews found a distressing pattern of health and environmental effects.

Carbaryl can produce numerous health effects, such as birth defects in dogs and other animals and permanent learning disabilities in young rats. Spraying of carbaryl in New Jersey is thought to have caused a series of miscarriages. Furthermore, preliminary experiments indicate that carbaryl may enhance the growth rate of viruses, potentially increasing human susceptibility to diseases like influenza and chicken pox.

Carbaryl may increase human susceptibility to viral diseases.

Malathion poses a significant hazard as well. Applicators (eg, spray plane pilots) have shown behavioral changes and difficulty sleeping after using malathion alone and in conjunction with other pesticides. A study done in Texas, where malathion was sprayed to control an encephalitis outbreak in 1966, showed that 5% of a study population experienced headache, nausea, weakness, and in some cases, breathing difficulty. Further studies on workers exposed to malathion and other pesticides show abnormal EEG (brain wave) patterns and changes in the nerve impulse conduction in muscles. Studies in rats show that doses as low as 1 or 2 parts per million produce EEG changes and learning disabilities. Finally, the induction of allergic problems, in particular skin rashes, from exposure to malathion has been demonstrated in both human and animal studies. CBE concluded that direct exposure of large segments of the population to malathion would very likely produce these or related effects in people. Sensitive members of the population, such as children, elderly people, pregnant women, and those with heart disease and/or chronic lung problems (bronchitis and emphysema), would be particularly at risk. These effects would probably be apparent in the exposed population whether there is repeated exposure to very low doses or a few exposures to larger doses.

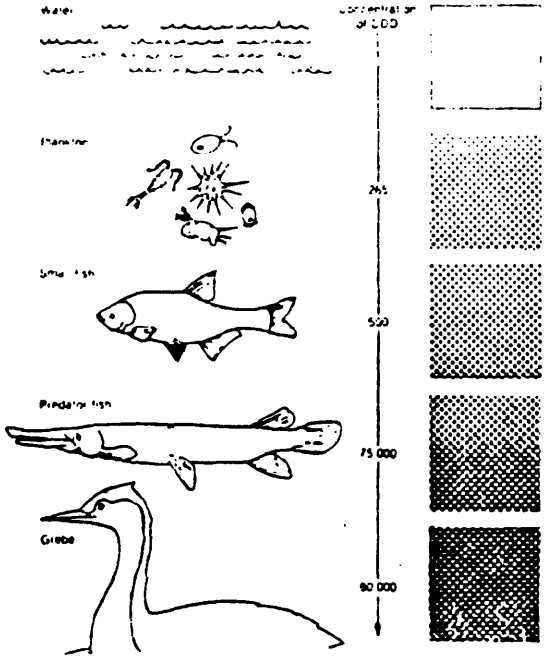
In general, we can only conclude that any pesticide program that is aimed at killing a broad range of insects or other pests will be toxic to humans as well. The greater the exposure of the human population, the more likely the development of health problems.

Given the potential for serious human health effects, one would expect that pesticides would be highly effective. This is not really the case. Clearly they are not very efficient in terms of the actual amount of pesticides reaching the pest. Furthermore, the intent of most spraying programs is to kill the adult insect ("adulticide"). Any eggs or larvae already in existence will be able to develop into adults, which will require another round of spraying. Thus spraying can rarely be done only once but must be repeated many times. Furthermore, many insects, especially mosquitoes, can travel several miles so that spraying in one area is, almost by definition, insufficient.

Another problem with reliance on chemical pesticides and "adulticide" is that insects can rapidly develop resistance to many pesticides. Generally a few insects in any population are immune to the effects of the pesticide. When a large percentage of the insect population is exposed, the ecological balance could be sufficiently changed to favor those insects that are immune. Resistance increases and eventually the pesticide becomes ineffective (see figure 3). This occurred in India between 1950 and 1978. DDT was initially used for malaria control in India in 1950. At first only houses were sprayed, thus exposing only a small fraction of the insect population. Mosquitoes did not build up resistance and the number of malaria cases sharply declined. However, the Indians then began using DDT in agriculture, consequently exposing large numbers of mosquitoes. The insects began building up resistance and the incidence of malaria in India increased from 100,000 cases in 1961 to 50 million in [illegible]. Over 400 species of insects and mites have some form of resistance to pesticides.[5]

Finally, the wholesale blanketing of an area with pesticides kills not target, beneficial insects, such as insect pollinators, upon which agriculture relies heavily, and

Figure 2. Biomagnification of DDD (a chemical pesticide) in the Food Chain at Clear Lake, California



Source: Bo... *A Integrated Pest Management*, Washington DC Council on Environmental Quality, 1979, page 16

honey bees. Natural predators, which control many insect populations, are also killed by pesticides.

Despite the clear hazards presented by widespread exposure to pesticides, aerial spraying and fogging continues in urban areas. However, it is the rising costs of pesticides, which are petroleum based, combined with pressure from citizens, that is forcing the use of alternatives.

The primary alternative to chemical pesticides, integrated pest management (IPM) is becoming more widely accepted and applied in both urban and agricultural areas. IPM involves controlling the pest population by maximizing natural controls. Tolerable levels of pests, not their elimination (which is impossible) are the goals. For example, IPM for mosquito control recommends elimination of breeding sites (eg, stagnant ponds, temporary pools of water) and killing the mosquito larvae before they can develop into adults (eg, addition of larvae-eating fish to ponds). IPM programs are not designed to kill a broad spectrum of pests but are uniquely designed to address particular problems in a particular area. IPM may include localized spraying of chemical pesticides if it is necessary. However that is not the first step nor is it the only step.

Over 400 species of insects are resistant to pesticides.

IPM programs have been implemented in a number of areas. The largest program ever attempted is currently in progress in California. The program began in December, 1980, after massive public opposition to a proposal to spray malathion over Santa Clara county to control an outbreak of Mediterranean Fruit Fly (MedFly). CBE was instrumental in raising public health issues and pointing out that spraying during the winter would be ineffective. Instead, an IPM program was developed: collection of all the fruit where the MedFly could have laid eggs, release of billions of sterile male flies to prevent females from producing viable eggs, and ground-spraying of malathion. The program appears to have been successful. The program also provided indirect confirmation of the hazards from aerial spraying. There were numerous reports of allergic-type reactions and other effects which resulted from just the ground-spraying of malathion. Vastly greater health problems would have occurred if aerial spraying had taken place.

The costs of pesticides, which are petroleum-based, are rising.

Another IPM program, designed to control gypsy moth in McHenry, Illinois included setting traps containing gypsy moth sex attractants, wrapping trees with burlap to catch the caterpillars, and spraying with a biological pathogen, BT.[1] This program, implemented by the residents over the objections of the town officials, has proved very successful, and at this time has controlled the gypsy moth problem in that area.

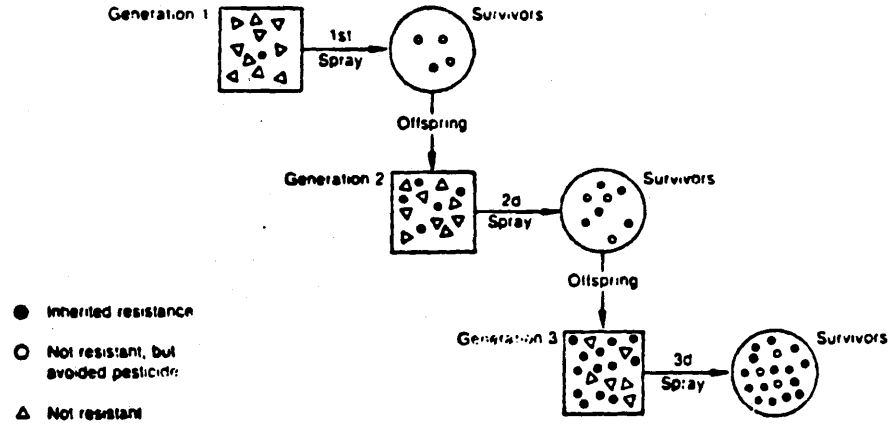
While there are clear health advantages to not spraying, there are other advantages as well. In some cases, IPM programs are becoming significantly cheaper than programs that rely on chemical spraying. For example, the South Cook County Mosquito Abatement District (which covers 340 square miles and contains urban and residential areas, 46 square miles of forest and nature preserves, and hundreds of acres of cattail marshes and woodland depressions) stopped street spraying in 1969 to concentrate on implementing control measures in the breeding areas. As a consequence, that Abatement District had the lowest increase in its tax assessment (5%) than any other taxing body in Cook County between 1969 and 1981. For the entire county the tax rate increased nearly 50% in the same period.

IPM programs should clearly be the logical choice for urban pest control. We can no longer afford to continue poisoning ourselves and ignoring the health costs to society. Unfortunately, it will take lots of pressure (especially in the current political climate) to successfully push for any new program. The fight has really only begun to stop this assault on our bodies and our health.

Notes

1. Ginsburg R. "The Spraying of McHenry" and "How Do We Know It's Toxic?" *CBE Environmental Review*. June/July 1980. p 6. Includes references about carbaryl
2. (a) Berrisford, Mathieson, and Brittain: Environmental Analysis Report-FY 1978. Aerial Herbicide Program-Chippewa National Forest April 1978. (b) Cameron and Anderson. Results of the Stream Monitoring Program-FY 1977 Herbicide Spray Projects, Coos Bay District US Department of Interior-Bureau of Land Management. (c) Rumker, Kelso, Horay, and Lawrence. A Study of the Efficiency of the Use of Pesticides in Agriculture. EPA #540/9-75-025. July 1975
3. (a) *New York Times*, March 4, 1980, page C1 (b) Hang and Salvo Toxics on Tap, NYPIRG 1980
4. Affidavit submitted by Dr. Robert Ginsburg US District Court-Northern District of California Town of Los Gatos et al v John Block et al April 2, 1981
5. Interview with David Pimentel, Cornell University Entomologist. *Chemical and Engineering News*. June 1981, p 23.

Figure 3. Evolution of Pesticide Resistance



Source: Bottrell DR. *Integrated Pest Management*. Washington

The Spraying of McHenry

Gypsy moths, which defoliate hardwood trees, have arrived in McHenry, Illinois. To prevent this pest from spreading, officials planned to spray the area with a potentially toxic pesticide. The residents, with help from CBE, sued for an injunction against the spraying and obtained it.

by Robert Ginsburg, PhD

Plagues of insects have destroyed crops, ruined countries, and caused starvation from ancient times to the present. The biblical locusts resulted primarily from natural cycles and climatic conditions. In recent times we have freed ourselves, in part, from some of those plagues. But in turn, we have created some new ones that may be harder to control than the old. The battle against the gypsy moth is a case in point.

The gypsy moth was brought to this country from Europe and Asia during the mid-nineteenth century for use in the breeding of a better silkworm. In 1869, some gypsy moths escaped from the laboratory in Massachusetts where they were being studied. Without the natural predators and controls that existed in its native habitat, the moth spread rapidly. By 1958 it had spread into Canada, New England, New York, and Pennsylvania, and since then has been spreading southward along the Appalachians and westward to Minnesota and Texas.

The moth itself does not pose a threat to forests, but the female can lay more than 400 eggs at a time. These eggs hatch into ravenous caterpillars (larvae), which can extensively defoliate a tree in a short time. The defoliation is not necessarily fatal to the trees, but repeated attacks can kill the trees. In New England, the larvae have defoliated 643,000 acres of forest at a cost of millions of dollars.

Gypsy moths are dispersed during the larva stage, when they are carried by the wind to new feeding areas. The eggs and larvae are often deposited on the gear of campers, who then carry the pest with them when they travel to new campgrounds. Attempts to control the moth have not been very successful.

The caterpillars have defoliated 643,000 acres of forest at a cost of millions of dollars.

In 1978, eight gypsy moths were spotted in McHenry, Illinois, a quiet, pretty town about 50 miles northwest of Chicago. In 1979, there were 165. This plague had arrived in Illinois.

Town officials, along with the Illinois Environmental Protection Agency, the Illinois Department of Agriculture (IDA), and the United States Department of Agriculture (USDA), decided that the only solution was to spray the area with pesticides before the number of moths got even larger. Federal funding was sought, and $20,000 was approved. The USDA runs the Gypsy Moth Eradication Program, which has been approved by the United States Environmental Protection Agency (US EPA). This program recommends several pesticides, including the one chosen for McHenry, Sevin-4-C (carbaryl).

The final plan was quite simple. A helicopter would fly over the infested area, a residential wooded area called Whispering Oaks, and would spray the trees. The pilot would try to avoid the homes and would not spray within 75 feet of the creek running through the woods. Few precautions were taken to protect the people, pets, or wildlife that would be exposed. Some of the residents were not even notified when the spraying would take place.

Some of the residents were concerned about the possible harm that the project could cause and began to look [illegible]. Their own research, combined with technical help from CBE, uncovered some frightening facts about Sevin and the use of pesticides to fight the gypsy moth. Unfortunately, the problems involved with the use of Sevin to control gypsy moth are typical of the general problems with the use of pesticides to control pests.

Carbaryl, the active ingredient in Sevin 4 Oil, has been widely used since its introduction by Union Carbide in 1958. It was considered a "safe" substitute for DDT. Carbaryl is considered "safe" by its proponents because of its moderate acute toxicity in mammals: a relatively large dose—400 to 850 milligrams of carbaryl per gram body weight (mg/kg)—is required to kill half of a test group of rats.

Carbaryl was considered a "safe" substitute for DDT.

Temik, another Union Carbide pesticide is considered highly toxic, because a much smaller dose—only about 5 mg/kg—is required to kill half of a test group of rats. (These doses are the LD/50. See "How Do We Know It's Toxic?" for an explanation.) Carbaryl's acute toxic effects, in both insects and humans, is based on its ability to interfere with the central nervous system. Proponents also point to the lack of evidence (despite the

Robert Ginsburg is CBE's chemist and toxicologist.

One female moth lays over 400 eggs. (Photo courtesy of the US Department of Agriculture)

lack of research) that carbaryl or its decomposition products accumulate in the food chain, environment, or organisms. It has become one of the most widely used pesticides in the world. However, recent research has indicated that it may not be as safe as is claimed.

In December 1979, two University of Maine microbiologists reported preliminary results showing that Sevin-4-Oil increased the rate of growth of a strain of the virus that causes chicken pox and shingles.[1] These results imply that exposure to the pesticide will make people more susceptible to viral diseases. Devastating effects on human health could occur even with exposure levels as low as fractions of a part per million (ppm). Given the extensive spraying in Maine (in 1979 an area about the size of Connecticut), such exposure levels may be occurring.

Carbaryl interferes with the central nervous system and can cause birth defects and learning disabilities.

In the past, Maine has banned the use of pesticides that affect viruses in this fashion. Thus a special panel was convened to evaluate the data on Sevin. The panel concluded that there was "a very strong basis for worry" and urged that "stringent regulations be developed ... to prevent human exposure."[1]

Animal studies have shown that carbaryl can produce birth defects and damage the reproductive system. Doses as low as 5 to 6 ppm have caused birth defects in dogs and higher levels have similarly affected other animals.[2]

In humans, carbaryl may also cause birth defects. Sevin had been sprayed in Cold Springs, New Jersey, a town of several hundred people. Five women, within a two-mile radius of the spraying, gave birth

Children may be more seriously affected than adults are.

to children with defects. In addition, a number of chickens died, 25 kittens were born with grotesque birth defects, and some dogs began acting strangely.[3] These reports apparently prompted several towns to ban further spraying with Sevin.

Children may be at even greater risk than adults. A 1974 study on rats exposed to 10 to 20 ppm carbaryl developed mild but permanent and increasing losses in their ability to learn various tasks. Children exposed to carbaryl may develop learning disabilities. Children can easily be exposed to greater concentrations than adults are. When exposed to direct spraying, although they may inhale or absorb the same quantity as an adult, the proportion of chemical to body weight is greater. Also, children play on the ground and often put their fingers or other objects, which may be contaminated, in their mouths.

Armed with this information, the residents of McHenry went to the town board and indirectly to the IDA to request reconsideration of the spraying. They were not well received. Their pleas were rejected with assurances that the exposure to the chemical would be ultra low and that there weren't any good alternatives. Further research by the residents and CBI countered those claims, but the officials did not change their position.

Residents were concerned about being exposed without their informed consent. Several US EPA studies have shown that when pesticides are sprayed from the air, it is nearly impossible to control the drift of pesticides outside the target area. To minimize the possible contamination of homes, roads, apiaries, water sources, and water supplies, the US EPA recently proposed that buffers, where no pesticide may be sprayed, be established around such areas. For carbaryl, the buffer zones range from 250 feet from "other waters" (rivers, streams, ponds, and lakes) to one half mile from any human habitation to one mile from public water supplies.[4] These are a far cry from the buffers originally suggested for McHenry.

Even if the spraying could be adequately controlled, the predicted exposure may still be high enough to produce health effects. Normally the "margin of safety" for human exposure is determined by reducing the lowest dose that affects animals by a factor of 100 to 1000. In animals, 10 to 20 ppm of carbaryl produces learning disabilities and 5 to 6 ppm causes birth defects. A 1000 fold decrease would set the "safe" exposure level at 0.01 to 0.02 ppm and 0.005 to 0.006 ppm, respectively. However, we are not even sure that this is an adequate safety factor because we don't know enough about how the chemical causes these problems to set any safety factor with confidence.

Furthermore, we cannot even exactly determine a person's total dose in any spraying operation because carbaryl can be inhaled, taken in with food, and absorbed through the skin. An adult person exposed to direct aerial spray would inhale about 0.4 mg of carbaryl—approximately 0.006 mg/kg (0.006 ppm).[5] Other routes of entry could increase that dose by a factor of 4 or 5 to 0.024 or 0.030 ppm, which could be harmful. The effects could be exacerbated if the nutritional condition of the exposed person is poor, as nutritional status is known to affect the development and severity of the acute effects.

Carbaryl also kills honey bees and fish food.

In addition to health effects in people, carbaryl is a broad spectrum pesticide and thus destroys many insects and or-

Continued on page 10.

McHenry resident nails a moth trap to an oak tree. (Photo by Aaron Silverberg)

Continued from page 7

ganisms other than its intended "victim." In California, carbaryl is responsible for most of the accidental kills of honey bees. The total number of dead insects downstream from sprayed areas increases by factors of up to 160. Long term depletion of fish food, such as minute water plants and invertebrates in streams and ponds, could significantly affect the growth and reproduction of fish, if the pesticide does not kill the fish first.

Carbaryl will not completely eliminate the gypsy moth nor, as Union Carbide points out, will it destroy all the other forest insects. The question becomes whether the chemical will upset the balance of natural controls in favor of the gypsy moth or against it. Studies on a similar pest (the spruce budworm) in the forests of New Brunswick, Canada, show that the growth rate of the pest in the year after spraying is equal to or greater than

The citizens of McHenry obtained an injunction against the spraying and a full hearing on the entire Gypsy Moth Eradication Program.

before the spraying.[1] This increased growth, coupled with the decimation of any possible natural control mechanism, requires a continuing program of spraying to keep the number of pests down. However, the spraying cannot be effective enough to stop the spread of the insect, therefore, more areas have to be sprayed each year. Spraying in New Brunswick went from 200,000 acres in 1952 to 2,000,000 acres in 1970. The Canadians are caught in a vicious cycle. The full impact of their spraying on the emergence of other pests, control of gypsy moths, and human health remains to be seen. The outlook is not good. There is clearly enough evidence to question the effectiveness, as well as the safety, of carbaryl.

In McHenry, town and state officials did not respond to the evidence brought by the residents. Several of them felt that they had no choice but to sue for an injunction against the spraying program and force the implementation of alternative methods of control. Faced with organized opposition, the town officials and the IDA cancelled the spraying program in McHenry. However, the federal court granted the injunction in May 1980 any way so that the full case on carbaryl, spraying, and the Gypsy Moth Eradication Program could be heard. The full hearing will question the adequacy of the Environmental Impact Statement (EIS) for the program and the approval that the US EPA gave to the program.

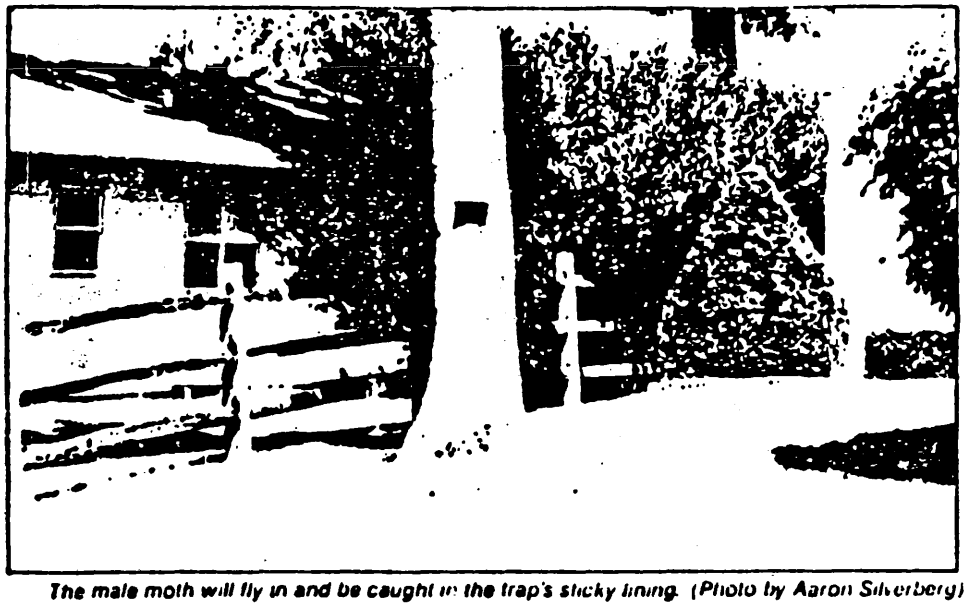
Fortunately there are alternatives to the use of carbaryl to control the gypsy moth.[2] The method that the McHenry residents are using involves collecting and squashing the caterpillars, spraying with bacteria (BT) that only affect caterpillars and kills them, and setting traps containing pheromones (sex attractants) from female moths in order to catch the male moths and thus prevent breeding. These methods are effective when the infestation levels are low, and the use of viruses and other disease agents, often in conjunction with parasitic wasps, is increasing in residential areas with few moths. It is unfortunate that the McHenry officials and the IDA were not ready to act in 1978 when there were very few moths. If these methods would have been more efficient.

The alternatives to chemical pesticides are not widely used because most chemical companies, the major group involved in pest control, do not support them, and many commercial pest control operators

The residents are using biological means to control the moths.

have no expertise in their use. Very little pressure has been applied by the public for use of the alternatives. In McHenry, it was necessary to go to court. Until we push for safe methods of pest control and force the government to do so as well, the large chemical companies will dominate, as will their chemical pesticides. Unfortunately, the battle in McHenry has not stopped the state of Illinois from spraying other people and other localities with carbaryl. Again, there was apparently no warning to residents before the spraying. The fight to prevent exposure of the public to potentially toxic pesticides, without their knowledge or consent, is not over.

Note: For more information on alternatives to chemical pesticides, see the end of "Pesticides in the City," in this issue.

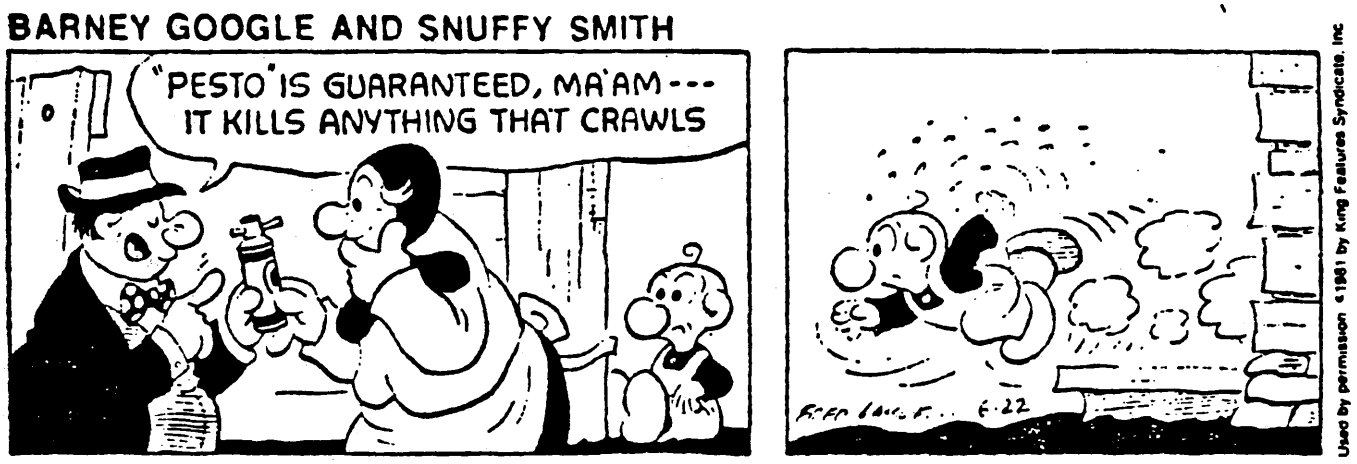


The male moth will fly in and be caught in the trap's sticky lining. (Photo by Aaron Silverberg)

Notes

1. Letter from Frank Lawrence, Maine Poison Control Center, to Kenneth Stratton, Director, Bureau of Forestry, Maine Department of Conservation, January 21, 1980.
2. Nisbet and Miller, DDT Substitute, *Environment* 13:10, 1971.
3. Information compiled by Erik Jansson, Friends of the Earth, Washington D.C. in a request to Douglas Costle, Administrator US EPA, April 15, 1980.
4. Desi Et al, Neurotoxicological Studies of Two Carbamate Pesticides in Subacute Animal Experiments, *Toxicology and Applied Pharmacology* 27:465-76, 1974.
5. (a) Bernsford Mathisen and Brittain, *Environmental Analysis Report FY 1978 Aerial Herbicide Program Chippewa National Forest*, April 1978. (b) Rumker, Kelso Hurley, and Lawrence, *A Study of the Efficiency of the Use of Pesticides in Agriculture*, EPA #540/9-75-025, July 1975.
6. 45 FR 32420, May 16, 1980.
7. Price PW, *Insect Ecology*, Wiley-Interscience Publishers, 1975, pp. 215-227.
8. General reviews: (a) Bottrell, *Integrated Pest Management*, Council on Environmental Quality, December 1979. (b) Choffnes and Anderson, Alternative Pest Control Strategies in Corn Belt, Minority Report, In *Pest Management Strategies in Crop Protection*, Office of Technology Assessment, Volume II, October 1979.

What Is Integrated Pest Management?



by Robert L. Metcalf

Integrated pest management (IPM) is the ecological approach to pest control. You will readily recognize its widely accepted cousins, wildlife management, fisheries management, forestry management. These dynamic approaches to conservation seek to optimize the populations of wildlife, fishes, and timber. IPM seeks to minimize populations of pests. Therefore, in contrast to widely practiced and mostly futile attempts at "extermination" or eradication of pests, IPM regulates their numbers to tolerate levels, that is, below economic or action thresholds (that specific pest density that causes sufficient economic damage or annoyance to balance efforts at control).

IPM is the ecological approach to pest control.

IPM rejects the routine application of broad spectrum biocides* and instead makes use of the variety of natural mortality factors, such as parasites, predators, and diseases, that exist in any ecosystem. IPM incorporates as well such human-contrived obstacles to pest population growth as ecosystem planning, resistant plant varieties, crop rotations, cultural practices, and source reduction by sanitation, trapping, flooding, cooling, and heating.

Above all, IPM is the application of common sense and socially responsible pest control measures. The practice of IPM can be encompassed into three goals:

1. Determine how the life system of a pest needs to be changed to reduce its numbers to tolerable levels, this is, *below the economic threshold*.
2. Apply biological knowledge and current technology to achieve the desired changes—*applied ecology*.
3. Devise procedures for pest control compatible with economic interests and environmental quality—*economic and social acceptance*.

Pesticides do have a role in IPM practices. They are not categorically rejected but rather are relegated as emergency measures to be used when natural regulating factors and other suppressive efforts fail to keep pest populations below the economic threshold. Under IPM philosophy, pesticides are carefully selected and applied for specific and selective action on the pest and for minimal disturbance to beneficial species and of course to humans, to wildlife, and to total environmental quality. Doing nothing is a valid IPM alternative, and the most selective way to use pesticides is not to use them at all.

Natural mortality factors and human-contrived obstacles to pest population growth are used.

Public and professional disenchantment with the overuse, misuse, and injudicious use of chemical pesticides was brought into sharp focus by Rachel Carson's book *Silent Spring* of 1962. It has been growing apace with steadily increasing scientific evidence that the eradicative pest philosophy based on the sole use of broad spectrum, persistent biocides is technologically unsound. Pesticides are purposeful pollutants, and the enormous extent of their use—farmers in the United States applied about 661 million pounds of active ingredients to 205 million acres in 1976—has resulted in widespread contamination of the total environment and

Principles of Integrated Pest Management (IPM)

1. Identify the pest.
2. Learn about its biology.
3. Decide what level of pest is tolerable because in many cases complete elimination of pests is unrealistic.
4. Based on the pest's biology, modify the pest's habitat to discourage its entrance, growth, or reproduction.
5. Determine if any preventative measures can be taken, such as crop rotation and natural predators.

*Another term for pesticide.

Excerpted from *Integrated Pest Management for the Home and Garden* by R.L. Metcalf, D. Fischer, R. Blazier, B. Francis, S. Wesley, of the Institute for Environmental Studies, University of Illinois. © 1980. Reprinted by permission. For more information on this publication, see "Resources for IPM" in this issue.

WHAT IS INTEGRATED PEST MANAGEMENT?

substantial damage to human health and to wildlife. An even more ominous result is the evolutionary emergence of new races of "monster pests" with altered genetic make up so that they are resistant to the

IPM rejects the routine application of broad spectrum biocides.

lethal actions of a wide variety of chemical pesticides. More than 400 important species of insect pests are now resistant to one or more chemical insecticides, some of them to every available insecticide.

Eradicative chemical pest control technology is rapidly becoming very expensive as pesticides increase in cost at an average rate of 22% per year. New products effective against resistant species are as much as 100-fold more expensive than DDT. IPM technology, by rejecting routine pesticide treatments in favor of treat-only-when-necessary, can immediately save up to 50% or more of pesticide costs.

IPM is immensely practical, economically successful, environmentally agreeable, and intellectually appealing. The use of IPM has been endorsed by many responsible agencies concerned with food production and environmental quality: The Food and Agriculture and World Health Organization of the United Nations, the US Department of Agriculture, the US Environmental Protection Agency, the President's Council for Environm Quality, the Environmental Defense, and the Sierra Club.*

Pesticides are reserved for emergencies.

It is high time that IPM practices are made available to the home owner in urban and suburban settings . . . . About three-quarters of the United States' population live in metropolitan areas. The nonfarm use of pesticides was estimated at about 354 million pounds of active ingredients in 1976. Another estimate suggests that 87 million pounds were used in homes and gardens in 1979. This is equivalent to about 2 pounds per household per year Because of the relatively small areas treated, home and garden use is among the most intensive anywhere. This use by relatively untrained persons, generally unaware of the hazards of pesticides, and often unwilling to read label

IPM is immensely practical, economically successful, environmentally agreeable, and intellectually appealing.

and follow directions, can have grav consequences to human and environmental health. Moreover, most urba pests are now resistant to specific pesticides, and thoughtless use can only increase the severity of the resistance problem and compound our inability to dea with these pests when emergency contr is imperative. . . .

Clearly IPM is a developing technology We don't know all the answers, but th methodology is practicable and the philosophy rewarding. Enthusiastic hom gardeners will find IPM an intellectu challenge that can add greatly to the plea sures of the applied ecology of gardening

IPM Resources

Books

Integrated Pest Management, by DR Bottrell, provides a good overview of the principles and uses of IPM. It includes technical information, statistics, graphs, and extensive references to the technical literature. Published by the Council on Environmental Quality, Washington, DC, 1979 For sale by the Superintendent of Documents, US Government Printing Office, Washington DC 20402. Stock Number 041-011-00049-1. $4.75 per copy. Make checks to Superintendent of Documents or call (202) 783-3238 to charge it.

Integrated Pest Management for the Home and Garden, by R Metcalf, D Fischer, R Balzier, B Francis, and S Wesley, presents methods of IPM and applications to specific pests in Illinois. It includes a bibliography and a list of sources for IPM materials, such as insect pathogens and pheromones. Available from the Institute for Environmental Studies, University of Illinois, 408 South Goodwin Avenue, Urbana IL, 61801. No charge for single copies.

Common Sense Pest Control for the Home and Garden, by H Olkowski and W Olkowski, presents the basis and methods of IPM and applications to specific pests in the San Francisco Bay area. It includes drawings of insects and a useful bibliography. Available from the John Muir Institute—CIAS, 1010 Grayson Street, Berkeley CA, 94710. No charge.

Report and Recommendations on Organic Farming, by the US Department of Agriculture, contains the results of a detailed USDA study of the nature, current practices, and potential benefits of organic farming. Organic farmers use IPM to control pests. It includes many ref- d the ames and addresses of the s: a members.

ress publishes many excellent books riodicals on organic farming, organic ning, and IPM. Rodale Press, 33 East Street, Emmaus PA, 18049; (215) 967-1.

Institutions and Experts

The John Muir Institute for Environmental Studies, Inc. is a not-for-profit organization that does research and education on natural systems and the role of people in those systems. Its Center for the Integration of Applied Sciences (CIAS) will answer questions from anywhere in the country about IPM. One page fact sheets on IPM for each of 15 common pests are available free, as well as individualized help. Identify the pest as accurately as possible (scientific name is best). John Muir Institute—CIAS, 1010 Grayson Street, Berkeley CA, 94710; (415) 450-8912.

US Department of Agriculture, state departments of agriculture, and cooperative extensions of state universities can often provide help for pest problems and pest identification. However, they tend to recommend chemical solutions.

University of California, Berkeley, Division of Biological Control does research on pests, predators, and parasites, and can provide information of IPM U of CA, Division of Biological Control, 1050 San Pablo Avenue, Albany CA, 94706; (415) 642-7191.

University of Illinois, Cooperative Extension. Urban entomologist Philip Nixon did his doctoral work on IPM and is willing to answer questions on IPM. U of I Cooperative Extension, 1010 Jorie Boulevard, Suite 300, Oakbrook, IL 60521; (312) 920-0760.

University of Wisconsin, Madison, Department of Plant Pathology. Jack Mitchell is on the IPM committee and is willing to answer questions. U of WI, Department of Plant Pathology, 1630 Linden Drive, Madison WI, 53706; (608) 262-0061.

Wisconsin Department of Agriculture, Plant Protection. Lee Lovett is willing to answer questions on IPM. Wisconsin Department of Agricultu Plant Protection, 801 West Badger Roa dison WI 53713; (608) 266-7138.

*And CBE.

P.S. Please send literature, as we misplaced that given us last year on gypsy moth/s-at that time it was felt the moths were not infested, but we know what we can do to protect our trees.

1287 Ross

1/20/83

Art Mason
Minn. Dept. of Agriculture
Plant Industry Div.
90 W. Plato Blvd.
St. Paul, Minn. 55107

776-9826

Dear Mr. Mason:

We are sorry we were unable to attend your meeting Jan. 18, and won't be able to attend your Gypsy Moth Control hearing on Feb 10 - other meetings or Boro Council with these dates + sickness did Jan 18.

We have 5 trees, 3 of them big + beautiful - a basswood, golden maple + apple. The basswood last year looked sickly - leaves riddled especially in early spring.

We are concerned about the gypsy moth, especially as we find not more than 1 to 2 blocks from where gypsy moth were found at 7th + Clarence. We would favor the aerial and Oil Eradication program.

Mary concerned tree lover,
Yvonne C. Lucente,
and/or Frank P. Lucente

Minnesota House of Representatives

February 15, 1983

Administrative Hearings Office
Minnesota Department of Administration
Third Floor
Summit Bank Building
Minneapolis, Minnesota 55415

Dear Hearing Officer:

I attended the Public Information Hearing held last week regarding the Gypsy Moth problem.

As I indicated at that time, I would make an effort to secure available funding for a treatment program.

My investigations and inquiries indicate that most likely the Minnesota Department of Agriculture will request the funds through the House Appropriations Committee and/or to the Legislative Advisory Committee.

I will work with the Department of Agriculture in this request and endeavor to secure funding for the proposal deemed most appropriate.

If you have any questions or if I can be of further assistance to you in this regard, please contact me at 296-3018 or in Room 162-1/2 State Office Building.

Sincerely,

Len Price

Len Price
State Representative
District 56A

LP:spd
02.00

cc: Daniel J. Guider, Jr., Mayor - Woodbury

STATE OF
MINNESOTA
DEPARTMENT OF NATURAL RESOURCES

BOX , CENTENNIAL OFFICE BUILDING • ST. PAUL, MINNESOTA • 55155

DNR INFORMATION
(612) 296-6157

FILE NO._____

February 18, 1983

Robert Flaskerd
Director
Plant Industries Division
Minnesota Department of Agriculture
90 W. Plato
St. Paul, MN

Dear Mr. Flaskerd,

The purpose of this letter is to summarize my oral testimony given at the Woodbury Public Hearing on the Gypsy Moth Control Program on the evening of February 15, 1983.

I am the Forest Insect and Disease Supervisor, for the Minnesota Department of Natural Resources Forestry Division. My testimony was given on behalf of the Gypsy Moth Ad Hoc Advisory Committee of which I am chairman. This committee was established in the fall of 1980. It was developed to address the potential introduction and subsequent management of Gypsy Moth in Minnesota. The committee consists of representatives from the Minnesota Department of Natural Resources, Minnesota Department of Agriculture, University of Minnesota Cooperative Extension Service, State and Private Forestry and Animal/Plant Health Inspection Service Units of the United States Department of Agriculture and the city forestry agencies for St. Paul, Minneapolis and Woodbury.

This committee has been involved with and reviewed the survey and monitoring activities surrounding gypsy moth in Minnesota over the past two years. When infestations of this insect were located in St. Paul and Woodbury in the fall of 1982 the committee met to discuss what management options and techniques were available to address the problem. After evaluating the alternatives it was the consensus of the committee that measures be taken to attempt to eliminate these localized infestations while the potential to do so exists.

Research and program results have demonstrated that applying the insecticide sevin (carbaryl) by aerial spraying in the infestation areas offered the most effective means of accomplishing this task. Therefore, the committee supports the Department of Agricultures recommendation of utilizing Sevin-4 oil in Woodbury and St. Paul to attempt elimination of the insect from these known infestation areas.

The possible human health hazards of utilizing carbaryl for spraying of this type surfaced at the hearing. However, these same issues have surfaced and been reviewed by the United States Environmental Protection Agency within the activities of the Cooperative Gypsy Moth Suppression and Regulatory Program of the U.S. Department of Agricultures' Forest Service and Animal and Plant Health Inspection Service. Carbaryl has been reviewed extensively during recent years and justification has not been found for restricting or eliminating its registered uses. If the committee had felt that evidence of a potential health hazard existed in utilizing carbaryl it would not have supported this alternative.

The committee's recommendations are based upon an eradication operation. Confusion between management programs in states with wide spread infestations and the efforts to eliminate two isolated infestations within Minnesota arose at the meeting. It must be recognized that attempts at eradicating this pest differ in concept and technique from those aimed at managing widespread infestations. Whereas control efforts with Bacillus thuringiensis offer some advantages in long-term management programs, the use of carbaryl appears to provide the best opportunities for eliminating this pest.

I am confident that the Department of Agriculture will base its decision upon the preponderance of factual evidence, which supports this project.

Sincerely,

S. Olin Phillips
Chairman
Gypsy Moth Ad Hoc Advisory Committee

SOP/bb

cc: J. Brooks
Committee Members

WRITTEN REPLY TO REQUEST FOR A FORMAL RESPONSE TO DR. GINSBURG's STATEMENTS PRESENTED AT THE WOODBURY PUBLIC HEARING

Prepared by

Arthur H. Mason, B.S., M.S., R.P.E.,
Assistant Director
Division of Plant Industry

and

Mark C. Schreiber, B.A., M.S.,
Supervisor
Technical Support

Minnesota State Department of Agriculture
90 West Plato Boulevard, St. Paul, Minnesota 55107

Phone: 296-8578

March 4, 1983

Mr. LeAllen J. Estrem
Citizens for Better Environment
127 N. 7th St.
Suite 204
Minneapolis, Minnesota 55403

Dear Mr. Estrem:

This letter is written in response to requests by representatives of Citizens for Better Environment (CBE) for a formal reply to the comments made and presented by Dr. Robert Ginsburg at the Public Hearing held February 15, 1983 in Woodbury, Minnesota. While all pertinent data dealing with the laboratory testing of carbaryl (Sevin) have been included in the Environmental Impact Statement, which will be available for public inspection, the Minnesota Department of Agriculture has a standing policy of responding to individual requests for information.

I will attempt to address all major concerns expressed by Dr. Ginsburg in the order he presented them. Attached is a copy of Dr. Ginsburg's text with the areas of concern highlighted in yellow. Copies of the literature citations referenced by me are also included.

TOXICITY OF CARBARYL

Page 1 COMMENT CBE: "... attempts to control large-scale gypsy moth infestations have not been very successful."
RESPONSE MDA: This is a true statement. It is also not revelant or appropriate when discussing the current gypsy moth situation in Minnesota. We are not proposing to control gypsy moth but to eradicate it through the limited use (approximately 430 acres, two spray applications) of carbaryl (Sevin 4-oil).

COMMENT CBE: "... recent research indicates that the pesticide may not be as safe as is claimed by the Minnesota Department of Agriculture."
RESPONSE MDA: No references citing recent research were presented to substantiate this statement. At public hearing it was announced that written documentation regarding the effects of carbaryl would be accepted until 4:30 p.m., February 22, 1983. Submitted documents would be studied and evaluated prior to any regulatory decision. The Department received no documentation supporting this statement.

COMMENT CBE: "In fact, the Department has not told citizens the whole story of carbaryl and its potential for adverse effects."
RESPONSE MDA: What, in fact, is the whole story? In our opinion, all revelant information was presented to the public and all questions which arose answered. Carbaryl's "Potential for adverse effects" was addressed at both public informational meetings held prior to the public hearings. At least one representative of CBE was present at the Woodbury

informational meeting yet no effort was made to publicly express concern with either carbaryl or the Department's presentation of the "whole story."

COMMENT: "The United States Environmental Protection Agency (EPA) placed carbaryl on pre-RPAR review (Rebuttable Presumption Against Registration)..."
RESPONSE: This in itself is a true statement. It would have been more complete to have added the same agency removed carbaryl from the pre-RPAR list based upon laboratory studies conducted in response to the concerns which placed it on the list originally. (Federal Register Notice, Volume 45, No. 241, Friday, December 12, 1980, pp. 81869-76).

Page 2

COMMENT: "... There were also a significant number of miscarriages (over 100) in Cape May, New Jersey, which might be related to spraying of carbaryl for gypsy moth control."
RESPONSE: No references supporting this statement were provided. We could not find any supporting documentation. The allegations, therefore, could not be proven to the best of our knowledge.

COMMENT: "... carbaryl is a potent viral enhancer ..."
RESPONSE: Dr. Ginsburg cites a 1981 document. This is subsequent to the EPA decision to remove carbaryl from pre-RPAR review. If carbaryl is the "potent viral enhancer" it is claimed to be why did it not place carbaryl on pre-RPAR again? The answer is in a statement from Dr. John A. Todhunter, Assistant Administrator for Pesticides and Toxic Substances, EPA issued in 1982.

> "In addition to studies on the prenatal effects of carbaryl, we reviewed studies on its gene mutation affects, its potential for tumor induction, and a possible relationship between exposure and certain viral diseases... Based on these results, then, we found that carbaryl has little potential for causing adverse reproductive effects. The remaining available data did not demonstrate a relationship between carbaryl exposure and any other of the adverse effects mentioned above."

In addition, I suggest you become familiar with the document entitled "Assessment of Human Exposure Associated with the Aerial Application of Carbaryl for the control of Gypsy Moths, Lake Zurich, Lake County, Illinois." by the Environmental Chemistry Section,Division of Engineering and Sanitation, Illinois Department of Public Health, October 20, 1982. According to Chris J.Wiant, M.A., M.P.H., Chief Environmental Section, "We concluded from the investigation that no adverse health effects occurred as a result of carbaryl exposure." Mr. Wiant was quoted in The Chicago Tribune: "People should be perfectly comfortable and be assured there doesn't appear to be any health problems that should occur as a result of that spraying."

COMMENT: "In June, 1980, the US EPA recommended guidelines for the use of carbaryl in the Maine spraying program which restricted the application of carbaryl. These guidelines require buffer zones... one half mile from any human habitation ..."
RESPONSE: The restrictions involved by the US EPA at this time were a result of carbaryl's placement on the pre-RPAR review list. The reasons for these restrictions are no longer valid.

Pages 2 & 3 COMMENT:
"... the state of Connecticut does not apply carbaryl at all in residential areas for gypsy moth control."
RESPONSE: The state of Connecticut has banned all aerial spraying of pesticides.

Page 3 COMMENT: "Similar complaints, including some consistent with immunological effects were noted in residents from Lake Zurich ... after an aerial application of carbaryl for gypsy moth control."
RESPONSE: No documentation in support of this statement was supplied. However, to repeat reference cited above, I have reviewed a study conducted in response to this incident and there was no correlation between immunologic effects and the aerial application of carbaryl. In fact, the report concluded that no adverse health effects of any kind occurred as a result of carbaryl exposure. (Assessment of Human Exposure Associated with the Aerial Application of Carbaryl for the Control of Gypsy Moths, Lake Zurich, Lake County, Illinois. Prepared by the Environmental Chemistry Section, Division of Engineering and Sanitation, Illinois Department of Public Health, 1982).

COMMENT: "Given the nature of the potential health effects ... and the spraying guidelines recommended by US EPA, CBE would be opposed to the aerial spraying of carbaryl in Woodbury."
RESPONSE: I have addressed the "Potential health effects" previously as well as the spraying guidelines which were only valid while carbaryl was under pre-RPAR review. If these guidelines were still in effect the Department would not consider carbaryl as a possible eradication tool.

LONG-TERM PLANNING AND DETECTION

Page 3 COMMENT: "... we believe that some action is necessary to control this outbreak of gypsy moth and to plan for future outbreaks."
RESPONSE: To repeat, we propose to eradicate two small infestations, not control the moth populations therein. The term control implies managing a population to achieve acceptable levels of insect populations or incidences of disease. This is not what we propose to do. In addition, the two infestations in Minnesota are not "outbreaks." I define an outbreak as a sudden increase in numbers of an endemic population. These infestations are a result of imported, infested material. Currently, Minnesota has no known natural endemic gypsy moth population.

COMMENT: "The experience with isolated outbreaks or infestations of gypsy moth in the East and Midwest indicates that they will reoccur."
RESPONSE: I have discussed the meaning of the word outbreak above. It is not applicable to Minnesota. No documentation in support of the reoccurrence-in-the-Midwest claim was offered. It is likely gypsy moth will be introduced again.

COMMENT: "By proposing a control program..."
RESPONSE: We are proposing to eradicate gypsy moth not control it.

Page 4 COMMENT: "However, the Department has not come forward with a long-range plan. Instead, the public has been offered a"this year carbaryl-- next year, who knows?" approach ..." to end of paragraph.

RESPONSE: We recognize the fact that gypsy moth can survive Minnesota winters. The current infestations originated from egg masses and/or larvae introduced in 1978-79. The winter of 1981-82 was one of the most severe on record yet viable egg masses found in November 1982 indicate gypsy moth survived.

With regard to "Long-range plans" the Department has been conducting gypsy moth surveys in Minnesota since the 1960's. Since 1973 these surveys have been undertaken annually. Long-range planning includes continued monitoring in the future. This was stated at the public informational meetings. Additional long-range plans will be developed in accordance with the status of gypsy moth. Our goal is to prevent gypsy moth from becoming established in Minnesota; hence, our desire to eradicate the only two known infestations. If gypsy moth becomes established and multiplies beyond the point where eradication is feasible, an acceptable suppression or control program would be undertaken. These programs have different goals than an eradication program. I would urge integrated pest management strategies be developed and implemented, emphasizing the use of Bacillus thuringiensis and any other biological tool available.

I wonder why, if our plans were so incomplete, no representative from CBE expressed concern for them at the public informational meeting? It would have been useful to your group and to the Department to have your concerns made known earlier so they could be addressed in the formative stages of the regulatory process and not at the last available opportunity to speak.

COMMENT: "... one may suppose they will follow precedent - - treating each year's gypsy moth outbreak as a separate crisis."
RESPONSE: Because Minnesota has no known endemic population of gypsy moth any year's infestation is a separate crisis with no relation to other infestations in terms of origin of egg masses, method of introduction or degree of infestation. It is like putting out sparks from a fire when one has no control over the fire. Hopefully, the fire will burn down as will the outbreak populations of gypsy moth along the east coast. We anticipate less accidental long-range movement of gypsy moth when populations in the east collapse.

COMMENT: "... carbaryl may be seen as an easy answer."
RESPONSE: For eradication purposes it is the best option available both efficaciously and environmentally. We eagerly look forward to the time when Bt and other biological agents under development are proven more reliable and consistant as gypsy moth eradication tools.

It should be mentioned that a long-range effective control program has yet to be discovered for gypsy moth. For example the state of New Hampshire relied primarily on biological control methods since the introduction of the Gypsy moth to that state over 100 years ago. It was believed to be the only answer until 1981-82 when an unprecedented 2 million acres were defoliated by this pest.

We are well aware of the continuing cost of control programs. In fact, it is one of our justifications for proposing an eradication program.

ALTERNATIVES TO AERIAL SPRAYING WITH CARBARYL

Page 5 COMMENT: "The public cannot evaluate any program or control option until they get detailed and realistic cost data .... This is particularly relevant in light of CBE's cost estimates which are substantially at odds with Department statements."
RESPONSE: The Department has attempted to present accurate cost estimates. As the appendix to Dr. Ginsburg's text states, "There are several confounding factors which affect the accuracy of these calculations: ..." We agree.

With regard to the difference between the two set of figures the MDA is not alone in apparently making errors. The proposed treatment area for Bt and carbaryl was clearly stated to be 430 acres, total. Dr. Ginsburg presented carbaryl cost estimates on 600 acres.

Finally, the decision to deal with gypsy moth in Minnesota will not be based on cost. Public safety and welfare and how best to deal with this introduced pest are the sole criteria on which the final decision will be based!

COMMENT: "... the failure of aerial spraying of carbaryl and other chemical pesticides to control the spread of gypsy moth in other areas, ..."
RESPONSES: To the best of my knowledge carbaryl has not been used to control the spread of gypsy moth anywhere. Carbaryl, as with other insecticides, are used to reduce population levels. We are proposing to eradicate a known, limited infestation. We will attempt to control spread through regulatory action.

Page 5 & 6 COMMENT: "The basis for any effective gypsy moth control program has to be the use of a variety of techniques."
RESPONSE: This would be a true statement if the Department had, in fact, embarked on a control program. To repeat, we are proposing eradication.

Page 6 COMMENT: "These examples refute the Department's contention that carbaryl application is the only effective control for low-level infestations."
RESPONSE: The Department has never contended or implied "that carbaryl application is the only effective control for low-level infestations." We said, "Carbaryl has shown to be the most effective treatment in eradication efforts, to date, in situations such as we have in Minnesota."

COMMENT: "McHenry, Illinois has eradicated its infestation over a two year period by a combination of ... Bt, intensive trapping, and banding of trees..."
RESPONSE: In reaching our recommendation we were well aware of the McHenry, Ill. situation. This eradication effort is somewhat unique. It took two years to affect eradication. The infestation was initially thought to be isolated on one tree, quite separated from other host trees. Every day, people climbed throughout the tree, located larvae and physically crushed over 600. Later, seven or eight additional tree

were found to be infested. The state made two applications of Bt to the area. The citizens followed this with four or five additional applications of Bt.

COMMENT: "Last year a major infestation ... was similarly treated with equal success."
RESPONCE: This potentially important example was not referenced or even identified.

If you or any members of CBE have any questions please contact me.

Sincerely,

Arthur H. Mason, Assistant Director
Division of Plant Industry

AHM:dc
Enclosures

Copy of CBE statement
Copy of EPA Federal Register
Copy of Lake Zurich Report
Copy of Todhunter Statement

a CBE Comment

CBE-8430

COMMENTS

ON THE

PROPOSED AERIAL SPRAYING PROGRAM

TO CONTROL GYPSY MOTH IN

WOODBURY AND ST. PAUL

BY

ROBERT GINSBURG, Ph.D.

Staff Chemist/Toxicologist

FOR

CITIZENS FOR A BETTER ENVIRONMENT
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February 14, 1983

Citizens For A Better Environment

a CBE Comment

Citizens for a Better Environment (CBE) makes the following recommendations for Gypsy Moth control programs in Minnesota:

1. There should be no aerial spraying of carbaryl in residential areas.

2. Control of the infestations in Woodbury and St. Paul should be accomplished through:

    a. Two aerial applications of 12+ BIU Bt

    b. Mass trapping at 3 traps per acre

    c. Establishing an active public education/community participation program.

3. A long-term control program should be developed based on a regional study of the Gypsy Moth problem. The study should include (but not be limited to):

    a. An assessment of the environmental effects and human health risks of each control option

    b. A determination of which tree species in Minnesota are most susceptible to Gypsy Moth damage

    c. A discussion of the probable effect of Minnesota winters on Gypsy Moth populations

In support of these recommendations, CBE submits the attached comments.

aCBEComment

My name is Dr. Robert Ginsburg. I am the Staff Chemist and Toxicologist for Citizens for a Better Environment (CBE). CBE is a public interest environmental group of over 24,000 members nationally, and over 2,400 members in Minnesota. The following comments specifically address the proposed aerial spraying program for gypsy moth in Woodbury. However, the recommendations I will make are equally applicable for the proposed aerial spraying program in St. Paul. My comments are divided into three major topics:

(1) The toxicity of carbaryl and the history of its use;

(2) The need for long-term regional or county-wide planning and monitoring for the gypsy moth problem;

(3) Alternatives to the aerial spraying of carbaryl.

Toxicity of Carbaryl

Historically, attempts to control large-scale gypsy moth infestations have not been very successful. Carbaryl, the active ingredient in one of the pesticides frequently used in control efforts (Sevin-4-Oil), was originally introduced in 1958 as a "safe" substitute for DDT because of its moderate acute toxicity in mammals and because neither carbaryl not its decomposition products were believed to accumulate in the food chain, environment, or organisms. However, there were no data at that time on its chronic or long-term toxicity, and recent research indicates that the pesticide may not be as safe as is claimed by the Minnesota Department of Agriculture. In fact, the Department has not told citizens the whole story of carbaryl and its potential for adverse effects.

The United States Environmental Protection Agency (EPA) placed carbaryl on pre-RPAR review (Rebuttable Presumption Against Registration) for a number of reasons. One reason was concern for possible teratogenic effects of carbaryl.

This concern is based on several studies indicating that carbaryl can cross the placental barrier in mice and rats[1], induce teratogenic activity in guinea pigs[2], increase fetal mortality in hamsters[3], and cause teratogenic effects in chickens, pheasants, and quail[4]. There were also a significant number (over 100) of miscarriages in Cape May, New Jersey, which might be related to spraying of carbaryl for gypsy moth control.

In addition to possible teratogenic effects, carbaryl went through pre-RPAR review because of the potential for significant neurologic effects from exposure to carbaryl. Research [4,5] has shown that weanling and young rats exposed to as little as 10mg/kg (10ppm) of carbaryl develop permanent learning disabilities and possible permanent EEG changes.

Recent research has also shown that carbaryl is a potent viral enhancer[6]; i.e., it increases the susceptibility of human cells to viral growth. Thus any person in an immune depressed condition -- i.e., allergies, old age, or pre-existing conditions -- could be far more susceptible to viral disease following exposure to carbaryl. These results were deemed so significant that the state of Maine restricted aerial spraying of carbaryl to non-populated areas in the northeast part of that state during the 1980-81 spraying season. In June, 1980, the US EPA recommended guidelines for the use of carbaryl in the Maine spraying program which restricted the application of carbaryl. These guidelines require buffer zones for spraying carbaryl: 250 feet from rivers, streams, ponds and lakes; one half mile from any human habitation; and one mile from public drinking-water supplies.

Finally, the state of Connecticut does not apply carbaryl at all in residential

areas for gypsy moth control. The Connecticut Department of Health Services has also warned the public not to apply carbaryl, "either by commercial pesticide applicatiors via the do-it-yourself route". According to the Department, "numerous complaints of symptoms (headaches, dizziness, eye, stomach, or respiratory problems), including some suggestive of cholinesterase inhibition, were observed following carbaryl exposure last year (1981)". Similar complaints, including some consistent with immunologic effects were noted in residents from Lake Zurich, Illinois in April 1982 after an aerial application of carbaryl for gypsy moth control. In addition, the Connecticut Department of Health Services stated that "besides the immediate harm, we're also quite concerned because animal studies indicate that Sevin (carbaryl) is a suspected cancer-causing agent". Additionally, "studies on three separate species of animals have shown Sevin to cause birth defects in their offspring."[7,8]

Given the nature of the potential health effects, the size and variety of particularly susceptible portions of the population (i.e., young children, the elderly, allergy sufferers, and pregnant women), and the spraying guidelines recommended by US EPA, CBE would be opposed to the aerial spraying of carbaryl in Woodbury.

Long-Term Planning and Detection

While we are opposed to aerial spraying of carbaryl, we believe that some action is necessary to control this outbreak of gypsy moth and to plan for future outbreaks.

The experience with isolated outbreaks or infestations of gypsy moth in the East and Midwest indicates that they will reoccur. By proposing a control program, the Department has tacitly acknowledged that Gypsy Moth will adapt to Minnesota

and become a significant problem -- even though infestations are currently small. However, the Department has not come forward with a long-range plan. Instead the public has been offered a "this year carbaryl--next year, who knows?" approach to the problem. At the public meeting held February 8, two different plans for control of future outbreaks were presented. In order to formulate a reasoned response to the proposed control program, residents need to know precisely what the proposal entails. They further deserve a rational, comprehensive presentation of the long-term costs and benefits of various control options.

In the lack of a long-term plan from the Department, one may suppose they will follow precedent -- treating each year's gypsy moth outbreak as a separate crisis. Given this narrow perspective, carbaryl may be seen as an easy answer. However, experience shows this to be an ineffective response. The citizens who ultimately fund control strategies, and those people who bear the risks, deserve an effective control program. Further, CBE believes that no plan can be evaluated in isolation and a regional or county-wide strategy is essential. The Department's program fails on this count also. By ignoring these larger issues, the Department has not adequately examined the economic impact (i.e., the continuing costs of control) of a program lasting several years, nor has the Department examined the environmental and health impacts of any spraying program (aerial or otherwise) over a period of several years. The public cannot properly evaluate the various options, let alone choose one or a combination of options, without such a regional study. We strongly urge that such a study be prepared. Furthermore, we urge the Department to publish the details of the control program. The public has the right to see, in printed form, exactly what the Department is planning and why, instead of listening to conflicting verbal presentaions.

Alternatives to Aerial Spraying with Carbaryl

The public cannot evaluate any program or control option until they get detailed and realistic cost data. We urge the Department to provide such information prior to any further decisions. This is particularly relevant in light of CBE's cost estimates which are substantially at odds with Department statements. Based on data provided by USDA at public meetings in Illinois and Wisconsin, CBE has calculated the costs (for programs in both St. Paul and Woodbury) as follows -

CBE:

i) Carbaryl $11,250 - $18,000

ii) Bt/Mass trapping $15,600 - $21,000

Department of Agriculture (as reported at 2/8/83 meeting in Woodbury):

iii) Carbaryl $8,700 - $13,000

iv) Bt/Mass Trapping $28,000 - $38,000

Details of CBE's cost calculation are included in Appendix A.

Given the toxicity of carbaryl and the failure of aerial spraying of carbaryl and other chemical pesticides to control the spread of gypsy moth in other areas, we believe that the long-term interests of Woodbury will best be served by the development and implementation of an alternative program.

The basis for any effective gypsy moth control program has to be the use of a variety of techniques. These can include:

(1) aerial and ground application of the biological pesticide, Bt (Bacillus thuringiensis) in conjunction with banding of trees and intensive trapping;

(2) an extensive network of traps for monitoring;

(3) a public education program which encourages community participation in gypsy moth control;

(4) inspections to detect "hitch-hiking" moths on trailers, mobile homes, nursery shipments, etc.;

The extensive use of traps to monitor an infestation before and after treatment, combined with the use of multiple control measures after an infestation is well defined, have been effective in other communities. Seattle, Washington; Appleton, Wisconsin; and Monona, Wisconsin; have successfully treated their low-level infestations through intensive trapping. These examples refute the Department's contention that carbaryl application is the only effective control for low-level infestations. McHenry, Illinois has eradicated its infestation over a two year period by a combination of aerial and ground applications of Bt, intensive trapping, and banding of trees in the infested area. The program in McHenry was distinguished by effective mapping of the infestation and widespread citizen participation. Last year a major infestation elsewhere in Illinois was similarly treated with equal success. All communities which used the Bt trapping program have elected to use it again this year and the programs enjoy widespread public support.

In conclusion, we believe that a variety of options exist to control and eradicate the gypsy moth. CBE will be glad to meet with the Department, residents, and other environmental groups to develop detailed alternative control strategies for Woodbury. CBE further believes that the community must participate for any control program to be truly effective. Clearly, the current infestations can be dealt with by a combination of equally effective techniques less disruptive to the environment and of less hazard to human health than carbaryl. Given the toxicity

of carbaryl, even at low doses, and the availability of alternative strategies, CBE concludes that the proposed aerial application of carbaryl to control gypsy moth in Woodbury would pose an unreasonable threat to the health of all residents who might be exposed. The citizens of Minnesota deserve better then the alarmist claims of the Department of Agriculture and must demand more than the short-sighted, crisis-management plans presented so far.

References:

1. Dollinger, P.M., and Fitch, W.L. Carbaryl: A Report from Peter Dollinger Associates to U.S. EPA. 1980.

2. Robeus, J.R. Toxicology and Applied Pharmacology, 15 (1969), p. 152.

3. U.S. EPA Carbaryl Decision Document, December 1980.

4. Desi, I., et al. Adverse Effects of Chemical Psychotropic Drugs, 1 (1973), p. 125.

5. Desi, I., et al. Toxicology and Applied Pharmacology, 27 (1974), p. 465.

6. Abrahamsen, L.H., and Jerkofsky, M. Applied and Environmental Microbiology, 41 (1981), p. 652.

7. Keys, John E., Connecticut Department of Health Services. Letter to Steve Dreistadt, Citizens for a Better Environment, 2 November 1982.

8. Connecticut Department of Health Services, Public Health Education Section. News release, 19 April 1982.

APPENDIX A

COST ESTIMATES FOR VARIOUS GYPSY
MOTH CONTROL PROGRAMS

I. Woodbury - 100 acres with Bacillus thuringiensis (Bt) and
200 acres with Mass Trapping at 3 traps/acre (MT)

OR

150 acres with carbaryl

	low	high
Bt	$2300	$3600
MT	$1600	$1900
Bt + MT	$3900	$5400
Carbaryl	$2700	$4500

II. St. Paul- 300 acres with Bt and
600 acres with Mass Trapping

OR

450 acres with carbaryl

	low	high
Bt	6900	10800
MT	4800	5700
Bt + MT	$11,700	$16,500
Carbaryl	$8550	$13,500

III. COMBINED (Woodbury and St. Paul)

	low	high
Bt + MT	$15,600	$21,900
Carbaryl	$11,250	$18,000

NOTES. 1. Detailed breakdown for costs of Bt, Mass trapping and Carbaryl

i)Bt 12 BIU, 2 aerial applications

	low	high
Bt/acre	$12	$15
application/acre	10	20
misc.	1	1
TOTAL	$23	$36

ii)MT 3 traps/acre (+enantiomer)

	low	high
traps/acre	$2.50	$4.00
labor/acre	5.00	5.00
misc	0.50	0.50
TOTAL	$8.00	$9.50

iii)Carbaryl 2 aerial applications

	low	high
carbaryl/acre	$ 8	$ 9
application/acre	10	20
misc.	1	1
TOTAL	$19	$30

2. There are several confounding factors which affect the accuracy of these calculations:

a. the size of the treatment areas is based on general information supplied by the Department of Agriculture and is consistent with USDA practice in IL and WI. Without accurate trapping data it is impossible to properly determine treatment areas.

b. cost estimates for the use of Bt, MT and carbaryl were obtained from USDA at public meetings on January 26, 1983 in WI and February 3, 1983 in IL.

c. Salary costs for MT have been reduced in IL by the use of volunteers over a 2 year period.

d. Size of treatment areas do not reflect the impact of severe cold on winter survival rates of gypsy moth eggs. Also size of areas do not reflect recent USDA research showing greater effectiveness of higher concentrations of Bt.

APPENDIX

Section G

NEWS RELEASE -- MINNESOTA DEPARTMENT OF AGRICULTURE
Gypsy Moth -- Immediately 10-24-80

The Minnesota Department of Agriculture has carried out an intensive gypsy moth trapping program the past two years in cooperation with the Animal and Plant Health Inspection Service of the United States Department of Agriculture, to monitor the potentially devastating spread of the insect from the eastern quarantine area of the nation.

For an even longer period the state agency has been cooperating with the federal agency and the regulatory agencies in the eastern quarantine states in a special inspection program designed to prevent the spread of the gypsy moth by its penchant for hitch hiking. Minnesotans who have spent summer vacations in gypsy moth infested eastern forests and parks must clear an inspection either on departure from the quarantine area, or upon arrival back home, to make sure their camping equipment, trailers, tents and vehicles are free of the gypsy moths in any form from egg mass to mature adults.

Robert Flaskerd, director of the Plant Industry Division of the Minnesota Department of Agriculture, described the gypsy moth as an insect with an enormous appetite for tree foliage. The moths from a single egg mass can completely defoliate several trees in a matter of a few weeks, and endanger the life system of the trees. Pine trees will die if the gypsy moths consume most or all of the needles.

Minnesotans who find evidence of gypsy moth egg masses on recently planted or new nursery trees are urged to immediately contact the Plant Industry Division of the Minnesota Department of Agriculture, 90 West Plato Boulevard, St. Paul, Minnesota 55107, telephone 612-296-3347, or John Hayward of the United States Department of Agriculture, Animal and Plant Health Inspection Service, Room 472 Federal Building, 110 So. 4th Street, Minneapolis, Minnesota 55401, telephone 612-725-2302.

Citizens should not attempt to remove or destroy the suspected gypsy moth egg masses until these have been inspected and confirmed by a state or federal official who will provide advice on proper control and disposal measures.

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NEWS RELEASE
MINNESOTA DEPARTMENT OF AGRICULTURE
FOR RELEASE Immediately (10-24-80)

90 WEST PLATO BOULEVARD
ST. PAUL, MN 55107
PHONE: 612 - 296 - 9310

State and federal authorities are moving swiftly to control a major new threat to Minnesota's urban reforestation program, thanks to the alertness of a St. Paul parks and recreation employee, Agriculture Commissioner Mark Seetin reported today.

David Sundmark found unusual fuzzy light brown egg masses on young shade trees being planted October 16 on boulevards in St. Paul. Further investigation confirmed the egg masses as those of the gypsy moth, the nation's most destructive shade tree insect.

Several hundred of the new trees obtained by Minnesota from eastern nursery stock suppliers have been placed under seizure after inspection by state Department of Agriculture personnel confirmed that at least three shipments were heavily infested by gypsy moth egg masses.

An embargo has been ordered by the Minnesota Department of Agriculture against delivery in this state of any trees supplied by three Connecticut nurseries until the state and federal cooperative regulatory program can again certify their stock as disease and pest free. The embargoed nurseries, identified as the suppliers of the pest laden trees, are Mulnite, Imperial and Robert Baker.

Commissioner Seetin said that all Minnesota nurseries, city officials and citizens should be aware of the gypsy moth problems and double check any new nursery stock known to have originated in Connecticut or other New England states.

Each egg mass, roughly the size of a nickel or even a quarter, contains up to 750 of the gypsy moth eggs. The masses are usually found on the tree trunk, underside of the branches, in the joint of branches to the trunk, and infrequently on the leaves. The mass is brown and fuzzy, almost velvety. In size the eggs compare to fine bird shot.

(Continued)

NEWS RELEASE
MINNESOTA DEPARTMENT OF AGRICULTURE
FOR RELEASE Monday, November 30, 1981

90 WEST PLATO BOULEVARD
ST. PAUL, MN 55107
PHONE: 612 - 296 - 9310

Snow and sleet may slow but not halt an important tree inspection operation this winter to determine if a major forest and shade tree pest has become established in Minnesota, according to Agriculture Commissioner Mark Seetin.

Six local, state and federal government agencies are involved in the cooperative inspection team effort to determine the extent of the gypsy moth infestation indicated by the moth trapping results this past growing season.

Inspection teams will continue to inspect trees in Minneapolis and St. Paul all winter and into the spring, looking for tan, fuzzy, egg masses about the size of a quarter. Each egg mass may contain as many as 500 eggs of the gypsy moths.

All of the crew members carry official identification cards from their respective government agencies, to show to concerned citizens, or other authorities. Inspections will be done only during the hours between 8 a.m. and 4:30 p.m. Mondays through Fridays. Police have been advised of the activity and area movements, so they can reassure citizens calling to complain about strangers looking at trees.

The gypsy moth is considered one of the most damaging forest and shade tree defoliating insects to become established in the United States, and it has been migrating west from the eastern states where massive quarantine and control programs have been implemented.

Last summer 110 male gypsy moths were trapped in 65 locations. Most of the moths were found in Hennepin and Ramsey counties, however a few also were caught in Anoka, Dakota, Scott, Washington and even as far southeast as Olmsted counties.

Gypsy moth egg masses are usually found on the tree trunk, underside of the branches, and under loose bark. Citizens are invited to join in the search on their own trees, but are cautioned not to attempt to remove or destroy the suspect eggs. Instead, citizens who find suspect egg masses as described above should contact either of the two principal agencies involved in the inspection program for expert analysis.

Contact either the Minnesota Department of Agriculture, 90 West Plato Boulevard, St. Paul, MN 55107, telephone (612) 296-3347, or the U.S. Department of Agriculture Animal and Plant Health Inspection Service, Room 472 Federal Building, 110 South Fourth Street, Minneapolis, MN 55401, telephone (612) 725-2302.

Also cooperating in the search for gypsy moth egg masses are the Minnesota Department of Natural Resources, University of Minnesota Entomology Department, U.S. Department of Agriculture State and Private Forestry agency, and the shade tree pest control personnel of the cities of Minneapolis and St. Paul.

-30-

NEWS RELEASE
MINNESOTA DEPARTMENT OF AGRICULTURE
FOR RELEASE Immediate (10-22-82)

90 WEST PLATO BOULEVARD
ST. PAUL, MN 55107
PHONE: 612 - 296 - 9310

A cooperative team of state, local and federal government specialists has begun a yard by yard survey in two metropolitan residential areas to determine whether the gypsy moth, a major shade tree pest, has spread to Minnesota, according to Agriculture Commissioner Mark Seetin.

The survey began last week in the Park Hills area of Woodbury township, and within ten days will be expanded to include the Phalen Park area in St. Paul. Local law enforcement authorities have been advised and are cooperating. Survey team members will carry official identification, and will give homeowners information pamphlets on the gypsy moth hazard.

This will be one of the most intensive pest searches ever conducted in Minnesota and will require cooperation and understanding from hundreds of residents in the two target areas. For the safety of survey team members, please leash or house watchdogs in those areas between 8:00 a.m. and 4:30 p.m., Monday through Friday, the survey team appeals.

Target areas have been identified by the annual summer moth trap collections that revealed high populations of male gypsy moths in the Lake Phalen and Woodbury Park Hills communities.

Survey cooperators will be inspecting all yard contents, fences, building exteriors, trees, and even rocks, for egg masses that may represent a potential population explosion of gypsy moths in 1983. Literally, the survey will be a fine tooth comb inspection for the egg masses. Each egg mass contains up to 500 of the pearly white and hairy eggs.

Homeowners cooperation in checking their own premises for the gypsy moth egg masses will help minimize the danger of the pest becoming established. The egg masses of this moth have a golden yellow to brown tinged and soft suede-like cover. The masses usually are concealed on the underside or in crevices of just

(continued)

MINNESOTA DEPARTMENT OF AGRICULTURE
DIVISION OF PLANT INDUSTRY
PLANT PEST SURVEY & DETECTION
GYPSY MOTH CATCHES 1982

COLLECTION DATE	COLLECTION NUMBER	TRAP NUMBER	MOTHS	COUNTY	CITY/TOWNSHIP	LOCATION
08/16/82	JR-17-82	C-221	3	Dakota	W. St. Paul	1057 Chippewa Ave., tree on E end of yard, N of Chippewa, S of John
08/25/82	RT-6-82	T 25	1	Hennepin	Bloomington	100 yards W of W 94th & Colorado Ave., tree NE of intersection W 94th & RR tracks
08/12/82	9-JT-82	287	2	Hennepin	Edina	5809 Long Brake Trail, oak tree E-NE of home
08/12/82	10-JT-82	274	1	Hennepin	Edina	Normandale Raquet & Swim Club, S of 78th St., between Glasgow & Gleason Rds., ash tree NW corner of building & property
08/12/82	11-JT-82	286	1	Hennepin	Edina	5859 Long Brake Trail, poplar tree NW of home, NE of Dewey Hill sign
08/10/82	8-JT-82	104	1	Hennepin	Long Lake	10 Willow Drive, SE of W Watertown Rd., maple tree SW of home, W of Willow Drive
07/22/82	DE-1-82	B-196	1	Hennepin	Minneapolis	1720 - 50th St., frontyard, SW corner on maple tree
07/29/82	2-JT-82	A-580	1	Hennepin	Minneapolis	4609 Washburn Ave. S, ash tree NW of home, between driveways, nearest cross street 46th St.
07/30/82	3-JT-82	633	1	Hennepin	Minneapolis	137 - 50th St., E of Wentworth, maple tree N of home, next to front walk
07/30/82	4-JT-82	639	1	Hennepin	Minneapolis	4222 Wentworth Ave., maple tree E of home, front yard
07/30/82	7-JT-82	641	1	Hennepin	Minneapolis	4600 Wentworth Ave., pine tree E of home, next to front walk, nearest cross street 46th St.
08/02/82	5-JT-82	630	1	Hennepin	Minneapolis	5224 Wentworth Ave., N of Minnehaha Pkwy. & 52nd St., maple tree E of home, home is W of road
08/04/82	6-JT-82	817	1	Hennepin	Minneapolis	5456 Shoreview Ave., near Lake Nokomis, oak tree SW of home
08/24/82	JT-14-82	638	1	Hennepin	Minneapolis	4221 Harriet Ave., SW of home, E. of Harriet Ave., nearest cross street 42nd
08/27/82	DE-10-82	B-772	1	Hennepin	Minneapolis	3500 Roosevelt, SE corner tree, frontyard
08/23/82	JT-12-82	716	1	Hennepin	Richfield	6920 Wentworth Ave., E of home, W of Wentworth, nearest cross street is 69th
08/23/82	JT-13-82	650	1	Hennepin	Richfield	7121 Clinton Ave., W of home, E of Clinton Ave., nearest cross street is 71st St.
08/02/82	DE-3-82	B-713	1	Hennepin	St. Anthony	2812 - 32nd Ave. NE, SE corner of house
08/26/82	DE-8-82	B-713	3	Hennepin	St. Anthony	2812 - 32nd Ave. NE, E side yard, sight of previous 1982 catch
08/03/82	DE-4-82	B-715	1	Hennepin	St. Anthony	2416 - 34th Ave. NE, maple tree in backyard, nearest cross street Roosevelt St. NE
08/26/82	DE-7-82	B-712	1	Hennepin	St. Anthony	3124 Edward St., S of 32nd & Edward, backyard center maple tree
08/11/82	1-EH-82	EH-1	1	Olmsted	Rochester	1551 - 7th Ave. NE, backyard, apple tree
08/10/82	JR-15-82	C-305	1	Ramsey	Maplewood	Forest, E side of McKnight, S of Ogden intersection on W side, oak tree just S of firehydrant on E side of road
08/04/82	DE-5-82	B-817	1	Ramsey	N. St. Paul	Due S of 2507 Cty. Rd. B, W of school, W of NW bus stop
08/27/82	DE-9-82	B-771	1	Ramsey	St. Anthony	NE corner of 37th Ave. NE & Roosevelt, W of 37th & Silver Lake Road, W of Pet Hospital
07/23/82	DE-2-82	B-314	1	Ramsey	St. Paul	NW corner of E River Rd. & unkept woods, Randolph, N of cement barrier, small tree 5 ft. N of barrier
07/29/82	5-JR-82	C-449	1	Ramsey	St. Paul	1544 Upper Afton Rd., maple tree E of garage on Dora St.
08/03/82	7-JR-82	C-662	1	Ramsey	St. Paul	789 Orange, cottonwood tree in front yard
08/03/82	8-JR-82	C-634	1	Ramsey	St. Paul	993 Case, tree on E end of front yard
08/03/82	9-JR-82	C-568	1	Ramsey	St. Paul	Magnolia, between Johnson Pkwy. & Prosperity, boulevard or median, tree nearest S side of Magnolia

ILLINOIS department of AGRICULTURE

Illinois State Fairgrounds, Springfield, Illinois 62706-1001
Phone (217) 785-2427

Division of Agricultural Industry Regulation
Bureau of Plant & Apiary Protection
1010 Jorie Blvd., Suite 20
Oak Brook, Illinois 60521-2271
312/920-9256

January 11, 1983

Mr. Robert G. Flaskerd, Director
Division of Plant Industry
Minnesota Department of Agriculture
670 State Office Bldg.
St. Paul, Minnesota 55155

Dear Mr. Flaskerd,

This letter is in response to our phone conversation earlier today regarding Illinois' experiences with gypsy moth.

Like Minnesota, gypsy moth infestations in Illinois were introduced either by outdoor articles as part of household moves or infested nursery stock originating in the generally infested northeastern states. Present Illinois infestations are also isolated and far removed from the generally infested region.

Our first experience with gypsy moth in Illinois was in Palos Park, an affluent suburb of Chicago. The infestation was confirmed in 1974, adequately delimited by 1975, and eradicated in 1976. Eradication was accomplished by the aerial application of Sevin 4 Oil (carbaryl) on an area of 1000 acres. Later, with more experience, we learned that we probably would have eliminated the Palos Park infestation by treating only 100 acres.

In subsequent years, gypsy moth populations were building to heavy numbers in New England and household moves into Illinois were increasing. Consequently, more infestations were discovered. One of the incipient infestations occurred at McHenry, Illinois. This situation was interesting, because the area is inhabited by some well organized, environmental activists. Near panic resulted when we made our proposal for the use of carbaryl on the McHenry gypsy moth infestation. The activists frightened the citizenry to such a degree that we felt we had better go with a pre-planned acceptable alternative. We would have stayed with our original proposal but the ensuing fear in the community warranted that at least one side of the issue act responsibly. We did! We proposed our two year biological program utilizing Bacillus thuringiensis and mass trapping. We enlisted the activists to set the traps. We pointed out a few trees known to harbor larvae and encouraged volunteers to manually crush the larvae on one tree in particular. This they did as well as treat the trees from the ground with B. t. Government made two applications of B. t. from the air over 40 acres.

On the one tree which stood alone in a parking lot, a number of egg masses averaging approximately 1000 eggs each were destroyed and approximately 600 larvae were crushed by volunteers. As a result, subsequent trapping yielded only half the number of moths trapped the previous year and no egg masses were located. However, a few larvae were found outside of the treated 40 acres.

The following year there were no precise trees known to be infested - only suspects. These suspect trees were treated from the ground by citizens as well as aerially by cooperating governmental agencies. Aerial application was expanded to 100 acres owing to the larvae found outside of the original 40 acre tract. The end result - no moths trapped. Unfortunately, the McHenry story does not end here.

The McHenry infestation was unique. It was found early and the most heavily infested trees were known to us and easily accessible. It was an ideal infestation, and is not likely to occur again in such a manner. The activists immediately seized upon the successful conclusion at McHenry and expanded their idealistic philosophy to other communities having incipient gypsy moth infestations. Part of their approach was and is to espouse their philosophy that all chemical pesticides are bad. They have yet to learn that judging pesticides is similar to judging human beings. One must judge on the basis of the individual and not the whole class. Like human beings, pesticides are not perfect and have a full range of good to bad. In Illinois, our first choice has been carbaryl. Experiences of others as well as our own in utilizing this particular insecticide, together with laboratory data indicate a valid record of safety. During and since McHenry, the Illinois Department of Agriculture in cooperation with the USDA has eliminated seven more infestations with carbaryl insecticide in only one season and virtually without complaint.

During 1982, we had a problem at Lake Zurich, Illinois. Lake Zurich is located not too distant from McHenry. During our treatment of Lake Zurich using carbaryl, a few children may have inadvertantly been exposed to one of the passes of our spray craft. Of course, no physical harm resulted in the children. However, the mishap was seized upon by the aforementioned activists together with some citizens in Lake Zurich who immediately reminded everyone that 1982 was an election year. The term "political entomology" used elsewhere, now became known to us. Plans to make a second treatment at Lake Zurich were dropped. Even so, only one moth was trapped at Lake Zurich which further emphasizes the effectiveness of carbaryl on isolated infestations.

Our plans for 1983 include aerial treatment of six communities with an improved formula of B. t. Almost all of these infestations are near one another and are such that we feel we can afford a test program at this time. Our approach will be a realistic attempt at eradication utilizing a biological alternative. I mention this not to encourage you to do the same. I emphasize again that we are making this attempt because we feel we can afford the gamble.

On my desk is a letter from a sixth grader. His letter is an inquiry in conjunction with a science project on the Mediterranean Fruit Fly. His letter reminds me of the lesson California learned in dealing with an exotic plant pest. That is: A little pesticide at the right place and at the right time is considerably better than great quantities of pesticides all over the place all of the time later on. Good luck with your program.

Sincerely,

Norman G. Seaborg

Norman G. Seaborg
State Entomologist

AGRICULTURE
COMMISSION

David D. Diehl

Dr. S. Leon Whitney

John Kronemeyer

Robert Chaffin

Rebecca Tompkins

STATE OF MICHIGAN

[redacted] Governor
James J. Blanchard

DEPARTMENT OF AGRICULTURE

Lewis Cass Building, P.O. Box 30017
Lansing, Michigan 48909

DEAN PRIDGEON, Director

January 11, 1983

Mr. Robert G. Flaskerd, Director
Division of Plant Industry
Minnesota Department of Agriculture
90 West Plato Blvd.
St. Paul, MN 55107

Dear Bob:

It is regrettable that two gypsy moth infestation sites have been discovered in your state. However, I understand that each of these is small comprising just a few hundred acres in each case.

From our experience in dealing with this insect since 1972, I would strongly recommend that you take vigorous action to eliminate those spot infestations. Here we are dealing with an established core infestation and an increasing number of small infestations isolated from the core and created by the introduction of the gypsy moth by householders moving into the state from New England, New York, and Pennsylvania.

While we have not had the resources to do much with the core infestation except to confine it, we do think it important to eliminate those isolated from the core. In pursuing this course of action we have tried all of the control methods and materials that are available including the use of Sevin-4 Oil, Dimilin, Disparlure, Gypcheck, mass trapping, and BT. Of these, Sevin-4 Oil has been the best eradicant with Dimilin a close second. However, the latter, as you know, has some restrictions on its use in populated areas. The other materials didn't give good control let alone eradication. In at least 12 to 15 isolated sites, two applications of Sevin-4 Oil have reduced gypsy moth populations to an undetectable level as determined by trapping and scouting in subsequent years. Thus this is the material of our choice where we wish to eliminate an infestation.

If we can be of any assistance to you through additional sharing of our experiences, please feel free to call on us.

Sincerely,

Dean F. Lovitt, Chief
Plant Industry Division

DFL:kd

STATE OF INDIANA

INDIANAPOLIS, 46204

DEPARTMENT OF NATURAL RESOURCES

JAMES M. RIDENOUR
DIRECTOR

613 State Office Building

January 13, 1983

Mr. Robert G. Flaskerd, Director
Division of Plant Industry
Minnesota Department of Agriculture
90 West Plato Blvd
St. Paul, MN 55107

Dear Bob:

Here in Indiana we consider gypsy moth a very serious threat to the economy and general well being of the entire state and its citizens.

We probably don't have recreational and timber resources comparable to Minnesota, but we still have some of the finest oak timber in the world located in the "Knobs" area of south-central Indiana. As you know, the oaks in general and white oak in particular constitute the prime host of gypsy moth in the United States. The loss of these oaks through successive defoliation and the resultant species change to less desirable or less valuable types would have a serious impact on the wood product, industry and recreationally oriented interests of Indiana and the rest of the country for all time to come.

I am sure that you in Minnesota are acutely aware of the threat of gypsy moth to recreational resources and the economic consequences of the loss or reduced use of such resources.

Since trapping our first male moth in 1974, we have found several isolated introductions but no established infestation until 1980 when 4 moths were taken in Vigo County near the Illinois border. The next year some 30 moths were trapped in a relatively small area. The egg mass survey in the fall of 1981 revealed some 60 egg masses on the property of a family that had moved in from New Jersey shortly before the first moths were trapped. About 500 acres were sprayed aerially with 2 applications of Seven-4 Oil. Intensive trapping in Vigo County revealed no moths this past summer.

We have two areas this year where we believe incipient infestations have been established. We plan to treat these areas next spring if funds are available. At the moment, Seven-4 Oil is the material of choice.

The role of RV's and camping activities cannot be denied in the potential spread of gypsy moth. A total of 17 male moths were trapped during the NCHA Camporee at a county park in south-central Indiana last

August. There were also positive single finds at 4 state parks and 7 private camp grounds last summer.

I am enclosing a report of the Indiana Gypsy Moth Technical Advisory Committee that was established last fall. My report to the Central Plant Board will have further information.

Sincerely,

DIVISION OF ENTOMOLOGY

John

John J. Favinger
State Entomologist

Enclosure
JJF/bg

SF-00006-02

STATE OF MINNESOTA

DEPARTMENT of Natural Resources

Office Memorandum

FEB 14 1983

TO : State Executive Council
and Legislative Advisory Commission

DATE: February 2, 1983

FROM : Joseph N. Alexander
Commissioner

PHONE: 296-2549

SUBJECT: Gypsy Moth Control

The purpose of this memo is to introduce you to a new forest pest problem within the state and alert you to potential funding needs which may arise as a result of the problem.

The gypsy moth, Lymantria dispar (L.), is a serious pest of forest trees in the United States. In spite of a federal quarantine and the efforts of regulatory personnel within the State of Minnesota, monitoring of male moths with attractants during the growing seasons of 1980-82 had indicated that a potential infestation existed. The first significant number of male gypsy moths trapped in the metropolitan area occurred in 1980 when twenty-seven (27) moths were trapped. The number of male moths trapped in 1981 rose to slightly more than one hundred (100). At this time, the first egg mass surveys were conducted on recently planted boulevard trees under the suspicion that egg masses may have been brought in on nursery stock purchased in the northeastern United States. However, no egg masses were found. In 1982, despite a very severe winter, in excess of 100 male gypsy moths were once again trapped in the metropolitan area. In the fall of 1982, intensive ground surveys for egg masses conducted for the second year, confirmed the presence of infestations in St. Paul and Woodbury. This confirmation results in some serious implications.

The potential impact of this insect on the nursery, Christmas tree, tourism, and forest industries is extensive. In 1981 this insect defoliated almost 13 million acres in the northeastern United States. This has resulted in large scale losses of trees in both urban and forest areas. Infestations of the insect also result in quarantines which place restrictions on the movement of nursery stock, Christmas trees, and forest products. These quarantines at the minimum increase production costs for the affected products through increased inspection and treatment expenses as well as limitations on product movements. The near complete defoliation of forest areas due to gypsy moth and the repulsive occurrence of large numbers of larvae in the summer reduce the aesthetic appeal of forested areas for tourists.

The major long distance spread of gypsy moth is through inadvertent transport by people. Therefore an infestation within the heavily populated metropolitan area is a potential source of infestation to the entire state. However, the gypsy moth's natural spread potential (the egg laden female moths are poor fliers) gives us the opportunity to eliminate or greatly reduce infestations through intensive control efforts and thereby restrict further spread within the state.

In 1980, a State Gypsy Moth Advisory Council was formed. The Council consists of representatives from the Minnesota Department of Agriculture, the Animal and Plant Health Inspection Service (APHIS) and State & Private Forestry units of the United States Department of Agriculture, the Cooperative Extension Service of the University of Minnesota, the forestry and parks departments of the cities of Minneapolis and St. Paul, and the Department of Natural Resources. The purpose of this council was to coordinate the activities of city, federal and state agencies who are or would be involved in gypsy moth monitoring and control programs.

This council has reviewed the current infestation information and is recommending that intensive efforts be undertaken to control these infestation areas. The preferred alternative proposed is the treatment of the infestation areas with an insecticide to attempt to eliminate the insect populations.

The proposal to control this insect before it is allowed to spread is extremely important to the management of urban and forest areas statewide. The Gypsy Moth Advisory Council has advised that early action is necessary and has recommended that these costs be borne by the State because of the potential significance of the gypsy moth. This would require supplemental funding for the agencies involved. I would encourage a meeting on this problem to bring you up to date on the findings, control alternatives and financial needs. Steps are being taken at this time to conduct control activities this spring.

cc: Jim Nichols
Commissioner of Agriculture

Olin Phillips
Chairman, Gypsy Moth Advisory Council

Minnesota House of Representatives

February 28, 1983

Arthur H. Mason, RPE., Asst. Director
Minnesota Department of Agriculture
90 West Plato Boulevard
St. Paul, Mn 55107

Dear Mr. Mason:

I am writing to request your help in obtaining funds to deal with the Gypsy Moth infestation in Minnesota.

The Gypsy Moth is a threat because it has the capabilities of destroying the forests of Minnesota. In the caterpillar stage, it satifies its voracious appetite by feeding on the foliage, stripping it much like the Tent or Army Caterpillar. A single defoliation can kill some softwood trees; two or more defoliations can kill many types of hardwoods.

Since the Moth has no natural enemies in this country, it presents a threat to some of our basic industries. In recreation areas, the unsightlinesss of defoliated trees can result in decreased visitor use and revenue, not to mention the decline in value of parks and wooded homesites. Since quarantines are often used to control the migration of the insect, State and USDA regulations could be used to restrict the sale and movement of trees and other woody plants, logs, pulpwood, and firewood in Minnesota and elsewhere.

Obviously there is the potential for substantial economic losses for our forest and nursery industries. In Pennsylvania for example, the first major defoliation by Gypsy Moths did not occur until 1968. Yet between 1972 and 1980, the State lost $40 million in trees because of Gypsy Moth feedings. Most of the trees that died were oaks. Infestations of millions of caterpillars can strip whole forests in a matter of days.

The Agriculture Department has identified two sites as having Gypsy Moth infestations--the Phalen Park area of Ramsey County and the Woodbury area in Washington County. The Minnesota Department of Agriculture will be submitting a request to the Legislative Advisory Council for funding so that an eradication program can commence in May, 1983.

Please give the request your consideration and support so that we can keep Minnesota's forests and tourism business healthy.

Sincerely,

Len Price

Len Price
State Representative
District 56A

LP/pe

Draft

US 70 IMPROVEMENT, ALAMOGORDO-TULAROSA SECTION: Otero County, New Mexico. December 5: Proposed is improvement of US 70/Alamogordo-Tularosa section in Otero County, New Mexico. The improvements would begin at Holloman AFB and end 2.8 miles east of US 54 extending for 26 miles. The alternatives considered within the Alamogordo segment are: (1) no action, (2) widening of existing route to 6 to 8 lanes, and (3) a 4 lane relief route one-half mile west of the existing route. The alternatives for the Tularosa section are: (1) no action, (2) improvement of existing route, and (3) two possible routes east of the Tularosa village limits. The cooperating agency is the State of New Mexico. (FHWA-NM-EIS-80-01-D). (EIS Order #800931).

BREMERTON FERRY TERMINAL CONSTRUCTION: Kitsap County, Washington. December 1: Proposed is the construction of the Brementon Ferry Terminal in Kitsap County, Washington. The terminal would consist of: (1) New and/or rehabilitated docking facilities: (2) 22,500 sq. ft. terminal: (3) separate parking, bus terminal, kiss-and-ride, and taxi areas; (4) separate pedestrian and bicycle circulation pathways, and (5) handicapped facilities. (EIS Order #800907).

MUKILTEO FERRY TERMINAL AND ACCESS IMPROVEMENT: Snohomish County, Washington. December 5: Proposed is the improvement of the Mukilteo Ferry Terminal and WA-525 in the city of Mukilteo, Snohomish County, Washington. Improvement of the terminal would include: (1) two ferry slips, (2) an increased vehicle holding area, (3) transit facilities, (4) improved restroom facilities, (5) walk-on passenger waiting room, (6) improved ticketing, and (7) provisions for the handicapped. The terminal access route will include truck-climbing lanes and either widening of existing WA-525 on a new road connecting the terminal with WA-526. The cooperating agency is the state of Washington. (FHWA-WA-EIS-80-06-D). (EIS Order #800927).

Final

KIPLING TO INDEPENDENCE, I-70 TO RALSTON ROAD: Jefferson County, Colorado. December 4: This project consists of the location and construction of a four lane arterial through the Kipling/Independence corridor. The corridor is located in the Northwest quadrant of the Denver metropolitan area and south central portion of the city of Arvada, Jefferson County, Colorado. In addition to a no build alternative four others are being considered which are: (1) maintain existing Kipling/Independence route, (2) extend kipling north to Arvada cemetery and transition into Independence, (3) transition from Kipling to Independence along the Public service power lines and extend up Independence, (4) extend Kipling north to Ralston Road. (FHWA-Colo-EIS-78-01-F). Comments Made by: HUD, EPA, COE, DOT, DOI, State and local agencies groups and individuals. (EIS Order 800918).

OSAGE EXPRESSWAY, CITY OF TULSA: Tulsa, Osage Counties, Oklahoma, December 1: Proposed is the construction of the Osage expressway in the city of Tulsa and in the counties of Osage and Tulsa, Oklahoma. The study corridor extends from the city of Tulsa on the southern boundary to OK-20 near the city of Skiatook on the northern boundary. The alternatives considered are: (1) two expressway routes, (2) upgrading the existing facilities to carry projected traffic volumes, (3) a mass transit alternative, and (4) no build. (FHWA-OK-EIS-79-01-F). Comments made by: EPA, HUD State and local agencies groups. (EIS Order 800908).

URBAN MASS TRANSPORTATION ADMINISTRATION

Final

DETROIT DOWNTOWN PEOPLE MOVER: Wayne County, Michigan, December 4: Proposed is the awarding of a grant for the construction of a downtown people mover in the central business district of Detroit, Wayne County, Michigan The automated transit system would operate on an elevated, track guideway and would be controlled from a central operations facility. The system would be a 2.96 mile, single-lane, elevated loop alignment around the CBD. Some stations would be linked to major buildings by above-grade walkways. All stations would have access to street level. Comments made by: AHP, USDA, FEMA, DOT, DOI, EPA, HEW, local agencies, individuals and businesses. (EIS Order 800920).

[FR Doc. 80-38659 Filed 12-11-80, 8:45 am]
BILLING CODE 6560-37-M

[OPP-35000/2; PH-FRL 1700-6]

Determination Not To Initiate a Rebuttable Presumption Against Registration (RPAR) of Pesticide Products Containing Carbaryl; Availability of Decision Document

AGENCY: Environmental Protection Agency (EPA).

ACTION: Notice of Determination not to initiated an RPAR.

SUMMARY: The EPA has concluded not to issue a rebuttable presumption against registration for carbaryl, a broad-spectrum pesticide currently registered by EPA for use as an insecticide/acaricide, and as a plant regulator. The Agency has determined to return carbaryl to the registration process; however, the Agency will require from registrants additional data to support existing registrations pursuant to section 3(c)(2)(B) of the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), as amended, and will negotiate appropriate label changes, outside the RPAR process, to ensure that exposure to carbaryl is held to reasonable levels.

ADDRESS: Copies of the Decision Document of Carbaryl are available from: Juanita Wills, Special Pesticide Review Division (TS-791), Office of Pesticide Programs, Room 711, Crystal Mall No. 2, 1921 Jefferson Davis Highway, Arlington, Virginia 22202.

FOR FURTHER INFORMATION CONTACT: Juanita Wills (703-557-7420).

SUPPLEMENTARY INFORMATION:

I. Introduction

Carbaryl is a broad-spectrum insecticide/acaricide as well as a plant regulator used in thinning apples. Its major uses include applications to cotton, peanuts, soybeans, field and sweet corn, ornamentals and turf, forest and shade trees, deciduous tree fruits, many other fruit, vegetable, and nut crops, poultry, and pets. EPA has reviewed the risks associated with the use of carbaryl to determine whether a Rebuttable Presumption Against Registration (RPAR) should be issued for carbaryl. The Agency submitted carbaryl to the Special Pesticide Review Division (SPRD) as a candidate for the RPAR process primarily because a laboratory study conducted in 1968 found carbaryl to be teratogenic when administered in low doses to pregnant beagle dogs. A 1969 study of beagles also showed positive results. In addition to teratogenicity and fetotoxicity, the Agency was concerned that use of carbaryl had the potential to cause the following effects: mutagenicity, oncogenicity, neurotoxicity, and viral enhancement. This Notice sets forth the Agency's determinations with regard to the potential of carbaryl to produce these adverse effects of concern. The Agency has concluded that the overall weight of evidence of the extensive data which are currently available does not indicate that risk criteria warranting a Rebuttable Presumption Against Registration for carbaryl have been met or exceeded. Accordingly, the Agency has determined to return carbaryl to the registration process. Independent of the Agency's determination not to issue a Rebuttable Presumption Against Registration of carbaryl pesticide products, the Agency has determined that the following measures are warranted and will be pursued: (1) requirements for additional data to support the existing registrations, pursuant to section 3(c)(2)(B) of the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), as amended; (2) appropriate label changes to be implemented according to negotiations between the Agency and registrants to ensure that exposure to carbaryl is held to reasonable levels.

This Notice is organized into four units. Unit I is this Introduction. Unit II, entiled "Legal Background", sets forth a general discussion of the regulatory

framework within which these actions are taken. Unit III, and the accompanying Decision Document, set forth the determinations which the Agency has reached and the bases for these determinations. Unit IV, entitled "Procedural Matters", provides a brief discussion of the procedures which will be followed in implementing the determinations announced in this Notice.

II. The RPAR Process—Legal Background

In order to obtain a registration for a pesticide under FIFRA, a manufacturer must demonstrate that the pesticide statisfies the statutory standard for registration. That standard requires, among other things, that the pesticide perform its intended function without causing "unreasonable adverse effects on the environment" (Sec. 3(c)(5)). The term "unreasonable adverse effect on the environment" is defined as "any unreasonable risk to man or the environment, taking into account the economic, social and environmental costs and benefits of the use of any pesticide" (Sec. 2(bb)). In effect, this standard requires a finding that the benefits of each use of the pesticide exceed the risks of use, when the pesticide is used in accordance with commonly recognized practices. The burden of proving that a pesticide satisfies the registration standard is on the proponent of registration and continues as long as the registration remains in effect. Under Sec. 6 of FIFRA, the Administrator is required to cancel the registration of a pesticide or modify the terms and conditions of registration whenever he determines that the pesticide no longer satisfies the statutory standard for registration.

The Agency created the RPRA process to facilitate the identification of pesticide uses which may not satisfy the statutory standard for registration and to provide a public, informal procedure for the gathering and evaluation of information about the risks and benefits of these uses. The regulations governing the RPAR process are set forth at 40 CFR 162.11. In broad summary, these regulations set forth certain criteria of risk and provide that an RPAR shall arise against a pesticide if the Agency determines that the ingredient(s), metabolite(s), or degradation product(s) of the pesticide in question meet or exceed any of these risk criteria.

In administering the RPAR process, the Agency adheres to the standard for initiating the RPAR process established by Sec. 3(c)(8), one of the 1978 Amendments to FIFRA, which provides that the Agency may not start and RPAR unless it has "a validated test or other significant evidence raising prudent concerns of unreasonable adverse risk to man or to the environment." In determining whether a particular pesticide raises "prudent concerns," the Agency examines the degree of toxicity of the pesticide as indicated in laboratory studies and attempts to extrapolate the degree of risk which is likely to be posed to humans and the environment. In making this kind of extrapolation, the Agency evaluates the quality and adequacy of all available data before proceeding with an RPAR. This approach allows the Agency to avoid the burdensome consequences of an RPAR proceeding in those case where studies of questionable validity have called the safety of a pesticide into question but where the overall toxicological profile does not indicate that prudent concerns are warranted.

The Agency generally announces that an RPAR has arisen by publishing a notice in Federal Register. After an RPAR is issued, registrants and other interested persons are invited to review the data upon which the presumption is based and to submit data and information to rebut the presumption. Respondents may rebut the presumption of risk by showing that the Agency's initial determination of risk was in error, or by showing that use of the pesticide is not likely to result in any significant exposure to humans or to animals or plants of concern with regard to the adverse effects in question. See 40 CFR 162.11(a)(4). Further, in addition to submitting evidence to rebut the risk presumption, respondents may submit evidence as to whether the economic, social, and environmental benefits of the use of the pesticide subject to the presumption outweigh the risks of use.

The regulations require the Agency to conclude an RPAR by issuing a Notice of Determination in which the Agency states and explains its position on the question of whether the risk presumptions have been rebutted. If the Agency determines that a presumption is not rebutted, it will then consider information relating to the social, economic and environmental costs and benefits which registrants and other interested persons submitted to the Agency, and any other benefits information known to the Agency.

After weighing the risks and the benefits of a pesticide's uses, the Administrator may conclude the RPAR process by issuing a notice of intent to cancel or deny registration pursuant to FIFRA Sec. 6(b)(1) and Sec. 3(c)(6) of by issuing a notice of intent to hold a hearing pursuant to Sec. 6(b)(2) of FIFRA to determine whether the registration should be cancelled or applications for registration denied.

In determining whether the use of a pesticide poses risks which are greater than benefits, the Agency considers modifications to the terms and conditions of registration which can reduce risks, and the impact of such modifications on the benefits of the use. Among the risk reduction measures short of cancellation which are available to the Agency are changes in the directions of use on the pesticide's labeling and classification of the pesticide for "restricted use" pursuant to FIFRA Sec. 3(d).

III. Determinations and Regulatory Conclusions

A. Determinations on Risk

The Agency has considered information on the potential of carbaryl to produce teratogenicity and fetotoxicity, mutagenicity, neurotoxicity, and viral enhancement. The Agency's conclusions regarding these potential effects as based on currently available data are summarized below.

1. *Teratogenicity and Fetotoxicity.* 40 CFR 162.11(a)(3)(ii)(B) provides that a rebuttable presumption against a pesticide's registration and continued registration shall arise if that pesticide's ingredient(s) "produces any • • • chronic or delayed toxic effect [other than an oncogenic or mutagenic effect] in test animals at any dosage up to a level, as determined by the Administrator, which is substantially higher than that to which humans can reasonably be anticipated to be exposed, taking into account an ample margin of safety."

Data concerning the potential of carbaryl to induce adverse prenatal effects in mammalian species are extensive, more extensive than has been the case for other pesticides which have come under Agency review. As discussed in the introduction of this Notice, carbaryl became a candidate for the RPAR process because a laboratory study (Smalley, 1968) found carbaryl to be teratogenic when administered to low doses to pregnant beagle dogs. A subsequent study (Imming et al., 1969) in beagle dogs also reported positive results. In addition, numerous studies have been conducted on diverse other mammalian species including the mouse, rat, gerbil, hamster, guinea pig, rabbit, swine, sheep, and monkey. All of the studies are not of equal utility, however, for purposes of assessing the potential of carbaryl to act as a perinatal toxicant in the environment. A number of the studies were done with inappropriate

protocols, and some of the older American studies, as well as many of the foreign papers, are seriously flawed by inadequate presentation of data. The Agency has therefore chosen to base its conclusions concerning the potential teratogenic and fetotoxic risk from carbaryl exposure on the weight of evidence of those studies which are valid and interpretable.

Based on an assessment of the weight of currently available evidence, two general conclusions may be drawn concerning the potential of carbaryl to affect mammalian development. The first is that the administration of carbaryl to pregnant animals (at sufficiently high dose levels and/or sufficient duration of treatment) may result in adverse effects to the embryo or fetus. Of those studies from which definite conclusions may be drawn, carbaryl has been shown to produce terta in the guinea pig, rabbit, and dog; and fetoxicity in the mouse, rat, and gerbil. The second conclusion which may be arrived at is that these effects have generally occurred at dose levels which are toxic to the maternal animal. Adverse developmental effects have been seen at levels which resulted in maternal death in the guinea pig, cholinergic toxcity in the rabbit, and weight loss in the rat and mouse (the health status of the maternal gerbils was not given in the published study concerning that species). The dog appears to be the only exception to this conclusion, and in this species the treated females had difficulty giving birth, a possible sign of carbaryl-induced maternal toxicity. In the Agency's judgment, the quality of the studies by Smalley et al., and Imming et al., which were conducted more than a decade ago, does not meet current scientific standards. Insufficient numbers of animals were included in the dose groups, and insufficient attention was paid to the condition of the bitches throughout the period of dosing, and to maternal and fetal blood levels of the compound.

The Agency fully acknowledges that the evaluation of these studies in terms of their applicability to the human population must be done with great care. In assessing the totality of the experiments, the Agency recongnizes that carbaryl has been tested in an extremely wide variety of species and has been found to be teratogenic only in three species (guinea pig, rabbit, and dog), of which defects were found in only one species (the dog) at doses below those causing maternal toxicity. In view of the circumstance that there are adequate prenatal studies in eight species, it would appear that carbaryl is not a potent teratogen. This same close dose relationship exists between maternal toxicity and forms of adverse fetal effects other than teratogenicity.

In judging the relevance of embryonic fetal effects which are "confounded" by gross maternal toxicity, several factors must be kept in mind. In an experiment where significant differences are seen between control and treated groups, these differences are by definition attributable to treatment. If adverse perinatal effects are found in carbaryl-treated litters, the cause of these effects is understood to be carbaryl. Even if these effects are seen only in litters of mothers who were themselves adversely affected by the carbaryl treatment, we must still conclude that carbaryl is the cause of the developmental effects.

When the Agency begins to consider the relevance of such studies to the human population, however, other factors must be taken into account. Foremost are possible mechanisms by which the effect in the developing organism was obtained. If, for instance, a compound is administered which affects the maternal animal's desire to eat, the mother may lose weight and be unable to provide sufficient nourishment to either the fetal or neonatal animal. A study such as this raises the question, however, whether any type of food restriction would have resulted in the same effect. If this is the case, the primary effect would be the food restriction, and the mechanism for producing it would become almost incidental. In the study by Robens (1968), for example, carbaryl produced terata in guinea pigs at doses which resulted in 40% maternal mortality. While carbaryl was by definition the teratogenic agent, it is very possible that the actual cause of the terate lies in some part of the general debilitation of the surviving animals. Without a control group which is equally sick it is impossible, however, to distinguish between the unique effects of carbaryl and the effects of the severe maternal toxicity. In all the species tested, with the possible exception of the dog, adverse fetal effects were not seen when there was no maternal toxicity. There is a valid question, therefore, as to whether carbaryl itself has any properties which render it fetotoxic or whether carbaryl, like most pesticides, can cause severe maternal toxicity when administered at sufficiently high doses, and some aspect(s) of this toxicity in turn results in adverse developmental effects.

Another aspect of the relationship of maternal toxicity to adverse fetal effects is the relationship between the effect doses of both types of effects. It is generally felt that a compound which is fetotoxic at much lower dose levels than it is maternotoxic has the potential to be a greater human hazard than one in which the effect levels are similar. The reason for this is that the former case is far more insidious environmentally, since a slight rise in terata or other fetal toxicity is extremely difficult to identify by epidemiological means. Acute health problems in the adult population are easier to identify, and corrective action may be swiftly taken. The relationship between maternal and fetal toxic dose levels clearly approaches equality in most species tested with carbaryl. Even in the case of the dog, some signs of maternal toxicity occurred at doses where terata were noted, indicating that in this species, too, adverse developmental effects were not seen at doses below those which elicited maternal toxicity.

In view of the overall weight of evidence of studies which are valid and interpretable, the Agency has concluded that currently available data on carbaryl do not indicate that a rebuttable presumption on the basis of teratogenic and fetotoxic effects is warranted at this time. In the Agency's judgment, the extremely high doses of carbaryl used to elicit effects in the developing organism, coupled with the positive correlation of maternal and fetal toxicity in the multiple species tested (the dog being a possible exception), indicate that carbaryl would not constitute a potential human teratogenic or reproductive hazard under proper environmental usage.

2. *Mutagenicity.* 40 CFR 162.11(a)(3)(ii)(A) provides that "a rebuttable presumption shall arise if a pesticide's ingredient(s), metabolite(s), or degradation product(s) * * * induces mutagenic effects, as determined by multitest evidence." 40 CFR 162.3(y) defines mutagenicity as "the property of a substance or mixture of substances to induce changes in the genetic complement of either somatic or germinal tissue in subsequent generations."

The Agency has reviewed the extensive data which are currently available on the mutagenicity of carbaryl and conducted an assessment of the mutagenic potential of carbaryl based on the weight of existing evidence. Specifically, the primary objective of a mutagenicity risk assessment is to determine the potential of a chemical to cause heritable germline effects in man (Environmental Protection Agency's Proposed

Guidelines for Mutagenicity Risk Assessments (45 FR 74984–74988). Only mutagenicity as a possible adverse effect of carbaryl per se is at issue in this determination. The possibility of a mutagenic risk posed by formation of N-nitrosocarbaryl in stomach physiology will be addressed in a separate Agency review of nitroso compounds.

In broad summary, carbaryl has been reported to produce gene mutations in bacteria, *Drosophila*, and mammalian cells in culture. However, there are several inadequacies in these studies. In addition, the results of cytogenetic tests imply that carbaryl may induce chromosomal effects in mammalian cells in culture, in whole mammals, and in plants, and carbaryl has been shown to cause primary DNA damage in cultured human cells. Collectively, all of these factors strongly suggest that carbaryl may act as a mutagen. To cause heritable effects in man, however, a chemical with intrinsic mutagenicity must reach the germinal tissue. Evidence that carbaryl and/or its active metabolites reaches the gonads is only suggestive. Gonadal effects in males—e.g., abnormal sperm morphology, reduction in the number of spermatogonia and spermatozoa in the seminiferous tubules, and reduced sperm motility—have been observed in rodents exposed to carbaryl (Degraeve et al., 1976; Shtenberg and Rybakava, 1968; Kitagawa et al., 1977). In addition, abnormal sperm head morphology has been reported in workers with known exposure to carbaryl. Therefore, given the weight of evidence, carbaryl may have the potential to act as a germ cell mutagen. It should be emphasized, however, that carbaryl is not intrinsically a potent mutagen in the reported studies, and probably acts as a weak mutagen only.

a. *Evidence Concerning Point (Gene) Mutations—Bacteria.* Originally, McCann et al. (1975) classified carbaryl as nonmutagenic in the *Salmonella*/microsome assay using four histidine-requiring strains. Metabolic activation did not augment the mutation frequency. Later, however, McCann and associates re-examined their data and conducted additional experiments at different concentrations of carbaryl to detect reversion at the histidine locus of *Salmonella typhimurium* TA 1535 (base-pair substitution sensitive strain). In the absence of metabolic activation they found that carbaryl appears to be weakly mutagenic.

The mutagenicity of carbaryl was also evaluated by Rashid (1978), employing five strains of *Salmonella typhimurium*. Rashid found that carbaryl produced a weak positive response only in strain TA 1535 (missense) in the absence of metabolic activation. The presence of rat liver (S–9) microsomal enzymes did not increase the reversion frequency. Cook (1977 [abstract]) observed weak mutagenic activity (2-fold increase) on another base-pair substitution sensitive strain TA 100 in the absence of metabolic activation. Egert and Greim (1976) reported positive mutagenic activity using the *Salmonella typhimurium* strain sensitive to frameshift mutagens TA 1538, with metabolic activation.

In contrast, several investigators have reported negative responses with carbaryl using the *Salmonella*/Ames test (Marshall et al., 1976; Shirasu et al., 1976; DeLorenzo et al., 1976; Blevins et al., 1977). Other bacterial tests in which carbaryl has been reported as negative include back mutations in *Bacillus subtilis* (DeGiovanni-Donnelly et al., 1976), forward mutations in *Haemophilus influenzae*, (Elespuru et al., 1974) and back and forward mutations in *Escherichia coli* (Ashwood-Smith et al., 1972; Egert and Greim, 1976; Fahrig, 1974; Ficsor and Ni Lo Piccolo, 1972; Nagy et al., 1975; Shirasu, et al., 1976).

b. *Evidence Concerning Point Mutations—Mammalian Cells in Culture.* Ahmed et al. (1977) found approximately a 9-fold increase in the number of ouabain-resistant (OUA^R) mutants over spontaneous mutants after V79 Chinese hamster cells were treated in monolayer with 10 uM of carbaryl (66% cell survival). These OUA^R mutants were reported to be phenotypically stable. Although carbaryl was found to be weakly mutagenic in this gene mutation assay, several inadequacies are apparent in this report which reduce the weight of the positive result: e.g., (1) a concentration-related increase in mutation frequency was not demonstrated, (2) concurrent positive controls were omitted, and (3) data were not presented to support the statement of phenotypic stability of the ouabain-resistant phenotype.

c. *Evidence Concerning Point Mutations—Drosophila: Sex-linked Recessive Lethal Test.* Brezheskii (1972) exposed *Drosophila melanogaster* males to a 1% suspension of "Sevin" (85% carbaryl) in dilute sugar for 24 hours (50% survival). Brezheskii reported a small increase in the percentage of complete (heritable mutations) and partial (not all mutations transmitted to progeny) recessive lethals (0.02%) as compared to control values.

d. *Evidence Concerning Primary DNA Damage.* Ahmed et al. (1977b) have shown that exposure of virally transformed human cells (VA–4) in culture to carbaryl initiates unscheduled DNA synthesis at exposure as low as 1 uM as determined (1) by autoradiography and (2) by photolysis of bromodeoxyuridine (BrdUrd), which is incorporated into DNA during DNA repair synthesis. Metabolic activation by liver microsomes did not enhance carbaryl's ability to induce unscheduled DNA synthesis. The cytotoxicity of the carbaryl doses used was not given in this report.

Regan et al. (1976) treated a culture of human skin cells with 100 uM of carbaryl for 1 hour and found no evidence of DNA damage. The technique employed, however, was not the same as that used by Ahmed et al. (1977b). Regan et al. (1976) determined the sedimentation profiles in alkaline sucrose gradients of cellular DNA treated with carbaryl as a detection method for DNA damage. This method of detection, however, may not be as sensitive as the (BrdUrd) photolysis method.

Siebert and Eisenbrand (1974) used a diploid strain of *Saccharomyces cerevisiae* D4 heteroallelic at the gene loci *ade*-2 and *try*-5 to assay for the ability of carbaryl to induce mitotic gene conversion in these loci. This is another assay that detects damage to DNA. In this organism, genetic activity (genetic damage) was not produced by a 16-hour carbaryl (1000 ppm) treatment. Yeast cells cultured in this solution showed only a 22% lethality.

e. *Evidence Concerning Chromosome Effects.* Several cytogenetic studies have shown that carbaryl can cause chromosome abnormalities (colchicine mitosis, chromosome lagging, chromosome fragmentation, multipolar anaphases, anaphase bridges, multinucleated cells) in both meiotic and mitotic chromosomes of plants (Wuu and Grant, 1966; Amer, 1965; Amer et al., 1971; Amer and Farah, 1968; Brankovan, 1972). Although carbaryl is capable of breaking chromosomes in plants, predominantly it causes mitotic disturbances by interfering with the spindle mechanism. This may result in chromosome loss and/or gain. Russian studies provide suggestive evidence that carbaryl may also act as an antimitotic agent in human cells in culture and in rats (Shpirt, 1975; Kazarnovskaya and Vasilos, 1977; Vasilos et al., 1972, 1975).

In addition, Ishidate and Odashima (1977) studied the effects of carbaryl on chromosomes of cultured Chinese hamster fibroblasts. Three different doses (0.0075, 0.015, 0.03 mg/ml) were added to cell cultures. At the maximum effective dose, 0.03 mg/ml (50% growth inhibition dose), several types of

chromosome aberrations (35% aberrant cells) were reported 48 hours after treatment. Specifically, chromatid gaps and breaks, chromosome breaks, translocation, ring formation, and fragmentation were observed with a higher frequency than in non-treated control cultures (1% aberrant cells). Although the authors stated the "gaps" were the predominant chromosomal effect, the frequency of occurrence for each particular type of aberration and the frequency of aberrations within a cell were not given. At lower doses, 0.015 mg/ml resulted in 24% aberrant cells, and 0.0075 did not appreciably affect chromosome structure (1% aberrant cells). The authors did not give the toxicity of these doses.

The dominant lethal assay in rodents, which detects chromosome damage in germ cells, was used both by Epstein et al. (1972) and by Weil et al. (1973). Using male mice, Epstein et al. (1972) administered 1000 mg/kg and 50 mg/kg (subtoxic doses) of carbaryl by gavage in daily portions over five consecutive days. Reportedly, this dosage schedule did not produce significant early fetal deaths or preimplementation losses. However, data were not presented in this report to support this statement. Weil et al. (1973) looked for dominant lethality in rats using a 3-generation study and found no significant lethal effects. The authors do not state if the carbaryl dosage level was the maximum tolerated dose. Furthermore, the number of males treated, the number of virgin untreated females mated with each treated male, and the number of implant and fetal deaths per female of test or control groups are not given in this report.

f. *Evidence as to Whether Carbaryl Reaches the Germinal Tissue.* In order for any mutagen to cause genetic alterations that may be inherited by future generations, it must reach the gonads. Numerous inadequacies are apparent in the available reports concerning the potential of carbaryl to reach the mammalian gonads, and the evidence is considered suggestive rather than conclusive.

Two epidemiological studies of gonadal effects in carbaryl-exposed males have been reviewed by the Agency. Wyrobek et al. (1980) analyzed semen samples from 50 carbaryl production workers who had spent at least one year on the job, using semen from thirty-four new hires for control purposes. A significant elevation of sperm abnormalities (abnormal head morphology) in currently exposed workers as compared to controls was observed. However, previously exposed workers (an average of 6.5 years since last carbaryl exposure) did not exhibit a significant elevation of sperm abnormalities from control values. Because of the small sample size, however, it cannot be established if carbaryl effects are reversible. Although this study reports a statistical correlation between working in a carbaryl-exposed area and an alteration of human spermatozoa, it is not clear that carbaryl is the causative link since these workers were exposed to pesticides other than carbaryl. The Agency has serious doubts about the validity of this study in view of the generally weak methodology employed. A small number of employees was observed, no longitudinal follow-up (multiple sampling with the same workers) was carried out, study results were in all likelihood confounded by the effects of aging in view of the difference in mean age between new-hire controls (24 years) and exposed subjects (39 years), and those workers who were subject to the longest durations of exposure exhibited lesser sperm morphology effects. In an earlier epidemiological study performed with workers at the same plant studied by Wyrobek et al. (1980), Whorton and Milby (1978) examined semen samples provided by 47 workers. The results of the semen counts were compared to semen counts obtained from 90 members of a composite (off-site) control population. A higher percentage of the carbaryl-exposed workers (14.9%) showed depressed sperm counts (less than 20 million per ml) than did the control group (5.5%), but the difference is not considered statistically significant ($p=0.0686$). Reproductive hormone levels in the carbaryl-exposed workers were normal.

In addition to the epidemiological studies cited above, the Agency has reviewed a number of gonadal studies in rodents, though most of these reports are flawed in terms of the rigor of the experiments performed, or by inadequate presentation of data. The following studies reported adverse gonadal effects: Krylova and Denisova (1973), [Russian study]), Kitagawa et al. (1977), Degraeve et al. (1976), Thomas et al. (1974), and Shtenberg and Rybakova (1968). In contrast, some investigators have reported no significant gonadal effects attributable to carbaryl: Dikshith et al. (1976) and Weil et al. (1973).

Due to the weak mutagenic responses which have been measured, and due to the suggestive rather than conclusive nature of the evidence available as to the potential of carbaryl to reach the germinal tissue, the Agency has determined that the weight of evidence does not constitute a basis on which to conclude that carbaryl poses a mutagenic risk. The Agency has therefore determined that a rebuttable presumption against carbaryl on the basis of mutagenic effects is not warranted at this time.

3. *Oncogenic Effects.* 40 CFR 362.11(a)(3)(i)(A) provides that a rebuttable presumption shall arise if a pesticide's ingredient(s), metabolite(s), or degradation product(s) induce(s) "oncogenic effects in experimental mammalian species or in man as a result of oral, inhalation or dermal exposure." The term "oncogenic" is defined in 40 CFR 162.3(bb) as "the property of a substance or mixture of substances to produce benign or malignant tumor formation in living anaimals." To determine whether or not carbaryl might pose an oncogenic hazard warranting a rebuttable presumption, the Agency has conducted a review of the available literature. Only oncogenicity as a possible adverse effect of carbaryl per se is at issue in this determination. The possibility of an oncogenic risk posed by formation of N-nitrosocarbaryl in the stomach will be addressed in a separate Agency review of nitroso compounds.

Innes et al. (1969) administered 4.64 mg/kg carbaryl in 0.5% gelatin daily by stomach tube to mice, beginning at 7 days of age and continuing until mice were 6 weeks old. (Carbaryl dosage was not adjusted according to weight gain during the 6-week period.) Vehicle groups and untreated control groups consisted of 18 animals each. Subsequently, the vehicle groups were fed a diet containing 14 ppm carbaryl, and the experiment was terminated when the mice were approximately 78 weeks of age. Treated mice showed no significant increase in the incidence of tumors over controls. It should be pointed out, however, that the 14 ppm dietary dosage of carbaryl was probably too low to be a firm indicator of no oncogenic potential. In a parallel experiment, Innes et al. (1969) administered a single subcutaneous dose of 100 mg carbaryl/kg in DMSO to weanling mice. Tumor incidence in treated animals was not significantly increased.

In a study conducted by the Mellon Institute (1963), groups of 48 male and 48 female CD-1 mice were fed diets containing 0.04%, 0.01%, and 0% carbaryl. Seventy-two of the 288 animals included in the study were given gross and histopathological examination. Of the other 216 animals, those which died during the initial 80-week period (50%) were subjected to gross examination.

and tissues suspected of having pathology were examined histologically. Of the 65 animals allowed to live for 2 years, 9 males and 21 females were sacrificed at the end of the period, and no information was given on the remaining animals. No significant difference in tumor incidence between treated and untreated animals was observed in those mice sacrificed after 80 weeks, those which died during the 80 week period, or those sacrificed at the end of 2 years. Because this study is very seriously flawed, however, it cannot stand as a basis for any determination for or against the carcinogenic potential of carbaryl. Among numerous drawbacks, the most serious problems are (1) that no information is available concerning 93 of the 288 animals with which the experiment began, and (2) that for animals dying during the study, histopathology was carried out only on animals suspected of tumor growth and not on all animals.

In another experiment conducted by the Mellon Institute (1962), a mixture of 40 parts Sevin 85 sprayable powder (85% carbaryl) and 60 parts water was applied (schedule of application unspecified) on the skin of 36 mice for 30 months. None of the animals developed tumors. In the same experiment, methylcholanthrene (0.2% solution in acetone) was applied to a group of 32 animals. All animals in this group developed tumors by the end of 12 months. Details concerning pathology and experimental procedure were not available for review, however.

Makovskaia et al. (1965) administered weekly doses of carbaryl (60 mg/kg in a 2% solution in sunflower oil) intraperitoneally to groups of line A and C_3HA mice. The experiment included 400 carbaryl-treated animals, 150 animals treated with urethane (200 to 1000 mg/kg intraperitoneally) as a positive control group and 100 animals in the untreated control group. Animals were sacrificed at 1, 3, 5, 9, 12, 15, 18, and 24 months after the test began, and several organs (lungs, kidneys, liver, heart, spleen, pancreas, thyroid, and adrenals) were reportedly examined histopathologically. Makovskaia et al. reported that "carbaryl treatment did not produce any new growth in lungs or liver," but their report failed to provide experimental details necessary for evaluation. No conclusion concerning the carcinogenic potential of carbaryl can be drawn from this study.

Carpenter et al. (1961) maintained groups of male and female CF–N rats on a mixture of Purina Chow and carbryl (in concentrations of 0.04%, 0.02%, 0.01%, 0.005%, and 0.00%) for two years. Rats were 60 days old when the experiment began, and 20 rats were included in each group. Sixty-one of the 102 animals which died during the study, and 98 animals sacrificed at the end of the study, were examined histopathologically. Although female rats were found to have more pituitary tumors relative to males, no significant increase in tumors was found in treated groups relative to controls. The validity of Carpenter et al. is compromised, however, in that the study began not with newborn or weanling rats but with 60-day-old animals. Because they are known to be more sensitive to chemical carcinogenesis than are adults, newborn or weanling animals are preferred for purposes of cancer bioassays (CAG, 1977).

An an experiment conducted by Andrianova and Alekseev, a group of 60 adult male rats (mongrels) was given 30 mg/kg carbaryl orally (as a water suspension) twice weekly by gavage for 22 months. This dose was approximately one-twentieth of the LD_{50} dose. Tumors, as well as organs suspected of having tumors, were examined histopathologically. Out of 12 rats alive in the treated group at the end of the experiment, four animals were found to have malignant tumors (sarcomas). In another experiment, Androanova and Alekseev (1970) introduced 20 mg of carbaryl (enclosed in a purified paraffin capsule weighing 250 mg) hypodermically in a group of 48 male rats. Tumors were discovered in 2 out of 10 rats that survived 22 months. In both animals, tumors (diagnosed as fibrosarcoma) were observed under the skin near the back, not near the site of the implant. Whether or not controls were similarly implanted with gelatin capsules without the chemical was unclear. Andrianova and Alekseev used a group of 48 untreated rats as controls for both these experiments. Among controls, one fibrosarcoma was discovered after 11 months, at which time 46 of the original controls remained alive. The number of controls surviving the full 22 months of the experiment was not given.

In a study performed by Shimkin et al. (1969), the carcinogenic potential of carbaryl was tested with the pulmonary tumor response in male A/He mice, 7 to 9 weeks old. Carbaryl was prepared by reacting its chloroformate with ammonia. The dosing vehicle was 99.9% pure tricaprylin. Intraperitoneal injections of 20 mg carbaryl/kg were made 3 times weekly for 4 weeks. The mice were sacrificed at 20 weeks after the final injection. Necropsies were performed, and lungs were examined microscopically. Untreated and vehicle-treated control animals were similarly maintained and evaluated. Fifteen of an original 16 carbaryl-treated animals survived to 20 weeks. Upon sacrifice and examination, one lung tumor was found in each of 4 animals, and 2 lung tumors were found in each of 2 animals. Twenty-eight of an original 32 vehicle control animals survived to be sacrificed. Upon examination, 1 lung tumor was found in each of 6 animals, and 1 animal had 2 tumors. Thirty-one of an original 32 untreated control animals survived to be sacrificed. Upon examination, 1 lung tumor was found in each of 2 animals. The number of lung tumors per mouse in the carbaryl-treated, vehicle control, and untreated control groups was, respectively, 0.7, 0.3, and 0.1.

The tumor incidence observed by Shimkin et al. in carbaryl-treated mice (40%), was slightly higher than in the vehicle control group (25%). However, this difference is not statistically significant. Moreover, Shimkin et al. in fact state that a slightly higher tumor incidence in vehicle-control mice (used as the standard comparison group in the above calculation) over untreated control mice is commonly observed in this strain. In the Agency's judgment, no conclusion about the potential human carcinogenicity of carbaryl can be made from this test.

A study has been reported by A. J. Triolo (1978) in a U.S. EPA document, which attempted to evaluate the ability of carbaryl to enhance the incidence of forestomach tomors in Ha/ICR female mice and lung tumors in A/J female mice treated with benzo(a)pyrene (BP). Dietary levels of carbaryl up to 2000 ppm did not increase the incidence of forestomach tumors in mice treated with 300 ppm benzo(a)pyrene in the diet for 12 weeks. In A/J mice given 3 mg benzo(a)pyrene *per os* on days 7 and 21, 1000 ppm carbaryl in the diet produced a statistically significant ($P<0.05$) increase in lung tumor incidence (18/18) as compared to the BP-treated control (15/17). This increase is slight, however, and in a repeat experiment the incidence in the carbaryl-BP group (16/34) was similar to that in the BP group (16/31). The A/J mice were on study for 20 and 16 weeks, respectively, in these experiments. The Agency's conclusion with respect to this study is that a co-carcinogenic effect has not been conclusively demonstrated.

Based on the weight of evidence of available studies on carbaryl the Agency has concluded that a rebuttable

presumption on the basis of oncogenic effects is not warranted a this time.

4. *Neurotoxicity.* As stipulated in 40 CFR 162.11(a)(3)(ii)(B), "a rebuttable presumption shall arise if a pesticide's ingredient(s), metabolite(s), or degradation product(s) * * * produces any other chronic or delayed toxic effect in test animals at any dosdage up to a level, as determined by the Administrator, which is substantially higher than that to which humans can reasonably be anticipated to be exposed, taking into account ample margins of safety."

Three available studies concerning the neurotoxicity of carbaryl have been reviewed by the Agency. To test the neuromuscular degenerative potential of carbaryl as compared with that of triorthocresyl phosphate (TOCP), Carpenter et al. (1961) administered single subcutaneous injections (concentrations of 25% to 40% in lard) to 2-year-old moulting Rhode Island Red hens (13 and 10 hens, respectively). In addition, undiluted TOCP was given to one chicken, and undiluted lard was given to two others. Five control chickens received no injections. No adverse effects were observed at 1.0 g/kg or lower doses of carbaryl. Chickens administered 2.0 g/kg carbaryl showed leg weakness on the first or second day following dosing, and in only one case was the chicken nonambulant for 3 days. A nephrotoxic action was also observed in fowl which received 2.0 g/kg or larger injections of carbaryl. Necrosis was not present. In hens which received 3.0 g/kg carbaryl, leisions were observed. Such lesions were found at all levels in hens examined after injection with TOCP, with the anomalous exception of the 2.0 g/kg dosage. Likewise at all dosage levels tested, animals injected with TOCP showed fatty deposition of a similar though more diffuse nature to that observed in fowl administered 2.0 g/kg or larger doses of carbaryl. At 3.0 g/kg, TOCP proved lethal in 3 to 10 days, with leg weaknesses observed in 3 of 4 cases only on the day of death. At all lower dosage levels, weakness was not apparent until the thirteen or fourteenth day. Upon histopathological examination, slight evidence of demyelination was observed in three of the 10 TOCP-treated hens, whereas carbaryl-treated hens showed no signs of demyelination.

In screening tests for the production of paralytic effect in chicken hens, Gaines (1969) tested 30 organic phosphorous pesticides and 9 carbamate pesticides including carbaryl. Gaines (1969) administered carbarly subcutaneously to hens at doses of 800 and 1600 mg/kg and observed them for 24 days. Prior to carbaryl treatment, the hens were treated with 15 mg/kg of atropine orally. The hens treated with 1600 mg/kg dose of carbarly showed leg weakness within 24 hours, but all chickens recovered by day 24. The TOCP-treated animals developed paralysis after 14 days, and the paralysis continued until death.

Smalley et al. (1969) administered carbaryl at a dose of 150 mg daily for 72 and 83 days to one male pig and one female pig, respectively. In a second experiment, one female and two males given 150 mg/kg of carbaryl for 28 days, followed by 300 mg/kg/day for either 18 (males) or 57 (females) additional days. Ataxia was observed in both experiments. Microscopic examination of skeletal muscle showed myodegeneration. The author reported that hydrochlorothiazide, a diuretic, reversed the signs of toxicity of carbaryl administration in chronic testing of pigs.

Based on this currently available evidence, the Agency has concluded that carbaryl does not pose a neurotoxic hazard and that a rebuttable presumption on the basis of neurotoxicity is not warranted at this time.

5. *Viral Enhancement.* A recent study (Abrahamsen and Jerkofsky, 1980) which has come to the Agency's attention concerns viral enhancement as a possible adverse effect of human exposure to carbaryl. Abrahamsen and Jerkofsky investigated the effect of Sevin 4 oil on the replication of the human herpes virus varicella-zoster (VZ) in primary human embryonic lung (HEL) and HEP-2 cell cultures. Complete Sevin 4 oil, its active ingredient (analytic grade carbaryl) and its "base oil plus inert ingredients" in sub-toxic concentrations, were tested for the ability to enhace the growth of VZ virus as measured by an infectious center assay. A 12- to 15-fold increase in virus production by cells pretreated with Sevin 4 oil and carbaryl was observed. No enhancement was observed in base oil-treated cultures. Similar results were obtained when HEP-2 cells were used. Viral enhancement appeared to be concentration-related in that decreasing concentrations of carbaryl brought decreases in viral enhancement. Experiments with herpes simplex virus type 1, however, showed no viral enhancement by sevin 4 oil of any of its components. Abrahamsen and Jerkofsky suggest that the results of their work may be pertinent to studies of Reye's syndrome "since published epidemiological evidence has suggested a possible relationship between pesticide spraying, certain viral diseases including chickenpox or varicella, and the subsequent occurrence of Reye's syndrome" (Abrahamsen and Jerkofsky, 1980 [abstract]).

With regard to viral enhancement as a possible adverse effect of exposure to carbaryl, the Agency's determination at this juncture is that the work of Abrahamsen and Jerkofsky is preliminary in nature and that current data do not constitute a basis on which to conclude that carbaryl poses a human hazard in terms of viral enhancement. The Agency has therefore concluded that a rebuttable presumption is not warranted at this time.

B. Regulatory Determinations

As discussed in the preceding sections, the Agency has considered all available information on the human risks posed by the use of carbaryl and has concluded that the overall weight of evidence does not raise prudent concerns of unreasonable adverse risk. Consequently, the Agency has determined that the issuance of a rebuttable presumption against registration for carbaryl is not warranted at this time. Accordingly the Agency has determined to return carbaryl to the registration process. The reasons which form the basis for this determination are set forth in further detail in a separate Decision Document. Should further review of data call these determinations into question, the Agency will re-evaluate its conclusions and, if warranted, initiate an RPAR proceeding or take other appropriate regulatory actions.

C. Other Determinations

While the Agency has determined not to proceed with an RPAR action at this time, the Agency will pursue the courses of action outside the RPAR process to remedy data limitations and to ensure that exposure to carbaryl is held to reasonable levels.

During the review of carbaryl to determine if the available data indicated that the pesticide met or exceeded the RPAR risk criteria, the Agency discovered limitations in the data pertaining to the possible toxic effects of carbaryl. The Agency has therefore determined that it will request additional data, under the authority of Sec. 3(c)(2)(B) of FIFRA, to maintain the registrations of carbaryl products in effect. The request for this data is independent of the Agency's determination not to initiate a rebuttable presumption against registration for carbaryl pesticide products. The data requirements imposed by the Agency pursuant to Sec.

3(c)(2)(B) will be formally communicated to the registrants in the near future. In addition, negotiations between the Agency and registrants will be initiated regarding appropriate label changes to ensure that exposure to carbaryl is held to reasonable levels.

IV. Procedural Matters

In accordance with the determinations announced in unit III of this Notice, the Agency will not initiate a rebuttable presumption against registration for pesticide products containing carbaryl at this time, but will return carbaryl to the registration process. Copies of this Notice and the separate Decision Document will also be transmitted to the affected registrants and applicants. Other interested persons may obtain a copy of the Decision Document by contacting Juanita Wills at the address or telephone number given in this Notice.

Upon receipt of the 3(c)(2)(B) data, and any other data which provide information about the potential of carbaryl to produce adverse effects in man and the environment, the Agency will review the carbaryl data base to determine if the initiation of an RPAR proceeding, or other appropriate regulatory action, is warranted.

Dated: December 14, 1980.

Edwin L. Johnson,

Deputy Assistant Administrator for Pesticide Programs.

[FR Doc. 80-38577 Filed 12-11-80; 8:45 am]

BILLING CODE 6560-32-M

[EN-FRL 1699-4]

Approval of Georgia's NPDES Program To Regulate Federal Facilities

AGENCY: Environmental Protection Agency.

ACTION: Notice of approval of the State of Georgia's request for authority to administer the national pollutant discharge elimination system (NPDES) program with respect to Federal facilities.

SUMMARY: On December 8, 1980, the Environmental Protection Agency (EPA) approved the State of Georgia's request to include regulation of Federal facilities under their State water pollution permit program. Previously the State had been approved to participate in the NPDES program.

FOR FURTHER INFORMATION CONTACT: Joel Blumstein, Permits Division (EN-336), U.S. Environmental Protection Agency, 401 M Street, S.W., Washington, D.C. 20460, 202-426-4793.

SUPPLEMENTARY INFORMATION: In 1977 Congress amended section 313 of the Clean Water Act (33 U.S.C. 1251, et seq.) to authorize States to regulate Federally owned or operated facilities under their water pollution control programs. Prior to the amendment, States, including those authorized pursuant to section 402(b) of the Clean Water Act to participate in the NPDES program, were precluded from regulating Federal facilities. Therefore, EPA in approving State programs under section 402(b) reserved the authority to issue NPDES permits to Federal facilities.

With the passage of the 1977 amendments, EPA has been transferring NPDES authority over Federal facilities to approved States. Today's Federal Register notice is to announce the approval of the State of Georgia's request to assume NPDES authority over Federal facilities.

Also included in this notice is a list of approved NPDES States indicating which have been granted Federal facilities and pretreatment authority.

	Approved State NPDES permit program	Approved to regulate Federal facilities	Approved State pretreatment program
Alabama	10/19/79	10/19/79	10/19/79
California	05/14/73	05/05/78	
Colorado	03/27/75		
Connecticut	09/26/73		
Delaware	04/01/74		
Georgia	06/28/74	12/8/80	
Hawaii	11/28/74	06/01/79	
Illinois	10/23/77	09/20/79	
Indiana	01/01/75	12/09/78	
Iowa	09/10/78	09/10/78	
Kansas	06/28/74		
Maryland	09/05/74		
Michigan	10/17/73	12/09/78	
Minnesota	06/30/74	12/09/78	07/16/79
Mississippi	05/01/74		
Missouri	10/30/74	09/26/79	
Montana	06/10/74		
Nebraska	06/12/74	11/02/79	
Nevada	09/19/75	09/31/78	
New York	10/28/75	06/13/80	
North Carolina	10/19/75		
North Dakota	06/13/75		
Ohio	03/11/74		
Oregon	09/26/73	03/02/79	
Pennsylvania	06/30/78	06/30/78	
South Carolina	06/10/75	09/26/80	
Tennessee	12/28/77		
Vermont	03/11/74		
Virgin Islands	06/30/76		
Virginia	09/31/75		
Washington	11/14/73		
Wisconsin	02/04/74	11/26/79	
Wyoming	01/30/75		

Dated: December 8, 1980.

Jeffrey G. Miller,

Acting Assistant Administrator for Enforcement.

[FR Doc. 80-38561 Filed 12-11-80; 8:45 am]

BILLING CODE 6560-32-M

[OPTS-51190; SH-FRL 1700-3]

Butanenitrile, 2-Methyl, 2-Amino; Premanufacture Notice

AGENCY: Environmental Protection Agency (EPA).

ACTION: Notice.

SUMMARY: Section 5(a)(1) of the Toxic Substances Control Act (TSCA) requires any person who intends to manufacture or import a new chemical substance to submit a premanufacture notice (PMN) to EPA at least 90 days before manufacture or import commences. Section 5(d)(2) requires EPA to publish in the Federal Register certain information about each PMN within 5 working days after receipt. This Notice announces receipt of a PMN and provides a summary.

DATE: Written comments by January 12, 1981.

ADDRESS: Written comments to: Document Control Officer (TS-793), Management Support Division, Office of Pesticides and Toxic Substances, Environmental Protection Agency, Rm. E-447, 401 M St., SW., Washington, D.C. 20460. (202-755-8050).

FOR FURTHER INFORMATION CONTACT: David Dull, Chemical Control Division (TS-794), Office of Pesticides and Toxic Substances, Environmental Protection Agency, Rm. E-206, 401 M St., SW., Washington, D.C. 20460, (202-426-2601).

SUPPLEMENTARY INFORMATION: Section 5(a)(1) of TSCA (90 Stat. 2012 (15 U.S.C. 2604)), requires any person who intends to manufacture or import a new chemical substance to submit a PMN to EPA at least 90 days before manufacture or import commences. A "new" chemical substance is any substance that is not on the Inventory of existing substances compiled by EPA under section 8(b) of TSCA. EPA first published the Initial Inventory on June 1, 1979. Notices of availability of the Inventory were published in the Federal Register of May 15, 1979 (44 FR 28558-Initial) and July 29, 1980 (45 FR 50544-Revised). The requirement to submit a PMN for new chemical substances manufactured or imported for commercial purposes became effective on July 1, 1979.

EPA has proposed premanufacture notification rules and forms in the Federal Register issues on January 10, 1979 (44 FR 2242) and October 16, 1979 (44 FR 59764). These regulations, however, are not yet in effect. Interested persons should consult the Agency's Interim Policy published in the Federal Register of May 15, 1979 (44 FR 28564) for guidance concerning premanufacture notification requirements prior to the

EPA has been asked to respond to concerns many have about possible exposure to the pesticide carbaryl through the gypsy moth spray program.

To put EPA's role in such programs in the proper perspective, the Agency is responsible under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) for conducting pre-market reviews of the health and safety of pesticides before they can be registered for use. This involves weighing the risks of using a pesticide against its economic and social benefits. If, at any time after a pesticide is registered, new evidence casts doubt on its safety, EPA is authorized to conduct further risk/benefit evaluations to see if regulatory measures to reduce any unreasonable risks should be initiated.

Carbaryl has been registered as a pesticide since 1959 and has been widely used to suppress gypsy moth infestations in the northeastern part of the country over the past years. However, its use was called into question after two studies found that the chemical produced adverse prenatal effects (birth defects) when administered in low doses to pregnant beagle dogs. This has led to numerous additional tests on carbaryl to assess its effects (primarily reproductive) on diverse mammalian species. Because of the human health implications of these studies, and because carbaryl is a widely used insecticide, EPA initiated an intensive review of the available toxicological evidence on carbaryl in the late 70's.

In the course of this review the Agency evaluated a significant number of studies on carbaryl. (In fact, the data base on this chemical is extraordinarily extensive, much larger than for most other chemicals reviewed by the Agency.) In addition to studies on the prenatal effects of carbaryl, we reviewed studies on its gene mutation effects, its potential for tumor induction, and a possible relationship between exposure and certain viral diseases.

In assessing the large body of prenatal studies conducted with various animals, Agency scientists found that carbaryl did not consistently induce adverse effects in mammalian fetuses. Ten species were tested, and in many instances several tests had been done with each specie. Physical and/or function defects were identified in some of the offspring of three species (the dog, guinea pig, and rabbit). With the possible exception of the dog, however, these offspring were affected only at dose

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levels high enough to be grossly toxic to the mother as well. In addition to the scattered nature of the effects observed, this is a crucial consideration. In our scientists' view, a compound which can cause adverse effects in a fetus without affecting the health of the mother in any visible way represents a far greater hazard than one which would not affect the fetus unless the mother has suffered acute toxic poisoning.

Another relevant study assessing reproductive effects was a recent epidemiological study conducted by the New Jersey Department of Health which compared the rate of birth defects in several areas treated with carbaryl to similar untreated communities. No link between carbaryl spraying and the rate of birth defects was indicated in that study. Based on these results, then, we found that carbaryl has little potential for causing adverse reproductive effects. The remaining available data did not demonstrate a relationship between carbaryl exposure and any other of the adverse effects mentioned above.

Thus, the Agency concluded that the overall weight of the current evidence demonstrated that the benefits of carbaryl use outweigh the risks and that regulatory action to reduce further human exposure was not warranted. In the Agency's judgment, the extremely high doses of carbaryl used to elicit effects in the developing organism, coupled with the positive correlation of maternal and fetal toxicity in the multiple species tested (the dog being the possible exception), indicate that carbaryl would not constitue a potential human teratogenic or reproductive hazard under proper environmental usage. The Scientific Advisory Panel (an independent panel of scientists created by law to serve as a checkpoint on the scientific bases of pesticide decisionmaking) agreed with this conclusion. In December 1980 the Agency issued a Decision Document describing these findings.

There are also pesticides other than carbaryl which are registered for gypsy moth control. In addition to the chemical insecticides dylox, acephate and diflubenzuron, there are biological alternatives. The most readily available is B.t. (Bacillus thuringiensis), a bacterium which selectively attacks gypsy moth larvae. Although more expensive and slower to act than the chemical controls, some communities in the voluntary control programs have chosen to use it because of its selectivity and extremely low toxicity. Mechanical methods such as tree banding and removing egg masses can also be useful for dealing with small scale infestations.

The cooperative Gypsy Moth Supression and Regulatory Program is carried out by the U.S. Department of Agriculture's Forest Service and Animal and Plant Health Inspection Service in cooperation with State and local governments.. EPA becomes involved in this program when these agencies submit required Environmental Impact Statements (EIS) to EPA for comment each year.

In connection with gypsy moth programs conducted in the East, we have observed that a key element to the success of such programs has been community participation in the program decisionmaking process. Open dialogues among state and local officials, USDA, and the public have served to resolve many uncertainties related to such programs. Citizens have responded positively to playing a vital role in their communities' deliberations on whether treatment is needed and, if so, by what method and at what cost. In other words, when offered the option of making such cost/benefit decisions, localities have been able to achieve reasonable solutions to situations which, absent public input, could be difficult.

In summary, then, carbaryl is a registered pesticide which has been demonstrated not to cause unreasonable adverse effects when used in accordance with commonly recognized practices. We have reviewed the risks and benefits to the fullest extent for carbaryl and also for other registered forest pest controls and believe that in a spray program, so long as registered pesticides are used according to label directions and precautions, there is little likelihood of adverse effects to human health or the environment.

/s/

John A. Todhunter, Ph.D.
Assistant Administrator
for Pesticides
and Toxic Substances

October 29, 1982

525 W. Jefferson

Mr. Bill Anderson
Illinois Department of Agriculture
State Fairgrounds
Springfield, Illinois 62706

Dear Mr. Anderson:

Enclosed for your information is a copy of our final report entitled "Assessment of Human Exposure Associated with the Aerial Application of Carbaryl for the Control of Gypsy Moths". This investigation took place in Lake Zurich, Illinois.

We concluded from the investigation that no adverse health effects occurred as a result of carbaryl exposure. If you have any questions concerning this investigation, feel free to contact me at telephone 217/782-4674.

Very truly yours,

Chris J. Wiant, M.A., M.P.H., Chief
Environmental Chemistry Section

jah/5424X

OCT 2 0 1982

Assessment of Human Exposure Associated with the Aerial Application of Carbaryl for the Control of Gypsy Moths Lake Zurich, Lake County, Illinois

Environmental Chemistry Section
Division of Engineering and Sanitation
Illinois Department of Public Health

This study was performed with cooperation from the U.S. Environmental Protection Agency, Region 5; the Lake County Health Department; the Illinois Department of Agriculture and the Division of Occupational Medicine, Cook County Hospital.

Introduction

In response to the destructive potential of the Gypsy Moth, the Illinois Department of Agriculture (IDA) has instituted a program designed to suppress defoliation in wooded areas of infestation in Illinois. A part of the management program may involve the aerial application of the pesticide carbaryl (Sevin) in oil.

It was determined after study and evaluation by IDA that a portion of the city of Lake Zurich (Lake County) should be treated by aerial application in an effort to control a potentially destructive infestation of Gypsy Moths. The application of Sevin took place at 7:00 a.m. on May 18, 1982. Although notice had been given to residents of the spray area, actual application of the pesticide took place after the time originally scheduled. As a result, several residents reported that they were outdoors during the spraying and suspected that they had been exposed to Sevin. Several individuals expressed concern about various health symptoms experienced around the time of the spraying and about possible long term health effects in residents of the area.

Following the receipt of numerous inquiries about the spraying, US EPA Region V convened a meeting with IDA, the Department of Public Health (IDPH), Lake County Health Department, the Division of Occupational Medicine at Cook County Hospital, the Illinois Attorney General's Office and the University of Illinois School of Public Health. As a result of the meeting, it was determined that IDPH, with consultation from the Division of Occupational Medicine, would design a survey tool and implement an investigation to evaluate health effects that may have been associated with exposure to Sevin. This study was performed beginning July 20. The results of the study are discussed in this report.

Background

Carbaryl is a widely used pesticide which is manufactured in the United States under the trade name "Sevin." It is a member of the carbamate family of insecticides and acts by impairing the nervous system of the target pest through inhibition of the enzyme acetylcholinesterase. The use of carbaryl is quite widespread for two reasons: first, it has a fairly low mammalian oral and dermal toxicity; and second, it is able to control a broad spectrum of the insect population.

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The product is registered as an insecticide/acaricide, as well as a plant regulator used in thinning apples. Carbaryl's major uses include applications to cotton, peanuts, soybeans, field and sweet corn, ornamentals and turf, forest and shade trees, deciduous tree fruits, many other fruit, vegetable, and nut crops, poultry and pests. It is moderately persistent in soil and is metabolized by several species of microbes into 1-naphthol and other metabolites (Carbaryl Decision Document, 1980).

Absorption into the body is through ingestion, inhalation and the skin. It is rapidly metabolized causing a reversible inhibition of acetylcholinesterase at cholinergic neuroeffector junctions, skeletal muscle myoneural junctions and in autonomic ganglia. Signs and symptoms which are commonly associated with exposure to carbaryl include nausea, vomiting, diarrhea, abdominal pain, blurred vision, profuse sweating and salivation. Other common symptoms have been dyspnea, tremors, muscle twitching, ataxia, headache and lacrimation. Severe poisonings may result in respiratory depression, pulmonary edema and convulsions. Illnesses as a result of exposure to carbaryl are usually of short duration with symptoms lasting no more than a few hours. Severe poisonings usually respond well to treatment with atropine and supportive care (Morgan, 1982).

Carbaryl is classified as a "moderately toxic" product within the carbamate family of pesticides. Its acute oral LD_{50} in the rat is greater than 50 mg/kg (Morgan, 1982). Studies have determined that with proper application, the compound does not pose a human health hazard in terms of neurotoxicity or oncogenicity. A review of currently available animal studies have also led to the conclusion that carbaryl does not constitute a potential human teratogenic, mutagenic or reproductive hazard when used properly (Carbaryl Decision Document, 1980).

A preliminary risk assessment was prepared by US EPA based on information obtained regarding the rate of pesticide application. In summary, at one pound per acre of application of carbaryl to control the gypsy moth, the concentration would be 10 mg/ft^2, assuming all the aerially sprayed carbaryl would reach the ground. Assuming that carbaryl would cover two square feet of a person's body, the total amount of carbaryl would be 20 mg. In reality, the amount of carbaryl reaching the ground would be much less; and the amount of skin exposure would be expected to be less than two square feet. Studies have shown that the amount of carbaryl expected to be absorbed into the body would be 12% or 2.4 mg. The maximum level of carbaryl noted in a spray area has been reported to be 0.0003 mg/m^3. Given a respiration rate of 20 m^3/day, the amount of carbaryl inhaled would be insignificant (0.0060 mg). If the 2.4 mg of carbaryl absorbed via the skin is expressed per body weight, and assuming a pregnant woman weighs 110 pounds (50 kilograms), then her dosage would be 0.05 mg per k of body weight. This is approximately 120 times less than the

lowest dosage of carbaryl found, on a daily basis for months, to induce birth defects in beagles. A single accidental exposure to carbaryl would, therefore, not be expected to have a teratogenic or fetotoxic effect on developing fetuses in pregnant mothers. The literature would also suggest that only slight poisoning signs and symptoms could have resulted from exposure to carbaryl at Lake Zurich. Scientifically, it is not possible to rule out an acute or chronic (long-term) effect from exposure to carbaryl at Lake Zurich, but the available evidence and risk assessment does not indicate the likelihood of serious health effects.

Method

The target area for aerial spraying was specifically defined by IDA. It included 180 homes located in the Old Mill Grove area of Lake Zurich. The spray area is outlined on the map attached to this report.

The sample population included all of the homes in the spray area. The twenty-seven homes outside the spray area for which affidavits were received by US EPA were also surveyed. The results of these questionnaires were not added to those in the spray area unless individuals reported that they were in the spray area during the aerial application of pesticide. A survey questionnaire was to be introduced at each household by personal interview. The survey was designed to provide general demographic information about each family and specific health background and exposure data for each individual in the family.

A small control group of 35 homes was also identified in an area upwind (north) from the spraying. Interviewers were provided by the Lake County Health Department and IDPH. They were instructed to make two visits to each home if necessary. If no contact was made after the second visit, a letter was left soliciting cooperation in the survey. Questionnaires were also left for completion and return by mail if the resident desired.

For analysis of the results, each individual that participated was defined in an exposure group and determined to be a confirmed, possible or unlikely case based on the signs and symptoms reported.

Exposure groups were identified as follows:

High Exposure

1. Outside during spraying with skin contact or ate unwashed fruits or vegetables from a garden in the spray area within 1 month after spraying;

Low Exposure

Inside during spraying in the spray area; or arrived in the area after spraying was completed.

Cases were also defined as follows:

Confirmed

1. Confirmation of physiologic effect by laboratory testing (i.e..increased urinary naphthol).

2. Cholinergic signs and symptoms within 48 hours confirmed by a physician.

Possible

1. Onset of 2-3 cholinergic signs or symptoms within 48 hours of exposure.

Unlikely

1. Less than 2 signs or symptoms within 48 hours.

2. Signs and symptoms beginning after 48 hours.

3. Nonspecific signs and symptoms.

Each participating individual was characterized in the proper exposure and case definition categories.

Results

A total of 180 homes were identified in the spray area. The response to the survey is described below.

Spray Area	Number of Homes	Percent
Participants	100	56%
No Response	53	29
Response but no participation	23	13
Telephone interview	2	1
Response by mail	2	1
	180	100%
Control		
Participants	24	68%
No response	11	32
	35	100%

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In the 215 homes cooperating, a total of 336 individuals participated in providing information for the survey. The breakdown of participants by age and sex is provided in Table I. Table II describes the breakdown of individuals by exposure and symptoms.

Each of the most probable cases were evaluated individually to assess the likelihood that the symptoms reported were compatible with carbamate poisoning. In each case, the nature and duration of the symptoms were not compatible with the effects of carbaryl exposure. The symptoms were more suggestive of a viral infection, for example. The same findings resulted from evaluation of the 2 possible cases in the low exposure group. In summary, the evaluation suggests that there were no symptoms reported that would be classified as being related directly to the effects of carbamate exposure.

Evaluation of "Possible" Cases

Two cases were classified as "possible" in the High Exposure Group. Each of the three individuals are described below.

1. Two brothers, ages 13 and 11, were waiting for a school bus during the spraying which was taking place about 25 yards away. On May 19, the 13 year old had a temperature of 104°, severe headache and body aches. The temperature lasted for 3 days; then recurred 4 days later for 1 day. Other symptoms lasted for 10 days. The second child, age 11, reported the same symptoms beginning May 26.

2. A 41 year old female was also waiting for a bus when the helicopter flew over and sprayed the area. Later that day she suffered from abdominal cramps for about 45 minutes. Sore throat, congestion and cough began between May 19 and 21. The symptoms lasted about 2 weeks.

There were two "possible" cases in the Low Exposure Group. The specific symptoms are described below.

1. In this case, a 2 year old male brother of case #1 above presented similar symptoms of fever and runny nose at an unspecified date after May 19.

2. This case involves a 39 year old male that was diagnosed with bronchitis which began at an unspecified time after May 19. There was no reported direct exposure to the spraying on May 18.

Symptoms

The most frequent symptoms reported were headache, sore throat, sinus problems, cough and fever. Table III lists the frequency of the symptoms reported in the spray and control areas. There appears to be no difference in the kind or frequency of symptoms reported in the spray and control areas.

Conclusion

Based on the information collected, it appears that no adverse health effects occurred as a result of exposure to the pesticide carbaryl (Sevin) by aerial spraying. This finding is consistent with the fact that exposure was estimated to be well below a level generally associated with adverse health effects.

It was concluded from the interviews that the major concerns of many residents were the potential of future effects and the possibility of direct exposure because of the change in the time of spraying. The recommendations that follow will address the issue of notification of the public.

Although no cases were found in which carbaryl was suspected to cause symptoms, actual exposure information would have been helpful in the evaluation process.

Recommendations

1. In this investigation, exposure was estimated based on the rate of carbaryl application as reported by IDA. It is recommended that in the future the aerial application be monitored by ground sampling in various locations to provide quantitative exposure information. Assessment of the health risks can be more adequately determined with better exposure data.

2. Although carbaryl is considered to be of relatively low toxicity, it is the general policy of IDPH to limit exposure to any toxic substance as much as feasible. There were reports of individuals that were outside their homes, in the spray area, during the aerial application of the pesticide. Interviews with residents suggested that the notification procedure may not have been adequate. In addition, the time of spraying was altered, which caused some confusion. It is recommended that IDA evaluate notification procedures to assure that all residents are informed of the time of spraying.

3. In order to more effectively assess health effects associated with gypsy moth and similar spraying programs, it is recommended that pre and post health evaluations be performed in the area to be sprayed and a corresponding control area. The evaluations may include reviews of hospital emergency room traffic in the area, telephone and/or interview surveys in the spray and control areas and inquiries to physicians concerning reported illnesses.

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Table I

Lake Zurich Health Survey
Age, Sex Breakdown of
Spray Area and Control Groups

Age (yrs.)	Males Spray Area	Control
0-10	31	3
11-20	37	3
21-30	9	2
31-40	29	7
41-50	23	4
51-60	7	0
61-70	5	1
	141	20

Age (yrs.)	Females Spray Area	Control
0-10	24	3
11-20	31	4
21-30	13	6
31-40	51	12
41-50	19	3
51-60	4	1
61-70	4	0
	146	29

Total Participation

Male	161
Female	175
Total	336

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Table II

Lake Zurich Health Survey
High and Low Exposure Groups

High Exposure (n=70)

Cases	Number	Rate/100 persons
Confirmed	0	0.0
Possible	2	2.85
Unlikely	21	30.0
No symptoms	47	67.14
	70	

Low Exposure (n=195)

Cases	Number	Rate/100 persons
Confirmed	0	0.0
Possible	2	1.02
Unlikely	37	18.97
No symptoms	156	80.0
	195	

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Table III

Frequency of Reported Signs and Symptoms

Spray Area	
Symptom	**Frequency**
Headache	14
Sore throat	7
Sinus Problems	6
Cough	5
Fever	5
Allergies	2
Respiratory Infection	2
Nausea	2
Stiff neck	2
Difficulty breathing	2
Dizziness	2
Irritable	2

Control	
Headache	3
Fever	3
Sore throat	3
Nausea	2
Flu	2
Runny Nose	2
Difficulty breathing	2
Cough	2

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References

Carbaryl decision document, USEPA Office of Pesticides and Toxic Substances, December 1980.

Morgan D.P. Recognition and management of pesticide poisonings (USEPA-540/9-80-005). Washington, D.C.: U.S. Government Printing Office, 1982.

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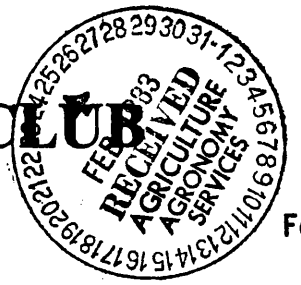
SIERRA CLUB
North Star Chapter



February 23, 1983

To: Minnesota Department of Agriculture
Pesticide Division
From: Harriet Lykken representing
Sierra Club, North Star Chapter
Re: Proposed Gypsy Moth Control Program

I would like to submit the following comments on behalf of the Sierra Club, North Star Chapter. We now have approximately 6,700 members in Minnesota. For many years we have worked on forestry issues and we presently have an active Forestry Task Force. Generally we focus our attention on forest planning in both our state and national forests. This is the first time that Gypsy Moth control has been considered as a Minnesota issue. I was present at the hearing in Woodbury on Feb. 15th and had the opportunity to discuss the State's plans for Gypsy Moth control with members of your department.

The Sierra Club, both nationally and at the state level, supports the position of Citizen's for a Better Environment (CBE) and the testimony presented by Dr. Robert Ginsburg at the Woodbury Hearing on Feb. 15th. We are strongly opposed to the aerial spraying of carbaryl (trade name Sevin - Union Carbide) but we could support aerial application of the bacterial insecticide Bacillus thuringiensis and a mass trapping program. We believe that the program cannot succeed without public education and participation.

We feel that is is essential that the Department of Agriculture develop a long term program based on a regional study of the gypsy moth and that the study should include(but not be limited to):

a. An assessment of the environmental effects and human health risks of each control option.
b. A determination of which tree species in Minnesota are most susceptible to Gypsy Moth damage.
c. A discussion of the probable effect of Minnesota winters on Gypsy Moth populations.

Further, it is important that the proposed program be published and available for public distribution in a form that the public can understand.

In addition to the potential adverse effects of carbaryl on human health listed by Dr. Ginsburg, we have further concerns regarding the environmental impact of carbaryl. We have had an opportunity to review the document titled Environmental Fates and Impacts of Major Forest Use Pesticides prepared in Dec. 1981 by TRW for the U.S. Environmental Protection Agency, contract #68-02-3174. As you probably know, this document is a review of the literature published on the use of carbaryl. As indicated in this document, "Extensive aerial spraying of carbaryl is being questioned as a safe, effective means of insect control". Surely, if it is neither safe nor effective, the use of carbaryl cannot be justified.

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This document states clearly that carbaryl is considered "moderately" persistent in the environment and that "half lives range from a few days to several months depending on environmental conditions". This is contrary to information presented at the Woodbury hearing where it was indicated that carbaryl would persist for several days only.

We are concerned that Carbaryl is taken up and metabolized by both target and non-target insects, plants and animals. Most disturbing is the fact that "carbaryl affects many beneficial insects, especially aquatic insects and honey bees"..the high toxicity of carbaryl to honey bees being a major hazard and the fact that forage bees may carry affected pollen back to the hive where it remains toxic up to eight months eventually killing the queen and the entire hive. Although the effects of carbaryl on forest animals has not been extensively studied, the information that is available is grounds for concern. Regarding birds, "temporary abandonment and loss of food supply have been noted and larger doses will produce decreased hatching of eggs". Carbaryl is toxic to fish and "acquatic organisms are particularly susceptible to the toxic effects of carbaryl in water".

From the information that has been made available to us at this time, it would seem that we could also support an alternative of "No Action". According to the National Audubon Society, there is strong evidence that the rapid expansion of the Gypsy Moth's range on this continent is partly the result of selection for the dispersal trait by insecticide blitzes. Before the DDT applications of the 1940's and 1950's the entire North American populations of Gypsy Moths was confined to eastern Massachusetts. The Environmental Consultant for the National Audubon Society has been quoted as saying, "The usual effect of application of carbaryl (Sevin) is to prolong outbreaks of gypsy moths and other pests in the succeeding year".

We would appreciate receiving notice of any further hearings conducted by the State Department of Agriculture regarding Gypsy Moth Control. Because of the potential for spread of the Gypsy Moth in Minnesota, we consider this a state-wide issue.

ADDENDUM

of

REMARKS PREPARED BY THE

NEW JERSEY DEPARTMENT OF AGRICULTURE

in

RESPONSE TO QUESTIONS ASKED DURING THE

ASSEMBLY HEARING (AR 51)

AGRICULTURE AND ENVIRONMENT COMMITTEE

on

OCTOBER 2, 1980

TRENTON, NEW JERSEY

QUESTIONS and RESPONSES

1. Why is the New Jersey Department of Agriculture attempting eradication and/or containment of the gypsy moth?

Since the early 1970's the Department has not been concerned with eradication or containment but how do we best live with the gypsy moth. The Department's answer and approach to the gypsy moth problem is to provide for the implementation of an integrated program employing both chemicals and biological controls. The chemical portion of the program is voluntary with the local municipality for the purpose of preventing tree mortality in the forested residential community. The municipality has the option of selecting either Sevin or Bt (Bacillus thuringiensis, a biological insecticide). The spray materials are applied from the roadside, 200 ft. to the back property line. The unsprayed contiguous wooded areas act as reservoirs from which gypsy moth virus disease, parasites and predators will build up and disperse eventually stabilizing the population.

2. Will spraying perpetuate and cause the gypsy moth to become resistant to pesticides?

It is recognized that insects develop resistance, particularly those pests that have more than one generation per year and where pesticide applications are applied several times during the year. Gypsy moth produces only one generation per year. Secondly, spray applications are applied in a limited and discriminate manner. Treatments are made only to areas expecting defoliation for the second year in an effort to prevent tree mortality. Selected forested residential areas are usually treated one time during a gypsy moth outbreak, therefore, reducing the development of resistance. Sampling and testing of

gypsy moth larvae collected from different areas of the State do not indicate development of resistance to Sevin, the chemical employed in the Department's integrated control program.

Chemical treatments as recommended in the Department's program are applied to small acreages, therefore, discouraging a continuum of high or repetitive outbreak of gypsy moth populations.

3. Does spraying kill beneficial insects?

Regardless of the spray materials used within a control program, the mortality of the host or gypsy moth caterpillar also reduces the parasite population. However, the objective of the program is to spray only small acreages, thus, relying on the contiguous unsprayed areas to provide for reservoirs from which parasites will build up and disperse. It has also been determined that parasites and predator populations are not as high in residential areas since the activities of man have disturbed the natural environment, thus, reducing parasite niches.

4. Does Sevin kill fish and birds?

From the tests and monitoring provided over the years, the impact on wildlife is very low. In the many years that the Department has been involved in treatment programs employing Sevin, no confirmed specimen of bird or fish has been recorded as being killed. It is also known that birds may temporarily migrate from an area because of reduced insect food. However, the same effect is observed in areas defoliated by the gypsy moth, resulting from lack of shade and increased temperatures.

5. Should the gypsy moth sex attractant (Pheromone) be employed in the State program?

The Department has actively participated with the United States Department of Agriculture in the pilot testing of the gypsy moth sex pheromone. All the tests conducted in New Jersey and other states indicate that the sex attractant, whether dispersed by air or ground traps, are not effective in high gypsy moth populations. In such high population levels, the male moth is capable of searching and locating the female moth by sight. The testing does, however, indicate some potential use of the pheromone in very low population levels at the leading edge of gypsy moth infestations, particularly, in newly infested states. To apply the pheromone in low stable gypsy moth populations within New Jersey could affect parasite and predator ability to survive, thus, triggering gypsy moth outbreaks.

6. Should only water based Bt formulations be employed within the Department's program?

All Bt formulations are water mixes. The public objection to the Bt product (Thuricide 16B) used in the 1980 program centered on the three percent xylene incorporated into base formulation. The Thuricide base formulation included not only the xylene which is a stabilizer to prevent deterioration while in storage, but other additives to prevent evaporation and sticking ability for the final preparation. One quart of the base material is mixed with one gallon of water for application on one acre. Xylene, once mixed with the water evaporates rather quickly and does not reach the ground in application, thus, poses no environmental risk. For any biological pesticide

to be effective, it is essential that a sun screen be added to protect the living spores against the ultraviolet light, in addition to antievaporants and stickers to provide for some degree of longevity when applied to the foliage. Bt, without the additives, would be extremely erratic providing poor control results.

7. Can people help themselves by placing burlap bands around infested trees?

Removing egg masses of the gypsy moth, tanglefoot, and placing burlap band around tree trunks can have some effect at low population levels. When the population is in the outbreak stage, only spraying with a chemical or biological insecticide is effective in reducing the gypsy moth population. Shade trees usually of a height of 75 to 100 feet tall limit the homeowner in his ability effectuate controls not having proper spray equipment. It is therefore, necessary that commercial applicators be recruited to effectively control the population. It must also be pointed out that homeowner attempts at control introduce heavy loads of pesticides into the environment with little success of control.

8. Spray materials employed in control programs should carry guarantees of safety?

All spray materials used in control programs are approved and registered with the United States Environmental Protection Agency. All pesticides are in a continual process of review. For example, Sevin is now being recommended for return to full registration after four years of review by E.P.A. After having examined all the data for Sevin, E.P.A., has concluded that Sevin is of

low risk to human health when applied in accordance with the label of use. There cannot be a guarantee of no risk. If such were the case, we would not be able to use any pesticide or drug including food products.

A REVIEW OF SEVIN CARBARYL TOXICOLOGY

AND

ITS RELATIONSHIP TO HUMAN EXPOSURE

TOXICOLOGY: THE STUDY OF PHYSIOLOGICAL RESPONSES TO CHEMICALS.

ACUTE/SUBACUTE TOXICITY:

ACUTE ORAL LD_{50} (RATS) 500-850 MG/KG

ACUTE DERMAL LD_{50} (RATS) > 4000 MG/KG, (RABBITS > 5000 MG/KG)

ORAL LD_{50} (MATACIL 30 MG/KG, DYLOX 450-630 MG/KG, ORTHENE 866-945 MG/KG, MALATHION 1375 MG/KG)

DERMAL LD_{50} (MATACIL 275 MG/KG, DYLOX 2000 MG/KG ORTHENE _____ MALATHION 4100 MG/KG)

ACUTE INHALATION (RATS)

10 MG/M^3 CONTINUOUS FOR 90 DAYS - NO MORTALITY.

195 MG/KG CONTINUOUS FOR 4 HOURS/DAY, 2 WEEKS - NO MORTALITY.

PRIMARY SKIN IRRITATION (RABBIT) NONE FROM 10% SOLUTION IN ACETONE.

PRIMARY EYE IRRITATION (RABBIT) 10% SUSPENSION IN PROPYLENE GLYCOL —> 0.2. (5.0 RATED AS SEVERE INJURY).

SUMMARY: SEVIN CARBARYL EXHIBITS A MODERATE TO LOW ORDER OF ACUTE/SUBACUTE TOXICITY.

CHRONIC TOXICITY

LIFE SPAN FEEDING: No Tumors Or Pathological Effects In Rats Fed 8.2 mg/kg Day (200 ppm) For 2 Years. Considered the "NO EFFECT LEVEL".

: No Effect Level On Dogs Is 400 ppm.

ADI (FAO/WHO) FOR HUMANS = 0.01 mg/kg/Day.

CARCINOGENESIS: NOT A CARCINOGEN (NCI And EPA).

Two Year Feeding Studies On Rats And Dogs,

80 Weeks - Mice.

Subcutaneous Weekly Injections To Mice For 5 Months.

MUTAGENESIS: None Detected In Rats And Mice At Dosages From 50 - 200 mg/kg/Day.

None Detected In 3 Generation Dominant Lethal Rat Study.

DEMYELINATION POTENTIAL. None Detected From Subcutaneous Injections to Chickens at 1000 - 2000 mg/kg.

CHRONIC TOXICITY (CON'T)

TETRATOGENESIS. NO TERATA IN MONKEY (20) MOUSE (30) SWINE (32) SHEEP (32), SHEEP (100) GUNIEA PIG (200) RABBIT (200) HAMSTER (250) RAT (500) AND GERBIL (1000) (MG/KG/DAY)

- BEAGLE 63 DOSES OF 5 MG/KG DAILY THROUGH PREGNANCY-TERATA. DOG IS MOST SENSITIVE SPECIES. DURING NORMAL USE HUMANS ENCOUNTER LESS THAN 1/50,000TH OF THE DOSE CAUSING DOG TERATA.

EPA'S AND INDEPENDENT TOXICOLOGISTS CONCUR THAT SEVIN IS NOT A TERATOGENIC THREAT TO HUMANS.

HUMAN EXPOSURE TO CARBARYL

DIETARY - FAO/WHO ADI = 0.01 MG CARBARYL/KG/DAY

BASED ON PRACTICAL CERTAINTY THAT NO INJURY WILL OCCUR OVER A LIFETIME, U.S. FDA MONITORS PESTICIDE RESIDUES IN MARKET BASKET SURVEYS - 0.0002 MG/KG AVERAGE CARBARYL RESIDUES OR 2% OF ADI (12 YEAR AVERAGE).

PESTICIDAL - EPA REGISTRATION OF CARBARYL DUST FOR CONTROL OF HEAD LICE ON HUMANS.

MANUFACTURING AND PACKAGING - 21 YEARS OF COMMERCIAL PRODUCTION

OVER 800 MILLION POUNDS MANUFACTURED IN U.S.

THREE EMPLOYEES HAVE PACKAGED 10 YEARS. NO ABNORMALITIES IN BLOOD OR URINE.

DERMAL EXPOSURE RANGES FROM 0.80 - 1,209 MG/HR. (MEAN 74 MG/HR)

RESPIRATORY EXPOSURE RANGES FROM 0.3 - 4.1 MG/HR. (MEAN 1.1 MG/HR.

MEAN POTENTIAL EXPOSURE = 600 MG/8 HOUR DAY.

T L V FOR WORKERS = 5 MG/M^3 / 8 HOUR DAY / 5 DAY WEEK.

NATIONAL INSTITUTE OF OCCUPATIONAL SAFETY AND HEALTH (1976):

CARBARYL NOT AN ADVERSE CHRONIC HAZARD

HUMAN EXPOSURE TO CARBARYL (CON'T)

HOME AND GARDEN USE: INHALATION: NEGLIGIBLE<.001 MG/MIN.

DERMAL: MAX 0.024 MG/KG/MIN OR 0.04% OF APPLIED DOSE.

(67 - 94% DEPOSITED BELOW WAIST)

SKIN PENETRATION: DEPENDS ON SOLUBILITY OF A COMPOUND.

CARBARYL HIGHLY SOLUBLE IN ACETONE → PENETRATES SKIN READILY.

LOW SOLUBILITY IN OIL OR WATER → POOR SKIN PENETRATION.

ACUTE ORAL LD_{50} (RATIO) = 500 MG/KG

ACUTE DERMAL LD_{50} (RATIO) > 5000 MG/KG.

DIFFUSION ACROSS NEONATAL RAT STRATUM CORNEUM = 1.65 μGM/CM^2/HR.

EXAMPLE:

IT WOULD TAKE 9 HOURS OF TOTAL IMMERSION IN A SATURATED CARBARYL SOLUTION FOR AN INDIVIDUAL WITH A BODY SURFACE OF 1.70 M^2 TO RECEIVE AN INTERNAL DOSE OF 5 MG/KG.

SUMMARY: CARBARYL DOES NOT PRESENT A CHRONIC HAZARD TO HUMANS AT DOSES ENCOUNTERED IN THE HIGHEST KNOWN EXPOSURE SITUATIONS.

St. Paul Dispatch Tuesday, Nov. 30, 1982

Gypsy moth eggs found here believed not serious

By Don Ahern
Staff Writer

Gypsy moth egg masses have been found in the St. Paul area, but not in sufficient concentrations to pose serious problems in the next few years.

Minnesota Agriculture Department spokesman Arthur Mason said department investigators found isolated masses of the eggs near Seventh and Clarence streets south of Phalen Park in St. Paul and in the Park Hills area of Woodbury.

But Mason emphasized that the infestation is not considered serious at this point.

"Our problem right now is to decide what we are going to do about it," he said. "Do we want to live with it, or eradicate it?"

Gypsy moths have become a serious problem in northeastern states, periodically defoliating nearly 100 percent of the trees and bushes in infested areas during the month of June. They are most dangerous in the caterpillar state, when they feed on leaves of almost any tree.

However, if the serious outbreaks don't occur several years in a row, the deciduous trees will survive, Mason said. But once an evergreen is stripped, it will die.

Mason said he does not expect any noticeable defoliation for about five years, even if no eradication program is initiated.

State officials and representataives of the cities involved will decide in the next few months what course of action to take. Mason said part of the decision will be based on how the egg masses survive Minnesota's winter.

Eradication could include chemical control methods, but Mason said more immediate methods will probably be restrictions on the movement into the state of goods that could be carrying the eggs, such as yard furniture, firewood, campers and other vehicles that are parked in yards in areas where the moths are prevalent.

The eggs that were found in Woodbury were on patio furniture of a family that moved here from Boston four years ago. The egg masses near Phalen Park in St. Paul were in a reforestation site where trees from Connecticut were planted in 1980 to replace dead elms.

Mason said some people argue that it's only a matter of time before the gypsy moth infests the entire country, so it makes little sense now to use control measures. "But we can buy a heck of a lot of years by getting rid of it now by spraying," he said.

Homeowners can check for egg masses on their own property, but Mason cautioned that they should not try to remove them themselves. "They could be damaged and some of the eggs spilled," he said. "We would prefer if people leave them alone and tell us first."

The egg masses are about the size of a quarter, rounded, tan in color and with a suede texture. Each mass contains about 500 eggs.

St. Paul Pioneer Press Tues. Nov. 30, 1982

Gypsy moth egg peril eases

Minnesota Agiculture Department investigators found "isolated" masses of gypsy moth eggs in their yard-to-yard search of a neighborhood south of Phalen Park in the Park Hills section of Woodbury.

"We found only isolated egg masses," Agriculture Department spokesman Arthur Mason said Monday. He said the discoveries during the recently completed searches were not considered serious.

Gypsy moths, responsible for defoliating up to 1.3 million acres of forests in northeastern and mid-Atlantic states, are most dangerous in the caterpillar stage when they feed on leaves of oak and other trees.

State officials worried that the moths found their way from the East Coast to the Twin Cities. But the situation here is under control, Mason said.

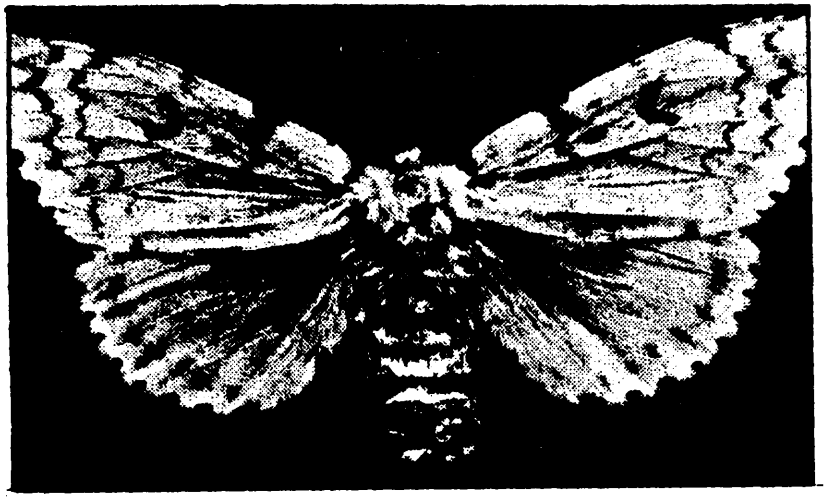
Gypsy moths were caught throughout the Twin Cities, but authorities were most concerned about the egg masses, which each contain about 500 eggs and have a soft, brownish covering.

Mason said investigators found egg masses on patio furniture near the home of a family that moved to Woodbury from Boston four years ago, and at a reforestation site south of Phalen Park where authorities imported trees from Connecticut in 1980 to replace elms.

Representatives of the Agriculture Department, the University of Minnesota, the cities of St. Paul and Woodbury and the Department of Natural Resources will meet in the next few weeks to decide what to do next.

Minneapolis Star and Tribune - Tues Oct. 26, 1982

Hunt is on to find, halt advance of devastating gypsy moth



Officials fear a "potential population explosion" of gypsy moths.

By Dean Rebuffoni
Staff Writer

Over the years, Minnesota's forests have been ravaged by Dutch elm disease, oak wilt, butternut blight, white pine blister rust, pine wilt disease, canker worms, forest tent caterpillars, bronze birch borers and a little critter called the aspen tent roller.

And now, maybe, the gypsy moth cometh.

The dreaded little nasty, whose leaf-eating caterpillars have stripped million of acres of forests in eastern states, is present in very small numbers in Minnesota, state and federal officials said Monday.

But the officials stressed that it is not known if the moth has become firmly established here, or whether it is spreading beyond a few small tracts in the eastern part of the Twin Cities metropolitan area.

To determine the extent of the insect's infestation, officials began a yard-by-yard search last week in the Park Hills area of Woodbury in Washington County. The survey will be expanded this week to the nearby Phalen Park area of northeastern St. Paul.

"We always knew that the gypsy moth was a hitchhiking pest that posed a threat to Minnesota, so we've been looking for it for a long time," said Art Mason, an assistant director of the Minnesota Agriculture Department.

"But until recently we didn't have the right tools to locate it. Now we've got those tools and, suddenly, we find we've got it here. But before we can decide what to do, we have to find out how much of it we have."

Mason's agency is working with the U.S. Department of Agriculture and local officials in the moth search.

Members of the survey team are carrying official identification, and are providing homeowners in the search area with information pamphlets on the moth's habits.

Moth continued on page 4A

MOTH: Oak leaves the favorite of the gypsy

Continued from page 1A

The Woodbury-Phalen Park area was chosen because traps set there revealed high populations of moths. The survey team is inspecting fences, building exteriors, trees and rocks for egg masses that the state agriculture department said may represent a "potential population explosion" of moths next summer.

Each mass contains up to 500 of the pearly white, hairy eggs. The egg masses have a soft, suede-like cover that is golden-yellow to brown-tinged. The state agency said the egg masses are concealed on the underside or in crevices of "just about anything found on the average home premises outdoors."

Residents finding suspected egg masses are advised to leave them undisturbed and to call the agriculture department (296-3347) or local park or forestry agencies.

Concern about the moth stems from its destruction of forests, primarily in northeastern states. The damage occurs during the moth's caterpillar, or larval, stage. It begins in late May and continues through July. During that time the insect devours leaves, particularly those of the oak.

"The big problem occurs when the caterpillars repeatedly defoliate a tree over several summers," said Mason. "A healthy tree can withstand three or four consecutive years of defoliation, but if you couple that with a severe drought — which naturally weakens a tree — then you've got big trouble."

He said that while the moths prefer oaks, they also relish the greenery of fruit trees and birches. In addition to the damage caused by defoliation, the caterpillars' droppings are very messy. And in some parts of New England, during particularly heavy infestations, the insects have stalled freight trains by the sheer number of their slippery bodies.

While the moths are not Minnesota natives, they entered the state in extremely limited numbers in the 1970s. Hart Graebner, a plant protection officer for the federal agriculture department, said the insect's egg masses were brought here on the camping equipment and mobile homes of Minnesotans who had visited eastern campgrounds where the moth is abundant.

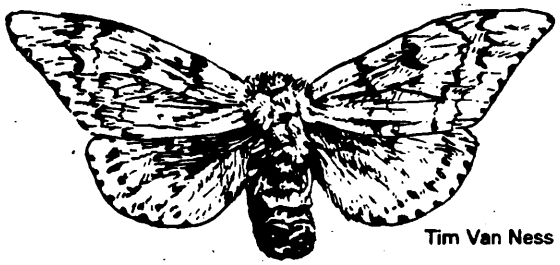
The current moth survey will continue this autumn and will be resumed early next spring, before the normal hatching season in May.

St. Paul Dispatch

Tuesday
Oct. 26, 1982

Metro Final-25¢

Gypsy moth, tree threat, found here



Tim Van Ness

The gypsy moth.

By Jeann Linsley
Staff Writer

A pesky alien, the gypsy moth, has found its way from the East Coast to two St. Paul area neighborhoods, prompting a yard-to-yard search for the insect in the Twin Cities area, state agriculture officials said today.

The moth, which has defoliated an estimated 13 million acres of forests in Northeastern and Mid-Atlantic states, has been found in small numbers in the Pine Hill section of Woodbury, and in an area just south of Phalen Park, according to Arthur Mason of the Minnesota Department of Agriculture.

About 60 male moths were collected in those areas, he said, and about 40 more in other areas of the state. "These are terribly small numbers," he said.

The moths, which are not native to Minnesota, are thought to have been transported to the Twin Cities area from trees imported from Connecticut, Mason said. Those trees were imported as part of a reforestation effort after a local outbreak of Dutch Elm disease.

Other moths were found near the home of a family who had moved to Woodbury from Boston nine years ago, Mason said.

"We would like to hear from persons who have moved here from areas where there have been gypsy moth infestations," he said. "If they'd inspect their patio furniture and trees, then give us a call (296-8578), that would help."

Please see Moths / 2A

Moths

■ Continued from Page 1A

The insects are most dangerous in their caterpillar stage, Mason said. The caterpillars, which often reach two-and-a-half inches in length, feed on leaves of oak and other trees. They also can defoliate evergreens, which are even more sensitive to damage, Mason said.

"If you have them in high enough numbers they will completely strip the tree," he said.

Agriculture officials will continue to survey the two St. Paul areas this fall for evidence of moth eggs. Mason advised homeowners to watch for the insect's egg masses on outdoor furniture, wood piles, telephone poles, and trees. The egg masses contain about 500 eggs, and have a soft, brownish covering.

If the infestation becomes serious, he said, several control methods would be considered, the easiest consisting of a chemical spray program.

"We're just not sure about that yet. We have to find out what we've got first," Mason said.

Gypsy moth, tree threat, found here

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Metro/Region Briefing

From staff and wire reports

Search for clues to gypsy moth infestation expanded

A yard-by-yard search for evidence of gypsy moth infestation was expanded this week to the Phalen Park area of St. Paul.

Officials began the search last week in the Park Hills area of Woodbury in Washington County.

State and federal officials said the moth, whose leaf-eating caterpillers stripped millions of acres of forests in eastern states, has been found in small numbers in Minnesota.

They stressed that it was not known if the moth had become firmly established here, or whether it is spreading beyond a few small tracts in the eastern part of the Twin Cities metropolitan area.

Group says pesticide may harm residents

By Dean Rebuffoni
Staff Writer

TRIBUNE 2-18-83

Some residents of St. Paul and Woodbury could be harmed if a pesticide is sprayed in their neighborhoods this spring to eradicate gypsy moths, an environmental group charged Thursday.

Citizens for a Better Environment said young and elderly people, allergy sufferers and pregnant women would be particularly susceptible to the pesticide, called Sevin or carbaryl. It urged the Minnesota Department of Agriculture to use other means to control the leaf-eating pest.

Art Mason, a department official, said a control program will be decided upon next month. But, he said, controlled use of the pesticide would not harm the public health or the environment.

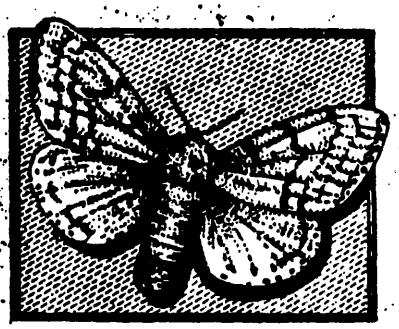
The department concluded public hearings this week on possible control programs on two areas of moth infestation: 300 acres south of Phalen Park in northeastern St. Paul and 130 acres in the Oak Hills area of Woodbury, in Washington County.

The moth is a relative newcomer to Minnesota, but its egg masses have demonstrated the ability to survive the state's harsh winters. A survey last fall confirmed that the insect is established in the two residential areas.

The agriculture department says a control program is needed this spring to avert a potential population explosion of the insect, which has stripped millions of acres of forests in eastern states. The damage occurs during the moth's caterpillar stage, which begins in late May and continues through July.

One of the programs being considered is the spraying of Sevin.

It would be applied to trees twice between May 23 and June 10, when the caterpillars are leaving their



eggs to feed on leaves. The spraying would be done in the early morning to avoid exposing residents to the pesticide.

Another possible program would be the spraying of Bacillus thuringiensis, a contagious disease organism that kills caterpillars. A third program would involve trapping male moths, spraying Bacillus thuringiensis and introducing other organisms that are natural enemies of the moth.

Citizens for a Better Environment, a national organization that recently set up an office in Minneapolis, said it favors the third program.

"The problem is that spraying (of the chemical pesticide) is very hard to control," said Carol Ann Barth, the group's Minnesota research director. "You can't completely get people out of the way."

Robert Ginsburg, the group's staff chemist and toxicologist, said state residents "deserve better than the alarmist claims of the agriculture department and must demand more than the shortsighted, crisis-management plans presented so far."

Mason said the federal Environmental Protection Agency (EPA) has reviewed risks and benefits of using the pesticide. A 1981 EPA report says careful use of Sevin/carbaryl to control tree pests poses "little likelihood of adverse effects to human health or the environment."

Protest

Continued from page 2B

Ellertson said late last night that he was going home and leaving the pro-

Utilities m

By Anthony P. Carideo
Staff Writer

Two Minnesota electric utilities appear to be backing off on a six-year struggle to add the last of three transmission spurs to their controversial direct-current power line from Underwood, N.D., to Delano, Minn.

Cooperative Power Association (CPA) of Eden Prairie and United Power Association (UPA) of Elk River announced Thursday that they were prepared to begin "reexamining alternatives" to their proposed "Wilmarth Line," a 78-mile, 345-kilovolt power line from Delano to Mankato, Minn.

UPA and CPA's announcement comes in the wake of a decision last August in the first of a two-stage hearing to determine whether the line should be built. In that decision, Kent Eklund, then-Minnesota commissioner of energy, planning and development, ruled that the utilities had not shown a need for the electricity from the line.

The utilities and a group of landowners opposing the line are about to enter into the second stage of hearings, which are designed to give the cooperatives a chance to demonstrate whether the line should be built for other reasons.

UPA and CPA said yesterday that they planned to file a "detailed position document by May 25, 1983" as part of those hearings.

"We are concerned about the effect these rising costs would have on our consumer-members' electric bills," said a spokesman for the coopera-

Ton
the ca

Moth spray fought

By Jeann Linsley
Staff Writer

St. Paul Dispatch

Friday, Feb. 18, 1983

A proposed spraying program to control gypsy moths in two St. Paul area neighborhoods could be harmful to residents, a national environmental group claims.

Citizens for a Better Environment, which recently set up an office in Minneapolis, said the insecticide proposed for use this spring — Sevin 4-Oil, also known as carbaryl — has been linked by various researchers to birth defects, neurological effects and increased susceptibility to viral infections.

The Minnesota Agriculture Department has proposed spraying about 300 quarts of the chemical in two areas, a 300-acre area south of

Please see Moths / 4A

Moths

■ Continued from Page 1A

Phalen Park and a 1,130-acre area in the Oak Hills section of Woodbury.

"Clearly the infestations can be dealt with by a combination of equally effective techniques less disruptive of the environment and of less hazard to human health than carbaryl," said Robert Ginsburg, the group's staff chemist and toxicoligist.

The chemical is approved for use by the U.S. Environmental Protection Agency and is one of the most widely used pesticides, Ginsburg said. But research done by private consultants has indicated possible links with birth defects in laboratory animals. Research done at the University of Maine and at Semmelweis Medical University in Budapest has shown possible links with neurological disorders, he said.

The group also disputed the Agriculture Department's cost estimates for the control program. The group said the estimates were biased against the use of biological control methods.

The department recently held hearings on the proposed control program. While the department favors the carbaryl spray program, it has said that if residents object to that method, a biological control program would be used. That method would consist of aerial application of a natural moth disease organism, known under the brand name of Dipel.

However, virtually no one showed up at one hearing on the issue in St. Paul, according to department spokesman Art Mason. The Woodbury hearing drew about 30 residents, he said.

Citizens for a Better Environment raised the major objections to the carbaryl spraying program at the hearings, he said.

Mason said the carbaryl spraying program would cost between $8,700 and $13,000. The biological control program would cost about $30,000, he said.

Twelve gypsy moth egg masses of about 500 eggs each have been found in the Phalen and Woodbury areas.

The insects are most dangerous in their caterpillar stage. They feed on the leaves of oak and other trees and can defoliate evergreens. The moth has defolitated an estimated 13 million acres of forests in Northeastern and Mid-Atlantic states.

The small numbers of moths found in St. Paul and Woodbury are thought to have come from trees imported from other states.

NOTICE OF GYPSY MOTH SURVEY

Gypsy moth caterpillars eat the foliage of many types of trees. Male gypsy moth adults were detected in Minnesota last summer. It is important that we determine gypsy moth populations and pinpoint their locations before considering control possibilities. Detection traps will be located throughout this area in a particular pattern to provide us with meaningful results.

In order to conduct an efficient survey, it is important that we place traps in certain locations as rapidly as possible. An unsuccessful effort was made to contact you. Because of the importance of this location to the overall analysis of our results and for efficiency's sake, a trap was placed on your property. We hope you will not object to this action. This trap contains a piece of plastic impregnated with a synthetic sex attractant which lures gypsy moth males. It contains no harmful materials. The trap will be inspected several times this summer and removed in early September.

Your cooperation will be appreciated. Hopefully, this program will be of benefit to you and the other residents in this area. If you object to the trap's location or its presence on your property, please call:

(612) 725-2302 or (612) 296-8620

United States Department of Agriculture
Animal and Plant Health Inspection Service
Plant Protection and Quarantine Programs

Minnesota Department of Agriculture
Division of Plant Industry

PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT

Section H

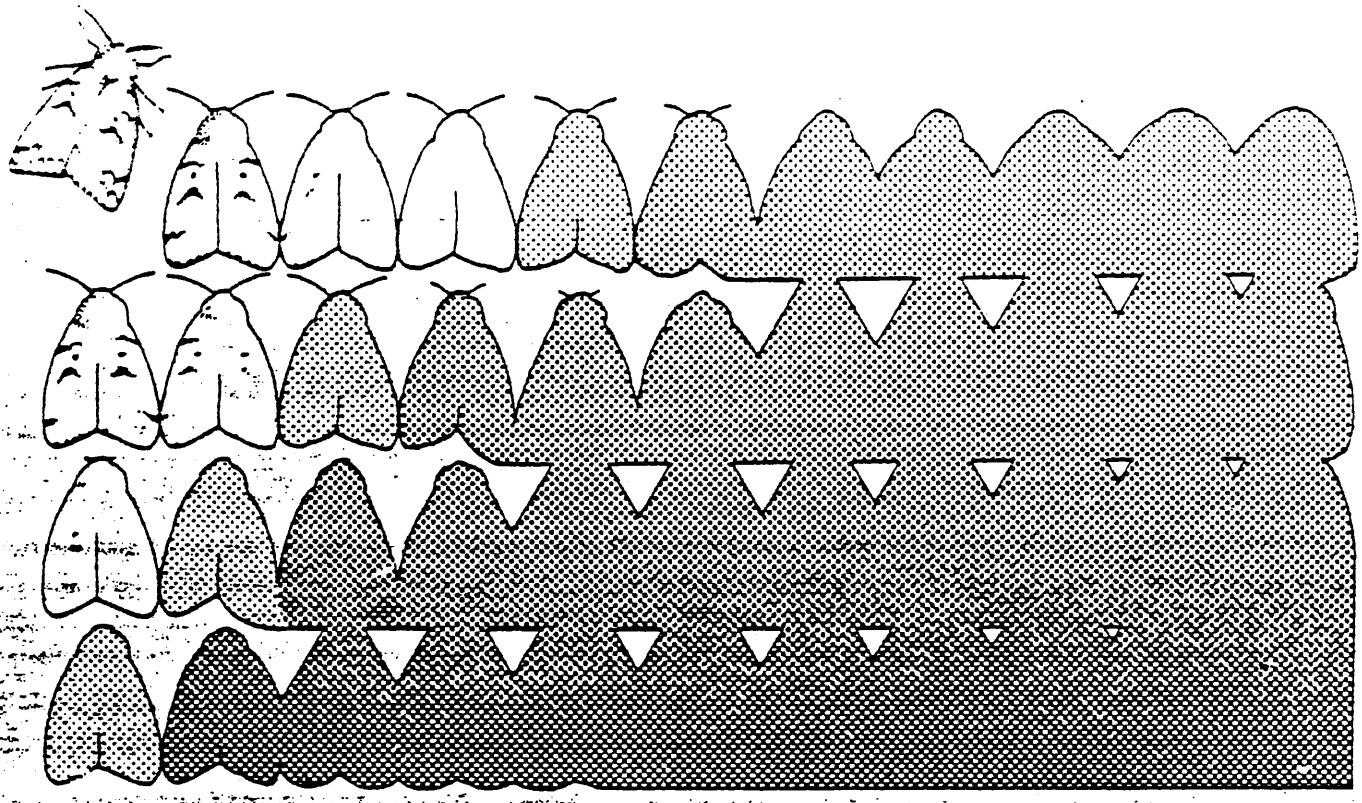
FINAL

Programmatic

EIS

ENVIRONMENTAL IMPACT STATEMENT

PROPOSED COOPERATIVE GYPSY MOTH SUPPRESSION and REGULATORY PROGRAM ACTIVITIES



U.S. Department of Agriculture

Forest Service

Animal and Plant Health Inspection Service

Final Programmatic Environmental Impact Statement
USDA FS-FEIS 81-01
USDA Cooperative Gypsy Moth Suppression and Regulatory Program
Prepared in Accordance with Section 102(C) of NEPA

Lead Agency:
USDA Forest Service
P. O. Box 2417
Washington, DC 20013

Cooperating Federal Agency:
USDA Animal and Plant
Health Inspection Service
Washington, DC 20250

Cooperating State Agencies[1/]

Responsible Officials:

Cooperative Suppression Projects
R. Max Peterson, Chief
USDA Forest Service
P.O. Box 2417
Washington, DC 20013

Regulatory Programs
Harry C. Mussman, Administrator
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Abstract: This Programmatic Environmental Impact Statement describes the proposed USDA Forest Service and Animal and Plant Health Inspection Service (APHIS) Cooperative Gypsy Moth Suppression and Regulatory Program. The proposed program would affect Northeastern States that request USDA Forest Service financial assistance to suppress gypsy moth infestations and States where APHIS regulatory activities are implemented to eradicate existing infestations in locations isolated from the generally infested area or to retard the spread of gypsy moth from the generally infested area. Four alternatives including a "no-action" alternative, are described. The environmental effects of implementing each of the proposed alternatives are discussed. The alternative selected by USDA Forest Service and APHIS is Integrated Pest Management involving chemical and biological insecticides, and the gypsy moth pheromone. If implemented, the selected alternative would guide USDA gypsy moth suppression and regulatory activities until revised at some future date. Annual requests by cooperating States for USDA Forest Service financial assistance will be considered on an individual basis. Annual decisions will be made concerning USDA Forest Service participation in cooperative suppression projects and APHIS regulatory programs based on the results of site specific environmental analyses documented in accordance with the NEPA regulations.

The selected alternative will not be implemented until 30 days after the notice of availability of the Final Programmatic Environmental Impact Statement has been published in the Federal Register and a Record of Decision has been signed and dated by the responsible official.

1/ Cooperating State agencies and responsible State officials are listed in Consultation With Others, beginning on page 62 and in Appendix F.

SUMMARY

FINAL PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT

USDA COOPERATIVE GYPSY MOTH SUPPRESSION AND REGULATORY PROGRAM

USDA FS-FEIS 81-01

Type of Action: Administrative

Responsible Federal Agencies:

USDA Forest Service
P. O. Box 2417
Washington, DC 20013

USDA Animal and Plant
Health Inspection Service
Washington, DC 20250

Responsible Officials:

Cooperative Suppression Projects	Regulatory Programs
R. Max Peterson, Chief USDA Forest Service P. O. Box 2417 Washington, DC 20013	Harry C. Mussman, Administrator USDA Animal and Plant Health Inspection Service Washington, DC 20250

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Date of Transmission to EPA and the public: FEB 27 1981

Draft; ____ Final; _X__

Implementation of the IPM alternative would result in the use of biological and/or chemical insecticides, the gypsy moth mating disruption pheromone, homeowner self-help techniques, and other operationally available suppression and regulatory methods in an integrated approach. The biological effects of the IPM alternative will depend on the extent to which the various components are implemented. The IPM approach encourages the selection of either biological and chemical insecticides or other suppression methods commensurate with the environmental sensitivity of the treatment area. Maximum public involvement would be achieved when the public is presented with all gypsy moth suppression and regulatory methods currently available. In terms of foliage protection and population reduction, the IPM alternative may necessitate that the public tolerate a greater degree of tree defoliation and higher gypsy moth population in some areas than what would be realized under the chemical insecticide alternative. Economic efficiency for IPM may be less than for the chemical insecticide alternative depending on the extent to which various IPM components are implemented.

The no-action alternative would not necessarily eliminate gypsy moth suppression activities. State agencies and individuals may undertake suppression projects without Federal financial assistance. If no action is undertaken by either State agencies or individuals, tree defoliation, mortality, and larval nuisance will occur. Nontarget organisms will not be adversely affected. Gypsy moth parasite and predator populations may increase to levels which could exert some biological pressures on localized gypsy moth populations. If State agencies or individuals implement suppression activities, the biological and physical effects would depend upon the method used. If no action is taken by State agencies or individuals, there would be no immediate impact on the physical environment except for the potential presence of many gypsy moth larvae. State governments and private individuals would finance the entire cost of suppressing gypsy moth populations. Depending on program priorities, State agencies may not be able to participate financially in gypsy moth suppression activities. Therefore, the costs of suppression would be borne by individual property owners. Suppression projects undertaken without State coordination may not provide for adequate public involvement and notification of property owners adjacent to those residences conducting suppression activities, and could result in the application of more insecticides than necessary to suppress gypsy moth populations.

IV. Major Issues, Concerns and Opportunities

Major issues, concerns, and opportunities identified during the scoping phase of the environmental analysis were: concern for human health; a need for more public education regarding gypsy moth suppression and regulatory programs; a need for increased public involvement in selection of insecticides and treatment areas; concern for the environmental effects of using insecticides; a need for discussion of alternatives to chemical

insecticides; a need for continued Federal/State coordinated gypsy moth suppression and regulatory projects; a need for improved and continuous communciations between project coordinators regarding safety; and a need to update future Environmental Impact Statements with new information on registered insecticides such as label changes, new insecticides, and environmental monitoring.

V. Alternative Selected by USDA for Gypsy Moth Suppression and Regulatory Programs

The alternative selected by USDA Forest Service and APHIS for gypsy moth suppression and regulatory projects is the IPM alternative. An IPM approach would result in the use of quarantine, inspections, biological and/or chemical insecticides, the gypsy moth pheromone, and other operationally available suppression and regulatory methods.

If implemented, the selected alternative would guide USDA gypsy moth suppression and regulatory activities until new insecticides or insecticide application methods are developed, or analyses identify unreasonable risks to human health or the environment associated with proposed projects. Annual requests by cooperating States for USDA Forest Service financial assistance will be considered on an individual basis. A decision will be made concerning USDA Forest Service financial assistance and APHIS regulatory projects based on the result of site specific environmental analyses that will be documented in accordance with the National Environmental Policy Act (NEPA) regulations.

VI. Consultation with Others

The USDA Forest Service and APHIS held scoping sessions during September and October 1980 in the States proposing cooperative gypsy moth suppression projects for 1981: Maine, New Jersey, New York, Pennsylvania, and Rhode Island. The purpose of the scoping sessions was to identify major concerns, issues, and opportunities related to USDA gypsy moth suppression and regulatory projects. The sessions were announced through letters sent to individuals, agencies and groups identified by cooperating States. The meetings were attended by 131 individuals representing various agencies, organizations and interests; 20 made oral presentations. A total of 43 comment letters also were received.

In accordance with NEPA regulations, the Draft Programmatic Environmental Impact Statement was sent for public review and comment to a variety of agencies, organizations, and individuals. Written comments were received from the following agencies and individuals during the review period:

U. S. Department of the Army
U. S. Department of Commerce
U. S. Department of Health and Human Services (formerly HEW)
U. S. Department of Interior
U. S. Department of the Navy

U. S. Environmental Protection Agency
California Department of Food and Agriculture
Connecticut Council on Environmental Quality
Connecticut Office of Policy and Management
Illinois Department of Agriculture
Iowa Department of Agriculture
Maine Department of Environmental Protection
Maryland Department of Agriculture
Michigan Department of Agriculture
Minnesota Department of Agriculture
New Jersey Department of Agriculture
New York Division of Regulatory Affairs
New York State Parks and Recreation
North Carolina Department of Agriculture
North Carolina Office of State Budget and Management
Ohio State Clearinghouse
Pennsylvania Department of Environmental Resources
Rhode Island Department of Administration
Vermont Department of Forests, Parks and Recreation
Virginia Council on the Environment
Virginia Department of Conservation and Economic Development
Washington Department of Natural Resources
Washington Department of Transportation
Washington Office of Financial Management
New York State College of Agriculture and Life Sciences
Foster Agricultural Services
Union Carbide Corporation
Boy Scouts of America, Narragansett Council, RI
Hammermill Paper Company
Maine Audubon Society
Tompkins County Environmental Management Council, NY
Delaware Valley Toxics Coalition, New Hope, PA
Highlands Watershed Association, NJ
Chevron Chemical Company
Thompson-Hayward Chemical Company
Office of Selectmen, Topsham, ME
Susan Reynolds Shaw - Montville, NJ
Dr. Philip M. Tierno, Jr. - Norwood, NJ
Michael R. Teta - McHenry, IL
Louis E. Marchi - McHenry, IL
Patricia W. Buhrman - McHenry, IL
Patricia Shanholtzer - McHenry, IL
Nancy B. Coleman - Morris Plains, NJ

The Final Environmental Impact Statement was submitted to the U. S. Environmental Protection Agency (EPA) and will be made available to interested persons after ~~DEC 7 1984~~.

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APPENDIX (See Individual Headings)

A. Preparers
B. Availability of past Final Environmental Impact Statements
C. Draft PEIS Review Comment Letters·
D. Summary of Carbaryl Decision Document, December 1980. Replaces Appendix D of Draft PEIS: September 1980 letter from Marcia E. Williams, EPA, to Philip Alampi, Secretary of Agriculture, New Jersey
E. Letter from William N. Hedeman, Jr., EPA to R. Max Peterson Chief, USDA Forest Service, concerning public notification and human exposure to pesticides, March 20, 1980.
F. Mailing list for Final PEIS.

INTRODUCTION

PURPOSE

This Final Programmatic Environmental Impact Statement presents the proposed USDA Forest Service and Animal and Plant Health Inspection Service (APHIS) Cooperative Gypsy Moth Suppression and Regulatory Program. Alternatives for gypsy moth suppression and regulatory activities in cooperating States are discussed. The alternative selected by the USDA is identified. If implemented, the selected alternative would guide the USDA gypsy moth suppression and regulatory program until new insecticides or application methods are proposed, or environmental analyses identify unreasonable risks to human health or the environment associated with proposed projects. This Programmatic Environmental Impact Statement (PEIS) will be supplemented with annual site specific environmental documents for Forest Service Cooperative Gypsy Moth Suppression Projects and the APHIS Cooperative Regulatory Program, each developed individually by agency. Since development of the Draft PEIS, a redirection of resources within the APHIS Gypsy Moth Program has occurred. This was brought about by the recent increased significance of household moves from the generally infested area in artifically spreading the gypsy moth. This redirection precludes regulatory treatment of campground areas. Site specific information for Forest Service and APHIS Cooperative Projects will be available to the public after the Final PEIS record of decision has been signed and dated.

As required by the NEPA the USDA Forest Service and APHIS developed the environmental analysis documented in this Final PEIS. The analysis examines four alternatives:

1. Chemical insecticide treatments to suppress or regulate gypsy moth infestations.

2. Biological insecticide treatments to suppress or regulate gypsy moth infestations.

3. Integrated pest management (IPM) approach to suppress or regulate gypsy moth infestations.

4. No Action. No gypsy moth suppression or regulatory activities will be financed or implemented by USDA.

THE SITUATION

The gypsy moth, Lymantria dispar (L.), is native to many areas of Europe, Asia, and Africa. This insect was introduced and accidentally released in the United States in 1869 in the State of Massachusetts. Outbreak populations of the gypsy moth presently occur in portions of Connecticut, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, and Vermont.

Isolated infestations, resulting from artificial spread of the insect, presently occur in localized areas of California, Illinois, Michigan, Nebraska, North Carolina, Ohio, Oregon, Virginia, Washington, West Virginia, and Wisconsin.

The current gypsy moth outbreak in the Northeastern United States began in 1969 when defoliated acreage tripled over the previous year. Defoliation remained at very high levels until 1974 when an apparent population collapse began. In 1977, tree defoliation caused by gypsy moth again increased and reached a peak of 1,594,589 acres. In 1979, the number of acres defoliated decreased to 643,509. During 1980, however, the number of acres defoliated increased dramatically to over 5.1 million acres.

Table 1 (pages 5,6) presents a summary of gypsy moth defoliation by State from 1924 to 1980.

MAJOR ISSUES AND CONCERNS

The general buildup of gypsy moth populations has focused public attention on efforts to suppress infestations and regulate spread. The current concerns of State agencies responsible for gypsy moth management are the impacts of larval nuisance, tree defoliation, and tree mortality.

USDA Forest Service cooperative gypsy moth suppression projects strive to protect high-use and high value forested areas from excessive tree defoliation and mortality, larval populations and nuisance within the generally infested States.

The USDA APHIS cooperative regulatory program is aimed at reducing the risk of natural and artificial long-range spread of the gypsy moth and eliminating remote infestations. Remote infestations are known to occur in California, Illinois, Michigan, Nebraska, North Carolina, Ohio, Oregon, Virginia, Washington, West Virginia, and Wisconsin.

In developing the environmental analysis for cooperative suppression and regulatory projects, the USDA Forest Service and APHIS conducted scoping sessions--in Maine, New Jersey, New York, Pennsylvania, and Rhode Island--during September and October 1980, to identify the major issues and concerns to be addressed in the PEIS.

Federal, State and local agencies, affected Indian tribes, environmental and related private organizations, and persons who have shown an interest in gypsy moth suppression or regulatory activities were invited to attend the scoping sessions. Written responses were invited from those who could not attend. The following is a summary of the issues and concerns identified, beginning with those most frequently mentioned.

1. Human health. Concerns were expressed regarding the aerial application of chemical and biological insecticides to forested communities and adjacent populated areas in relation to direct and indirect contamination of drinking water, wells, watersheds, and garden crops. Also expressed were the implied health risks from direct and indirect human exposure to insecticides. Concerns expressed for suppression of the insect were related to possible allergic reactions from contact with larval hairs, larval excrement, and moth wing scales.

2. Public education. Participants expressed a need for increased education in the form of publications, newspaper articles, and films that present the gypsy moth problem in an unbiased manner; additional publications on homeowner self-help techniques and the current status of new techniques; increased use of biological insecticide and parasites; and case studies on the long-term effects of gypsy moth defoliation. In addition, respondents felt that a thorough discussion regarding the purpose of the cooperative suppression and regulatory program was necessary. Such information should include organizational structure of the agencies involved and respective responsibilities.

3. Public involvement and notification. Respondents indicated a need for local determination of project involvement based on State and local meetings and guidance; the need for improved and continuous communications between State, local and community coordinators, and the public regarding areas planned for treatment, treatment dates, cancellation of treatments and rescheduled dates; and an explanation of plans to ensure public safety. A need also was expressed for the identification of officials responsible for administering suppression or regulatory projects and those available to the public to provide project information.

4. Environmental effects. Concern was expressed regarding the need to use short residual insecticides; the effect of insecticides on gypsy moth parasites, predators, honeybees, aquatic insects, and wildlife.

5. Alternative to chemical insecticides. Respondents expressed the desire for a discussion of alternatives to chemical insecticides such as the increased use of biological insecticides, homeowner self-help techniques, and parasites and predators, and their effectiveness and long-term benefits. A need for a status report on the development of other techniques was identified.

6. Availability of past and current Environmental Impact Statements. Some people do not know where to obtain copies of past and current Environmental Impact Statements. A mechanism needs to be developed whereby documents can readily be obtained.

7. Label interpretation. Participants expressed a need to update Environmental Impact Statements with information on registered insecticides; label changes, new insecticides, monitoring, and human health studies.

8. Project administration. Requests were made for a more coordinated approach between the USDA Forest Service, APHIS, and cooperating State agencies; a new funding arrangement for cooperative suppression favoring increased application of biologicals over the lower cost chemical insecticides; increased emphasis on IPM.

9. Federal involvement. Most participants favored State and Federal involvement in cooperative suppression and regulatory projects to provide for coordinated projects utilizing registered insecticides applied under optimum weahter conditions with proper application timing. Such involvement keeps overall costs down, provides for maximum public involvement, and favors the use of biological insecticides.

These concerns and issues were used to guide the discussions in the "Effects of Implementation" and "Alternative Evaluated" sections of this Final PEIS.

SUMMARY OF GYPSY MOTH DEFOLIATION BY STATES
(Calendar Years Beginning in 1924)
Table 1.

YEAR	ME	NH	VT	MA	RI	CT	NY	PA	NJ	DE	MD	TOTALS
1924	71	591	–	163	–	–	–	–	–	–	–	825
1925	–	239	–	48,321	–	–	–	–	–	–	–	48,560
1926	1	960	5	78,193	1,663	–	–	–	–	–	–	80,822
1927	4,985	3,923	2	131,880	126	4	–	–	–	–	–	140,920
1928	5,575	119,757	3	137,121	58	–	–	–	–	–	–	262,514
1929	15,187	440,845	–	95,078	23	–	–	–	–	–	–	551,133
1930	55,174	205,125	–	27,856	66	5	–	–	–	–	–	288,226
1931	20,938	96,690	277	86,694	114	8	–	–	–	–	–	204,721
1932	42,298	43,287	1	200,387	376	46	–	–	–	–	–	286,395
1933	19,718	216,669	2	157,003	4,292	46	–	–	–	–	–	397,730
1934	60,403	285,880	25	128,237	17,750	66	–	–	–	–	–	492,361
1935	92,630	330,195	106	106,097	10,908	833	–	–	–	–	–	540,769
1936	80,944	192,114	–	152,469	3,095	–	–	–	–	–	–	428,622
1937	140,026	72,973	81	393,613	2,063	4	–	–	–	–	–	608,760
1938	120,432	34,122	416	154,348	3,297	1,339	–	–	–	–	–	313,954
1939	202,193	136,772	5,311	143,292	848	4,224	–	–	–	–	–	492,640
1940	204,041	152,797	3,160	125,586	52	–	–	–	–	–	–	485,636
1941	122,386	80,579	980	263,369	707	–	–	–	–	–	–	468,021
1942	850	6,963	49	36,715	–	–	–	–	–	–	–	44,577
1943	10	290	–	34,481	64	–	–	–	–	–	–	34,845
1944	21,221	2,346	210	225,637	640	14	75	6	–	–	–	250,149
1945	210,881	58,517	93,950	456,832	1,280	16	–	11	–	–	–	821,487
1946	203,813	183,943	15,900	217,132	1,645	486	–	–	–	–	–	622,919
1947	–	166	–	7,256	–	–	–	–	–	–	–	7,422
1948	60	21	–	32,386	–	–	–	–	–	–	–	32,467
1949	–	8	–	78,665	–	–	–	–	–	–	–	78,673
1950	2	12	–	4,979	–	375	–	–	–	–	–	5,368
1951	8,195	2,478	1,108	3,185	–	5,673	675	–	–	–	–	21,314
1952	82,715	94,975	26,985	82,372	–	6,005	–	–	–	–	–	293,052
1953	174,999	209,335	120,787	917,996	–	56,215	7,745	–	–	–	–	1,487,077
1954	170,485	154,015	24,650	118,095	–	13,848	10,355	–	–	–	–	491,448
1955	10,810	14,975	8,875	–	–	6,842	10,559	–	–	–	–	52,061
1956	7,285	9,305	12,635	3,830	–	3,458	6,645	–	–	–	–	43,158
1957	120	–	495	16	–	4,909	858	60	–	–	–	6,458
1958	–	–	–	8	–	117	–	–	–	–	–	125
	2,078,448	3,150,867	316,013	4,649,292	49,067	104,533	36,912	77	–	–	–	10,385,209

Table 1. - Continued

YEAR	ME	NH	VT	MA	RI	CT	NY	PA	NJ	DF	MD	MI	TOTALS
1959	1,000	4,000	1,500	382	-	5,980	1,605	-	-	-	-	-	14,467
1960	6,350	4,600	6,132	150	-	15,000	16,490	-	-	-	-	-	48,722
1961	21,340	621	11,834	3,000	-	-	30,685	-	-	-	-	-	67,480
1962	3,998	3,390	6,292	150,000	-	83,290	61,342	-	-	-	-	-	308,312
1963	1,970	8,345	12,020	87,847	-	40,140	22,600	-	-	-	-	-	172,922
1964	-	14,509	23,523	20,787	375	98,552	97,237	-	-	-	-	-	254,983
1965	190	8,451	2,903	17,232	50	86,009	148,366	-	-	-	-	-	263,201
1966	30	20	650	500	110	15,895	34,655	-	5	-	-	-	51,865
1967	825	561	2	909	150	2,731	46,160	-	1,035	-	-	-	52,373
1968	777	5,830	-	3,925	565	16,416	47,525	60	5,025	-	-	-	80,123
1969	1,450	17,160	-	6,060	313	56,881	121,610	830	51,525	-	-	-	255,829
1970	1,080	38,525	-	6,835	1,082	368,706	416,270	10,500	129,835	-	-	-	972,833
1971	820	3,250	790	18,787	8,525	655,107	479,150	598,200	180,595	-	-	-	1,945,224
1972	40	200	4,215	20,480	22,510	513,880	177,605	404,060	226,140	-	-	-	1,369,130
1973	490	30	200	43,970	35,925	333,215	248,441	856,710	254,865	-	-	-	1,773,846
1974	860	-	-	76,903	2,120	120,980	42,350	479,590	28,102	-	-	-	750,905
1975	110	-	15	17,895	435	63,411	9,275	317,880	55,430	-	-	-	464,451
1976	-	-	1,750	29,820	7,540	9,809	26,583	732,310	57,630	-	-	-	865,442
1977	2,010	320	33,435	133,081	125	-	91,313	1,296,550	39,185	-	-	-	1,596,019
1978	4,120	725	29,756	63,042	-	3,835	500,046	452,892	204,830	-	-	-	1,259,246
1979	23,180	5,980	15,411	226,260	655	7,486	162,275	8,552	193,700	10	-	100	643,609
1980	221,220	183,999	75,094	907,075	43,830	272,213	2,449,475	440,500	411,975	-	3	5	5,105,389
	2,370,308	3,451,383	541,535	6,484,232	173,377	2,974,069	5,267,970	5,598,711	1,839,877	10	3	105	28,701,580

HISTORY OF GYPSY MOTH SUPPRESSION[1/]

Gypsy moth suppression activities have been cyclical due to the periodic increases and decreases in the gypsy moth population. Suppression activities have traditionally involved State, county and local government as well as private citizens.

Inconspicious during the twenty years after its introduction, gypsy moth populations exploded in 1889, threatening to overrun Medford, Massachusetts. Unable to deal with the situation, local officials appealed for state assistance. The Commonwealth responded quickly and appropriated funds for control and for a permanent commission to carry out the work.

Soon thereafter, Gypsy Moth Commissioners met with mayors of affected towns, scientists, and officials from the USDA Division of Entomology to seek advice on long range goals and tactics. Largely at USDA urging, a policy of eradication was implemented.

The first recorded use of a chemical to control gypsy moth occurred as part of the Massachusetts eradication effort. The material was an arsenical, Paris green (Forbush and Fernald 1896). The treatment of infested trees and other foliage with Paris green was supplemented by applications of creosote to egg masses; burning of infested trees and shrubbery and clusters of caterpillars; and banding of trees with burlap and sticky materials to either trap the larvae or prevent their ascent of the trees.

The technology of insecticide application lagged far behind scientific understanding of the problem; machines designed for spraying orchards bogged down in the rough, hilly forest terrain. By the end of the 1891 field season it was evident that Paris green could not be used to eradicate the gypsy moth. Besides its poor efficacy, Paris green was often phytotoxic and was easily washed off foliage (Kirkland 1905). The inadequacies of Paris green also generated adverse public reaction.

Once again the Gypsy Moth Commission was forced to turn to the expensive and time consuming methods of gathering egg masses and utilizing traps and sticky bands to stop the larvae. Experimental work on new insecticides continued and, while an effective eradication material was not available in 1892, bromine and chlorine were found to be useful in destroying egg masses in hollow trees. In 1893, a new compound, lead arsenate, proved effective in the field (Forbush and Fernald 1896). For the next 50 years, this material was the standard insecticide in the Northeast for gypsy moth control.

1/ Major sources of this section: "Gypsy Moth: Research toward Integrated Pest Management" USDA Technical Bulletin 1584. (in press)
Thomas R. Dunlap, "The Gypsy Moth: A Study in Science and Public Policy Journal of Forest History, vol. 24, no. 3, 10 p., July 1980.

In 1900, funds were not appropriated by the Massachusetts legislature for the Gypsy Moth Commission and the first gypsy moth campaign ended. In the succeeding years, gypsy moth populations increased such that, during the summer of 1905, populations in Medford, Massachusetts, and surrounding towns were similar to those in 1889.

By 1905 the gypsy moth had spread to other States in New England making an eradication policy impossible with the insecticides and application methodology available at the time. At this point, the USDA Bureau of Entomology became involved in gypsy moth control activities.

In this second campaign, Federal and State officials looked toward biological control, that is, the use of parasites and predators to keep gypsy moth populations below damaging levels. The USDA funded programs to import and establish the natural enemies of gypsy moth that kept it in check in Europe, and States enthusiastically supported the European parasite expeditions. Expectations ran so high that some officials predicted that the biological program would control gypsy moth within two to three years. By 1908, however, scientists were having doubts about biological control as an immediate and economical method. The establishment of gypsy moth parasites and predators was proving more difficult and expensive than had been anticipated. Little was known about the biology and habits of these insects and most parasites did not survive in the new environment. Even though some parasites were found to be preying on gypsy moth, the effect was not noticeable.

Biological control eventually did prove somewhat successful. By the 1920's, parasites and predators were having an effect on gypsy moth populations--but not to the extent of providing relief from defoliation and the nuisance of larvae as orginally expected. Biological control work slowed after 1911 and continued at a reduced rate until World War I and for a few years beyond.

After 1911, State and Federal agencies fell back to a selective approach, treating areas such as roadsides, parks and towns-areas where gypsy moth damage would be visible. In 1922, the gypsy moth reached New York and a barrier zone along the Hudson River was established to confine the insect to New England. A strenuous attempt was made to eradicate isolated infestations outside the barrier zone.

During this period the most important control techniques involved the use of insecticides, mainly lead arsenate. The popularity of insecticides was due to many factors. First was the public's desire for a immediate solution to high, damaging gypsy moth population levels. Second, insecticides could be used without much advance planning and they had immediate visible results. Finally, they could be used by individuals or towns without a need to coordinate activities. Chemical insecticides and improved application equipment made roadside and urban spraying economical and practical.

The barrier zone policy continued until a hurricane struck in 1938 and apparently facilitated the spread of gypsy moth. In the early 1940's, gypsy moth eradication policies were all but abandoned, primarily because lead arsenate and existing equipment were inadequate for large-scale control efforts.

The New York barrier zone was established in part to slow the spread of gyspy moth until new control techniques and methodologies could be developed. In 1939, the insecticidal properties of a synthetic organic chemical, dichloro-diphenyl-trichloroethane (DDT), were discovered.

DDT acted as both a contact and a stomach poison; larvae not killed by contact soon succumbed following ingestion of treated foliage. Less than a pound of DDT per acre killed almost all of the larvae. Soon after, DDT was availabe for general use USDA officials considered ideas of gypsy moth eradication--the first revival of that idea since the turn of the century. By 1956 Federal and State officials had formulated an eradication plan. The first phase involved aerial application of DDT to eliminate outlaying gypsy moth infestations in New York, Pennsylvania, and Michigan. The second phase would involve treatment of gypsy moth infestations in New England. At its peak use in 1957, over two million acres of forest and forested communities were treated with DDT.

During the period of its use, DDT was applied to over 12 million acres of forest in nine Northestern States and Michigan for gypsy moth control (U. S. Environmental Protection Agency 1975).

In the late 1950's and early 1960's, a growing public concern developed over the use of DDT. The material was being described as a "dangerous substance which killed beneficial insects, upset the natural ecological balance and collected in the food chain, thus posing a hazard to man, and other forms of advanced aquatic and avian life" (U. S. Environmental Protection Agency 1975). Starting in 1958, DDT was phased out of USDA cooperative gypsy moth suppression projects. In 1972 the EPA cancelled most uses of DDT.

Since the 1950's, there has been an increase in the research and development of new insecticides. In 1958, a new material, carbaryl, under the trade name of Sevin®, was introduced to replace DDT as the primary agent to control the gypsy moth. Although carbaryl has a much shorter half-life and is generally considered much safer than DDT, the material in certain formulations is highly toxic to honeybees. During the period from 1962 to 1977, almost two million pounds of this material were used by Federal and State agencies against the gypsy moth in the Northeastern United States.

In the late 1960's, an organophosphate, trichlorfon, registered under the name of Dylox®, proved efficacious against the gypsy moth. By early 1970's, two formulations of Dylox had been used in operational gypsy moth programs. During the 1970's, another organophosphate, acephate (Orthene®) and a growth regulator, diflubenzuron (Dimilin®), were registered.

Insecticide research and development in recent years has not been limited to chemicals. During the 1960's, development began on a bacteria that affects many lepidopterous species. The bacteria, B.t., was formulated into an insecticide and registered as Thuricide® and Dipel®, both of which are available today. During that time, the USDA Forest Service also began investigations of a virus that causes a wilt disease primarily in heavy gypsy moth populations. This virus product was refined in the 1970's and registered as GYPCHEK® in 1978. Recently, the USDA successfully isolated and synthesized the sex attractant emitted by female gypsy moths. This material, called disparlure, has been used almost exclusively for detecting isolated gypsy moth infestations. Development and evaluation of the material is currently being conducted by Federal agencies and private industry to be used to confuse male moths and disrupt mating.

Gypsy moth suppession activities have evolved from State-administered projects, like those in Massachusetts in the 1890's to current State/Federal coordinated projects. The failure of earlier policies to check the spread of gypsy moth caused pest managers as well as private citizens during the 1950's to question feasibility of eradication goals in the Northeast. Although gypsy moth eradication policies are still pursued in high risk isolated infestations, they currently follow a concept of IPM.

An IPM approach is possible today because of the different kinds of treatment and methodologies now available. The existence of several chemical as well as biological insecticides allows pest managers flexibility in selecting suppression tactics that will be most effective and pose the least harm to the environment. An IPM strategy also provides for more public involvement in the selection of treatment areas and suppression tactics.

Because of the range of gypsy moth today, infestations have been classed as three distinct types: 1) generally infested area; 2) periphery of the generally infested area; and 3) remote infestations. The generally infested area includes the Northeastern States of Connecticut, Massachusetts, Rhode Island, New Jersey, and sections of Maine, New Hampshire, Vermont, New York, Pennsylvania, and Maryland. Federal coordination of gypsy moth projects in this area is the responsibility of the USDA Forest Service and APHIS each with specific goals.

The goal of USDA Forest Service cooperative suppression is to provide to State agencies within the generally infested area Federal financial and technical assistance to meet short term objectives of reducing gypsy moth larval populations and nuisance, tree defoliation, and mortality. The goal of the USDA APHIS is to cooperatively conduct progams with State agencies to eradicate isolated infestations located outside of the generally infested area and to retard the artificial and natural spread of gypsy moth from the generally infested area. The continued cooperation between USDA Forest Service, APHIS, and State agencies will facilitate implementation of an IPM strategy for gypsy moth suppression and regulatory projects.

The present policy of the USDA toward the gypsy moth within the generally infested area should not be confused with eradication policies of earlier years. No attempt is being made to treat all of the infested area. Parasites, predators, and natural mortality factors are being relied upon to exert biological pressures on the majority of gypsy moth infestations. Treatment of localized high-value and high-use areas in cooperative suppression projects is intended to meet short-term objectives identified by cooperating States within the generally infested area. Quarantine and inspections are utilized to lower the risk of spread of the gypsy moth from the generally infested area.

USDA PARTICIPATION REQUIREMENTS

Laws applicable to the USDA Forest Service and APHIS that govern participation in the proposed cooperative suppression and regulatory project are:

A. The Cooperative Forestry Assistance Act of 1978 (Pub. L 95-313), which incorporated provisions of the Forest Pest Control Act of 1947 (now repealed), provides authority for Federal/ State cooperation in forest insect and disease management. The law recognizes that the Nation's capacity to produce renewable forest resources is significantly dependent on non-Federal forest lands. Therefore, the Secretary of Agriculture is authorized to assist in the control of forest insects and diseases on non-Federal forest lands in order to (a) enhance the growth and maintenance of trees and forests and (b) promote the stability of forest-related industries, and employment associated therewith, through protection of forest resources.

B. The Plant Quarantine Act of 1912 as amended (7 USC 151-165, and 167); the Federal Plant Protection Act of 1957 (7 USC 150aa-150jj); and the cooperation with States in Administration and Enforcement of Certain Federal Laws approved September 2, 1963 (7 USC 450). These authorities direct the development of APHIS activities for the regulation of the natural and artificial spread of the gypsy moth within the quarantined area, and the eradication of isolated gypsy moth infestations outside this area.

C. The National Environmental Policy Act of 1969 (Pub. L 91-190) requires detailed environmental analysis of proposed major Federal actions that may affect the quality of the human environment. Generally, the courts have regarded those State actions which involve potential environmental consequences, and for which purpose Federal funds are granted, as Federal actions (Atherton 1977).

D. The Federal Insecticide, Fungicide, and Rodenticide Act of 1947, as amended by the Environmental Pesticide Control Act of 1972 (Pub. L 92-516) and the Federal Pesticide Act of 1978 (Pub. L 95-36) require that insecticides used on cooperative Federal/State suppression projects be registered with the EPA. The registration process assures that in view of the available scientific data, pesticides applied according to label instructions pose no unreasonable risks to human health or to the environment.

USDA policies considered in the evaluation of cooperative gypsy moth suppression and regulatory projects are:

A. A principal mission of the USDA is to assure an adequate supply of high quality food and fiber and a quality environment for the American people. The USDA gives special emphasis to the development and use of efficient and environmentally acceptable integrated pest management systems. All methods including pesticides are considered in pest management programs.

B. Forest Service policy relevant to forest pests is to protect and preserve the forest resources of the Nation against destructive forest insects and diseases. Pest population outbreaks will be prevented or suppressed by methods that will restore, maintain, and enhance the quality of the environment. These objectives are attained on non-Federal lands through cooperation with the State foresters or equivalent State officials. Projects approved for cooperative financing must meet Forest Service standards for environmental acceptability. Approval is based on the results of an environmental analysis documented in a site specific environmental document.

C. The purpose of the APHIS/State cooperative regulatory program is to retard the artificial, long-range spread of the gypsy moth. This is accomplished by implementation of Federal and State gypsy moth quarantines, and by inspections at infested sites from which the gypsy moth may be transported, and by treatments designed to eradicate isolated infestations of the pest, thus delaying spread to its fullest possible range in the United States. A program to retard natural spread of the insect from the generally infested areas of the Northeastern States has been discontinued for reasons as discussed on page 1, paragraph 1. Results of the cooperative gypsy moth survey programs provide information about distribution of the pest that serves as a guide in direction of eradication and regulatory control activities.

MANAGEMENT REQUIREMENTS

Public Notification

In accordance with the NEPA process, the USDA encourages public involvement in the development of cooperative gypsy moth suppression and regulatory projects. Public notification procedures relavent to these projects include:

- Providing public notice of scoping meetings.

- Making EIS and related documents available to inform those agencies, Indian tribes, and individuals who may be interested in or affected by proposed actions.

- Publishing notice of proposed suppression or regulatory actions in the Federal Register.

In addition, State agencies that participate in cooperative gypsy moth suppression and regulatory projects are required by the USDA to actively seek public participation and involvement at the local level and to increase the awareness of the public through announcements in local news media. The following guidelines are in general followed by cooperating State agencies to encourage public participation and awareness.

- The cooperating State agency provides concerned county or municipal agencies with biological data so that they can determine the need for suppression activities.

- County or municipal governments interested in suppressing gypsy moth populations must petition the State agency for inclusion in the cooperative suppression program.

- State agencies that anticipate the need for Federal assistance assist in the preparation of environmental documents required by NEPA.

- The lead State agency requires that county and muncipal governments hold advertised public meetings to discuss the gypsy moth problem, proposed alternatives or actions, and methods of cost sharing. In some States, local governments may be required to adopt a resolution declaring the gypsy moth a "Public Nuisance" at a legally advertised public meeting.

- County and muncipal governments may be required to assist in the administration and coordination of the suppression program, name local coordinators, and provide funding and labor.

- County and local governments are required to notify by all occupants living in proposed treatment blocks by first class mail. Residents can object to the program and prevent treatment of their property.

- State, county, and local municipalities notify beekeepers in and adjacent to treatment blocks as to the time of treatment, insecticide to be used, and the availability of pollen traps if applicable.

- County and local governments publish legal notices of proposed treatment or action dates in local newspapers.

- State agencies identify individuals who will answer questions from the public concerning the proposed actions.

Additional detail on public participation and notification relative to individual State suppression or regulatory programs will be provided in annual site-specific environmental documents.

Treatment Area Selection

For Forest Service cooperative suppression projects, the specific method used by each State for selecting treatment areas will be fully addressed in the respective State proposals included in each annual site-specific environmental document.

In general, public involvement at the community, township, county, and/or State level is an integral part of the treatment area selection process. Local news media and public meetings are used to inform the public that financial and technical assistance for suppression and regulatory projects are available through the State. Responding to requests from the local level, the State conducts field evaluations to determine if the proposed areas meet the necessary criteria for treatment.

Field evaluations of proposed treatment areas include assessment of egg mass size, numbers, and viability, previous defoliation, and land use category. Local residents decide whether or not to participate in a cooperative gypsy moth suppression project for those potential treatment areas that meet specific State criteria in the above categories.

APHIS regulatory programs for isolated infestations are planned once the limits of the infestation are defined. Local news media and public meetings are used to involve the public in the development of these treatment projects.

Insecticide Selection

The insecticide selection criteria used by each State will be specifically addressed in each annual site-specific environmental document for USDA Forest Service cooperative gypsy moth suppression projects.

In general, for USDA Forest Service cooperative suppression projects and APHIS regulatory projects, the insecticide selection process considers the project objectives, environmental sensitivities of proposed treatment areas, and the biological and economic efficiency of each insecticide. In addition:

1) the insecticide must be registered with the EPA for use on the proposed site.

2) the method for application must conform with label specifications.

Performance Standards

Insecticide Application Procedures. The ultimate fate of insecticides released in the atmosphere depends on the insecticide and its formulation, the type of equipment used to apply the material, and the atmospheric conditions during the time of application.

The operational planning of cooperative gypsy moth suppression and regulatory projects will maximize insecticide deposition on the target area. Gypsy moth suppression and regulatory projects will be undertaken using small, single or multiple engine, fixed-wing aircraft, helicopter, or ground equipment. These types of aircraft are highly manuverable, operate at slow airspeeds close to the canopy, and ensure optimum control of insecticide application. Pilots can easily identify hazards and treatment boundaries, and make the necessary application system shutoffs. Low-elevation application directly over treatment areas minimizes insecticide drift out of and within the target areas. In addition, observer planes will be used on most projects to direct aerial application to the treatment areas, to notify pilots of exclusion areas (no treatment), and to monitor delivery of the insecticide--its ejection from the aircraft, its deposition and drift. In this way, any mechanical problems can be identified quickly and adjustments can be made in the application, or the project can be shut down if treatment is not reaching the target areas. In selected areas where laws prohibit the aerial application of insecticides, ground equipment will be used.

Individual target areas will be small, usually limited in size to forested residential communities, recreational sites, selected high-value forest stands, or well-defined isolated infestations. Consequently, there should be few, if any, treatment exclusion areas within most treatment areas. Target and exclusion areas are identified on large-scale maps that will be used to orient the aerial applicators. Target areas will be designated with helium-filled weather balloons or some other technique that will be highly visible from the air. Treatment exclusion areas will be observed by aerial applicators during pretreatment overflights of all areas.

Insecticides will be applied only when weather conditions favor effective insecticide penetration and dispersal into the target areas. Suppression and regulatory projects will adhere to the following guidelines:

1) To minimize drift, application of insecticide will be made when the wind speed is between 2 and 10 mph.

2) High temperatures cause evaporation of the insecticide before it reaches the target. The amount of evaporation depends on the type of insecticide being used. Generally, insecticide application should not be made when temperatures exceed 80°F.

3) Insecticide application will be suspended when precipitation is imminent. If precipitation occurs, insecticides will be applied only when precipitation ceases to drip from target foliage.

4) The treatment will be suspended whenever the insecticide does not appear to be settling in the target area.

Insecticide application is best accomplished in the early morning (4:30 am to 10:00 am) and late afternoon-early evening hours (4:00 pm to 9:00 pm). Observations made during past insecticide projects have shown that for every five acceptable morning treatment periods, there are an average of two acceptable evening treatment periods occurring over the same time span. Early morning treatment, when most people are still in their homes, will minimize human exposure to insecticides.

Gypsy moth suppression projects utilize small, single or multiple engine aircraft that afford increased selectivity, close drift control, slower application speeds, and greater maneuverability. Use of observer aircraft to guide aircraft to the treatment areas, and to observe the actual application of insecticide, can assure that proper application procedures are being followed. The same basic standards are considered when applying pesticides with ground equipment.

Monitoring Procedures. Monitoring will be a continual process taking place before, during, and after treatment application. State cooperators begin the process by conducting egg mass surveys to determine treatment areas. The egg masses in selected areas are monitored for winter survival and the effects of parasites and predators to determine if treatment is still needed.

During insecticide application, treatment deposit cards or a similar technique can be used to check for treatment deposition and drift. On some projects, observer aircraft will be used during actual insecticide application to monitor application characteristics. Daily weather measurements of temperature, wind speed, and relative humidity will be made on site, and communication with the U. S. Weather Bureau will ensure that insecticide application is made under the proper weather conditions.

Following treatment activities, project personnel will visit representative treatment blocks and assess larval mortality. Later in the summer, aerial defoliation estimates will be conducted statewide. Ground estimates may also be made if necessary. In the fall, egg mass counts will be made in selected areas to measure population reduction.

AFFECTED ENVIRONMENT

A large number of biological, physical, economic, and social factors are potentially affected by the alternatives for gypsy moth suppression and regulatory program. These factors are discussed below.

BIOLOGICAL FACTORS

Gypsy Moth

Since 1869, gypsy moth infestations have spread naturally from Massachusetts throughout New England, Pennsylvania, and New Jersey. Artificial spread has lead to infestations as far west as California and to the south in South Carolina. At epidemic levels, the gypsy moth causes host-tree growth loss and mortality, larval nuisance, and a reduction in the aesthetic benefits from high-value forests and recreational areas.

The duration of the present gypsy moth outbreak cannot be predicted. Localized population buildup continues to occur within the generally infested area. New infestations continue to spread outside of the generally infested area of the Northeast to adjacent States as a result of the natural spread of the insect. Artificial spread of insect stages continues to result in infestations in States far removed from the generally infested area.

Host Vegetation

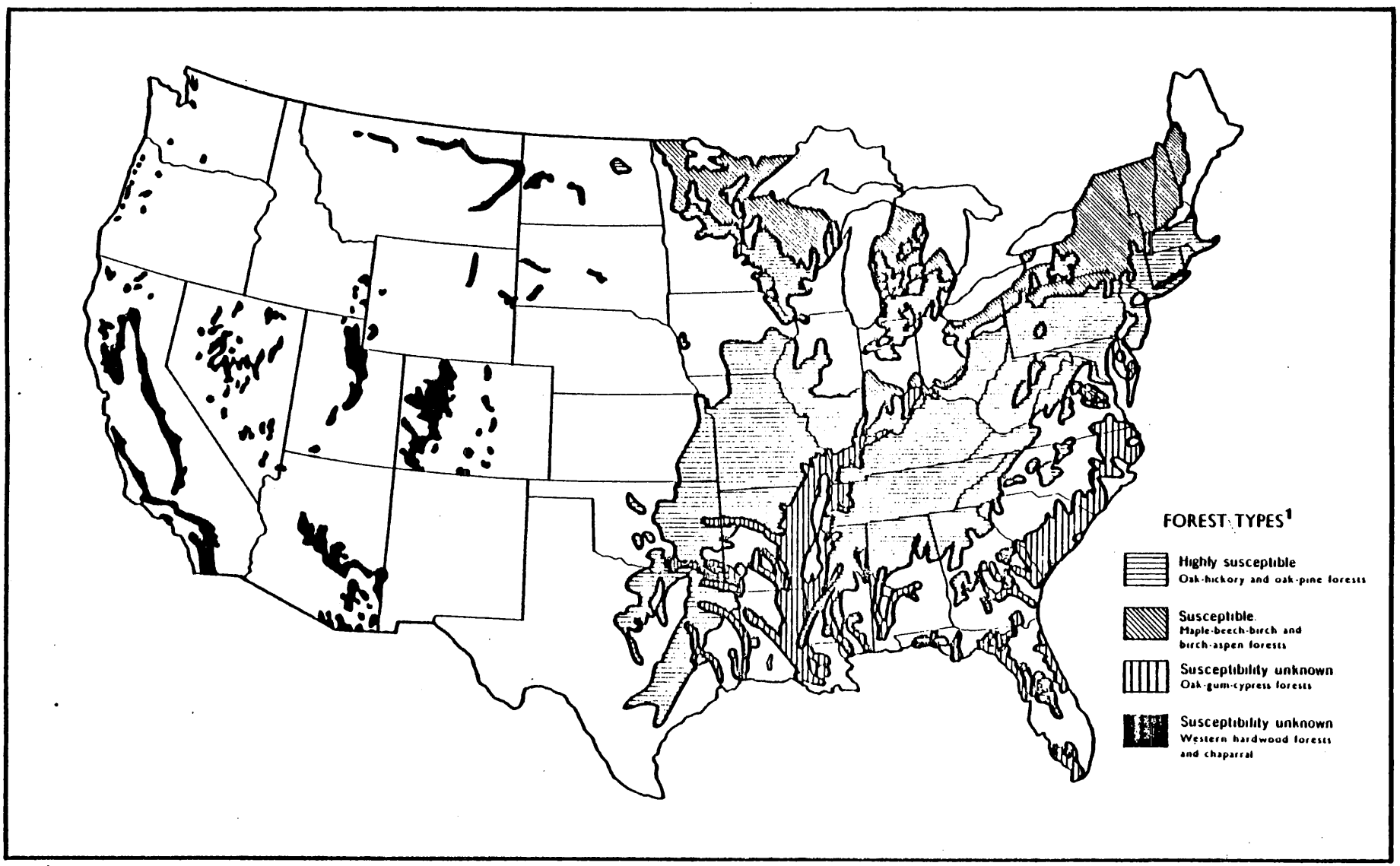
The gypsy moth feeds on a variety of vegetation. Figure 1 depicts forest host types in the continental United States that are susceptible to gypsy moth infestation. Preferred hosts are dry-site oak species characteristic of early to mid-successional stages, especially white oak. Additional hosts include apple, basswood, gray and river birch, hawthorn, poplar, beech willow, and other oaks. Less desired but still attacked are black birch, yellow birch, paper birch, cherry, cottonwood, elm, blackgum, hickory, hornbeam, larch, maple, sassafras, hemlock, spruce, and pine. Late-instar gypsy moth larvae feed on the foliage of several species that early-instar larvae
normally avoid, particularily hemlock, pine, and spruce. The gypsy moth avoids ash, balsam fir, butternut, black walnut, catalpa, red cedar, flowering dogwood, American holly, locust, sycamore, yellow or tulip poplar, and shrubs such as native laurel, rhododendron, and arborvitae. However, in outbreak situations, gypsy moth larvae will feed on almost all vegetation. As gypsy moth populations spread to the south and west, the number of plant species known to be susceptible to gypsy moth will undoubtedly increase.

Human Population

Permanent residences occur throughout the range of vegetation susceptible to gypsy moth infestation. On private land, permanent and seasonal houses are located in forested residential areas and in remote wooded sites. Entire developments and forested communities are designed and constructed to

Figure 1

Gypsy Moth Susceptible Forest Type



[1] "Major Forest Types", in National Atlas, Separate Sheet Number 182, U.S. Ecological Survey, Washington, DC

maintain a forest setting. On public lands, forested areas are developed into campsites, recreational areas, campgrounds, picnic areas, hiking trails and scenic areas. Visitors include campers, canoeists, anglers, hikers, and others.

Most of the recreational use is concentrated around water, scenic areas, or in parks. The distribution of these visitors is not uniform throughout the year and most of the areas visited are not treated with chemical insecticides.

Nontarget Organisms

There are many species of fish, mammals, reptiles, birds and amphibians that inhabit the various forest types susceptible to gypsy moth infestations. Other nontarget organisms occuring in gypsy moth susceptible host types include terrestrial and aquatic insects; pollinators, including bees needed for honey production; gypsy moth parasites and predators; and soil organisms. Some insect populations may be reduced temporarily by insecticides used for gypsy moth suppression.

Gypsy moth suppression and regulatory projects are not expected to adversely affect threatened and endangered species that may be found within treatment areas. However, pursuant to Pub. L 93-205, consultation procedures will be initiated with the USDI Fish and Wildlife Service for any projects that may affect endangered species.

PHYSICAL FACTORS

The generally infested area consists of New Jersey, Rhode Island, Connecticut, Massachusetts, and parts of New Hampshire, Vermont, Maine, Pennsylvania, New York, and Maryland. The topography of this area is extremely variable. Some sections are hilly but most of the region consists of plateaus and mountains more than 1,000 feet in elevation. The highest elevation is Mount Washington in New Hampshire at 6,288 feet. Areas in the Champlain Valley and bordering the St. Lawrence River, Lake Ontario, and the Atlantic Ocean are nearly flat and less than 400 feet in elevation.

More than half of the region has been glaciated. The advance and retreat of glaciers has carved U-shaped valleys, steep smooth-sided mountains, peat bogs, lakes, and a heterogeneous mantle of glacial drift a few inches to many feet in depth, ranging from boulder fields to stone-free slit loams. North of the glacial boundary, soils developed from this glacial drift. To the south, soils developed in residium from underlying or nearby rocks, and along the Coastal Plain from marine sediments.

About 40 percent of the once forested area is now treeless. Along the coasts and in the river valleys, extensive areas have been developed into cropland and metropolitan areas, especially along the Atlantic seaboard from Maryland to Maine.

ECONOMIC FACTORS

Applying economics to gypsy moth infestations requires some measure of value associated with the resources affected. The principal values to be protected by forest residential owners are backyard recreation and the enjoyment of natural beauty. Managers of commercial campgrounds are generally concerned with the impacts of larval nuisance, the defoliation, and tree mortality on property values and recreational use. Managers of both public and quasi-public recreation areas are most concerned with the impacts of nuisance and defoliation on recreational opportunities. Forest stands are valued for various reasons. Some areas are important for timber production; other areas are important for wildlife or scenic beauty; while others have recreational values.

The economic standard for measuring the financial magnitude of gypsy moth infestation is based on the homeowners' or land managers' demonstrated willingness to pay for suppression measures. The amount of money that property owners or land managers are willing to spend for suppression efforts is often determined by the importance they attach to a particular good or service. Aesthetic benefits gained by protecting recreational areas are difficult to ascertain; however, they are present. In forest stands, some of the value loss may be recovered if the trees lost are of merchantable size and marketable. The merchantability and market conditions for salvaged timber vary by locality. Economic factors associated with the regulatory aspects of the gypsy moth problem involve control costs and resource losses prevented by eradicating outlying infestations or limiting spread.

SOCIAL FACTORS

Suppression projects are conducted to minimize host-tree defoliation and mortality and provide larval nuisance abatement. Some forested residential property owners view gypsy moth suppression projects as necessary to prevent loss of property values. Owners of recreational property may view gypsy moth infestations as a direct cause of reduced income due to reduced aesthetic values of campgrounds and increased larval nuisance problems. Others question the potential risks of adverse effects of chemical insecticide. Through increased public involvement efforts, individuals who desire suppression assistance can be identified and become involved in suppression project activities. Likewise, through the public involvement process, individuals who prefer to avoid the use of insecticides can be identified and their property excluded from insecticide application.

EVALUATION CRITERIA

Criteria were developed for evaluating alternatives for cooperative gypsy moth suppression or regulatory projects. The criteria are based on comments concerning past gypsy moth Environmental Impact Statements and the issues and concerns expressed at USDA Forest Service-sponsored scoping sessions. These issues and concerns are summarized on pages 2-4 of this Final Programmatic Environmental Impact Statement. An evaluation criterion not applicable to Forest Service cooperative suppression projects is Biological Criterion #3. An evaluation criterion not applicable to the APHIS regulatory programs is Economic Criterion #1.

BIOLOGICAL CRITERIA

1) Minimizes gypsy moth-caused tree defoliation and mortality.

2) Reduces gypsy moth populations.

3) Reduces risk of gypsy moth spread from generally infested area and establishment of isolated infestations outside the generally infested area.

4) Rigorously seeks to minimize human exposure to chemical insecticides.

5) Minimizes unavoidable impacts on nontarget organisms.

PHYSICAL CRITERIA

1) Minimizes adverse impacts on soil and water, and water within treatment areas.

2) Minimizes adverse impacts on nontarget areas.

ECONOMIC CRITERIA

1) Minimizes monetary losses in forested recreation areas, watersheds and high value forests, and losses incurred by forested residential landowners from gypsy moth impacts.

2) Demonstrates favorable economic efficiency.

SOCIAL CRITERIA

1) Minimizes nuisance problems caused by the presence of gypsy moth larvae.

2) Provides for public involvement in cooperative gypsy moth suppression and regulatory project decisions.

3) Addresses public concern over the use of and the exposure to insecticides for gypsy moth suppression and regulatory projects.

ALTERNATIVES CONSIDERED

The alternatives for the USDA Cooperative Gypsy Moth Suppression and Regulatory Program were developed from the concerns and issues raised during the 1980 scoping sessions and comments regarding alternatives presented in past Environmental Impact Statements. The considerations included: project effectiveness with regard to the gypsy moth; impact on nontarget organisms (including humans); impact on nontarget areas; economic efficiency; and public acceptance.

The following action alternatives meet the objectives of State suppression projects, address issues and concerns raised at the scoping session, and adhere to USDA guidelines governing Forest Service and APHIS participation in gypsy moth suppression and regulatory projects. The NEPA guidelines for Environmental Impact Statements also require the identification and evaluation of a no-action alternative, which is interpreted here to mean no Federal cooperative suppression and regulatory program.

The four alternatives considered are:

1. Chemical insecticide treatment to suppress or regulate gypsy moth infestations.

2. Biological insecticide treatment to suppress or regulate gypsy moth infestations.

3. IPM approach to suppress or regulate gypsy moth infestations.

4. No action. No gypsy moth suppression or regulatory activities will be financed or implemented by USDA.

CHEMICAL INSECTICIDE TREATMENT

The chemical insecticide treatment alternative would provide Federal financial assistance to cooperating State agencies for proposed projects utilizing only chemical insecticides such as carbaryl, trichlorfon, diflubenzuron, and acephate. These insecticides have successfully achieved the desired objectives in previous suppression and regulatory projects and are currently registered by the EPA for application against the gypsy moth.

During aerial application, insecticide droplets can settle into inconspicious streams on ponds that are not visible from the air. Soil, water, and animal contamination risks can be minimized by using the proper type of application equipment, proper calibration of this equipment, adherence to strict standards for site and insecticide selection, and by following the operational plan for the project, including the use of buffer strips where necessary.

Exposure risks are greatest for those individuals involved in the actual mixing and application of insecticides. Insecticide exposure to individuals living in treatment areas can be minimized by remaining indoors during insecticide application (Schultz 1979).

Proper safety clothing and procedures will minimize any risk to individuals involved in these tasks. Safety plans will be developed to address and make contingencies for items such as pesticide spills, exposure, and poisoning. A general discussion of mitigation measures is presented in the MANAGEMENT REQUIREMENTS section of this Final PEIS beginning on page 14. A more detailed discussion of mitigation measures will be presented in annual site-specific environmental documents.

BIOLOGICAL INSECTICIDE TREATMENT

The biological insecticide treatment alternative would provide Federal financial assistance to cooperating State agencies for projects using only biological insecticides. The biological insecticides considered and evaluated during the environmental analysis were formulations of *B.t.* and the gypsy moth NPV. Both are registered by the EPA for application against the gypsy moth.

The biological insecticides are considered environmentally safe and are not known to present any human health problems. Exposure to any insecticide should be avoided and can be minimized by remaining indoors during insecticide application.

INTEGRATED PEST MANAGEMENT

The IPM alternative would provide Federal financial assistance to cooperating State agencies to support insecticide application in an IPM strategy for gypsy moth suppression and regulatory projects. The components of this strategy include quarantines, inspections, biological and/or chemical insecticide application, parasite and predator population management, application of the gypsy moth mating disruption pheromone, homeowner self-help, sterile male moth release, and forest stand manipulation.

Mitigating measures related to insecticide application are discussed under the chemical insecticide and biological insecticide alternatives.

NO ACTION

The no action alternative would result in no Federal funds for State suppression projects proposed for financing by USDA Forest Service or for APHIS regulatory projects.

Although Federal funds would not be provided under this alternative, State agencies, communities, or individuals would not be precluded from financing their own action against the gypsy moth. Federal technical assistance would continue to be available to State agencies.

EFFECTS OF IMPLEMENTATION

CHEMICAL INSECTICIDE TREATMENT

Implementation of the chemical insecticide treatment alternative will, in the year of treatment, reduce or eliminate gypsy moth populations and protect the foliage of the host trees, and provide larval nuisance abatement. The application of chemical insecticides will temporarily reduce populations of some nontarget insects, including beneficial insects. There is no documented evidence that chemical insecticides, as used in gypsy moth suppression projects and regulatory programs, have an adverse impact on human health. Treatments discussed herein are economically efficient. Public anxieties concerning chemical insecticides, however, will remain.

The general characteristics of the chemical insecticides considered for use--diflubenzuron, carbaryl, trichlorfon, and acephate--are presented in Table 4, page 54. A detailed discussion of the biological, physical, economic, and social effects of implementing the chemical insecticide treatment alternative follows.

Biological Effects

The chemical insecticides proposed for use are contact and stomach insecticides. Contact insecticides will kill gypsy moth larvae through contact, they do not have to be ingested to be effective. These insecticides take effect within 1 to 2 days after application, except diflubenzuron which does not take effect until gypsy moth larvae go through a molting phase. A successful treatment with chemical insecticides (except diflubenzuron) produces a rapid knockdown of gypsy moth larvae within hours and a subsequent reduction of at least 90 percent in the number of live larvae present and feeding within 1 to 2 days. Chemical insecticide will result in protection of host foliage of at least 70 percent and at least a 90 percent reduction of the gypsy moth population.

The application of any of the chemical insecticides considered will suppress gypsy moth populations in that year. However, if surrounding untreated areas are heavily infested with gypsy moth, an application of the chemical insecticides may be required the following year and, in some regulatory cases, the same year due to reinfestation of the treatment area.

The impact of chemical insecticide on nontarget organisms, including humans, is different for each insecticide and will be discussed separately. Background information on each of the insecticides, except diflubenzuron, has been presented in past Environmental Impact Statements (USDA 1974, 1978), and is summarized below. The background information on diflubenzuron follows:

Diflubenzuron. Diflubenzuron is an insect growth regulator formulated as a 25 percent wettable powder (Dimilin W-25®). Studies have been made concerning the effects of diflubenzuron on a number of nontarget species in the forest ecosystem (USDA 1975; Willcox and Coffey 1978).

In these studies, several different forest ecosystems were treated with Dimilin W-25 at rates from 0.03 to 0.06 pounds of active ingredient per acre. Following application of Dimilin, soil microbes and invertebrates, terrestrial insects--including predators and parasites of the target species--aquatic insects and other nontarget crustaceans, fish, small forest mammals, and birds were monitored for the effects of treatment. No treatment related effects were observed with elements of the soil community, including soil microbes and fungi, soil inhabiting mites, and collembolans. It was shown that diflubenzuron, at the rates applied, had no effect on the organisms that are involved in degradation and utilization of the forest leaf litter. In the studies of the terrestial insect, the single application of diflubenzuron had no effect on the free flying, forest-inhabiting insects. Honey bees were unaffected when hives were placed directly within test areas. The effects monitored included honey production, egg production by the queen, and brood hatch development and survival (Willcox and Coffey 1978).

Because of the single low dosage application that was used in the forest environment, the impact of the aquatic community was nondetectable at all trophic levels. This was also the case with the higher elements of terrestial forest ecosystem. Even though potential exposure to insectivorous small mammals and birds was possible, no treatment related effects were observed. Species composition and territorial distribution remained unchanged (Willcox and Coffey 1978).

A number of other studies have been conducted in aquatic habitats to determine the effect of diflubenzuron on aquatic insects and nontarget crustaceans (Mulla et al. 1975; Steelman et al. 1975; and Miura et al. 1975). Diflubenzuron has been found to reduce populations of certain sensitive nontarget crustaceans, primarily water fleas, cyclops and immature copedpods, as well as certain species of aquatic insects (mayflies, corixids, and notonectids).

The effect on the aquatic environment is extremely variable and, although the species diversity in this habitat is often altered, populations of the nonsensitive forms adjust the overall community numbers to counteract the effects. The limited environmental impact due to the nonpersistence of diflubenzuron is, therefore shortlived, and population recovery of the more sensitive species occurs within 14 to 28 days in most cases (Willcox and Coffey 1978).

The acute toxicity of diflubenzuron to mammals has been investigated by Phillips-Duphar B.V., Harris Laboratories, and the Huntingdon Research Center (Willcox and Coffey 1978). Because of its mode of action, the interruption of chitin synthesis on the insect, diflubenzuron has low mammalian toxicity. Diflubenzuron (40 mg technical) was shown to be a marginal eye irritant, but 50 mg in an aqueous gum tragacanth solution was not irritating. The 25 percent wettable powder also was not irritating to the eye (0.5 mg in 0.1 percent saline). When diflubenzuron was tested for skin irritation properties, it was found to be nonirritating as either the technical material or 25 percent wettable powder on both abraded and nonabraded skin.

The very low toxicity of diflubenzuron for mammalian and nonmammalian species exclusive of insects and certain chitin containing arthropods is in part related to the ability of the compound to be absorbed by the animal exposed and its ability to biochemically detoxify and eliminate diflubenzuron from its system (Willcox and Coffey 1978).

Diflubenzuron was not shown to be mutagenic or carcinogenic in a number of feeding studies with test mammals (Willcox and Coffey 1978). Diflubenzuron is registered for "forest use only"; the EPA definition of forest being a concentration of trees and related vegetation in a nonurban area sparsely inhabited by or infrequently used by human beings.

Carbaryl. Carbaryl is a broad spectrum organocarbamate commonly known by the trade name Sevin®.

Carbaryl is effective against most insect orders (Haynes et al. 1957; Barrett 1968). Application for gypsy moth is likely to adversely affect some beneficial insects. However, any reduction in nontarget insects that may occur as a result of carbaryl application is temporary (Karael 1973; Moulding 1972). Aquatic insect populations are not expected to be adversely effected. Although carbaryl is toxic to honeybees, different formulations of carbaryl have different levels of toxicity. It is known that the Sevin 80S is more toxic than the Sevin 4 Oil formulation. The difference in toxicity is due mainly to the manner in which these formulations dry on the target foliage which determines how readily the insecticide can be picked up by honeybees and transported to the hive. Precautionary measures can be taken to protect apiaries such as locating hives beyond the flight range until 1 week after application, as stated on the Sevin 4 Oil label, and using pollen traps.

The use of carbaryl has no direct adverse effects on amphibians or reptiles (Romine and Bussian 1971; Willcox 1972) or fish (Tompkins 1966; Willcox 1972; Pillow 1973).

Carbaryl lowers the cholinesterase levels in many animals. Cholinesterase splits acetylcholine, the chemical responsible for forming the bond necessary to carry an impulse through the nervous system. If the acetylcholine is not split, the impulse is repeated again and again, and a severe lowering of cholinesterase will result in nerve poisoning symptoms. This effect in most animals is reversible, even in the presence of continuing symptoms. Some carbaryl may be stored temporarily in body tissues, but it does not accumulate. Depressed brain acetycholinesterase activity of forest birds was reported following application of 1.0 lb carbaryl per acre in Montana (Zinkl et al. 1977), while split treatments (0.31 and 0.69 lb carbaryl per acre) in Maine revealed no depression (Gramlich 1979).

In another study of breeding birds' response to an aerial spray of carbaryl, Zinkl et al. (1979) reported no significant effects on the numbers of breeding birds, nesting success, mortality rates, or the activities of brain cholinesterase.

Observations by Connor (1960) on 49 species of birds exposed to carbaryl failed to reveal any adverse effects on their behavior, conditions, or on reproduction and rearing of young.

An indirect effect of carbaryl spraying to birds may be a depletion of available food, which alters bird activity (Doane and Schaefer 1971). The investigators felt that nestlings may be particularly affected in large spray blocks. They also pointed out the need for more study of the bird-insect control relationship.

Split application totaling 2.0 lb carbaryl per acre in New Jersey resulted in graduated decline in numbers and diversity of songbird communities (Moulding 1972). The effects persisted through the following year and could represent: (1) opportunistic feeding outside the treated area; (2) reduced reproductive success; and (3) shift in nest site loyalty.

In the presence of sodium nitrite and an acidic media, N-methylcarbamate insecticide carbaryl forms nitrosocarbaryl. This derivative of carbaryl had been shown to cause mutations in certain microbial organisms. However, carbamate insecticides should not produce any significant amount of nitrosos derivatives at the levels that are normally found in the environment (Uchiyama et al. 1975).

Harry (1977) complied an extensive review of human exposure to carbaryl. despite almost universal exposure in the United States over a period of more than 20 years it seems that the safety record of carbaryl is almost unparalleled by any other insecticide. Controlled human studies with carbaryl have been conducted at dosages sufficient to cause significant adverse effects. One investigation showed that daily administration of carbaryl to human volunteers at 0.06 and 01.3 mg/kg/day for 6 weeks caused only slight signs and symptoms attributable to the insecticide (Wills et al. 1969). For carbaryl, the oral LD_{50} (amount necessary to kill half the animals in a test population) for rats is 500 mg/kg of body weight. Calculations based on this data indicate that it would take 34 grams to kill a 150-pound person. Additionally, there is little likelihood of oral exposure to humans in a gypsy moth suppression or regulatory project.

The carrying agent and emulsions of the Sevin 4 Oil formulation as with other insecticides, are a trade secret. However, investigations have shown that the formulation contains no significant quantities of polynuclear aromatics; compounds suspected of being carcinogenic. Nonionic polymers of polyoxyethylene ethers and nonyl phenol substances which may cause Reye's Syndrome are not present.

There is some evidence to suggest that carbaryl may have teratogenic (causes birth defects) potential. The lowest dose that caused teratogenicity in dogs (Smalley et al. 1968) was 6.25 mg/kg/day or 17.8 per day in the diet; no effect was observed at 3.25 mg/kg/day or 8.9 ppm. In a study with mice, (Innes et al. 1969) showed effects at 5 mg/kg/day of body weight, which was probably about 14.2 ppm (Dolinger and Fitch, undated).

It is highly unlikely that a single application of carbaryl such as that applied to treatment areas during gypsy moth suppression or regulatory projects would pose any human health hazard. In 1978 the New Jersey Department of Health, Epidemiologic Studies Program-Pesticides, monitored people residing in gypsy moth treatment areas. Following carbaryl application, researchers were unable to detect the presence of a metabolic indicator of carbaryl in the urine of homeowners residing in the treatment area. By contrast, pesticide mixing and loading personnel exhibited levels of the indicator metabolite. However, a study of carbaryl formulators, conducted by the New Jersey Epidemiologic Studies Program during 1967-73, found no relationship between excessive and long term exposure to carbaryl and chronic adverse health effects (NJESP 1974). The 1978 study further suggested that individuals who remain indoors during insecticide application receive no measurable exposure to the material. The 1978 study concluded that the aerial application of carbaryl to forested communities as conducted resulted in no measurable threat to human health (Schulze 1979).

The question of potential teratogenic effects in humans is addressed in a letter dated May 16, 1979, from Mr. Douglas D. Campt, Director of Registration Division, EPA, to Mr. William M. Cranstown, N.J. Department of Agriculture. The letter includes the following statement:

> "Since experimental exposure to carbaryl has caused birth defects in dogs, carbaryl may have some potential to do so in humans, and the Environmental Protection Agency is currently attempting to assess that potential. However, since a teratogenic study of carbaryl in rhesus monkeys was negative, it would appear that the teratogenic potential in humans, if any, is not great."
>
> "One can never conclude that risks from exposure to any chemical are zero, and it is only reasonable and prudent to suggest that women who may be pregnant should avoid any unnecessary exposure to carbaryl and other chemicals. This is easily accomplished in the use of carbaryl by remaining indoors or under suitable cover at the time the application is made. Once the spray settles, any further potential for exposure is greatly reduced, and should be of no concern."

The question of viral potentiation of Sevin 4 Oil was recently studied by two University of Maine researchers. Their data suggest that viral potentiation may be associated with exposure to Sevin 4 Oil. The Maine Bureau of Forestry appointed a panel of medical experts to review this study and to make recommendations concerning the potential health effects of Sevin 4 Oil. They concluded that Sevin 4 Oil poses a "potential but inconclusive health risk" and recommended that the Maine Bureau of Forestry develop more stringent limitations so that "no uninformed or unconcented human exposure will occur during a forest spray operation." A follow-up study was undertaken to determine the of the Sevin 4 Oil constituents that may be viral enhancing. The data indicate that the active ingredient, carbaryl, is responsible for the viral enhancement. The medical advisory panel reviewed these new findings and felt that the original recommendations were still valid along with several additional statements.

In 1978 and 1979, field studies were conducted by the South Carolina Epidemiologic Studies Center to measure human exposure to carbaryl during spruce budworm suppression projects in Maine. The level of carbaryl residues found in urine samples taken during the 1978 project are shown in Table 2. The following quotations regarding 1978 results are taken from the Draft Interim Report, Measurement of Exposure to the Carbamate Carbaryl: Maine Carbaryl Study, 1979. Medical University of South Carolina, Nov. 1969, used here by permission of EPA.

> "Human exposure to carbaryl applications during Maine's 1978 Spruce Budworm Suppression Project was monitored by the South Carolina Epidemiologic Studies Center. Except where there had been exposure to carbaryl from either mixing operations or home usage, none of the urine samples collected prior to application were found to contain the alpha-naphthol metabolite. Analyses of urine samples collected 12 to 24 hours after application found that the cohorts of pilots and aircraft loaders had the highest residues. About one-half of the samples from ecologists and rangers who were working and/or living in the application areas showed small but measurable levels of alpha-naphthol. Of the 49 urine samples collected from residents 12 to 24 hours after application, only seven were positive for alpha-naphthol and ranged from 14 to 38 ppb. From the administration of health effect questionnaires, it was determined that no participant reported symptomatology thought to be related to carbaryl exposure."
>
> "Data presented in the draft 1978 Maine Carbaryl Study report suggest that there were no apparent risks to those workers occupationally exposed to and individuals residing near areas aerially treated with carbaryl. Alpha-naphthol residues in the residential participants indicated that drift did not occur."

Because of continued public concern and the need to further investigate the amount of human exposure that results from an aerial application of carbaryl, another study was conducted in 1979. The objective was to monitor the exposure of humans to carbaryl by measuring the urinary metabolite, alpha-naphthol, in persons potentially exposed during the aerial application to forests and to relate this exposure to air sampling. Results of 1979 urine residue analyses are shown in Table 3. The following quote regarding results of this work is from the Draft Interim Report, Measurement of Exposure to the Carbamate Carbaryl: Maine Carbaryl Study, 1979. South Carolina Epidemiologic Studies Center, Medical University of South Carolina, Nov. 1979, used here by permission of EPA.

> "The National Institute of Occupational Safety and Health (NIOSH) has established a time weighted average (TWA) for occupational exposure to carbaryl. The TWA is a maximum exposure limit for occupational exposed employees based on a 10-hour work shift, 40 mg/m^3. The TWA, when compared to the air sampling results of the Washburn area, indicates that the residents located .6 miles north of spray block 6-14 were exposed to carbaryl concentrations in the magnitude of thousandths of one percent of the permissable occupational level. The highest reported level of carbaryl equivalent was found at Site 1 during the first 12 hours of sampling after application. This level (341.0 mg/m^3) when converted to milligrams equals 0.0003 mg/m^3 or 0.006 percent of the TWA standard. Thus the exposure of residents to carbaryl concentrations in environmental air throughout the sample period was the smallest fraction of allowable levels mandated for more intensive occupational exposure."

Table 2.-- 1-Naphthol residues in urine samples from persons exposed to Sevin 4 Oil in 1978[1/] [2/]

Exposure group	Number of tested participants	Total urine specimens tested	Number tested positive	Range of positive tests (ppb)	Median residue level of positive tests (ppb)	Average residue level of positive tests (ppb)
Pilots	5	10	10	41.00-1750.00	121.50	323.89
Loaders	5	9	8	83.00-5540.00	656.00	1144.21
Ecologists	9	17	8	14.00-146.00	28.66	51.87
Wardens/ Rangers/Wives	11	11	5	11.11-25.00	12.14	16.85
Scouts	10	10	4	10.77-23.00	14.58	15.73
Lab Tech.	11	11	3	11.25-16.25	13.68	13.73
Residents	42	50	7	10.00-37.60	14.00	15.63
EPA/Safety	5	6	5	23.00-1250.00	89.14	313.99

1/ Urine 1-naphthol residue analysis; lowest level detectable by this method is 10 parts per billion (ppb).

2/ From Draft 1978 Interim Report, Measurement of Exposure to the Carbamate Carbaryl: Maine Carbaryl Study, 1978. South Carolina Epidemiologic Studies Center, Medical University of South Carolina, March 1979. (Used by permission of EPA)

Table 3.-- 1-Naphthol residue in urine samples from persons exposed to Sevin 4 Oil in 1979[1/] [2/]

Exposure group	Number of tested participants	Total urine specimens tested	Number tested positive	Range of positive tests (ppb)	Median residue level of positive tests (ppb)	Average residue level of positive tests (ppb)
Pilots	2	2	1	156.87		156.87
Ecologists	3	3	1	25.75		25.75
Scouts	6	6	4	10.42-17.90	12.80	13.48
Ranger/Family	6	6	2	29.11-62.46	45.78	45.78
Field Tech.	7	7	2	14.23-187.48	100.86	100.86
Residents	16	16	5	24.00-2556.00[3/]	199.40	615.97
Safety	1	1	1	3029.00[4/]		3029.00

1/ Urine 1-naphthol residue analysis; lowest level detectable by this method is 10 parts per billion (ppb).

2/ From Draft Interim Report, Measurement of Exposure to the Carbamate Carbaryl: Maine Carbaryl Study, 1979. South Carolina Epidemiologic Studies Center, Medical University of South Carolina, November 1979. (used by permission of EPA)

3/ The 2556.00 figure is probably due to the use of a home garden dust containing carbaryl.

4/ 12 to 24 hours after a second intense dermal exposure.

In the 1979 study, individuals who remained indoors during a nearby application of carbaryl were found to have no detectable alpha-naphthol, a metabolite of carbaryl, in their urine with the exception of one person who may have been previously exposed to another source of carbaryl or the insecticide malathion. Persons outdoors at the same location were found to have detectable levels.

The same study indicated that persons entering spray blocks more than 24 hours after carbaryl application would probably have a 5 percent or less chance of receiving detectable exposure to carbaryl (personal communication, Dr. Sandifer, South Carolina Epidemiologic Studies Center).

As expected, results from 1978 to 1979 studies in Maine indicate that, while precautions can be taken to reduce the number of people exposed and the amount to which they are exposed, it is not possible to avoid exposing some people to carbaryl during the spray operation. However, the amount of carbaryl is extremely small.

Reentry into spray blocks after treatment is necessary to evaluate treatment success. In such cases, persons entering spray blocks soon after application may be exposed to small amounts of carbaryl residues on plants. In agricultural situations, reentry standards are established by EPA and are based on estimated adult tolerances to insecticide exposure. It has been assumed that children might be more vulnerable to the effects of insecticides because of stages of development that they are passing through during these ages, though no studies in this respect have been made. Recent U. S. Department of Labor rulings have been made regarding the use of 10- and 11-year olds in hand harvesting insecticide-treated, short season crops, and is presented.

Carbaryl is applied to strawberries at 2.0 lb/acre and potatoes at 1.0 and 2.0 lb/acre (depending on the pest). The preharvest interval for carbaryl is 1 day for strawberries and zero days for potatoes (USDA 1979). Until recently, the U. S. Department of Labor's safe reentry time (preharvest interval) after spraying with cabaryl was 40 days for 10- and 11-year old children harvesting strawberries and potatoes. In preparing this preharvest interval requirement, the U. S. Department of Labor reviewed existing scientific literature relating to the toxicity, enviromental degradation, and residue dynamics of carbaryl. The review did not disclose any research directed specifically to effects of carbaryl on 10- and 11-year-old hand harvesters. Based upon the absence of specific research data, the U. S. Department of Labor chose to add additional safety factors exceeding those standards established to protect adults from adverse effects (U. S. Department of Labor 1979). However, after lengthy judicial and Departmental review of re-entry times for 10-and 11-year old children engaged in hand harvesting, the Department of Labor issued a final ruling on August 14, 1980, regarding waiver provisions for these harvesters. The Department of Labor concluded that no minimum entry times for 10-and 11-year old harvesters can be established because there is no scientific data or methods available to show that pesticides can be used in crops with absolute assurance of safety to harvesters. The Department of Labor action was based on a February 15, 1980, decision by the U. S. Court of Appeals for the

District of Columbia Circuit that regulations published previously relating to waivers for 10- and 11-year- old children were invalid. The court ruled that absolute proof of no adverse health effects from pesticides on 10- and 11-year old children must be provided to establish minimum entry times.

Exposure of project personnel and others to insecticide residues in treatment areas is minimal due to the nature of cooperative gypsy moth suppression projects: Tree foliage is the target substrate and as a result insecticides are distributed over much more foliage compared to agricultural crops; trees intercept the majority of the delivered insecticide with very little penetration to the ground level where people might otherwise be exposed to residue; the dosage of insecticides used on short season agricultural crops far exceeds the amount used in forest applications (10 to 20 lb/acre of carbaryl for strawberries and potatoes versus 1 lb/acre in forests); and a concerted effort is made through local media to notify the public of treatment dates and areas so that they can take steps to avoid insecticide exposure.

Following an extensive review of currently available studies relating to the insecticide carbaryl, the EPA has concluded that Rebuttable Presumption Against Registration (RPAR) of pesticide products containing carbaryl is not warranted at this time (U.S. EPA 1980). A summary of that decision is presented in Appendix D of this Final PEIS, and replaces the notice of pending decision, as described in a letter to Philip Alampi, Secretary of Agriculture, New Jersey Department of Agriculture from EPA, that was presented in Appendix D of the Draft PEIS.

Trichlorfon. Trichlorfon is a broad spectrum organophosphate insecticide with various trade names, most commonly Dylox®. Trichlorfon, on the basis of research information and practical use, has shown no significant adverse effects against vertebrates, birds, reptiles, amphibians, and fish (Lewallen and Eilder 1962; Pearce 1970; Chemagro 1971; Chambers 1972; Caslick and Smith 1973; Finger and Werner 1973; Todaro and Brezner 1973). Bird activity is affected through the reduction of insects available for food (Doane and Schaefer 1971; Caslick and Cutright 1973).

Nontarget insects, including some parasites and predators of the gypsy moth may be temporarily affected. Trichlorfon is toxic to some hemipterous predators which return to pre-treatment population levels within a few weeks after application. Trichlorfon's toxicity for sacrophagid and tachinid flies reduces populations to low levels; recovery is slow, because such flies apparently disperse slowly (Doane and Schaefer 1971). Trichlorfon is classified as having low toxicity for bees (Johanson 1959). Therefore, honeybee colonies do not have to be removed from treatment areas. Trichlorfon applied at rates used for gypsy moth suppression and regulatory projects will reduce populations of some nontarget insects. Nontarget insect populations will recover, some within a few weeks (Chemagro 1968).

Trichlorfon has been used as a therapeutic agent to control internal parasites of humans without any detrimental effects (Abdalla et al. 1965; Beheyt et al. 1961; David and Bailey 1969; Wegner 1970). When used according to label instructions, trichlorfon will not pose any adverse hazard to human health.

Acephate. Acephate is an organophosphate insecticide. Acephate, formulated as Orthene® Forest Spray, is registered for foliage protection against gypsy moth larvae.

Acephate may adversely affect some nontarget insects within treatment areas. The effects on nontarget insects for an aerial application of Orthene® at 0.5 lb active ingredient acephate per acre for control of the gypsy moth were monitored up to 1 month after treatment (Lotel, 1975). It was concluded that lepidopterous larvae, dipterous larvae, and Hymenoptera predominantly the family Formicidae, were adversely affected. The order Coleoptera was least affected, while dipterous larvae showed the greatest decline in numbers; there was a knockdown effect observed immediately after treatment which affected all orders of arthropods collected. However, those populations which were depressed recovered to pretreatment levels within 1 month, and none was eliminated.

Acephate is toxic to bees present in treatment areas at the time of application. However, in a comparative test with worker honeybees, acephate was slightly more toxic than carbaryl (Chevron 1973).

Acephate has a very low toxicity to fish and mammals (Chevron 1973). To date, there have been no problems of intoxication or complaints resulting from the various field development programs using acephate. When handled properly, acephate poses no health hazard to persons formulating, spraying, or working in treated forests (Willcox and Coffey 1977).

A monitoring and medical study was conducted after several men were occupationally exposed to acephate in a plant where the material was being produced, and in a lab where large batches were formulated (Pack 1972). Urine samples were monitored for acephate and metabolites. Although concentrations of up to 5 ppm were detected in the urine, no adverse health effects were observed. Effects on blood cholinesterase levels, a sensitive indicator of organophosphate exposure, were not detected.

The proper use of diflubenzuron, carbaryl, trichlorfon, and acephate in cooperative gypsy moth suppression and regulatory program activities will not result in adverse human health effects.

No nontarget species or organisms will be permanently eliminated as a result of using the registered chemical insecticides according to the label instructions. These insecticides will not jeopardize threatened or endangered species, or their habitat.

Physical Effects

A thorough discussion of the effects that carbaryl, trichlorfon, and acephate have on the physical environment has been presented in the 1974 Environmental Impact Statement (USDA 1974). A summary of these effects and the effects of diflubenzuron on the physical environment follows:

Diflubenzuron. Diflubenzuron is considered relatively non-persistent in soil and water. In laboratory experiments, the half-life of diflubenzuron was shown to be 0.5 to 1.0 week.

The rapid degradation was unrelated to soil type but was shown to be very much dependent on both the microbial activity of the soil and the particle size of the diflubenzuron (Willcox and Coffey 1978). Studies at Brigham Young University for the Thompson Hayward Chemical Company (Pintar et al. 1975) have shown that all soil bacteria could utilize diflubenzuron as a sole carbon or sole carbon and nitrogen source and growth of a number of other bacteria was not influenced to concentrations as high as 10^5 ppm.

The persistence of diflubenzuron in water and soil-water systems is, as with soil alone, related to the microbial activity and the particle size of the material applied. With agricultural soils, the half-life in hydrosoils is 0.5 to 1.0 weeks for the parent compound and 8 weeks for the entire radiocarbon residue (Willcox and Coffey 1978).

Carbaryl. The residue of carbaryl does have effective insecticidal property for several days after spraying. In one study, application of Sevin 4 Oil at 1 lb. per acre caused 63 percent and 77 percent mortality 60 days after treatment in two groups of laboratory-reared gypsy moth larvae fed on leaves from trees in a suppression area (Doane and Schaefer 1971). Insecticide residues are degraded and diluted in the environment by a number of physical factors. For carbaryl, rain is the major factor in reducing residues (Union Carbide 1968).

Residues of carbaryl in soil, monitored in one gypsy moth suppression project, were detectable up to 64 days after treatment (detectable limit: 0.2 ppm).

If carbaryl is applied unintentionally over open water, such as small brooks or ponds, an initial deposit of 1 ppm or less in water at a depth of about 4 inches may be expected to completely degrade or disappear in 1 or 2 days (Romine and Bussian 1971; Calif. Dep. Fish and Game 1963; Lichtenstein et al. 1966). Results were similar for water treated with Sevin 4 Oil during a gypsy moth suppression project (Willcox 1972).

Trichlorfon. Trichlorfon degrades rapidly in the environment. Doane and Schaefer (1971) found that gypsy moth larvae that were fed leaves collected 12 days after treatment experienced only 2.5 percent mortality. Weiss et al. (1973), reported that residue levels of Dylox 80 SPA dropped

sharply within a few days after spray and by 60 days had reached the following percentages of their initial levels: 15 in leaves, 5 in litter, 10 in unexposed soil, and less than 1 in exposed soil.

In New York (Judd et al. 1972), trichlorfon was found in small amounts in water samples collected immediately after spraying, but the concentration of the chemical dropped below a detectable level 4 days after spraying; the half-life of trichlorfon in water at 30°C was 4.7, 0.6, and 0.1 days at pH levels of 5, 7, and 9 respectively. Water in this test was protected from light. In an outdoor pond (pH 7.0) at temperature 20°C, and with exposure to sunlight and wind, trichlorfon showed a half-life of only 0.3 day (Chemagro 1971).

Acephate. The effects of acephate on the physical environment are minimal. In plants, 90 to 95 percent of applied acephate is degraded directly into innocuous salts and 5 to 10 percent to 0,S-dimethyl phosphoramidothioate, the only metabolite of toxicological significance. Studies have shown that acephate has a half-life of 5-10 days in plants (Chevron 1973). In surface water, acephate applied at 0.1 ppm dropped below that level within 1 week, and was undetectable by 6 weeks (Chevron 1973). The fate of acephate in soils is variable. The major degradation factor is biological activity.

The chemical insecticides as a group will retain significant residual potency for several days to several weeks. All are readily degraded in soil and water. Variability exists due to the mechanism of degradation for each insecticide.

The chemical insecticides will not adversely affect structures or objects listed in or eligible for listing in the National Register of Historic Places, or cause loss or destruction or significant scientific, cultural, or historical resources.

Economic Effects

Expenditures for chemical insecticides alone for gypsy moth suppression range from $3 to $5 per acre. Total application costs, including pesticide mixing and aircraft, may range from $7 to $10 per acre depending on the chemical used, the number and size of treatment areas, and individual State contracts. Ground applications range from approximately $16 to $50 per acre depending on these same factors.

Previous project proposals for chemical insecticide treatment have been supported by positive benefit-cost ratios (see 1980 Final EIS.) Benefit-cost ratios for cooperative gypsy moth suppression projects are based on the amount a landowner is independently willing to spend to protect property from gypsy moth damage. Properties may vary from small residential lots, camps, and picnic areas to large commercial recreational facilities and resorts.

A method of measuring the impact of gypsy moth defoliation on forest stand as was developed by Gansner et al. (1978) and tested with data from 143 untreated plots established in Monroe and Pike Countries, Pennsylvania. Data collected over the 1970-75 study period revealed that cumulative tree mortality on the sample plots ranged from 0 to 67 percent and averaged 13 percent. Volume loss ranged from 0 to 26.6 cords per acre and averaged 2.5 cords. Value loss ranged from $0 to $468 per acre and averaged $14.

The economic impacts of gypsy moth infestations on homeowners and in recreation areas (commercial, public and quasi-public) were determined from data collected via interviews with 540 homeowners and 170 managers of recreation areas in New York and Pennsylvania (Moeller et al. 1977). Results indicated that the nuisance and defoliation effects of the gypsy moth infestations were of primary concern to all ownership classes. Suppression costs for homeowners who participated in a cooperative public program averaged $62 versus $146 for homeowners who contracted with commercial firms. Suppression costs were higher for managers of commercial campgrounds. Financial losses attributed to the gypsy moth infestation averaged $292 for homeowners who utilized commercial suppression versus average losses of $76 for homeowners who participated in a cooperative public suppression program.

For reducing the presence of gypsy moth larvae and the damage to host trees in forested communities, benefit-cost ratios ranged between 2:1 (NJ, NY) to 40:1 (PA). In high-value areas, suppression expenditures are additionally offset by expected benefits from wood products utilized in the future.

Benefit-cost ratios are favorable for using the chemical insecticide treatment alternative in high-use and high-value forests and forested residential and recreational areas.

Social Effects

Implementation of the chemical insecticide treatment alternative will provide immediate relief from the presence of gypsy moth larvae in communities and recreation areas. Potential allergic reactions associated with larval excrement droppings and the hairs on gypsy moth larvae will be reduced. Hazardous roadways and sidewalks conditions caused by slipperiness from stepping on or driving over gypsy moth larvae will be minimized.

Federal and State participants in the chemical insecticide alternative will provide a mechanism for early public involvement in the selection of treatment areas, and the identification of exclusion areas and subsequent mitigating measures to be implemented.

Through public involvement, individuals known to be allergic to certain insecticides can be notified and appropriate measures can then be taken to avoid exposure to that insecticide.

In order that the public is aware when insecticides will be applied, persons living within all treatment areas will be notified either by telephone, local newspaper, local radio, individual letter and/or personal contact as to treatment dates. Public recreation area users will be notified in parks or campground when they register, or at the main entrance to these areas.

Implementation of the chemical insecticide alternative will not alleviate the concerns of individuals regarding possible adverse health effects related to the use of insecticides. The USDA has an active public information program aimed at alleviating these concerns.

The biological effects on target and non target insects, and the physical effects on the treatment areas of implementing the chemical insecticide alternative, will be temporary. There will be no irreversible or irretrievable impacts on the environment. The human resources irretrievably committed are dollars and manpower. Irretrievable items would be supplies such as insecticides, fuel, and other materials associated with the actual application of insecticides.

BIOLOGICAL INSECTICIDE TREATMENT

The biological insecticides currently registered by the EPA for gypsy moth suppression are formulations of B.t.and the gypsy moth NPV. General characteristics of both biological insecticides are presented in Table 4 on page 54.

Biological Effects

Biological insecticides must be ingested by the gypsy moth larvae; therefore, no significant reduction in feeding activity or increase in larval mortality can be expected for 1 to 2 weeks. Maximum population reduction and foliage protection requires two applications of either biological insecticide, scheduled 5 to 10 days apart. Specifically, proper application of gypsy moth NPV can reduce the residual number of egg masses by 75 percent and may also reduce egg viability in the succeeding year. Less than 55 to 60 percent total defoliation can also be expected (Lewis et al. 1979). Similar results can be expected from B.t

The biological insecticides are considered to be environmentally safe. B.t. will not adversely affect birds, mammals, fish, or non target insects except lepidopterous larvae. Therefore, the material has been exempted from any tolerance on food or feed (USDA 1974). Additional background information regarding B.t. can be obtained from the 1974 Final EIS (USDA 1974). Similarly, NPV has shown no adverse effects on fish, game birds, vertebrates, or man. Because NPV and B.t. have shown

shown no direct adverse effect to parasites and predators or to higher animals, they are well suited for use in residential areas where people may find the use of chemical insecticides undesirable. Nevertheless, exposure to any insecticide should be avoided and can be minimized by remaining indoors during insecticide application.

Physical Effects

Studies on the fate of B.t. in the environment indicate that B.t. spores will persist in soil for several weeks depending on the soil type, soil flora, and factors such as pH, moisture, and solar radiation. A study of soils treated with B.t. applied for vegetable pest control concluded that spores can remain viable for long periods (over 3 months), and the organism can germinate and compete vegetatively in the soil and sporulate successfully under favorable soil conditions (Saleh 1969). The crystal is proteinaceous; degradation by the enzymatic action of soil flora can be presumed.

Laboratory-produced gypsy moth NPV has no degrading effect on the environment in which it is applied. It has a shorter residual persistence on bark and in the soil than the NPV occurring naturally in gypsy moth populations (Lewis et al. 1979).

Economic Effects

Both B.t. and NPV require two separate applications to be effective. The cost per application for the insecticide alone can range from $4 (NPV) to $10 (B.t.)per acre. The total cost for two applications, including insecticide formulation ingredients, mixing and application could exceed $10 per acre for NPV and $30 per acre for B.t. It should be noted that NPV costs per acre reflect government production figures. If and when NPV is produced by private industry, per-acre costs will rise to cover the costs of overhead and, advertising, and to produce a profit margin.

Social Effects

Implementation of the biological insecticide alternative will not provide rapid larval mortality but can, given proper application, provide foliage protection. Larval nuisance will persist for one or two weeks after application while the biological insecticides take effect.

Biological insecticides are environmentally safe and have no effect on beneficial life forms, except for B.t., which affects some lepidopterous larvae (Lewis et al. 1979). Individuals that are highly allergic to chemical insecticides may not be allergic to biological insecticides.

In order that the public is made aware when biological insecticides will be applied, persons living within treatment areas will be notified of the treatment date by telephone, local newspaper, local radio, individual

letter and/or personal contact. Public recreation area users will be notified in parks or campgrounds when they register, or at the main entrance to these areas.

Implementation of the biological insecticide treatment alternative will create no irreversible or irretrievable impacts on the environment. Irretrievable resources committed by this alternative are dollars, manpower, and supplies such as insecticides, fuel and related application materials.

INTEGRATED PEST MANAGEMENT

An IPM approach to gypsy moth management includes the use of insecticides, parasite and predator management, the gypsy moth pheromone, homeowner self-help, sterile male moth release, and forest stand manipulation. This strategy provides a wider range of options in dealing with the gypsy moth problem by providing both short-term as well as long-term solutions, however, some of this technology is still in the developmental state.

Currently, only the biological and chemical insecticides, the gypsy moth pheromone, and homeowner self-help techniques are considered viable components for gypsy moth suppression projects. Approaches to elimination of remote infestations are being developed. The unique nature of remote infestations dictates that development of such approaches be evaluated in these areas. This does, however, involve some added degree of risk since efficacy data does not exist for all IPM components. Certain components have demonstrated effective population reduction potential, however, several seasons may be necessary to achieve gypsy moth elimination. The use of forest stand manipulation, sterile male moths and parasite predator management need futher evaluation before they can be considered for gypsy moth suppression or regualtory projects.

Biological Effects

The biological effects of an IPM approach will depend on the extent to which the various components are implemented. An IPM approach encourages the selection of insecticides or other suppression methods based on an analysis of project objectives and treatment areas.

The biological effects of the registered insecticides as used in an IPM approach have been discussed in relation to the chemical and biological insecticide alternatives (see pages 26 and 41). The biological effects of implementing other IPM components are discussed below.

Parasites and predators play an integral role in the overall gypsy moth management strategy in the generally infested area. Since it is neither economically or environmentally feasible nor desirable to treat the entire infested area with insecticides, parasites and predators are relied on to exert biological pressure on gypsy moth populations in areas that are not treated. In the treatment area selection process, areas that support parasite or predator populations sufficient to maintain gypsy moth populations below damaging levels are not identified for insecticide treatment. Treatment is considered only in those high-use and high-value areas where the threat of excessive larval nuisance and host defoliation is immediate and where parasites, predators, and disease agents are not exerting effective biological pressure on gypsy moth populations.

Manipulation of parasite or predator populations to levels that would exert significant pressure on gypsy moth populations to reduce larval nuisance and host defoliation or mortality involves the timely release of large numbers of laboratory reared specimens. Since the gypsy moth was introduced into the United States, extensive efforts have been directed to the introduction of parasites and predators. To date, approximately 50 species have been imported from Europe and Asia with limited degrees of success. The primary problem in manipulation of parasites and predators is to establish and maintain populations at levels whereby they will contribute effective biological pressure.

Grimble (1976) studied the effects of the release of an established larval parasite, Apanteles melanoscelus (Ratz.) (Braconidae), and a pupal parasite, Brachymeria intermedia (Nees)(Chalcidae), on gypsy moth populations in New York. He concluded that the release of A. melanoscelus failed to increase the levels of parasitism by that species.

The inundative release of B. intermedia did cause a significant increase in parasitism but only within a 30-chain distance of the release points.

Between 1973 and 1979, 15 species of exotic parasites and predators from France, India, Spain, Yugoslavia, Japan. and Morocco were released in Pennsylvania to supplement existing populations of established parasites. Total project costs approached $1.5 million. As of 1979, there is no evidence of any of these species becoming established.1/

Since 1970, woodland study sites in New Jersey have been maintained to develop an understanding of gypsy moth population dynamics. During 1978, 402,047 parasites representing nine species were released in these sites. A complex system of parasites seems to be exerting biological pressures against the gypsy moth, one of the more significant parasites being Parasetigena silvestris (Robineau-Desvoidy).2/

1/ Robert A. Fusco, Pennsylvania Department of Environmental Resources, paper presented at Gypsy Moth Review, Columbus, Ohio, 1979.

2/ Letter from W.W. Metterhouse, N.J. Dep. Agric. to R.G. Doerner, NA, S&PF, USDA FS, dated July 30, 1979.

The gypsy moth sex pheromone, disparlure, has shown success in gypsy moth attraction and mating disruption strategies. The USDA and cooperating State agencies have successfully used disparlure baited traps to delimit gypsy moth population boundaries and to identify isolated infestations. The attractive properties of disparlure make it an invaluable survey tool for locating predamaging levels of gypsy moth.

Disparlure is registered by the EPA for use only in low level populations to reduce the incidence of gypsy moth mating. The reduction of mating will subsequently reduce the number of egg masses laid, which will help to maintin gypsy moth populations below damaging levels. The registered product, Hercon® Luretape, is a disparlure-impregnated tape requiring manual application of forty 2 in^2 tapes per acre in a grid pattern. This application rate is equivalent to approximately 1.8 g. disparlure per acre.3/ A second registered product by Hercon is a disparlure impregnated flake designed for aerial application.

The effectiveness of disparlure as a mating disruptant is density dependent. This means that the lower the level of infestation, the more effective the pheromone; the heavier the infestation, the less effective the pheromone. Therefore, the level of infestation must be determined prior to treatment to ensure the greatest mating disruption.3/

3/ Letter from A. R. Quisumbling, Herculite Production, Inc. to L. C. Yarger, NA, S&PF, USDA, FS, Dated November 7, 1979.

The use of disparlure to meet the objectives of foliage protection, larval nuisance reduction, and total population suppression requires further investigation. In low-level, isolated populations like those treated in APHIS Regulatory Programs, disparlure baited, high-capacity traps, when set in dense arrays, show some potential for gypsy moth control. In heavy populations as proposed for treatment in Forest Service cooperative suppression projects, disparlure alone would not be effective.

Disparlure may prove feasible to further reduce heavy populations that have been suppressed with insecticides or another component of an IPM program. The effects of disparlure may also occur in the second year after application if the material successfully reduced population levels. These techniques need to be developed.

Homeowner self-help techniques may be viable components within the overall framework of a statewide or regional IPM program. By using self-help techniques, the homeowner can minimize adverse effects on trees in backyards and reduce gypsy moth nuisance. Homeowner self-help can be divided into three phases: first, knowing how to identify and detect gypsy moth life stages and damage caused by infestations; second, maintaining good growth conditions for trees; third, discouraging gypsy moth survival. These three phases of homeowner self-help are discussed in detail in the The Homeowner and The Gypsy Moth: Guidelines For Control, USDA Home and Garden Bulletin No. 227 (McManus et al. 1979).

Before the homeowner can attempt to manage gypsy moth, he must first know how to identify the various life stages, at what time of the year they occur, and, most importantly, how to recognize gypsy moth-caused tree damage. The fall, winter, and early spring seasons are a good time to search for and remove egg masses from places around the home such as rock walls, wood piles, lawn furniture, roof overhangs, drain spouts, shrubbery, and yard trees. In May, homeowners can place burlap bands around the trunks of yard trees to capture larvae. Both of these surveys will indicate whether there is an infestation on the homeowner's property.

Homeowners can discourage gypsy moth survival by removing unnecessary yard objects, bark flaps, dead branches and debris on the ground that provide shelter for resting larvae and pupae. Diversifying the composition of trees and shrubbery to include species not favored by gypsy moth will discourage infestations. During autumn and winter, the homeowner can check the home and premises for egg masses. This includes removal of egg masses from lawn furniture and garden equipment before such are stored for the winter.

Trees that are stressed are more vulnerable to defoliation and subsequent mortality. Maintaining tree vigor will reduce the potential effects of defoliation. Healthier trees will respond to gypsy moth damage by growing new leaves more quickly and with less effort than stressed trees. Ways to improve and maintain tree vigor include watering, fertilizing, and pruning trees, using mulch around the base of the yard trees, and preventing damage to tree roots.

Homeowner self-help techniques, alone, will not prevent the presence of gypsy moth or prevent defoliation, but these techniques may help the homeowner minimize the effects of a gypsy moth infestation and to recognize when suppression action with insecticides may be necessary.

Forest stand manipulation techniques to suppress gypsy moth populations in high-value forest stands has been suggested in the past. However, this method has not proven biologically effective. In suburban woodlands, stand manipulation is considered feasible to reduce gypsy moth impacts; less preferred hosts could be encouraged or even planted. Tree species that are less susceptible to gypsy moth defoliation include black walnut, white ash, catalpa, flowering dogwood, American holly, tulip-poplar, locust, sycamore, juniper, and balsam fir.

The release of large numbers of sterile male moths in an attempt to successfully reduce gypsy moth mating is a component of IPM. Research and development is continuing on the effectiveness of using sterile male moths to control gypsy moth populations. At the APHIS, Otis Methods Development Laboratory, located at Cape Cod, Massachusetts, laboratory evaluations continued in 1980 on refining male moth mass-rearing techniques and evaluating competitiveness of irradiated male moths. A field test using sterile male moths was performed in Michigan in 1980; however, the results may not be available until 1981. Development of the sterile male moth technique is targeted for use in isolated infestations outside of the quarantine area, where the technique might be useful in an eradication strategy.

Physical Effects

Implementation of chemical and biological insecticides in an IPM approach may result in physical effects similar to those described under the chemical insecticide and biological insecticide alternatives. Implementation of parasite and predator management, the gypsy moth pheromone, and sterile male moth release will very likely locate no impact on the soil, water, or air in the treatment areas. Some aspects of homeowner self-help and forest stand manipulation may have a temporary impact on the soil, water, and esthetic values.

Homeowners can reduce the susceptibility of their residential property to gypsy moth infestations by selecting less susceptible host trees. Temporary soil disruption may occur if susceptible vegetation is replaced with vegetation less susceptible to gypsy moth infestation.

Forest stand manipulation could entail favoring less susceptible trees through the removal of the hosts or even by planting less favored hosts. Such activity might result in some soil erosion and silting of adjacent streams. Soil disturbances are temporary and often last no more than 2 or 3 months depending on the time of the year.

Economic Effects

The IPM approach relies on natural motality factors to maintain gypsy moth levels below that which cause larval nuisance, tree defoliation and mortality over the majority of infested acres in the Northeast. In these areas, there would be no monetary expenditures for gypsy moth suppression except those that might be taken by individuals implementing homeowner self-help techniques.

In selected high-value forests and forested residential and recreation areas, where the threat of larval nuisance, tree defoliation, and mortality is imminent, there would be monetary expenditures for implementation of one or more components of an IPM alternative. For projects using both biological and chemical insecticides, total application costs would range between $7 to more than $30 per acre depending on which insecticides were used, and the size and location of treatment areas. Benefit-cost ratios would be similar to those described under the chemical insecticide or biological insecticide alternatives.

In forested recreation or residential areas, the removal and replacement of highly susceptible host trees with less susceptible host trees would require monetary expenditures that could conceivably result in positive benefit-cost ratios only in the long term.

The use of disparlure as a mating disruptant is estimated to cost about $6 per acre for the disparlure-treated tape. Application of the tape in the grid pattern would require at least $1 to $2 per acre, unless the application was handled as a community project. Determination of benefit-cost ratios for disparlure application will require additional field evaluation.

Homeowner self-help components involving burlap banding, egg mass removal, and related activities are relatively inexpensive and applicable year after year. Costs will vary with with items implemented and the extent of implementation by each homeowner.

Economic information on sterile male moth release is lacking and will require field evaluation for several years before cost data become available.

Social Effects

An IPM approach favors the increased use of alternative means of suppression over chemical insecticides and the use of those methods of suppression that create minimal impact on the environment while meeting project objectives. Use of this approach is not expected to alleviate all concerns expressed by chemical insecticide opponents since chemical insecticides are recognized components of an IPM approach.

Public participation in the IPM alternative is a critical aspect in the successful implementation of the strategy and application of the various components.

NO ACTION

This alternative would not necessarily eliminate gypsy moth suppression activities. State agencies and individuals may undertake suppression projects without Federal financial assistance. Under this alternative, the following general effects can be expected.

Biological Effects

If no action is taken by either State agencies or individuals, gypsy moth-caused tree defoliation and subsequent mortality will occur. Gypsy moth populations will increase to a point where they finally collapse--a cycle of several years. Impacts of unimpeded gypsy moth-caused tree defoliation include tree mortality, reduced growth and changes in forest stand composition. These effects will be dramatic in the short term and their effects will last for many years. Several case studies illustrate the point. A study by Kegg (1972a) found that 2 years of heavy defoliation in northern New Jersey in 1969 and 1970 killed 63 percent of the oaks in the study area. Stephens and Hill (1971) studying changes from 1959-1970 in Connecticut forests, found that repeated defoliation caused an increase of 50 percent in oak mortality.

A reduction in radial growth also is associated with defoliation by forest insects (Kulman 1971). In Europe reductions of 15 percent to 67 percent were observed following severe gyspy moth outbreaks (Mirkovic and Miscevic 1960; Kondakov 1963). Similar observations have been made in the United States (House 1960; Minott and Guild 1925).

It is generally believed that gypsy moth activity tends to influence forest stand composition (Campbell and Valentine 1972; Stephens 1971). This might be perceived as being beneficial in some areas by reducing favored food hosts. However Bess, Spurr, and Littlefield (1947) stated that "frequent severe defoliation will generally create conditions highly favorable to future epidemics."

Several years of heavy gypsy moth defoliation may have an adverse impact on existing wildlife (Campbell 1979). It is logical to assume that animals that normally inhabit forests will be affected by several years of gypsy moth defoliation and subsequent tree mortality. The USDA Forest Service is currently studying this aspect in the Pocano Mountains in Pennyslvania.

In the generally infested area, where there is a complex of parasites and predators exists to a certain extent, it is possible that these organisms, as well as other natural controls such as wilt disease, will eventually exert pressure on gypsy moth populations. However, this will not occur immediately, and dramatic effects such as those discussed earlier will occur. In most isolated infestations occuring outside of the generally infested area, it is reasonable to speculate that no relief from gypsy moth impacts can be expected from parasites or predators since these organisms have not been introduced, as a general rule, in such outlying areas.

Streams shaded by forest trees are inhabited by aquatic plants and animals. Defoliation removes the shade from those streams, producing light and heat greater than the average to which the aquatic life is adapted. In the year of defoliation, that situation lasts until the trees refoliate. Under conditions of successive defoliation, those conditions, changed only temporarily the first year, may become more permanent characteristics of the streams, through tree mortality and changed composition of tree species.

If State agencies or individuals attempt suppression, the biological effects of such would depend on the strategy used and would not differ from the effects previously discussed for each treatment alternative. However, suppression activities undertaken by individuals or communities without the benefit of coordination with a State-administered program may result in the application of more insecticide than is necessary, and at improper times. In such cases, the impact on non target organisms could be greater, and suppression of gypsy moth populations might not be achieved throughout an entire community.

Physical Effects

If no action is taken by State agencies or individuals, there would be no immediate impact on the physical environment except for the potential excessive presence of large numbers of gypsy moth larvae.

Heavy gypsy moth populations may affect water quality and quantity. Frass excreted by larvae of gypsy moth is considered both a nutrient dump and water pollutant. Observations on the impact of frass are scarce. One report of an observation (Turner 1963a) stated: "Heavy defoliation produces hundreds of pounds of frass which soon is washed into the water by rain. The effect on the quality of water is immediate in small reservoirs. Moreover, the nutrient elements in the frass increase the growth of algae in water, creating an additional problem of longer duration." A similar observation was reported more recently for New Jersey reservoirs (Kegg 1972b).

Where gypsy moth defoliation and subsequent tree mortality is severe, there is less vegetation to intercept rainfall and to impede the movement of ground water. This could increase streamflow but at an added cost. Water quality might be lowered due to increased runoff of soil and soil nutrients previously held in place by vegetation now destroyed by gypsy moth. Defoliation along streams may result in increased water temperatures that affect not only existing aquatic organisms but also influence plant compositions along stream banks. While the impact of gypsy moth on soil and plants other than trees has not been specifically studied in detail it is known that when the forest floor is opened to unaccustomed heat and light, changes in forest soil and plant life occur (Bess et al. 1947; Kegg 1972b).

If suppression action is taken by State agencies or individuals, the physical effects are expected to be the same as those for the alternative previously discussed.

Economic Effects

State governments and private individuals would finance the entire cost of suppressing gypsy moth populations. Depending on program priorities, State agencies may not participate in gypsy moth suppression activities; therefore, the costs of suppression would be borne by individual property owners.

In tourist areas where unacceptable defoliation is expected, a reduction in visitor traffic is likely. This would have an adverse impact on the local economy in lost dollars for resort owners, local business, and local government.

Excessive tree mortality on city rights-of-way, and residential property would place a serious financial strain on local governments and individuals for removing the dead trees. Such dead trees near houses and along power lines would pose serious safety hazards and would be expensive to remove. Tree replacement costs would also be incurred.

Social Effects

The social effects of State government or individual suppression activities would be similar to those discussed for the other alternatives.

If no gypsy moth suppression is undertaken by State agencies or individuals, anxieties concerning the use of chemical insecticides and human health concerns would not occur. The presence of large numbers of gypsy moth larvae, however, based on past experience, would trigger some public sentiment for nuisance abatement. People with a natural fear of insects have been severely traumatized when confronted by large infestations of gypsy moth larvae.

In areas of heavy gypsy moth outbreaks recreational use of the forest and one's own background can be severely curtailed due to the presence of larvae and their excrement pellets. Painting of homes can be curtailed in outbreak areas as larvae wander over homes, congregating in sheltered places - under window ledges, porch roofs, door sills, and eaves.

Outdoors, sidewalks are avenues for migrating larvae. Individuals trying to use those surfaces step on larvae. The feeling is unpleasant as is the resulting mess. Sidewalks grow stained and caked with the remains of trampled caterpillars. Crushing them makes sidewalks slippery as well as unsightly. Parents may be understandably reluctant to permit their children to go outdoors when the gypsy moth is in the larval stage.

Larvae also migrate over driveways and roads. Vehicles traffic crushing larvae in an outbreak area can make roads slippery and dangerous, requiring highway department trucks to sand unsafe roads in July in the Northeast even in July.

Gypsy moths invading homes can seriously affect inidividuals with a natural fear of insects. Some individuals have actually cut down all trees on their property to avoid the nuisance of the insect. Others have been denied the use of summer homes during the period in which larvae are feeding.

Conditions experienced in Pennsylvania during the 1973 outbreak are reported in this summary (PA DER 1973).

> "Carbon and Schuylkill Counties were considered by local officals to be disaster areas. The mayor of Tamaqua declared a state of emergency as caterpillars invaded the town and the water supply reservoir. Farmers in outlying areas reported corn and alfalfa being eaten. A new form of "control" was witnessed near Tamaqua as a homeowner started a fire under trees in his yard. The flame and heat did a good job on the trees as well as the gypsy moth. Signs of all descriptions appeared along Schuylkill County roadsides denouncing government officials from the local level to Washington. In some areas, housewives reported that caterpillars had invaded homes and began eating house plants. Golfers reported that putting greens were literally moving with migrating caterpillars. People on vacations checked into untreated resorts but left the next day."

Even the natural disease agents affecting gypsy moth may be unpleasant. The disease killed larvae hang from their sheltered places on houses; their bodies rupture and the rotted fluid contents spill out, staining homes. Bacteria grow in the fluid, making the stench of a diseased population detectable from a distance.

It is difficult enough for people to live with the larval and frass of a gypsy moth outbreak. Yet they must also endure the experience of having the trees around them stripped of their leaves in June and July. Hardwood trees losing about two-thirds of their foliage generally develop another set of leaves (refoliate), beginning about mid-July. Such leaves are usually smaller, off-color, and fewer in number than the original leaves. In additon, refoliation decreases valuable sugar reserves needed to sustain the tree through the following spring and winter.

Two important impacts resulting from defoliation are reduced benefits and enjoyment from the trees. These two impacts blend, but it is conveient for this discussion to treat them as separate entities.

The direct benefits derived from trees that are in full foliage include cooling and humidifying effects, shade, reducing the level of sound, providing privacy, and sheltering from wind. These benefits often are taken for granted, and it is when the leaves are gone that many people realize clearly the benefits that trees provide.

Gypsy moth defoliation drastically alters the forest homeowner's environment. One purpose for living among trees is to enjoy them; robbed of that enjoyment by the gypsy moth, a person may experience decreased values associated with aesthestic surroundings.

Suppression activities undertaken by groups of residents may not provide for involvement by and notification of adjacent residents or other people who might be interested in participating. Benefits derived from organizing a coordinated suppression approach, including maximized treatment efficiency and public safety, would not be achieved.

The no-action alternative will not require irreversible or irretrievable resource commitments on the part of Federal agencies.

Table 4.--Comparative effects of pesticides registered for gypsy moth when applied according to the label. (X-observed effect; 0-no observed effect)

Characteristics	Diflubenzuron	Trichlorfon	Carbaryl	Acephate	Bacillus thuringiensis	Nucleopolyhedrosis Virus	Disparlure
I. Biological Efficiency							
1. Contact poison	X	X	X	X	0	0	0
2. Stomach poison	X	X	X	X	X	X	0
3. Rapid larval knockdown and mortality	0	X	X	X	0	0	0
4. Foliage protectant[1/]	X	X	X	X	X	X	0
5. Ovicidal activity	X	0	0	0	0	X	0
6. Population control	X	X	X	X	X	X	X
7. Pre-budbreak control	X	0	0	0	0	0	0
8. Mating disruption	0	0	0	0	0	0	X
II. Economic Feasibility							
1. Tolerance established on agricultural crops	X	X	X	X	0	0	0
2. Dosage lb. a.i./acre	.03-.06	1.0	1.0	0.5	8biu[2/]	25pu[3/]	1.8gpa[4/]
3. No. of applications	1/yr	1	1	1	2	2	1
4. Insecticide cost per acre (1979)[5/]	Low	Low	Low	Low	High	Med.	Med.
III. Environmental Effects							
1. Residual activity on foliage (10 days)	X	0	X	0	0	0	X
2. Half-life:							
--water (1-2 days)	X	X	X	0	X	X	0
--soil (.5-1 week)	X	X	0	X	X	X	0
3. Adverse effects on non-target insects:							
--parasites & predators	0	X[6/]	X	X	0	0	0
--pollinators							
4. Adverse effects on wildlife as a group	0	0	0	0	0	0	0
5. Adverse effects on aquatic organisms:							
--invertebrates	X	0	X	X	0	0	0
--fish	0	0	0	0	0	0	0
6. Causes temporary territory abandonment by birds	0	X	X	X	0	0	0

1/ Foliage protection would be achieved by definition when refoliation was prevented.
2/ Bacillus thuringiensis is applied at 8 billion international units per acre per application.
3/ Nucleopolyhedrosis virus is applied at 25 million gypsy moth potency units per acre application.
4/ Hercon Luretape applied at forty 2-square inch tapes/acre is equivalent to 1.8 grams disparlure/acre.
5/ Low $9.00/acre, medium - $9.00-15.00/acre, high $15.00/acre including application costs.
6/ May temporarily reduce Tachinid fly population.

ALTERNATIVES EVALUATED

The alternative selected should be effective in protecting the host-tree foliage and reducing gypsy moth populations. At the same time, the selected strategy must impose the least possible impact on non target organisms and non target areas, and must not adversely affect human health. A comparison of the alternatives based on the evaluation criteria listed on page 23 is presented in Table 5.

BIOLOGICAL EFFECTS

The alternative selected must reduce gypsy moth populations and protect the host-tree foliage. The chemical insecticides will meet project objectives. Most chemical insecticides take effect in a matter of hours after application, provide a minimum of 70 percent host foliage protection, and will cause a reduction of at least 90 percent in the number of larvae present and subsequent egg masses laid. Further, they can be applied almost anytime during the gypsy moth larval phase and still be effective. The effectiveness of biological insecticides, on the other hand, do not compare well with that of the chemical insecticides in these aspects.While population reduction and foliage protection can be achieved, it will be to a lesser extent. Biological insecticides must be ingested and generally it is 7 to 10 days before larvae are affected. During this time the insects continue to feed and defoliate the host trees.

Timing biological insecticide applications is more critical than with the chemical insecticides. Young larvae (second instar) are more sensitive to the biological insecticides than are the later instars (fourth instar). Consequently, if biological insecticides are not applied while larvae are in the early instars, project objectives may not be achieved. This contrasts with the chemical insecticides, which can be applied almost anytime during the larval phase and still be effective.

An IPM approach which utilizes both chemical and biological insecticides, as well as other components, can be expected to achieve the objectives of gypsy moth suppression and regulatory projects. However, due to the efficacy of biological insecticides and the gypsy moth pheromone, IPM may necessitate that some areas tolerate a greater degree of host-tree defoliation and higher gypsy moth populations than would be realized if only chemical insecticides were used. In terms of foliage protection and population reduction, IPM will perform somewhat less effectively than the chemical insecticide alternative and somewhat better than the biological insecticide alternative.

Table 5.-- Comparison of alternatives for gypsy moth suppression and regulatory projects

Evaluation criteria	Alternative 1/ 2/ #1	#2	#3	No Action
1. Minimizes gypsy moth-caused tree defoliation and mortality.	+	+	+	-
2. Reduces gypsy moth populations.	+	+	+	-
3. Reduces risk of gypsy moth spread from generally infested area and establishment of infestations isolated from generally infested area.	+	-	+	-
4. Rigorously seeks to minimize human exposure to chemical insecticides.	-	+	+	+
5. Minimizes unavoidable impact on non target organisms.	-	+	+	+
6. Minimizes adverse impacts on soil and water, and water within or fed by areas within treatment areas.	-	+	+	+
7. Minimizes adverse impact on non target areas.	-	+	+	+
8. Minimizes monetary losses in forested recreational areas, watersheds, high-value forests, and to forested residential landowners resulting from gypsy moth impacts.	+	+	+	-
9. Demonstrates favorable economic efficiency.	+	+	+	-
10. Minimizes nuisance problems caused by the presence of gypsy moth larvae.	+	-	+	-
11. Provides for public involvement in cooperative gypsy moth suppression and regulatory project decisions.	+	+	+	+
12. Addresses public concern over the use of and exposure to insecticides for gypsy moth suppression projects.	-	+	+	+
Total positive rating	7	10	12	6

1/ #1 Chemical insecticides to suppress or regulate gypsy moth infestation.
#2 Biological insecticides to suppress or regulate gypsy moth infestation.
#3 IPM approach to suppress or regulate gypsy moth infestation.
#4 No action.

2/ Rating System: + High probability criteria would be satisfied.
- Low probability criteria would be satisfied.

The no-action alternative will not result in a reduction of gypsy moth populations or protect host foliage. However, to the extent that State or private funds permit, State and local suppression activities may be undertaken without Federal assistance.

While the chemical insecticide alternative can maximize efficacy against the target insect, it cannot minimize impact on non target organisms. Unlike the biological insecticides, the chemical insecticides are broad spectrum and may temporarily reduce gypsy moth parasites, predators, and other non target insects, including pollinators. B.t. will affect the larvae of other lepidopterous insects, but no other nontarget organisms. The IPM alternative uses both chemical and biological insecticides, and gypsy moth pheromone and pheromone traps to meet project objectives and minimize environmental impacts.

The no-action alternative will not necessarily minimize the impact on non-target organisms. If no State or local suppression activity is undertaken there will be no impact on other organisms other than that caused by the presence of the gypsy moth itself. However, State and local agencies and individuals are not precluded from suppression activities. The resulting impact on non target organisms will depend on the type of suppression activity used. Potential impacts would probably be greater because individual projects might not be coordinated and controlled at the State level to assure an acceptable level of performance.

The alternative selected must minimize human exposure to chemical insecticides. The biological insecticide alternative will eliminate any human exposure to the chemical insecticides. The IPM approach will minimize human exposure since biological insecticides will be used where human health concerns are greatest and chemical insecticides will be used when the risk of human exposure is minimal. The chemical insecticide treatment alternative would result in the greatest potential for human exposure. The data presented in the PEIS indicates, however, that the risk of chemical insecticides to human health, as used in the cooperative gypsy moth suppression and regulatory program activities, is very low.

Perhaps the greatest risk of human exposure to chemical insecticides will occur if there is no Federal financial assistance for suppression projects. Individual homeowners, or groups of homeowners may contract with commercial firms for gypsy moth treatments. It is highly possible that these treatments could be applied during those times of the day, and in such a manner, that the risk of human exposure would be greatly increased.

PHYSICAL EFFECTS

In considering physical effects, only the biological insecticide treatment alternative best meets the established criteria (Table 5) in minimizing adverse impact on soil, air, and water in both treatment and non treatment areas. In contrast, the chemical insecticide alternative minimally meets the criteria, though, all four registered insecticides have a short residual life in soil and water. The physical effects of both biological and chemical materials are listed in Table 4, page 54.

The IPM approach, composed of chemical and biological insecticide components in addition to other suppression components, would exhibit physical effects depending on the extent to which the various components are used. The impact on soil, air and water would depend on the amount of acreage treated with chemical or biological insecticides. Impacts on soil air and water can be further reduced by careful monitoring of gypsy moth larval populations and treating a minimum number of acres with insecticides to achieve specific suppression targets. Areas where parasites or other natural controls are exerting adequate biological pressure on gypsy moth populations normally would not receive insecticide treatment.

In addition, the IPM strategy offers opportunities for maximum public involvement in the selection of options for gypsy moth suppression not available with the other alternatives. Physical effects important to one community may be of minor importance to other communities. An IPM approach allows for different mixes of components.

The no-action alternative may result in physical effects ranging from minimal impacts on soil, air, and water to greatly increased impacts in localized areas. Lack of Federal financial assistance will generally reduce the size and effectiveness of State-financed suppression projects. Impacts on soil, air, and water will remain at minimal levels, but overall effectiveness of the State-financed suppression efforts may be reduced. Areas eliminated for financial reasons from a State-financed project, often experience uncoordinated private suppression action; the result for many is a higher insecticide rate per acre. Biological insecticides are seldom utilized by commercial control operators due to higher costs and delayed larval kill.

ECONOMIC EFFECTS

The chemical insecticide treatment alternative is the most economically efficient alternative. Costs for material and application are between $7 and $10 per acre. The biological insecticides, which usually require two applications, could cost upwards of $30 per acre, depending on the size of the area treated and the material used.

The higher expenditure needed for the biological insecticides has definite implications for project benefit-cost ratios. In general, it is not economically justified to use these materials in areas where the values at risk are low. High-value forests, can be treated more economically with chemical insecticides in areas where concern for human health is not a constraint. Forest areas can also be treated using different components of an IPM approach. It is probable that the no-action alternative would have little economic impact on low-value areas.

The biological insecticide alternative would definitely be justified where physical and biological concerns of the environment have been identified, where the cost of treatment is not a major consideration, and where protection of host foliage and a reduction in population are not required. In such cases, benefit-cost ratios may range from 2:1 to 10:1. Benefit-cost ratios for use of chemical insecticides in forested communities have been established by State proposals in the 1979 EIS for Cooperative Gypsy Moth Suppression and Regulatory Programs, Appendix C. These range from 2:1 (NJ, NY) to 40:1 (PA). In high-value forests, suppression costs would be offset by expected benefits from wood products utilized in the future.

The costs of an IPM approach would depend on the extent to which the various components are used. The economic efficiency of the homeowner self-help approach will depend on how much time and effort an individual is willing to commit. The economic efficiency of other components requires more study.

The no-action alternative will not be cost effective at the local level. The lack of any suppression activities could seriously hurt the local economy in areas dependent on tourism and recreation. The cost of removing yard and street trees is significant and does not include expenditures for tree replacement. Moeller et al. (1977) demonstrated in their Pennsylvania and New York study that costs to homeowners for commercial suppression activities are close to twice as much as those for cooperative suppression activities. In general, it is not unreasonable to project that the costs of the no-action alternative could easily exceed the cost of the biological insecticide alternative.

SOCIAL EFFECTS

Social criteria for evaluating the alternatives entail minimizing insect nuisance, maximizing public involvement, and addressing public concern about the use of and exposure to insecticides used in gypsy moth suppression projects.

Maximum larval nuisance abatement can be achieved by implementing the chemical insecticide treatment alternative. This alternative would provide for public involvement in the selection of chemical insecticide and treatment areas. The chemical insecticide treatment alternative, however, would not alleviate concerns regarding exposure to chemical insecticides. By contrast, the biological insecticide treatment alternative would not provide maximum insect nuisance abatement. However, this alternative would address concerns regarding exposure to chemical insecticides. Public involvement would be provided in the selection of the biological insecticide and treatment areas. The biological insecticides are environmentally safe, having no effect on beneficial life forms except, in the case of B.t., other lepidopterous larvae.

The IPM alternative would allow for maximum public involvement. Component selection would not be limited to either chemical insecticides or biological insecticides. State, county or local governments with public involvement would select those components necessary to meet local gypsy moth suppression objectives and to alleviate local environmental concerns. Maximum insect nuisance abatement can be achieved by using chemical insecticides. Where insect nuisance abatement is a secondary consideration, exposure to chemical insecticides can be reduced by favoring biological insecticides and other suppression components.

The no-action alternative may not meet the social effects criteria. Since most State-financed suppression projects will be smaller than those proposed when Federal assistance is available, maximum insect nuisance abatement will not be achieved in the areas deleted from the State projects. Realizing increased monetary constraints without Federal assistance, State projects may utilize only the more effective and economical chemical insecticides. In this situation, concerns regarding exposure to chemical insecticides would not be alleviated. However, State projects utilizing both chemical and biological insecticides would allow for public involvement in the selection of insecticides and those areas which could be treated without Federal financial assistance.

IDENTIFICATION OF THE SELECTED USDA ALTERNATIVE

It is the policy of the USDA to conduct gypsy moth suppression and regulatory projects with minimal hazard to human health, wildlife, and the natural environment. An IPM approach will effectively meet the objectives of gypsy moth suppression and regulatory projects and at the same time minimize the impact of chemical insecticides on non target organisms and areas, and on human health concerns. The IPM approach will allow for maximum public involvement in the USDA Cooperative Gypsy Moth Suppression and Regulatory Program.

An IPM approach will result in treating gypsy moth as a regional problem rather than a local one. The regional approach will allow for more efficient implementation of suppression methods while maximizing reliance on established natural controls over the majority of infested acres. As new components of the IPM strategy become operational, the objectives of long-term gypsy moth suppression will become more attainable.

Therefore, the alternative selected by the USDA Forest Service and APHIS is to provide assistance for the implementation of an IPM approach to meet the objectives of gypsy moth suppression and regulatory projects.

If implemented, the selected alternative will guide USDA gypsy moth suppression and regulatory projects until new insecticides or application methods are proven operational, or until environmental analyses identify unreasonable risks to human health or the environment that are associated with proposed projects. Annual requests by cooperating State agencies for Forest Service financial assistance will be considered on an individual site-specific basis. Annual decisions will be made concerning USDA Forest Service financial assistance and APHIS regulatory programs based on the results of site specific environmental analyses documented in accordance with the NEPA regulations.

CONSULTATION WITH OTHERS

The USDA Forest Service and APHIS held scoping sessions during September and October, 1980 in the States proposing cooperative gypsy moth suppression projects for 1981: Maine, New Jersey, New York, Pennsylvania, and Rhode Island. The purpose of the scoping sessions was to help identify major concerns, issues and opportunities related to USDA gypsy moth suppression and regulatory projects. The sessions were announced through letters sent to individuals, agencies and groups identified by cooperating states. One hundred and thirty-one individuals representing various agencies, organizations and interests attended the meetings and twenty oral presentations were made. A total of forty-three written presentations were also received.

Major issues, concerns and opportunities identified during the scoping sessions were: concern for human health; a need for more public education regarding gypsy moth suppression and regulatory projects; a need for increased public involvement in selection of insecticides and treatment areas; concern for the environmental effects of using insecticides; a need for discussion of alternatives to chemical insecticides; a need for continued Federal/State coordinated gypsy moth suppression and regulatory projects; a need for improved and continuous communications between project coordinators regarding safety; and a need to update future Environmental Impact Statements with new information on registered insecticides such as labels, new insecticides and environmental monitoring.

In accordance with NEPA requirements the Draft Programmatic Environmental Impact Statement was provided for public review and comment to a large number of agencies, organizations, and individuals (see below and Appendix F). The following individuals and organizations commented during the draft review period. All written comments are included in Appendix C. and are preceded by responses to the main points of each letter.

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GLOSSARY

Acephate
: Organophosphate insecticide; the active ingredient found in insecticide formulations sold under the tradename Orthene®.

Acetylcholine
: A compound that is released at many automatic nerve endings. It is believed to function in the transmission of the nerve impulse.

Acetylcholinesterase
: An enzyme released at nerve endings in order to accelerate hydrolysis of acetylcholine thereby ending nerve stimulation after an impulse has passed.

Active ingredient
: The effective part of the pesticide formulation, or the actual amount of the pesticide present in the formulation.

Acute toxicity
: The toxicity of a compound when given in a single dose or in multiple doses over a period of 24 hours or less.

AI
: Abbreviation for active ingredient.

APHIS
: Animal and Plant Health Inspection Service. The USDA agency responsible for regulating materials which have potential for artificially moving gypsy moth out of the generally infestated area and for eliminating isolated infestations of gypsy moth.

Apiary
: A place where bees are kept.

Arthropods
: Major group of invertebrate animals belonging to the phylum Arthropoda. This group includes insects, spiders and crustaceans.

Artificial spread
: Term used to described the spread of gypsy by other than natural means; e.g. hitch-hiking insect stages on recreational vehicles, campers, cars, nursery stock, household goods, etc..

Bacillus thuringiensis
: Scientific name of a bacterium that is pathogenic to the larval stage of many lepidopterous insects. The active ingredient in biological insecticides sold under the names Dipel® and Thuricide®.

B.t.
: Abbreviation for *Bacillus thuringiensis*.

Buffer zones
Areas intended to receive only spray drift fallout from the treatment site. Areas usually set aside around lakes, streams, ponds or other exclusion areas.

Caddisfly
A small moth-like insect. The larvae live in fresh water in portable cases they construct around themselves. Member of order Trichoptera.

Carbaryl
Carbamate insecticide; the active ingredient in insecticide formulations sold under the tradename Sevin®.

Carcinogenicity
Tendency of a substance to produce cancer.

Chitin
A semi-transparent horny substance forming the principal component of crustacean shells, insect exoskeletons and the cell walls of certain fungi.

Chitinase
An enzyme that hydrolyzes chitin.

Cholinesterase
See acetylcholinesterase.

Chronic toxicity
The effect of a compound on test animals when exposed to sublethal amounts continually.

Collembola
Springtails. Primitive, wingless group of insects commonly found in soil and duff.

Copepods
Usually, minute freshwater and marine crustaceans belonging to the order Copepoda.

Corixids
Group of aquatic insects, usually freshwater, that feed on algae and other minute aquatic organisms; belong to the family Corixidae.

Crustaceans
Large group of mostly aquatic arthropods belonging to the class crustacea and characterized by a chitinous or calcareous and chitinous exoskeleton. Members of this group include Copepods, water fleas, shrimps and wood lice, among others.

Cyclops
Scientific name (genus) of a group of Copepods.

Diflubenzuron
The active ingredient of insecticide formulations sold under the tradename Dimilin®. Acts as a growth regulator by interferring with chitin synthesis and prevents gypsy moth from successfully completing their molting phases.

Dimilin W-25®
Commercial wettable powder formulation of diflubenzuron.

Dipel®
Tradename of biological insecticide formulations containing the bacterium Bacillus thuringiensis.

Disparlure
Commercially synthesized female gypsy moth sex pheromone. Disparlure is used to disrupt mating by making it difficult for male moths to locate female moths.

Dosage rate
Quantity of a toxicant applied per unit area. Usually expressed as oz. or lbs. active ingredient per acre.

Dylox®
Tradename of chemical insecticide formulations containing the active ingredient trichlorfon.

EC_{50}
Median effective concentration; is the concentration (ppm or ppb) of the toxicant in the environment (usually water) which produces a designated effect to 50 percent of the test organisms exposed.

EIS
Environmental Impact Statement.

Environmental analysis
Procedure defined by the National Environmental Policy Act of 1969 whereby the environmental impacts of a planned action (in this case gypsy moth suppression and regulatory programs) are objectively reviewed.

EPA
U.S. Environmental Potection Agency.

Exclusion areas
Areas where product label prohibits the use of an insecticide, or areas identified during public involvement process as no-treatment areas.

Formulation
The form in which a pesticide is packaged or prepared for use.

Frass
Solid insect excrement.

FS
Forest Service. The USDA agency responsible for cooperative gypsy moth suppression projects.

Generally infested area
That area from Maine to Pennsylvania in which the gypsy moth is considered to be firmly estabished.

Gypchek
USDA laboratory prepared and refined gypsy moth NPV product. Used as a biological insecticide.

Half-life
The time required for half the amount of substance (such as an insecticide) in or introduced into a living system to be eliminated whether by excretion, metablic decomposition, or other natural process.

Hemiptera
True bugs. Group of insects with semi-toughened forewings.

Hymenoptera
A large order of insects comprised of the ants, bees, sawflies and wasps. The typical adult each have four membranous wings and chewing type mouthparts.

Instar
The term for a insect before each of the molts (shedding of its skin) it must go through in order to increase in size. Upon hatching from its egg, the insect is in instar I and is so called until it molts, when it begins instar II, etc.

Invertebrate
Major group of animals of which arthropods are members; characterized by the lack of backbone and spinal column.

IPM
Integrated Pest Management

Isolated infestation
As pertains to gypsy moth, any infestation(s) occuring outside of the generally infested area as a result of artificial spread.

Larva (plural larvae)
An insect in the earliest stage of development, after it has hatched and before it changes into pupa; a caterpillar, maggot, or grub.

LC_{50}
Median lethal concentration as the concentration (ppm or ppb) of a toxicant in the environment (usually water) which kills 50% of the test organisms exposed.

LD_{50}
Median lethal dose, is the milligram of toxicant per kilogram of body weight (mg/kg) lethal to 50% of the test animals to which it is administered under the conditions of the experiment.

Lepidoptera
A large order of insects, including the butterflies and moths; characterized by four scale-covered wings and coiled sucking mouthparts.

Mg/kg/day
Milligrams per kilogram per day.

Mg/kg
Milligrams per kilogram; used to designate the amount of toxicant required per kilogram of body weight of test organisms to produce a designated effect, usually the amount necessary to kill 50 percent of the test animals. One mg/kg = 1 ppm. One mg = 0.000035 ounce, and 1 kg = 2.2 pounds.

Mutagenicity
The capacity of a substance to cause changes in genetic material.

Natural spread
Opposite of artificial spread; spread of gypsy moth through natural means, for example young larvae carried on the wind or older larvae walking to new food sources.

NEPA
National Environmental Policy Act of 1969, Public Law 91-190.

Notonectids
Group of predaceous aquatic insects belonging to the family Notonectidae. Commonly called backswimmers.

NPV
Nucleopolyhedrosis virus. In this case, naturally occurring virus specific to gypsy moth, and common in heavy gypsy moth populations. The active ingredient in the biological insecticide Gypchek.

Orthene®
Commercially produced chemical insecticide formulation containing the active ingredient acephate.

Parasite
Any animal that lives in, on, or at the expense of another.

PEIS
Programmatic Environmental Impact Statement.

Pheromone
As pertains to gypsy moth, chemical produced and emitted by female moths to attract male moths for mating.

Phytotoxic
Poisonous or harmful to plants.

Plecoptera
Stoneflies. Group of insects, the nymphs of which are aquatic and mostly phytophagous.

Ppb
Parts per billion; the number of parts of a substance in question per billion parts of a given material. One ppb = 1 ug/liter (water or air).

Ppm
Parts per million; the number of parts of a substance in question per million parts of a given material. (1 ounce of salt in 62,500 lbs of sugar). One ppm = 1 mg/kg (on a weight basis) = 1 mg/liter (water or air).

Predator
An animal that preys on others.

Pupa (plural pupae)
The immobile, transformation stage in the development of an insect that as an adult is completely different in its appearance compared to what it looked like when it hatched from its egg. Examples include beetles, flies, moths, and wasps.

Regulatory programs
As pertains to gypsy moth, APHIS programs designed to reduce artifical spread and to eliminate isolated infestations of gypsy moth.

Remote infestations
See isolated infestations.

RPAR
Rebuttable Presumption Against Registration. EPA process for reviewing and subsequently approving or withdrawing registration of pesticides.

Scoping Session
As defined under the National Environmental Policy Act - an early and open process for determining the scope of issues to be addressed and for identifying the significant issues related to a proposed action. This may include public meetings whereby significant issues are identified.

Sevin 4 Oil®
Commercial insecticide formulation containing the active ingredient carbaryl.

Sevin 80 S®
See Sevin 4 Oil.

Suppression projects
Projects administered by USDA Forest Service, in cooperation with State agencies, designed to relieve high gypsy moth populations in high-value high-use areas within the generally infested area.

Tachinidae
Family of flies, the larvae of which are parasitic.

Teratogenicity
The capacity of a substance to cause anatomical, physiological, or behavioral defects in animals exposed during embryonic development.

Thuricide®
Commercial biological insecticide formulation containing the active ingredient Bacillus thuringiensis.

Trichlorfon
Active ingredient found in chemical insecticide formulations sold under the tradename Dylox®.

USDA
United States Department of Agriculture.

USDI
United States Department of the Interior.

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APPENDIX A

LIST OF PEIS PREPARERS AND RESPONSIBILITIES

Name: Larry C. Yarger

Position: Entomologist, USDA Forest Service, State and Private Forestry, Forest Pest Management, Morgantown, WV 26505.

Experience Education: Two years in current position. Previous assignments with USDA Forest Service were at Juneau, AK and Lakewood, CO. Holds a B.S. in Forest and Range Management and an M.S. in Entomology from Colorado State University.

EIS Responsibility: Coordinated environmental analysis for USDA Forest Service Cooperative Suppression Projects.

Name: Robert D. Wolfe

Position: Staff Pathologist, USDA Forest Service, State and Private Forestry, Forest Pest Management, Broomall, PA 19008.

Experience and Education: Four years in present position. Sixteen year employment with the USDA Forest Service. Previous assignments were at Macon, GA, Alexandria, LA and Asheville, NC. Holds a B.S. degree in Biology and a M.F. in Forest Pathology from Duke University, Durham, NC.

EIS Responsibility: Coordination of EIS review, printing, distribution and filing with EPA. Assisted in environmental analysis for Forest Service Cooperative Suppression Projects.

Name: Noel F. Schneeberger

Position: Entomologist, USDA Forest Service, State and Private Forestry, Forest Pest Management, Morgantown, WV 26505.

Experience and Education: Two years in current position. Previous assignment with USDA Forest Service was with the Application Group, Expanded Gypsy Moth Research, Development and Application Program, Hamden, CT. From 1976-1978 was Forest Pest Specialist with South Dakota Division of Forestry. Holds B.S. degree in Biology from Wittenberg University, Springfield, OH and M.F. degree in Forest Entomology from Duke University, Durham, NC.

EIS Responsibility: Assisted in the environmental analysis for USDA Forest Service Cooperative Suppression Projects. Prepared section on the history of gypsy moth suppression.

Name: Gary E. Moorehead

Position: Staff Officer, USDA APHIS, Plant Protection and Quarantine, Hyattsville, MD 20782.

Experience and Education: Six months in current position. Twenty years service with APHIS, Plant Protection and Quarantine Program, sixteen of which involved Methods Development activities on biological control, IPM and gypsy moth. Holds a B.S. degree in Botany from Iowa State University and has done graduate work in Entomology at Purdue University.

EIS Responsibility: Coordinated environmental analysis for USDA APHIS, Cooperative Regulatory Program.

Name: Belinda Daughtry

Position: Statistical Assistant, USDA Forest Service, State and Private Forestry, Forest Pest Management, Broomall, PA 19008.

Experience and Education: Several months in current position. Holds a B.S. in Economics from North Carolina A&T State University. Currently continuing education toward M.A. in Economics at Temple University.

EIS Responsibility: Assisted in developing economic factors for Forest Service Cooperative Suppression Projects.

Name: Michael J. Birmingham

Position: Chief, Forest Insect and Disease Management Section, New York State Department of Environmental Conservation, Bureau of Forest Resource Management, Albany, NY 12233.

Experience and Education: Four years in current position. Eleven years experience in various insect and disease control position with New York Department of Environmental Conservation. Holds a B.S. in Forest Land Management from the State University of New York, College of Forestry and an M.S. in Urban and Environmental Studies from Rensselaer Polytechnical Institute, NY.

EIS Responsibility: New York Bureau of Forest Resource Management coordinator for the environmental analysis. Assisted in the formulation of suppression alternatives, and in analysis of their effects. Coordinated the scoping session in New York.

Name: John D. Kegg

Position: Supervising Entomologist, New Jersey Department of Agriculture, Division of Plant Industry, Trenton, NJ 08625.

Experience and Education: Began work as an entomologist with the New Jersey Department of Agriculture in 1963. In charge of the Forest Pest Survey and Control Program. Directs and manages the gypsy moth cooperative suppression program in New Jersey. Received BS degree in 1963 from Syracuse University, received M.S. degree from Rutger's University in 1974.

EIS Responsibility: New Jersey Department of Agriculture coordinator for the environmental analysis. Assisted in the formulation of suppression alternatives and in analysis of their effects. Coordinated the scoping session in New Jersey.

Name: George P. Koeck

Position: Principal Forester, State Land Management, New Jersey Department of Environmental Protection, Division of Parks and Forests, State Forestry Services Bureau of Forest Management, Trenton, NJ 08625.

Experience and Education: Began work with the Bureau of Forest Management in 1967. Holds B.S. degree in Forest Management from Pennsylvania State University.

EIS Responsibility: New Jersey Bureau of Forestry coordinator for the environmental analysis. Assisted in the formulation of suppression alternatives, and in analysis of their effects.

Name: John Chadwick

Position: State Entomologist, Bureau of Forestry, Maine Department of Conservation, Augusta, ME 04333.

Experience and Education: Five years in present position. Previously, 21 years in the Maine Bureau of Forestry in forest entomology. Holds B.S. in Forestry from University of Maine.

EIS Responsibility: Maine Bureau of Forestry coordinator for the environmental analysis. Assisted in the formulation of suppression alternatives, and in analysis of their effects. Coordinated the scoping session in Maine.

Name: William R. Slippey

Position: Supervisor, Control Operations Section, Division of Forest Pest Management, Bureau of Forestry, Department of Environmental Resources, Middletown, PA 17057.

Experience and Education: Two years with Pennsylvania Department of Agriculture; forester with Pennsylvania Department of Environmental Resources since 1972. Supervisor gypsy moth cooperative suppression projects in Pennsylvania. Holds a B.S. degree in Forestry from Pennsylvania University.

EIS Responsibility: Division of Forest Pest Management Coordinator for the environmental analysis. Assisted in the formulation of suppression alternative, and in analysis of their effects. Coordinated the scoping session in Pennsylvania.

Name: Rudolph D'Andrea

Position: Chief, Division of Agriculture, Rhode Island Department of Environmental Management, Providence, RI 02903.

Experience and Education: Twenty years in present position. Previously held position as plant pathologist for seven years. Holds B.S. degree in biology and has done graduate work in Entomology and Plant Pathology at the University of Rhode Island.

EIS Responsibility: Rhode Island Division of Agriculture coordinator for the environmental analysis. Assisted in the formulation of suppression alternatives in an analysis of their effects. Coordinated the scoping session in Rhode Island.

APPENDIX B

AVAILABILITY OF PAST FINAL ENVIRONMENTAL STATEMENTS

Past Final Environmental Impact Statements for USDA Cooperative Gypsy Moth Suppression and Regulatory Projects are available from the following locations:

USDA Forest Service
P.O. Box 2417
Washington, DC 20013
703-235-1560

USDA Forest Service
Northeastern Area, State & Private Forstry
370 Reed Road
Broomall, PA 19008
215-461-3158

USDA Forest Service
Northeastern Area, State & Private Forestry
180 Canfield St.
Morgantown, WV 26505
304-599-7133

USDA Animal and Plant Health Inspection Service
Plant Protection and Quarantine-
630 Federal Building
6505 Belcrest Road
Hyattsville, MD 20782
301-436-8745

APPENDIX C

Draft PEIS Comment Letters and Responses

Response to Comments

Letter	Comments	Response
1	a	Instructions for use of disparlure are included in the product label.
2	a	The alternatives presented in the Draft and Final PEIS were developed from the concerns and issues raised during the 1980 scoping sessions and comments regarding alternatives presented in past Environmental Impact Statements. Although the biological insecticide alternative may not fully meet the objectives of all suppression projects, the use of only biological insecticides is considered an alternative of gypsy moth suppression.
3		No response necessary.
4		No response necessary.
5A		No response necessary.
5B	a	The Draft and Final PEIS presents the proposed USDA Cooperative Gypsy Moth Suppression and Regulatory Program for cooperating States. Annual requests for Forest Service financial assistance will be considered on an individual basis. Annual decisions will be made concerning Forest Service Suppression and APHIS regulatory projects based on the results of site specific environmental analysis documented in accordance with the NEPA regulations.
	b	The alternative selected by USDA for cooperative suppression and regulatory projects is addressed on page 61.
	c	Public involvement and notification procedures are integral phases of suppression projects. An overview of public involvement and notification procedures is presented in the MANAGEMENT REQUIREMENTS section of the Draft and Final PEIS. Discussion of the specific public involvement and notification methods used by State agencies proposing cooperative suppression projects will be presented in each annual site specific environmental document.

Response to Comments

Letter	Comments	Response
5C		No response necessary
5D		Refer to response 5B.
6A		No response necessary.
6B	a	The Final PEIS further addresses those components of an IPM strategy that are considered viable for regulatory projects (p. iii and 1). Also see responce 25c. Specific objectives and strategies for annual regulatory or suppression projects will be addressed in annual site specific environmental documents.
	b	Comment noted and addressed in Final PEIS.
	c	Refer to response 5Ba.
6C		Refer to responce 6B a-c.
7	a	Insecticides are not applied directly to streams, lakes or ponds. The use of buffer strips can minimize the introduction of carbaryl into water bodies where trout may occur.
	b	The EPA has determined that research into viral enhancement as a possible adverse effect of exposure to carbaryl is preliminary in nature and that current information does not constitute a basis in which to conclude that carbaryl poses a human hazard; refer to EPA Carbaryl Decision Document, December 1980, Summary in Appendix D.
	c	Refer to Appendix D - Summary of EPA Carbaryl Decision Document, December 1980.
	d	Refer to Appendix D - Summary of EPA Carbaryl Decision Document, December 1980.
	e	Any reduction of insect populations that may occur as a result of the implementation of one or more of the IPM components can be considered temporary. Re-establishment of populations will occur from adjacent untreated areas.
	f	Comment considered.
	g	Effects of carbaryl on birds is addressed in the EFFECTS OF IMPLEMENTATION section of the Draft and Final PEIS.

Response to Comments

Letter	Comments	Response
7	h	Comment considered. A study with similar results was addressed in the 1974 FEIS, Page 121.
	i	Degradation of carbaryl in water is addressed in the 1974 EIS and also the Draft and Final PEIS.
	j	Carbaryl is not applied directly to water during gypsy moth suppression or regulatory projects. Buffer strips, the use of small fixed-wing aircraft, helicopter or ground equipment, and application during favorable weather conditions, as addressed in the MANAGEMENT REQUIREMENTS section, will minimize the possibility of carbaryl introduction into water bodies.
	k	Although the composition of streamside vegetation may not be highly preferred by the gypsy moth, under heavy populations levels, most if not all vegetation will be consumed. Comment regarding gypsy moth droppings as food for insectivorous birds and mammals is noted. However, areas heavily defoliated may actually experience a decrease in bird and mammal population associated with a decrease in vegetation cover.
	l	Does not apply to Sevin 4 Oil formulation.
	m	The State agency that requested Federal funds for gypsy moth suppression was asked to provide the USDA Forest Service with a list of agencies to invite to the scoping session. The list was restricted to concerned or affected State agencies, affected community or county leaders, county gypsy moth coordinators and environmental leaders or spokesmen. In addition, the USDA Forest Service invited the following Federal agencies: USDA Animal and Plant Health Inspection Service; U.S. Department of the Interior Bureau of Indian Affairs and National Park Service; and the Environmental Protection Agency.

Response to Comments

Letter	Comments	Response
		While private individuals were not specificially invited, they were not excluded from attending the meeting. This is because private input is provided for at the local level through municipal town meetings or county coordination meetings. Such meetings directly determine if the community is to be included or excluded from the State gypsy moth suppression program.
7	n	Public notification procedures are addressed in the MANAGEMENT REQUIREMENTS section of the Draft and Final PEIS. Specific procedures utilized by cooperating States will be addressed in each annual site specific environmental document.
	o	Comment considered.
	p	Cooperative gypsy moth suppression projects are initiated at the State and local level to meet the short term objectives of reducing gypsy moth larval populations and nuisance, tree defoliation and mortality. Federal and State assistance for chemical or biological insecticide treatment are requested by forested residential landowners and managers of forested recreation or high-value forests to prevent unacceptable damage caused by the gypsy moth. Larval dispersion generally occurs during the first and second instar due to the physical characteristics of gypsy moth larvae. Larval dispersions into areas proposed for treatment would occur prior to insecticide application. However, larval dispersions into areas treated the previous year may necessitate retreatment. The number of acres requiring treatment, two consecutive years, has been minimal.

Response to Comments

Letter	Comments	Response
	q	The primary units of economic measurement for cooperative gypsy moth suppression projects has been the cost of insecticide, mixing, application and monitoring verses the value of trees to be protected. Values associated with recreation, non-target organisms and watersheds are not easily and readily quantifiable. As techniques are developed to place values on secondary costs and benefits, they will be implemented to strengthen benefit-cost ratios.
	r	Comment considered.
8		No response necessary.
9	a	Glossary added to Final PEIS.
	b	Refer to response 6Ba.
	c	Insecticides will not be applied to those areas where the product label prohibits or to those areas decided upon during the public involvement process as exclusion areas.
	d	USDA encourages and the NEPA process requires public involvement in cooperative gypsy moth suppression and regulatory projects.
	e	Comment considered. Page 3, paragraph 2 changed to address comment.
	f	NEPA requires that public involvement be an integral part of major Federal actions.
	g	Refer to response 9c.
	h	Final PEIS reflects that IPM also includes regulatory inspection and quarantine, Page 25.
	i	Two applications of carbaryl, as registered, are expected to only affect application costs.
	j	Eradication is addressed in Evaluation Criteria #3 which indicates that no-action is not equal to chemical insecticide treatment alternative.
	k	Comment considered.
	l	Mailing list for Final PEIS is revised.

Response to Comments

Letter	Comments	Response
	m	Comment considered.
10A		No response necessary.
10B		No response necessary
11		Refer to response 5Ba.
12	a	Refer to response 5Ba.
	b	Comment considered.
	c	Past and current EIS documents are available upon request, either by mail or telephone, from offices identified in Appendix B.
	d	Refer to response 5Ba.
13	a	The section of the PEIS that addresses the effects of the no-action alternative on the evnironment has been revised. Further discussions are contained in the 1974 Final EIS.
	b	Comment considered.
14	a	Refer to Appendix D - Summary of EPA Carbaryl Decision Document, December 1980.
	b	Comment considered.
15	a	Refer to response 9c.
	b	Chemical insecticides currently used for gypsy moth suppression and regulatory projects have a relatively short residual life in soil and water compared to other insecticides.
	c	Comment considered.
	d	Comment considered.
	e	Statement corrected in Final PEIS.
	f	Comment considered.
	g	Projects are monitored to identify possible adverse effects. Cooperative suppression projects utilize EPA registered insecticides that are used in accordance with label directions and precautionary statements.

Response to Comments

Letter	Comments	Response
	h	Insecticide treatments are not applied to all infested acres. Only those high-value and high-use areas where there exists a current threat of unacceptable damage are proposed for treatment. Each year there are high-value areas where natural mortality factors have not maintained gypsy moth populations below damaging levels. In these areas, gypsy moth populations increase to levels where suppression projects are requested by residential homeowners or managers of recreation or high-value forests. Regulatory treatments of isolated infestation are necessary to eradicate infestations that developed outside of the generally infested area.
	i	Risk to human welfare is considered during EPA's registration process for pesticides.
	j	Refer to Appendix D - Summary of EPA Carbaryl Decision Document, December 1980.
	k	Comment considered.
	l	Post-suppression surveys allow pest managers to monitor the effects of insecticide treatments. If larval mortality is determined to be acceptable, high fall egg mass counts and the need for re-treatment the following year could then be considered due to larval reinfestation.
	m	The most recent finding and decisions covering carbaryl are presented in EPA's Decision Document on Carbaryl, December 1980. Refer to Appendix D for a summary of this document.
	n	Refer to Appendix D - Summary of EPA Carbaryl Decision Document, December 1980.
	o	Refer to Appendix D - Summary of EPA Carbaryl Decision Doxument, December 1980.
	p	Through the public involvement process and advance notification procedures, individuals are provided adequate opportunity for protection from exposure to pesticides. For carbaryl application, this can be accomplished by remaining indoors or under suitable cover at the time of application is made. Once the insecticide settles, any further potential for exposure is greatly reduced.

Response to Comments

Letter	Comments	Response
15	q	EPA has the responsibility for initiating any necessary action to issue that registered pesticides do not cause adverse human health effects when used according to label instructions.
	r	The original recommendation of the medical advisory panel regarding viral potentiation of Sevin - 4 Oil were: 1. No uninformed, unconsented human exposure occurs during a forest spray operation. 2. The formulation must be fully disclosed to the satisfaction of the registering agency. 3. The spray formulation must be consistent with the formula registered. A listing of the health advisory panel members will be forwarded under seperate cover.
	s	Refer to Appendix D - Summary of EPA Carbaryl Decision Document, December 1980.
	t	A residential community with trees can be conside the same as a forested community, depending on the number of trees in that community. A residential community with several shade trees would not be considered the same or a community established in a forested area. A residential community developed in a forested area can be considered a forested community. The registration of a pesticide by the EPA insures that where are no adverse human health effects when the product is used in accordance with label directions. Refer to Appendix D - Summary of EPA Carbaryl Decision Document, December 1980.
	u	Refer to Appendix D - Summary of EPA Carbaryl Decision Document, December 1980.
	v	Once insecticide spray settles, exposure to humans is greatly reduced. The relatively small amount of carbaryl that filters through the tree canopy to the soil is degraded and diluted by several physical factors, primarily rain. At the time of application, individuals can avoid any unnecessary exposure to carbaryl by remaining indoors or under suitable cover.

Response to Comments

Letter	Comments	Response
	w	Refer to Appendix D - Summary of EPA Carbaryl Decision Document, December 1980.
	x	Comment considered.
	y	Comment considered.
	z	Literature recieved.
	aa	Comment noted.
16	a	Comment considered.
	b	Comment considered.
	c	Components of an IPM strategy that are currently considered operational for gypsy moth suppression or regulatory projects include chemical and biological insecticides, homeowner self-help techniques and gypsy moth pheromone. The use of forest stand manipulations, sterile male moths and parasite/predator management needs furhter evaluation before they can be considered for gypsy moth suppression or regulatory projects.
	d	Comments supporting Maine Suburban Society recommendations were considered.
17	a	The alternative selected by APHIS is the IPM approach. Refer to Final PEIS pages iii, paragraph 1 concerning reduction of resources precluding Federal support of campground treatments within the generally infested area and response 25C.
	b	Assessments are continuing to evaluate and improve gypsy moth suppression and regulatory projects. Currently, evaluations are directed toward the use of sterile male moths, improved gypsy moth NPV formulation, and the use of the gypsy moth pheromone in regulatory activities. As new techniques prove operational, they can be implemented into the IPM strategy.
	c	Refer to response 5Ba.
	d	Comment considered. Final PEIS reflects this change.
	e	Comment considered.

Response to Comments

Letter	Comments	Response
	f	Pre-treatment gypsy moth population survey are conducted to determine if natural mortality factors, such as winter mortality and parasitism precludes the need for insecticide treatment.
	g	Projects are continually evaluated to insure that suppression and regulatory projects are conducted effectively and with minimal adverse environmental effects. Insecticide effeciency is determined through post-treatment monitoring surveys. Post-treatment surveys have shown that chemical insecticide treatments have consistently and effectively reduced gypsy moth populations while the results of biological insecticide treatments (B.t. and NPV) have been variable. Continued evaluation into B.t. and NPV formulations and application timing is needed to increase the effectives of projects utilizing biological insecticides.
	h	Refer to Final PEIS, page iii, paragraph 1, concerning reduction of resources precluding Federal support of campground treatment within the generally infested area and response 25C.
	i	Any reduction in not-target insects that may occur as a result of carbaryl application is temporary Beneficial parasites can be expected to become re-established within treatment areas. No increase is expected in forest pest populations since forest defoliators will also be reduced by insecticide application.
18	a	Correction made in Final PEIS.
	b	Refer to response 9c.
	c	Isolated populations of gypsy moth have been eradicated. Two recent examples are San Jose, California and Renton, Washington.
	d	Comment considered.
	e	Comment considered.
	f	Comment considered.

Response to Comments

Letter	Comments	Response
19	a	Glossary added to Final PEIS.
	b	Comment considered.
	c	Comments considered.
	d	Comment considered.
	e	Bacillus thuringiensis is the only species used in preparation of B.t. insecticide formulations However, there are several strains of this species currently being evaluated for use in insecticide formulations.
20	a	Refer to Final PEIS, page 14.
	b	Individuals residing within proposed treatment area are notified either through local news media or public meetings that a request for a suppression project has been initiated at the local level. At this time individuals can request that their property be excluded from treatment. A second opportunity to have property excluded from treatment is at the time when all individuals residing within proposed treatment areas are notified as to the actual insecticide application dates. County or State project coordinators utilize the public media including local newspapers and/or radio to announce treatment dates. In some counties and States, public notification is made by telephone. At the time of this notification, individuals who desire can request exclusion from the proposed project. Areas to be excluded from insecticide application will be identified to aerial applicators prior to treatment of specific blocks.
	c	Methods used to identify exclusion areas are made by the State/local coordinator and aerial applicator. The decision is based on topography, vegetation cover and pilot experience and preference. In all cases, the identification method used must precisely identify to the aerial applicator treatment blocks and exclusion areas. The use of helium balloons, white ground markers and topography maps are acceptable methods of identifing treatment and exclusion areas. Aerial applicators can easily identify these markers during orientation flights over treatment areas.

Response to Comments

Letter	Comments	Response
	d	Refer to TREATMENT AREA SELECTION section (page 15) and Public Notification section (page 14).
	e	Generally, areas supporting egg mass densities greater than 250/acre meet the population level criteria. In some instances, trained forest pest management personnel can determine through non - plot techniques that egg mass densities are greater than 250/acre. However, there are additional criteria relating to landownership and defoliation history that vary by state. Specific criteria used to identify proposed treatment areas will be addressed in the site specific document.
	f	NJ Epidemological Studies Programs (page 30) concludes that aerial application of carbaryl as conducted in cooperative gypsy moth suppression projects does not pose a threat to human health.
	g	Minimizing drift protects the rights of those individuals who do not request treatment while at the same time protecting the rights of those who request participation in cooperation suppression projects.
	h	Individuals who feel that they were subject to spray drift should first contact the county/state gypsy moth coordinator to determine if cooperative suppression projects were conducted during the date and in the area where drift was reported. Local county/state coordinators should then be consulted to determine what recourse is appropriate. On-site Federal/State/county project personnel are responsible for suspending treatments if insecticides do not appear to be settling within treatment areas.
	i	Areas where insecticides are not to be applied are identified on the product label and at the local level during the public involvement process.
	j	Refer to response 20h.
	k	Gypsy moth infestations are a community or regional problem, not just an individual homeowner problem. Coordinated suppression projects are proposed so that benefits accure to entire forested communities.

Response to Comments

Letter	Comments	Response
20	l	Several states in the generally infested area do not participate in USDA cooperative suppression projects. In these states, communities that undertak gypsy moth suppression efforts contract separately for treatments without Federal and State involvement.
	m	Cooperative suppression projects are proposed by forested residential landowners to prevent tree mortality due to gypsy moth infestations.
	n	USDA and cooperating State agencies are responsible for public involvement standards. See public notification standards, page 14.
	o	Federal/State and local gypsy moth project coordinators, with local public involvement, determine buffer strip locations. Refer to Appendix E, EPA letter regarding public involvement and buffer strips.
	p	Individuals who do not want any exposure to pesticides can: 1. petition State/county governments to have their property excluded from proposed treatments; 2. attend public meetings and scoping sessions to express their concerns; and 3. petition State/county governments to suspend proposed treatment for a given area.
	q	More efficient procedures are being developed to ensure that all residents within proposed treatment areas are notified as to the time and dates of insecticide application.
	r	Individuals can avoid unnecessary exposure to pesticides by remaining indoors during actual application. Once the insecticide settles, exposure is greatly reduced.
	s	Safety plans for cooperative gypsy moth suppression projects are developed by cooperative State agencies with USDA assistance. Safety plans can be obtained directly from the State agencies conducting the suppression project.
	t	Refer to response 20p,r.

Response to Comments

Letter	Comments	Response
	u	EPA continually reviews data regarding the effects of pesticides on human health and is responsible for the cancellation of the registration of products they feel would adversely affect human health.
	v	The registration of insecticides by EPA implies that when used in accordance with label instructions, such insecticides will not result in adverse effects to human health.
	w	As stated, 90% refers to gypsy moth only.
	x	Studies have not been conducted that specifically address this question. The possibility exists that the use of chemical insecticides may postpone an eventual crash of a gypsy moth population. However, tree defoliation and mortality occurs prior to collapse of high gypsy moth populations.
	y	Refer to response 20x.
	z	Refer to Appendix D - Summary of EPA Carbaryl Decision Document, December 1980.
	aa	Refer to Appendix D - Summary of EPA Carbaryl Decision Document, December 1980.
	bb	Refer to Appendix D - Summary of EPA Carbaryl Decision Document, December 1980.
	cc	A purpose of the public involvement process is to provide individuals opportunity to express concerns regarding proposed projects.
	dd	Statement added to Final PEIS regarding EPA decision on carbaryl (see page 36).
	ee	Refer to Appendix D - Summary of EPA Carbaryl Decision Document, December 1980.
	ff	Refer to Appendix D - Summary of EPA Carbaryl Decision Document, December 1980.
	gg	EPA did not cancel registration of the insecticide carbaryl during the review process.
	hh	Refer to Appendix D - Summary of EPA Carbaryl Decision Document, December 1980.
	ii	No. EPA is the responsible agency for evaluating potential human health effects of insecticides.

Response to Comments

Letter	Comments	Response
20	jj	EPA sets insecticide tolerance limits on agricultural crops.
	kk	USDA cooperative suppression and regulatory projects utilize EPA registered insecticides applied in accordance with label directions.
	ll	Refer to response 15p.
	mm	Refer to response 20p.
	nn	The study was conducted by Abrahamsen and Jerkofsky and is unpublished. Refer to summary of EPA Carbaryl Decision Document, December 1980.
	oo	Refer to Appendix D, Summary of EPA Carbaryl Division Document, December 1980.
	pp	Refer to Appendix D, Summary of EPA Carbaryl Decision Document, December 1980.
	qq	Refer to response 15p.
	rr	The deposition and degradation of carbaryl is addressed in the PEIS. Individuals can avoid unnecessary exposure by remaining indoors or under cover during insecticide applications.
	ss	Environmental and social impacts associated with the use of chemical insecticides is addressed in the PEIS which was distributed for public review.
	tt	The effects of carbaryl on aquatic organisms is addressed in the PEIS and the 1974 Final EIS.
	uu	Based on Forest Service resource surveys by State, natural mortality (including insects) generally averages 1-2% for the entire forest resource.
	vv	Several studies dealing with the effects of gypsy moth defoliation on forest stands were conducted by both Federal and State agencies and were utilized in development of the economic effects section.
	ww	Forest Service was not aware of the report at the time the environmental analysis was developed.

Response to Comments

Letter	Comments	Response
20	xx	The survey was not designed to assess monetary losses to property owners who did not participate in cooperative or private suppression projects. The study does not address self-help techniques or report incidences of massive tree mortality.
	yy	Laboratory rearing of gypsy moth parasites requires daily handling of gypsy moth larvae. Laboratory personnel have been known to develop minor skin and eye irritation from larval hair and excrement. Forest Service is not aware of studies that cite allergic reactions to larval excrement and larval hair as being a major problem. However, there exists a potential for allergic reactions to those who might be sensitive to gypsy moth larvae.
	zz	In some areas, mass migration of gypsy moth larvae across major roads, has created hazardous slippery conditions for motorists. County and municipal road crews have been observed sanding the slippery areas to reduce road hazard.
	aaa	Scoping sessions are held early in the project planning stage to identify local or regional issues and concerns.
	bbb	Allergies can be identified by a medical physician.
	ccc	Refer to response 20n.
	ddd	Through the public involvement process individuals who may be allergic to certain insecticides can be identified.
	eee	Public notification procedures vary by state agency and will be addressed in annual site specific documents. Individuals can express concerns regarding public notification procedure to Federal, State or local representatives coordinating gypsy moth suppression projects.
	fff	No irreversible or irretrievable impacts on the environment have been identified as a result of past cooperative gypsy moth suppression projects.
	ggg	Due to the mode of action of biological insecticides as discussed in the PEIS, the Forest Service recommends two applications of biological insecticides to be applied in accordance with label directions.

Response to Comments

Letter	Comments	Response
	hhh	Forest Service is stating that the biological insecticides do not kill the larvae immediately. Larvae will continue to feed for a period of time even up to weeks depending on the developmented stage of the larvae, the availability of best food, the quality of the application, the biological insecticide used, and the number of applications.
	iii	Yes. The key phrase is "after ingestion". Larvae in the field do not necessarily feed on the Dipel treated surfaces immediately. Therefore live larvae will still be present in the area for a day or more.
	jjj	Paragraph rewritten in Final PEIS to clarify environmental concerns.
	kkk	USDA Home and Garden Bulletin No. 227. The Homeowner and The Gypsy Moth: Guideline for Control, is available through Forest Service offices in Broomall, PA or Morgantown, WV (Appendix B) or state foresters listed in Appendix F. This publication is currently being revised and is expected to be available this summer.
	lll	Due to the wide distribution of and the dispersal habits of gypsy moth larvae in high populations, the use of homeowner self- help techniques alone, and by one individual may not adequately prevent defoliation nor reduce gypsy moth populations over the area of infestation. These techniques, when used in combination with other IPM components in coordination with community efforts will minimize the effect of gypsy moth infestations.
	mmm	Depends upon the extent of host food available. Populations can be concentrated in small areas of favored food trees but more generally in the Northeast high populations occur over a large continuous area.
	nnn	Refer to response 20k.
	ooo	Tree mortality studies have been made in the forest where trees are in their natural environment, the results of which are extrapolated to trees in more urban situations. It is accepted that trees under stress are more prone to subsequent mortality by insect and disease factors. Trees in the urban environment are increasingly existing in an unnatural and stressful environment.

Response to Comments

Letter	Comments	Response
	ppp	USDA cooperative suppression projects provide for public participation through scoping sessions and public meetings. Through the public involvement process, individuals opposed to suppression projects or who request treatment can express their concern. Without a coordinated approach to gypsy moth suppression, individuals within infested communities may not have this opportunity. Individuals attempting to suppress gypsy moth infestation may not make known when their treatment will occur and the type of insecticide to be used. In addition individual efforts would result in higher per acre costs for treatment.
	qqq	Refer to Final PEIS, page 1.
21	a	Comment considered.
	b	Comment considered. As discussed in the Final PEIS, carbaryl temporarily affects non-target insects.
	c-f	Refer to Appendix D - EPA Decision Document on Carbaryl, Summary, December 1980.
	g	Comment considered.
	h	Comment considered.
	i	Comment considered.
	j	Comment considered.
	k	Comment considered.
	l	Comment considered.
	m	Comment considered.
	n	Comment considered.
	o	Several drawbacks to the use of molasses have been identified. The addition of molasses to insecticide formulations not only directly increase the cost of suppression projects, but also indirectly due to the increase in weights per gallon of finished formulation. This increase in weight necessitates that aerial applicators carry fewer gallons of finished formulation per load resulting in increased flight time. In addition to increased costs, molasses formulations leave a sticky resid on treated foliage which has been considered undesirable by property owners.

Response to Comments

Letter	Comments	Response
	p	We are unaware of the results of any B.t.-acephate field evaluations. This combination may not prove useful since biological insecticides are generally proposed for use when chemical insecticides are not preferred.
	q	Comment considered.
	r	Comment considered.
	s	Comment considered.
22	a	Possible human exposure to insecticides would not be much different for campgrounds, golf courses, etc. than for a forested residential community. Public notification and involvement processes and performance standards as addressed in the MANAGEMENT REQUIREMENTS section of the PEIS are an integral phase of all gypsy moth suppression projects.
	b	Temperatures below minus 20 F can kill gypsy moth eggs. Winter-kill can result in a population collapse, at least among the egg masses that are not insulated from temperature extremes by snow. Pre-treatment larvae surveys can be conducted in these areas proposed for treatment to determine if insecticide treatments are still necessary.
	c	The no-action alternative is further addressed in Final PEIS.
	d	Present label restrictions imposed on the use of Dimilin for gypsy moth control, restrict the product for "forest use only". According to EPA's definition of the term "forest" under section 171-2(n) of 40 C.F.R., it is a concentration of trees and related vegetation in a non-urban area sparsely inhabited by or infrequently used by human beings.
23	a	Comment considered.
	b	Since development of the Draft PEIS, the USDA APHIS has determined that there is a higher risk of artificial spread of the gypsy moth associated with the movement of household articles than with other types of artificial spread. Therefore resources will be redirected into this program area.
	c	Chemical insecticide treatment is a component of IPM.
	d	Comment considered.

Response to Comments

Letter	Comments	Response
24	a	Correction made in Final PEIS.
	b	Comment considered.
	c	Correction made in Final PEIS.
	d	Comment considered.
	e	Correction made in Final PEIS.
25	a	Final PEIS provides guidelines for local decision making concerning public involvement and notification aspects of cooperative gypsy moth suppression and regulatory projects.
	b	Comment noted.
	c	At the present time there is no distinct program for isolated infestations employing only nonchemical techniques. The available approaches for elimination of isolated infestations as identified by the USDA Gypsy Moth Steering Committee at its October 31, 1980 meeting are as follows: 1. Two applications of a chemical pesticide. 2. One application of a pesticide followed by disparlure. 3. Two applications of B.t. followed by application of disparlure. 4. Ground application of B.t. followed by application of disparlure. 5. Application of disparlure. 6. Mass trapping. It is important to note that approaches 4 and 5 are all developmental in nature and that operational experience with all approaches, singly or in combination, is extremely limited. Programs to eliminate isolated infestations are developed on an individual basis with the above approaches being weighed against each infestation in light of the objective of the program, the local conditions and concerns, and the most recent information we have on the efficacy of the approaches.
26A		No response necessary.
26B		No response necessary.

Response to Comments

Letter	Comments	Response
27	a	Information concerning the effects of carbaryl on aquatic life is referenced in the Draft and Final PEIS and discussed in the 1974 Final EIS.
	b	Comment considered.
	c	Insecticide treatments will be suspended whenever the insecticide does not appear to be settling in the target area. Refer to Final PEIS, page 16.
	d	Comment considered.
	e	Comment considered.
	f	Pre-treatment monitoring of gypsy moth population within proposed treatment areas can be conducted to determine if natural mortality factors such as cold temperatures or parasites preclude the need for treatment.
28	a	A copy of the site specific-document will be forwarded to the Applied Biology Section, Philadelphi Navel Base.
	b	The PEIS presents an overview of general monitoring procedures. Specific monitoring procedures utilized by the various state agencies participating in the Cooperative Suppression Projects will be addressed in respective state chapter in early annual site-specific document. Insecticides will not be applied to those areas where the product label prohibits or to those areas decided upon during the public involvement process as exclusion areas.
	c	Request noted.
29		No response necessary.
30		No response necessary.
31		Request for publications noted
32	a	The IPM approach allows for the use of both biological and chemical insecticides. The selection to use biological or chemical insecticides is based on project objectives and concerns expressed during the public involvement process. The majority of the infested acres are not proposed for insecticide treatments. Only those areas where natural mortality factors are not exerting sufficient biological pressure to keep gypsy moth populations below damagin levels and where unacceptable defoliation or larval nuisance would occur, are proposed for treatment.

Response to Comments

Letter	Comments	Response
	b	Requests for treatment are initiated at the local level. Local news media and public meetings are utilized to involve the public in the development of treatment projects. Specific public notification and involvement procedures vary by state and will be addressed in each annual site specific document. In New Jersey, municipalities must request the New Jersey, Department of Agricultural to conduct egg mass surveys in areas where defoliation surveys indicate high populations. If a municipality decides to request assistance for suppression projects, they must pass a resolution declaring the gypsy moth a "public nuisance" and notify each residential landowner at least ten days prior to treatment.
33		Correction made in Final PEIS.
34		Comment considered.
35	a	Final PEIS has been clarified regarding the term sensitive areas. Refer to response 9c.
	b	Final PEIS reflects that non-target insects will temporarily be reduced with chemicial insecticide
	c	Correction concerning 80 S formulation made in Final PEIS.
	d	Correction made in Final PFIS.
36		A detailed analysis of the economic and social impact of the quarantines and regulatory inspections and treatments for gypsy moth is not available. Methodology is presently being developed, jointly by APHIS and FS, to analyze the impact of the gypsy moth. As this methodology evolves these aspects will be addressed.
37	a	Correction made in Final PEIS.
	b	Comment noted.
	c	Comment noted.
	d	Final PEIS reflects the review and EPA's decision concerning carbaryl.

Response to Comments

Letter	Comments	Response
38		The PEIS concerns USDA cooperative suppression and regulatory projects. The PEIS does not address gypsy moth suppression activities undertaken by private industry.
39	a	USDA APHIS Regulatory Program is further addressed in Final PEIS and response 25c.
	b	Refer to Final PEIS, page 1, paragraph 1.
40A		No response necessary.
40B	a	Refer to MANAGEMENT REQUIREMENTS section of Final PEIS. Criteria vary by State and will be addressed in the site-specific document.
41		No response necessary.
42A		No response necessary.
42B	a	Arrangements can be made at the request of county or local officials in cooperation with coordinating State and USDA agency.
42C		Comment considered.
43		Refer to comment letter and response 12.
44	a	Comment considered.
	b	Comment considered.
	c	Refer to response 18c.
	d	Defoliated acreage is determined from results of aerial detection surveys conducted by APHIS, Forest Service and State agencies. Efforts are underway to develope guidelines for reporting survey results to improve survey coordination between agencies and standardize the categories of defoliation detected and reported.
	e	The Forest Insect and Disease Management Section, NY-DEC in cooperation with SUNY, College of Environmental Science and Forestry and USDA Forest Service has conducted a pilot project to implement and evaluate the effectiveness of a gypsy moth IPM system in New York. A final report is scheduled for 1981 which will provide information directly relating to New York.

Response to Comments

Letter	Comments	Response
	f	Refer to MANAGEMENT REQUIREMENTS section of the Final PEIS.
	g	Performance standards for water bodies will involve the same as for other exclusion areas.
	h	Comment considered.
	i	The effects of chemical insecticides on aquatic organisms are discussed in the Draft and Final PEIS and 1974 Final EIS.
	j	Refer to response 7q.

REC'D ECO 12/17/80

DEC 29 1980

United States Department of the Interior

BUREAU OF INDIAN AFFAIRS
EASTERN AREA OFFICE
1951 Constitution Avenue NW.
Washington, D.C. 20245

IN REPLY REFER TO:
FORESTRY
EVP 5

Mr. R. Max Peterson, Chief
U.S.D.A. Forest Service
P.O. Box 2417
Washington, D.C. 20013

Dear Mr. Peterson:

Thank you for the opportunity to review the EIS concerning the alternatives to action for reducing the gypsy moth populations in high value-risk locations.

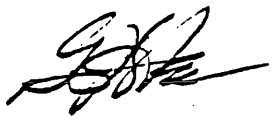
The Bureau of Indian Affairs is concerned about the destructive impact this insect has on affected species growing both on Indian and other property. Most of the preferred host trees mentioned in the statement grow on or about the Indian property located within the bounds delineated on your gypsy moth susceptible forest type map. In turn we have alerted our field staffs to look for the indicators of gypsy moth activity in the susceptibility unknown areas.

We have experienced some effects of the insects activity on two of the larger islands that comprise property owned by the Penobscot Tribe in the State of Maine. Our only action taken was to physically remove the arboreal and surface egg masses. Currently, the tribal property consists of islands located within the Penobscot River banks. Because of this, it is unlikely that the use of chemicals will be allowed. In lieu of this it would appear that the IPM homeowner self-help techniques, as described, might be more acceptable to all concerned. We therefore are interested in receiving a dozen, or what ever number you can supply, of Garden Bulletin No. 227 (The Homeowner and the Gypsy Moth: Guidelines for Control). The use of disparlure in conjunction with the self-help techniques tickles my fancy. Is it necessary that this sex pheromone be placed by licensed applicators or are the instructions included in the bulletin?

We have made our review based on the current location of Indian property in the State of Maine. Over the next few years, this property ownership will increase by approximately 300,000 acres. Those tribes who will benefit from this increase are the Penobscot, Passamaquoddy and Maliseet tribes of Indians. There is no definitive purchase date.

We have appreciated reviewing the EIS and sharing our thoughts within our capability. We feel the alternatives were what can be done. The pros and cons for each were described well. We understand, the complexity of the proposal and hope that the interested citizens will cooperate with you to the benefit of the country.

Sincerely yours,



Gregory Stevens
Forester
Eastern Area Office

2

FRED W. WALLER
Director
EMILE F. MOORE
Deputy Director

DIVISIONS
FORESTRY
LITTER CONTROL
MINED LAND RECLAMATION
MINERAL RESOURCES
OUTER CONTINENTAL SHELF ACTIVITY
PARKS
VIRGINIA STATE TRAVEL SERVICE
PROGRAMS
SALT WATER SPORT FISHING

COMMONWEALTH of VIRGINIA

Department of Conservation and Economic Development

DIVISION OF FORESTRY
Cornet McCormick & Alderman Roads
Box 3758, University Station, Virginia 22903
Telephone (804) 977-6555
WALLACE P. CLIFFORD, State Forester

BOARD
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FOREST PESTS
General

December 17, 1980

Mr. R. Max Peterson
U. S. F. S.
P. O. Box 2417
Washington, DC 20013

Dear Mr. Peterson:

I am enclosing selected pages from your "Draft Programmatic EIS" on gypsy moth with notations thereon for your consideration.

My main suggestion is that the "Alternatives Considered and Evlauated" be limited to three:

1. Chemical pesticides for regulatory action (APHIS) a
2. The IPM system to suppress or regulate GM
3. No action.

All states with a cooperative suppression program for GM practice IPM in applying chemical/biological insecticides only to carefully selected areas and permit the parasites, predators and virus to build-up naturally in the unsprayed areas. Even though their direct actions involve only insecticide application, that is not the only element in their overall program.

It would appear (p. iii, IV, p. 41) that IPM requires ("includes") the use of a number of specific methodologies or applications to qualify as IPM; I don't believe you mean this. The text should read "....might include one or more of the following activities: biological....."

Thanks for the opportunity to comment.

Sincerely,

C. L. Morris Jr.

C. L. Morris, Chief
Insect & Disease Investigations
and Member GM Management Board

CLM/dm
Attachment

JAN 12 1981

3

NARRAGANSETT COUNCIL 546 BOY SCOUTS OF AMERICA

175 Broad Street, Providence, Rhode Island 02903 401-351-8700

January 8, 1981

Mr. Allen J. Schacht, Area Director
United States Department of Agriculture
New England Area, State and Private Forestry
370 Reed Road
Broomall, Pennsylvania 19008

Dear Mr. Schacht:

I have read your environmental impact statement on gypsy moth control with great interest.

Our agency owns close to four thousand acres of land in Rhode Island in various parts of the State. During the fall, my observations are that Rhode Island has a serious if not alarming deposit of gypsy moth egg casings waiting for the right conditions to hatch the largest crop of larve that this State has ever had. I believe, if not checked in the early spring there will be an almost complete defoliation of the forest canopy in our State by the early summer of 1981.

Your selection of the IPM approach now means State agencies must gear up to do the chemical, biological and other forms of control. The real problem is time. What is to be done must be done in the early stage of larve development if this state is not to be denuded by summer.

Very truly yours,

Vincent N. Borrelli
Scout Executive

VNB:jw

cc: Governor J. Joseph Garrahy

DEPARTMENT OF AGRICULTURE

4

Harry Hughes, Governor
Wayne A. Cawley, Jr., Secretary
William M. Linton, Deputy Secretary

Parole Plaza Office Building, Annapolis, Maryland 21401
Phone: 301—269-2161

FIDM
Director
Programs
Methods
Coordination
Pesticides
Environmental
File

JAN 12 1981

December 30, 1980

Mr. R. Max Peterson, Chief
USDA Forest Service
P.O. Box 2417
Washington, DC 20013

Dear Mr. Peterson:

The Draft Programmatic Environmental Impact Statement for the Proposed Cooperative Gypsy Moth Suppression and Regulatory Program Activities for 1981 has been reviewed by the Maryland Department of Agriculture. The EIS is excellent and I have no suggestions for changes or improvements. I am pleased that the Federal Agencies are advocating an integrated pest management (IPM) approach to suppress or regulate gypsy moth infestations and support this concept.

Thank you for permitting me to review this document.

Sincerely,

Wayne A. Cawley, Jr.
Secretary

WAC:sd

I. Proposed Actions

The proposed USDA Forest Service cooperative suppression projects involve financial assistance to States within the generally infested area for an Integrated Pest Management (IPM) approach to meet the short term objectives of reducing gypsy moth larval populations and nuisance, tree defoliation, and mortality.

The proposed USDA Animal and Plant Health Inspection Service (APHIS) cooperative regulatory program involves the use of quarantine, inspections, chemical and biological insecticides, and pheromone and pheromone traps in an IPM approach to lower the risk of artificial spread from the generally infested area, or to eliminate existing infestations in locations remote from the generally infested area. The recent increased significance of the artificial long-distance spread of gypsy moth associated with the movement of outdoor household articles has necessitated a redirection of resources precluding regulatory treatment of campgrounds.

II. Alternatives Considered and Evaluated

Alternatives considered and evaluated for USDA Cooperative Gypsy Moth Suppression and Regulatory Programs are:

1. Chemical insecticide treatment to suppress or regulate gypsy moth infestations.

2. Biological insecticide treatment to suppress or regulate gypsy moth infestations.

3. IPM approach to suppress or regulate gypsy moth infestations.

4. No action. No gypsy moth suppression or regulatory activities will be financed or implemented by USDA.

The chemical insecticide treatment alternative would result in Federal assistance to cooperative State agencies proposing to use only chemical insecticides such as carbaryl, trichlorfon, diflubenzuron, and acephate. These chemical insecticides have successfully achieved the desired project objectives in previous suppression and regulatory programs and are registered by the U. S. Environmental Protection Agency (EPA) for application against the gypsy moth.

The biological insecticide treatment alternative would result in Federal assistance to cooperating State agencies for projects using only biological insecticides. The biological insecticides registered by the EPA for gypsy moth suppression are formulations of *Bacillus thuringiensis* (*B.t.*) and the gypsy moth nucleopolyhedrosis virus (NPV).

The IPM approach would provide Federal assistance to cooperating State agencies to support an IPM strategy for gypsy moth suppression and regulatory projects. The components of this strategy include biological and/or chemical insecticide application, parasite and predator population management, application of the gypsy moth mating disruption pheromone, homeowner self-help, sterile male moth release, and forest stand manipulation.

Currently, the biological and chemical insecticides, gypsy moth mating disruption pheromone, and homeowner self-help techniques are considered operationally viable components. The unique nature of remote infestations dictates that development of approaches to eliminate remote infestations be evaluated in these areas. This, however, involves some added degree of risk since efficacy data do not exist for all IPM components. Certain components have demonstrated effective population reduction potential; however, several seasons may be necessary to eliminate gypsy moths. The use of parasite and predator management, sterile male moth release, and forest stand manipulation activities require additional evaluation before they can be considered for gypsy moth suppression and regulatory projects.

The no action alternative would result in no Federal financial assistance for State suppression projects proposed for financing by USDA Forest Service or for APHIS regulatory projects.

III. Evaluation of Effects of the Alternatives

Implementation of the chemical insecticide treatment alternative will, in the year of treatment, reduce gypsy moth populations, reduce larval nuisance, protect foliage, and prevent excessive tree mortality. The application of chemical insecticides may reduce populations of nontarget insects, including some beneficial insects. Diflubenzuron is toxic to some aquatic organisms. Carbaryl is toxic to honeybees, some aquatic insects, and shellfish. Acephate is toxic to some nontarget organisms and honeybees immediately after treatment. These insecticides will be applied in accordance with insecticide label directions. There is no documented evidence that registered chemical insecticides as used in gypsy moth suppression or regulatory projects have an adverse impact on human health. The chemical insecticide treatment alternative is the most economically efficient alternative. Chemical insecticides used for gypsy moth suppression and regulatory projects have a short residual life in soil and water. Implementation of the chemical insecticide treatment alternative will not result in any irreversible or irretrievable impacts on the environment.

Implementation of the biological insecticide treatment alternative will provide foliage protection, population reduction, and have no effect on beneficial life forms, except some lepidopterous larvae. The biological insecticides currently available for gypsy moth suppression and regulatory projects are formulations of *B.t.* and the gypsy moth NPV. There will be no direct loss of existing parasite or predator populations in the treatment areas as a result of using biological insecticides. *B.t.* may adversely affect some nontarget lepidopterous larvae. NPV has shown no adverse effects on nontarget organisms. Both *B.t.* and NPV normally require two separate applications to be effective, resulting in less economic efficiency than chemical insecticides. Application of biological insecticides will provide foliage protection but will not result in rapid larval mortality. Consequently, larval nuisance and tree defoliation may continue for several weeks after application. Implementation of the biological insecticide treatment alternative will not result in irreversible or irretrievable impacts on the environment.

JAN 21 1981

5A

January 6, 1981

Mr. Henry C. Mussman, Administrator
U. S. Department of Agriculture
Animal and Plant Health Inspection
Service
Washington, D.C. 20250

Dear Mr. Mussman:

In our role as the State Clearinghouse, we have offered to appropriate state agencies the Draft Programmatic Environmental Impact Statement for Cooperative Gypsy Moth Suppression and Regulatory Activities.

Enclosed is a copy of the comments made by Mr. Domenic Forcella, Executive Director of Connecticut's Council on Environmental Quality. These comments are offered for your information and consideration.

Sincerely,

Aden H. Maben
State Clearinghouse Coordinator

AHM/dch

Enclosure

(203) 566-3410

STATE OF CONNECTICUT

5B

COUNCIL ON ENVIRONMENTAL QUALITY

December 31, 1980

TO: Aden H. Maben, State Clearinghouse Coordinator, OPM Comprehensive Planning Division

FROM: Domenic Forcella, Executive Director, Council on Environmental Quality

RE: CEQ comments on EIS #365, Cooperative Gypsy Moth Suppression and Regulatory Program, 1981

The EIS #365 report on Gypsy Moth Suppression and Regulations is a regional program. It does not address the peculiarities of individual states. a
Connecticut does not allow broad spectrum aerial application of pesticides. Although the report details the specifics of aerial application it does not mention in depth the process of ground application. We suggest that the implications and research of this plan specifically on Connecticut be conducted.

This report favors the use of Carbyl (sevin) and other chemical insecticides. An EPA decision document on Carbyl will soon be released. The EPA will not subject Carbyl to Rebuttable Presumption Against Registration (RPAR) because it believes the low risks are justified by its effectiveness. Alternate b
opions on the use of Carbyl and other chemical pesticides should be sought.

Public involvement on a local level should be given a high priority. Information should be made readily available for citizens on the problem and the various remedies. Self-help techniques should be stressed since they are inexpensive, effective and the least controversial. c

Proper notification of citizens in spray block should also be stressed. Citizens should be aware of pesticides used and their possible effects. Precautions to be taken should also be enumerated and made public.

Domenic Forcella
Executive Director

RECEIVED
JAN 5 1981
OFFICE OF
POLICY & MANAGEMENT
Division of Comprehensive Planning

PHONE: 566-3510 , 566-8066
STATE OFFICE BUILDING, RM. 141 HARTFORD, CONNECTICUT
AN EQUAL OPPORTUNITY EMPLOYER

5c KRS SEPF FIM

January 6, 1981 JAN 29 1981

FIDM
Director
Programs
Methods
Coordination
Pesticides
Environmental
File

Mr. R. Peterson, Chief
U. S. Department of Agriculture
Forest Service
Post Office Box 2417
Washington, D.C. 20013

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Aden H. Maben

Aden H. Maben
State Clearinghouse Coordinator

AHM/dch

Enclosure

(203) 566-3410

STATE OF CONNECTICUT

5D

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Domenic Forcella
Executive Director

RECEIVED
JAN 5 1981
OFFICE OF
POLICY & MANAGEMENT
Division of Comprehensive Planning

PHONE: 566-3510 / 566-8066
STATE OFFICE BUILDING, RM 141 HARTFORD, CONNECTICUT
AN EQUAL OPPORTUNITY EMPLOYER

COMMONWEALTH of VIRGINIA

Council on the Environment

903 NINTH STREET OFFICE BUILDING
RICHMOND, VIRGINIA 23219

January 20, 1981

Mr. Allen J. Schacht, Area Director
Northeastern Area State and Private Forestry
Forest Service
U.S. Department of Agriculture
370 Reed Road
Broomall, Pennsylvania 19008

Dear Mr. Schacht:

Enclosed are the letters and comments comprising Virginia's response to the Draft Environmental Impact Statement for Cooperative Gypsy Moth Suppression and Regulatory Program 1981 Activities. These letters were sent to separate recipients in accordance with your letter of December 1, which forwarded the documents for review.

Sincerely,

J.B. Jackson, Jr.

JBJ/CHE/all

Enclosures

cc: Dr. Berkwood Farmer, Department of Agriculture & Consumer Services
Mr. Bruce Meador, Department of Conservation & Economic Development
Mr. Brian Harrison, State Water Control Board

Enc 6B

COMMONWEALTH of VIRGINIA

Council on the Environment

903 NINTH STREET OFFICE BUILDING
RICHMOND, VIRGINIA 23219

January 21, 1981

Mr. Harry C. Mussman, Administrator
Animal and Plant Health Inspection Service
U.S. Department of Agriculture
Washington, D.C. 20250

Dear Mr. Mussman:

The Commonwealth has completed its review of the Draft Programmatic Environmental Impact Statement for Cooperative Gypsy Moth Suppression and Regulatory Program Activities. The Council on the Environment is responsible for coordinating the State's review of federal environmental impact statements and responding to appropriate federal officials on behalf of the Commonwealth. The following state agencies took part in this review:

Department of Agriculture and Consumer Services
Department of Conservation and Economic Development
State Water Control Board.

The Commonwealth agrees that the integrated pest management (IPM) alternative is the best of the four approaches outlined in the document for the control of gypsy moths, since it will, as page 56 suggests, permit efficient implementation of the suppression program without the risks to health and wildlife that the chemical insecticide treatment would involve. The IPM approach is already used in states having cooperative gypsy moth suppression programs.

The impact statement should have gone into greater detail in explaining, on page 10, the differences between suppression in generally infected areas and that of isolated infestations in remote areas. Objectives, and consequently strategies, may differ as between these cases, and the components of an IPM strategy (page 24) may be limited where the objective is eradication of an isolated infestation of gypsy moths. a

It should also be noted that the replacement of aquatic species sensitive to diflubenzuron by other species not so sensitive (assuming a chemical insecticide treatment) is not necessarily insignificant. It alters the diversity of life forms and disrupts the ecological balance in the affected stream, indicating a reduction in water quality. b

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12 mins

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The impact statement also lacks specificity on a number of details. The change in format since last year was accompanied by omissions: where, and how big, are proposed treatment areas in states applying for suppression funds? Where are the parks and recreation areas liable for treatment? Where are the areas for eradication of isolated infestations? We hope to see this information in the Final Environmental Impact Statement. C

Thank you for the opportunity to review this document.

Sincerely,

J.B. Jackson, Jr.

Enclosures

cc: The Honorable Maurice B. Rowe, Secretary of Commerce and Resources
Dr. Berkwood M. Farmer, Department of Agriculture and Consumer Services
Mr. Bruce B. Meador, Department of Conservation and Economic Development
Mr. Brian D. Harrison, State Water Control Board
Mr. Allen J. Schacht, U.S. Forest Service, Northeastern Area

6c

COMMONWEALTH of VIRGINIA

Council on the Environment

January 21, 1981

Mr. R. Max Peterson
Chief, U.S. Forest Service
U.S. Department of Agriculture
P.O. Box 2417
Washington, D.C. 20013

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Thank you for the opportunity to review this document.

Sincerely,

J.B. Jackson, Jr.

Enclosures

cc: The Honorable Maurice B. Rowe, Secretary of Commerce and Resources
Dr. Berkwood M. Farmer, Department of Agriculture and Consumer Services
Mr. Bruce B. Meador, Department of Conservation and Economic Development
Mr. Brian D. Harrison, State Water Control Board
Mr. Allen J. Schacht, U.S. Forest Service, Northeastern Area

7

14 Hathaway Lane
Montville, NJ 07045
January 22, 1981

Mr. R. Max Peterson, Chief
USDA Forest Service
P. O. Box 2417
Washington, DC 20013

Dear Mr. Peterson:

I appreciate this opportunity to comment on the Draft Programmatic EIS for the Proposed Cooperative Gypsy Moth Suppression and Regulatory Program Activities.

One reading this Draft EIS for the first time would not be aware of the fact that the 1974 EIS and impact statements of subsequent years would have to be read in order to comment on the 1981 EIS. It is both time consuming and difficult to have to refer to seven documents. A "complete" EIS should be written each year, and if the cost of distributing a more lengthy document to the public is prohibitive perhaps such copies can be placed in public libraries.

SYNERGISTIC EFFECTS

No mention is made concerning synergism in the 1974 and 1980 environmental impact statements. Carbaryl, alone, may not be toxic except when it combines with other chemicals. Rainbow trout were exposed to 1 ppm of carbaryl. It was reported that carbaryl was found to potentiate the toxicity of rotenone, 2,4-D n-butyl ester, pentachlorophenol and dieldrin (Statham & Leck 1975 in Dolinger p. Ca-87). Similar results were found with brown trout. Carbaryl in combination with the organosphosphorous pesticies - malathion, parathion, diazinon, dioxathian, dichlofenthian - showed toxicity(Keplinger &Deichmann 1967 in Dolinger p. Ca-127). Carpenter et al. 1961 reported similar results. a

IMMUNE SYSTEM

No mention is made that carbaryl depressed antibody formation when fed to rabbits at dose levels of 4.0, 20.0, 25.0 and 150.0 ppm (Street & Sharma 1975 in Dolinger p. Ca-121).

When cells were treated with virus-enhancing chemicals, they were unable to benefit from interferon. Interferon, a protein produced by living cells, helps to protect the body against viral infections (Rozee et al., 1979 in Richards 1979). Studies, I feel, need to be carried out using Sevin 4 Oil. b

CARBARYL NITROSATION

I am aware that carbaryl nitrosation is mentioned in the EIS, but wish to point out the failure to mention that nitroso-carbaryl in addition to being a potent mutagen, has been shown to produce stomach cancer in rats (Egert & Greim, 1976; Eisenbrand et al., 1976; Eisenbrand et al., 1975; Elespuru and Lijinski, 1973; Elespuru et al., 1973; Lijinsky & Taylor, 1976; Quarles & Tennant, 1965; Regan et al., 1976; Siebert& Eisenbrand, 1974 and Uchiyama, 1975 as reported in Dolinger p. Ca-125). c

I feel that carbaryl nitrosation is cause for much greater concern than expressed in this EIS because nitrite is present in low amounts in human saliva and in high amounts as a preservative in certain meats.

TERATOGENIC AND FETOTOXIC POTENTIAL

According to Carbaryl Decision Document (Dec., 1980), EPA admits that the human teratogenicity risk from carbaryl is expected to be low yet they feel that this does not warrant a RPAR. d

Dolinger (undated, p. Ca-3) reports that positive results have been obtained from experiments using mice, guinea pigs, sheep, chicks and fish. Dolinger feels that while they are in themselves only suggestive, together they indicate that carbaryl has a teratogenic potential. He further states that we do not know if humans are more or less sensitive than dogs to carbaryl teratogenicity. It is important to know if the parent compound, carbaryl, or the major metabolite, 1-naphthol, is the teratogen. If 1-naphthol is the teratogen then knowing whether the dog metabolizes similarly to humans is important. Dolinger further states that if carbaryl, the parent compound, is the teratogen then residence time and accessibility of carbaryl molecules to the developing embryo is of greater importance than the way the animal metabolizes. I would like to add here that all the studies cited by EPA in the Carbaryl Decison Document as regards teratogenic and fetotoxic effects involve carbaryl. Studies need to be done to determine 1-naphthol's effect.

As regards metabolism, Dolinger states that the chromatographic elution pattern of labeled carbaryl metabolites is nearly identical in dogs, rats and humans. He further states that the differences in carbaryl metabolites which are observed among different species are no greater than the difference in metabolites produced by different human tissues and organs (Chin et al., 1974 in Dolinger).

It is interesting to note that offspring of dogs exposed to low doses of carbaryl experienced heart and eye defects (Imming et al., 1969 in Dolinger p. Ca-105). Offspring of sheep exposed to high levels of carbaryl experienced heart defects (Panciera 1967 in Dolinger p. Ca-111). When developing eggs of fish were

exposed to high levels of carbaryl, both eye and heart defects were observed (Weis & Weis 1975 and 1976 in Dolinger pp. Ca-112 and 113).

In studies using rats, carbaryl has been found to localize in the fetus at higher concentrations than in maternal tissues (Deckybe & Derache, 1976; Strother & Wheeler, 1976 in Dolinger p. Ca-110).

According to some studies cited in the Carbaryl Decision Document, low birth weights were observed in some offspring. EPA does not regard low birth weights as birth defects. It is now known, however, that a large number of human premature babies suffer bleeding inside their brains which can lead to hydrocephalus (water on the brain) and retardation and possibly other damage (Cohn, Dec. 1980).

It is also important to mention that carbaryl when injected into chick eggs (1 to 4 mg) in combination with either malathion or mevinphos proved to be much more teratogenic (Ghadiri and Greenwood, 1977 in Dolinger p. Ca-112).

Based on the above information, EPA should do more than just consider having the dog experiments repeated.

IMPACT ON NON-TARGET ORGANISMS

On page 20 of the Draft EIS, it is stated that insecticides are not expected to adversely affect threatened and endangered species. It is important to point out that insects are not afforded any protection under New Jersey's non-game and endangered species laws. We do not know the effect a reduction of already low populations of insects might have on the food chain. e

EFFECTS ON FISH

Unfortunately, most scientitsts conducting laboratory and field experiments using fish have confined themselves to determining at what level a pesticide would kill the test organism. As a result, there appears to be a paucity of information as regards carbaryl's effect on normal activity patterns such as schooling and defense mechanisms. In addition, we do not know if carbaryl causes loss of appetite, blindness, sterility, etc. which cause the organisms to be unable to compete successfully with other fish not so afflicted. f

EFFECTS ON BIRDS

It would appear from the literature that carbaryl does not cause the death of birds. Many more studies are needed to ascertain whether carbaryl's reduction of insects which serve as food cause long-term effects. In addition, studies need to be done to determine if carbaryl affects nestlings, nesting behavior, reproductive success, etc. g

EFFECTS ON PLANTS

The 1974 and 1980 Final Environmental Impact Statements are deficient as regards carbaryl's teratogenic effect on plants. Wochok and Welch (1976) report an inhibition of growth due to carbaryl when cultured carrot tissues were grown in a medium containing 10 ppm. They further report that concentrations as low as 0.1 ppm caused a 50% reduction in embryo development. There was a 85% reduction in embryo development at 20 ppm.. They also report teratogenic effects in embryos that developed in high concentrations of carbaryl. h

The 1974 Final EIS mentions that carbaryl affected growth of two species of phytoplankton. Pesticide Wildlife Studies 1963 (in Nisbet & Miner 1971) report that the productivity of natural phytoplankton community was reduced by 17% with only 1 ppm of carbaryl. This study was not mentioned in the 1974 or 1980 final impact statements. This could have serious consequences since phytoplankton forms the base of the food chain.

FATE IN WATER

Carbaryl's fate in ground water should be addressed in the impact statement. i

METABOLITE OF CARBARYL

The 1974 Final EIS states that "1-naphthol is generally more toxic to fish and shellfish than carbaryl itself. Despite carbaryl's degradation, 1-naphthol can form a more persistent precipitate in sea water and can be toxic to estuarine species. Precautionary measures must be sufficient to prevent surface or subsurface runoff as well as atmospheric drift of carbaryl or 1-naphthol into brackish or salt water." What precautionary measures will be taken to assure that this does not happen? j

NUTRIENT LOADING OF STREAMS

On page 47 of the Draft 1981 EIS, it is stated that large gypsy moth populations could cause nutrient loading of streams due to frass. No studies have been done to show that this has happened. Furthermore, the droppings could act as a fertilizer and serve as food for insectivorous birds and mammals as pointed out by David Halliwell, a biologist with the Massachusetts Division of Fisheries and Wildlife. k

Page 47 also states that defoliation along streams will cause more sunlight to reach the stream and may cause a rise in water temperature. David Halliwell states that "the composition of streamside vegetation is not compatible with high preference gypsy moth food types except in upland oak stands".
I would like to add that spraying of carbaryl would not take place along the streams as the label forbids direct application over bodies of water.

HARVESTING SCHEDULE FOR GARDEN CROPS

I understand that some common garden crops such as lettuce, carrots and spinach cannot be harvested until 3 days after application of carbaryl. Does this apply to the forumulation, Sevin 4 Oil? If so, how will homeowners be alerted to this fact?

PUBLIC NOTIFICATION

The USDA Forest Service and APHIS held a scoping meeting in New Jersey on September 25, 1980. How was it determined what individuals were to receive letters informing them of this meeting? I had commented on the Draft 1980 EIS but had not received any notice of this meeting. I was able to attend this meeting only because I received word of it a few days before the meeting from a friend.

The present public notification system regarding the date to be sprayed and material to be used is inadequate. Many people learn that they are to be sprayed 10 days before the actual event leaving no time to voice objections or participate in the local government's decision.

DOCUMENTATION AS TO THE HEALTH AND ENVIRONMENTAL EFFECTS

The 1981 Draft EIS states that "no documented evidence exists that chemical insecticides as used in gypsy moth suppression projects have an adverse impact on human health"(p. 26).

The plan for identifying and keeping statistical records on pesticide poisonings in New Jersey seems suspect. I am told by the Department of Environmental Protection that there exists a national network PIMS (Pesticide Incident Monitoring System) set up for the reporting of incidents which include human and animal poisonings as well as other incidents involving pesticide use or miscuse. These incidents are then reported to the NJ Department of Health who then forwards the information to EPA Washington. This national network, as far as I know, is not publicized. The Department of Health is failing to report suspected pesticide poisonings. During the summer of 1980, I reported a suspected pesticide poisoning* involving death and illness of livestock, illness of pets and people. The Department of Health seem unconcerned, and I believe they failed to report to EPA Washington about this suspected pesticide poisoning. Furthermore, the Department of Health has no facilities for testing animals for pesticide poisoning. There is no law which requires doctors who suspect pesticide poisonings to submit blood and/or urine samples to be analyzed for pesticides. Many birds suspected of being poisoned by pesticides are sent by the Clinton Wildlife Management Area to a lab in Maryland for bacterial analyses rather than pesticide analyses. It is my feeling that many cases of actual and/or suspected pesticide poisonings go unreported for these very reasons. Perhaps this is why so many pesticides seem "safe".

* Pesticide was applied by private contractors.

LARVAL REDUCTION

It has been suggested that chemical insecticides may prolong the outbreak of the gypsy moths due to the fact that both natural and introduced parasites of the gypsy moths are killed. In the Massachusetts Audubon Society brochure, (Public Service Information by the Massachusetts Audubon Society, Lincoln, MA) it is reported "that the average infestation in sprayed areas according to reseach done by several states and the Federal government lasts up to twice as long as an unsprayed outbreak". Therefore, it seems to me p that we are forced into a vicious cycle of chemical spraying.

While it is true that Sevin may give rapid and high mortality of the gypsy moth population, a small percentage of gypsy moths which survive the chemical spray are left with an abundance of food and with few, if any, natural or introduced parasites. The possibility exists that a resistant strain of gypsy moths might result. Because carbaryl kills many beneficial non-target insects, an insect which had not been a pest may become one due to the interference its natural controls. There is no guarantee that a whole new population of caterpillars will not blow in from another area.

In summary, I would like to say that you have placed an economic value on trees; why not place economic values on trout and other natural resources? Also when a risk and benefit analysis is done, the fact that a paucity of information exists concerning the break-down products, their synergistic effects q and teratogenic potential must enter into the consideration.

Presently, it appears that not enough of the potential adverse effects of chemical insecticides are known, therefore, a water soluble formula of Bacillus thuringiensis (not Thuricide 16 B which contains xylene) should be used only when deemed absolutely necessary. Dipel 4L appears to be a good choice as r it contains Bt plus mineral oil.

Thank you for this opportunity to comment on the Draft EIS.

Sincerely,

Susan Reynolds Shaw

REFERENCES

1. Cohn, Victor, "Premature Babies Found to Suffer Bleeding in the Brain," The Washington Post, December 8, 1980.

2. Dolinger, P. Carbaryl Monograph Number 1, Environmental Health Evaluations of California Restricted Insecticides, prepared for Calif, Dep. Food and Agric. by Peter Dolinger Assoc., Menlo Park, CA.

3. Environmental Protection Agency, Office of Pesticides and Toxic Substances, Washington DC, Carbaryl Decision Document December 1980.

4. Nisbet, I. and D. Miner. 1971 "DDT Substitute" Environment 13 (6):10-17.

5. Richards, C. December 14, 1979 "Interferon, Virus Enhancement and Pesticides - A Brief to the New Brunswick Pesticides Advisory Board"(page 13 of the Friends of the Earth Health Effects of Carbaryl packet).

6. US Department of Agriculture 1974 Environmental Impact Statement for Cooperative Gypsy Moth Suppression and Regulatory Program.

7. Wochok, Z. and I. Welch 1976"Carbaryl Effects on Growth and Development in Suspension Cultures of Wild Carrot," Bulletin of Environmental Contamination and Toxicology 16 (3):325-329.

8

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January 23, 1981

Mr. Alan Schacht, Area Director
Northeastern Area State & Private Forestry
370 Reed Road
Broomall, PA 19008

Dear Mr. Schacht:

This will acknowledge receipt of the Environmental Impact Statement on the proposed Gypsy Moth suppression program. We reviewed it and have little to comment on at this time. We would appreciate being kept on your mailing list for future publications.

Sincerely yours,

HAMMERMILL PAPER COMPANY

R. J. LaBar

nk

R. J. LaBar
Forest Lands Manager

State of Illinois
DEPARTMENT OF AGRICULTURE
Division of Agricultural Industry Regulation
Emmerson Building / Illinois State Fairgrounds / Springfield 62706
Telephone (217) 782—3817
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312/920-9256

9

JAN 2 8 1981

January 12, 1981

Dr. Harry C. Mussman, Administrator
USDA, Animal & Plant Health Inspection Service
Washington, D. C. 20250

Dear Dr. Mussman:

We have received a copy of the draft Environmental Impact Statement (EIS) as it pertains to proposed cooperative Gypsy Moth suppression and regulatory program activities. The content of this document necessitates comment and criticism from the Illinois Department of Agriculture. We are certain you are aware that the State of Illinois is now in the front lines of the complex Gypsy Moth situation. We have isolated Gypsy Moth infestations distant from the generally infested area. Therefore, our needs and approach to the control of the pest differ from that which prevails in generally infested regions. The draft EIS does not address itself to the needs of the State of Illinois. We feel our comments and criticisms will justify our position on the matter.

In general, the EIS suggests dominance by the USDA Forest Service. The philosophy of Gypsy Moth management in generally infested areas predominates throughout the entire draft. There is latitude for confusion by reviewers with respect to terminology. The terminology a
suppression and regulatory usually appear together and infer a relationship. They should be well defined for clarity and shown to be separate programs. All terminology should be reviewed closely throughout the text.

On page iii, the second paragraph does not indicate that such methods b
are unproved for eradication of outlying infestations. There is evidence that the approach takes more than one season to eliminate the pest thereby increasing the danger of "breakout" and permanent establishment.

On page iv, please note the sentence "These insecticides are not proposed for use near sensitive areas". Sensitive areas is only defined on page C-4 and referenced further on page C-7. The statement as it stands does not lend itself to outlying infestations. In c
fact, as defined on page C-4 and C-7, it makes eradication impossible. If the statement is necessary, it should be modified to read, "These insecticides are not proposed for use near sensitive areas within the generally infested regions."

In the continuing paragraph at the top of page v, reference is made to "Maximum public involvement". The word involvement implies more than the public being adequately informed on suppression and regulatory methods. At the bottom of page v, further reference is made to "public involvement in selection of insecticides and treatment areas". These references as well as the last sentence in the first paragraph on page 15 are not applicable to most eradication efforts. It must be borne in mind that the public is not required to be objective in their views or knowledge of pesticides nor is the general public trained in proper pesticide usage. Involvement of the public in decisions involving pesticide and site selection is irresponsible. In fact, the public is not burdened with any responsibility or liability. Further, such participation may be contrary to some federal and/or state laws. Certainly, any such involvement can only apply to suppressive projects. d

Page 3 again refers to public involvement. Reference is made to "local officials responsible for administering suppression or regulatory projects". We in Illinois are not aware of any local officials being responsible for regulatory projects outside of California. We feel that if local officials are given responsibility, their involvement should be minimal. Within this paragraph, much more clarification appears necessary. e

On page 14, the fifth paragraph reads, "Local news media and public meetings are used to involve the public in the development of these treatment projects." The sentence should be modified to read, "Local news media and public meetings are used to inform the public on the development of these treatment projects." f Also, what are the environmental sensitivities mentioned near the bottom of the page? g

Under Integrated Pest Management near the bottom of page 24, it should be pointed out to persons outside of APHIS that APHIS has direct responsibility going far beyond financial assistance. IPM as used within this paragraph again implies this is a proven technology in regulatory projects such as eradication. h

Table 4, Roman Numeral II, number 2, on page 49, indicates one application of Carbaryl. This would apply to suppressive programs. The table implies both suppression and eradication. i

The rating system in Table 5, on page 51, gives the impression that no action is equal to chemical pesticide usage. The table is invalid with regard to eradication. j

Checking through the index, it is interesting to note that eradication is mentioned on five pages. Suppression is not listed in the index - apparently due to its frequent use within the text. The use of the word regulatory throughout the text should be clarified so that eradication is shown to be an integral part of the regulatory function. k

The mailing list in Appendix E, does not include APHIS and many of the regulatory officials of states with outlying infestations of Gypsy Moth. l

In conclusion, it appears that USDA - APHIS input was miminal or non-existant. It is realized that APHIS manpower resources and budgetary considerations are less than that of other entities within the structure of government. However, the responsibilities of APHIS are equal to or greater when contemplating the difference between prevention and mitigation. Prevention is a patent responsibility of APHIS and of state plant pest regulatory agencies. The draft EIS reflects an omission of APHIS input as well as the interests and needs of Illinois and other states outside and beyond the generally infested area. We find it difficult to believe this was merely an oversight. m

Sincerely;

Norman G. Seaborg
ILLINOIS DEPARTMENT OF AGRICULTURE
Plant and Pesticide Specialist Supervisor

NGS:jmw

cc: John R. Block, Director, Illinois Department of Agriculture

Tom Crawford, Superintendent, Division of A. I. R., Illinois Department of Agriculture

Commonwealth of Pennsylvania

GOVERNOR'S OFFICE
OFFICE OF THE BUDGET

Pennsylvania State Clearinghouse

P.O. BOX 1323 – HARRISBURG, PA. 17120 – (717) 787-8046
783-3133

NPS

10A

RE: PSCH #

APPLICANT:

PROJECT:

Dear Applicant:

Attached are comments concerning your State Clearinghouse submission referenced above.

Sincerely,

Anne Ketchum
Supervisor

1/19/81

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL RESOURCES
P. O. Box 2063
Harrisburg, PA 17120

Secretary

10 B

SUBJECT: Review and Evaluation of PSCH: 5-80-12-004
Programmatic Environmental Impact Statement,
Proposed Cooperative Gypsy Moth Suppression
and Regulatory Program Activities, Nationwide

TO: Anne Ketchum, Supervisor
Pennsylvania State Clearinghouse

FROM: CLIFFORD L. JONES
Secretary of Environmental Resources

The Department has reviewed the above named Draft Environmental Impact Statement and found that it does a good job of assessing the environmental impacts associated with gypsy moth suppression.

The only comment the Department has is to point out that the impact statement contains little or no information on gypsy moth regulatory program activities. However, we understand both suppression and regulatory activity impacts will be analyzed in more detail in subsequent impact statements.

AGRICULTURE COMMISSION

Robert Tuttle

David D. Doll

Dr. S. Leon Whitney

Robert Chaffin

John Kronemeyer

11

WILLIAM G. MILLIKEN, Governor

DEPARTMENT OF AGRICULTURE

Lewis Cass Building P.O. Box 30017
Lansing, Michigan 48909

DEAN PRIDGEON, Director

January 19, 1981

Dr. Harry C. Mussman, Administrator
U.S. Department of Agriculture
Animal & Plant Health Inspection Service
Washington, D.C. 20250

Dear Dr. Mussman:

Recently Mr. Norman Seaborg, Illinois Department of Agriculture, wrote you a letter detailing his criticisms of the Gypsy Moth Environmental Impact Statement.

I have had an opportunity to review his comments and find myself in complete agreement with him. The preoccupation of the Environmental Impact Statement with the problems in the northeastern generally infested area and the lack of attention to the incipient infestations outlying that area confuses those readers who are not thoroughly acquainted with the overall problem and, in fact, some that are.

While I realize that suppression and regulatory activities can be complementary, the goals are usually much different. Co-mingling the two in the EIS is, therefore, not appropriate. I would suggest that in the future the EIS be composed of three sections:

1. A general introductory explanation of the gypsy moth itself, the extent of the infestation, etc.

2. A section devoted to the problems and solutions, if any, in the generally infested area.

3. A section on regulatory to include actions designed to contain and eradicate outlying incipient infestations.

1/26/81
FINAL

We here in Michigan are already confronted with some problems caused by the co-mingling of the regulatory and suppression aspects of gypsy moth control as interpreted by laymen who have access to the 1980-81 EIS. This is a serious problem that must be corrected in future Environmental Impact Statements.

I urge that in the future APHIS more aggressively approach the construction of the Environmental Impact Statement rather than permit its continued drift toward an essentially U.S. Forest Service document.

Sincerely,

Dean F. Lovitt, Chief
Plant Industry Division

DFL:kd
cc: N. Seaborg
H. Ford, USDA

NORTH CAROLINA DEPARTMENT OF AGRICULTURE
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DEPUTY COMMISSIONER

OFFICE OF CONSUMER SERVICES
WILLIAM A. WILDER, JR.
ASSISTANT COMMISSIONER

12

January 20, 1981

Dr. Harry C. Mussman
USDA Animal and Plant
Health Inspection Service
Washington, DC 20250

Dear Dr. Mussman:

Re: Comments on the Environmental Impact Statement, Proposed Cooperative Gypsy Moth Suppression and Regulatory Program Activities

The North Carolina Department of Agriculture appreciates the opportunity to comment on the gypsy moth environmental impact statement.

In general, we feel that the statement does not address the specifics of a state such as North Carolina that is undergoing artificial introductions of gypsy moth in advance of the general front of infestation. The statement should address the specifics of trying to eliminate spots of infestation occurring outside generally infested areas. A different set of criteria should be used where limited amounts of pesticides or biologicals would be used. Employing spot eradication type treatments very likely can further delay larger and eventually more costly insecticide or biological treatments. a

I would also like to direct comments to specific items in the text of the statement. On page 1, reference is made to existence of isolated infestations in localized areas of certain states including North Carolina. We would dispute this point. We do not feel that an isolated infestation of gypsy moth exists in North Carolina. This determination was made on manual changes instituted by APHIS to which the state of North Carolina has not agreed. Presently there is no pattern to moth catches which have occurred in Avery County, N.C. There have never been other life stages of the pest detected in this location. At other locations in the text of the statement other references are made to isolated infestations in North Carolina. b

On page 3 under Major Issues and Concerns, Item 6, Availability of Past and Current Environmental Impact Statements, we would definitely encourage that a mechanism whereby documents can be readily obtained be developed. c

On page 10 of the statement it is indicated that, "The goal of the USDA/ APHIS is to cooperatively conduct programs with State agencies to eradicate isolated infestations located outside of the generally infested area and to retard the artificial and natural spread of gypsy moth from the generally infested area." Similar references to this role are also made on pages 12 and 13 under USDA Participation Requirements. We do not feel that isolated infestations outside of the generally infested area can be eliminated using existing methodology with the specified exclusion of isolated dwellings and sensitive areas or not being able to use certain chemicals near sensitive areas as stated in the text of the statement. Small scale isolated treatment operations do not pose the hazzard of large scale treatment operations and would not involve nearly as many citizens. Let me repeat, we think that separate criteria should be developed for these isolated situations. This problem is one that can increase in magnitude if not addressed properly.

Sincerely,

Alfred S. Elder

Alfred S. Elder
Director

ASE/pw

13

Iowa Department of Agriculture

R. H. LOUNSBERRY
SECRETARY OF AGRICULTURE

THATCHER JOHNSON
DEPUTY SECRETARY OF AGRICULTURE

HENRY A. WALLACE BUILDING
DES MOINES, IOWA 50319

January 21, 1981

Dr. Harry C. Mussman, Administrator
Animal & Plant Health Inspection Service, USDA
Room 316 E., Administration Bldg.
Washington, D.C. 20250

Dear Dr. Mussman:

I have reviewed the draft Program Environmental Impact Statement concerning Gypsy Moth in the U.S.. I have also communicated with a counterpart of mine, Mr. Norman Seaborg of the Illinois Department of Agriculture, who has already commented on this PEIS document. I have an additional comment concerning the document which is intended to be constructive, and is expected to strengthen the final document.

My comment concerns the No Action Alternative. In several areas of the PEIS the No Action Alternative is mentioned. (Specifically Pages V, 20, 47, and 52). On these mentioned pages there is in the text references to the effect that "no non-target organisms would be adversely affected" and "If no action is taken ———, there would be no immediate impact on the physical environment——". a These statements must be generalizations. Many people who are not experts in Entomology and Ecology will read this document and make judgements based on the information it contains. These statements allow the unspecialized reader to assume that uncontrolled Gypsy Moth populations would not be the problem that experienced persons know it to be.

On Page 20 - non-target organisms are identified. In that definition terrestrial and aquatic insects are included as a general category. Certainly there is competition for food between the Gypsy Moth and certain other foliage eating insects. The loss of foliage in a forested area will affect the temperature of normally shaded streams and consequently the species and locations of aquatic insects and fishes in those streams. These affects are adverse and direct to non-target organisms. Also they are immediate impacts on the physical environment.

I'm certain someone with Gypsy Moth expertise would be able to relate a number of other adverse affects, both immediate and long-term as a part of the no action alternative.

As a state agency representative in the uninfested area of the country I am concerned that these documents are accurate and thorough in presenting the alternatives for handling Gypsy Moth infestations. To say there would be no adverse affect to non-target organisms or no immediate impact to the physical environment from taking no action is to miscontrue the truth. Such statements will mislead the uninformed into a false sense of security. I do hope you will have the no action alternative reconsidered and presented more accurately in the final PEIS document. b

Sincerely,

C. E. Carlson

C. E. Carlson
State Entomologist

CEC/js

14

FROM THE DESK OF... 1/18/81

DR. PHILIP M. TIERNO, JR.

38 Carter St., Norwood, N.J. 07648

TO WHOM IT MAY CONCERN:

Thank you for extending to me an invitation to participate in your conference on aerial spraying for Gypsy Moth control. I am sorry that I will be unable to attend your program. Nevertheless I wish to make a statement:

I strongly oppose the use of "Sevin" in any mass spraying program. This substance is a proven teratogenic agent and becomes carcinogenic in human stomach forming N-nitrosocarbaryl when mixed with any nitrite containing food such as bacon, baloney, frankfurters, salami and hundreds of other prepared foods. The human studies on Sevin are a laugh - they are incomplete and lack objectivity. There are so many glaring omissions that one wonders how anyone except the manufacturers ($$$) of this product can be in favor of its use at all. For example, it is assumed that all normal healthy humans metabolize Sevin via the liver to 1-napthol which can be excreted in the urine. In all human studies this was the only metabolic byproduct of Sevin tested for! Why not test for other closely related compounds such as beta and alpha naphthylamines or aminoacid-beta naphthylamides (all carcinogens) or others? In addition there are many people with compromized liver function (such as geriatric and young populations, people on poor nutrional diets, people who imbibe alcohol excessively, people with overt hepatitis or other liver diseases, etc.) who may not completely metabolize seven to 1-naphthol but to other products. These studies haven't been done and must be done in order to better understand the human biochemistry of this product.

When Sevin is aerially sprayed it drops not only on trees but rooftops, street pavements, autos, house and literally everything. No one ever addressed themselves to this important question: What happens when Sevin interacts with any other organic material present in the environment such as oil and acrylic paints, motor and transmission oils, asphalt, roof tiles, petroleum products, auto and truck

emissions, industrial emissions, other pesticides and herbicides, and an endless variety of other organic matter? Reactions may occur when Sevin combines with these organic materials to form new potentially dangerous compounds hitherto unknown and untested. These products along with Sevin can find their way into the water table and eventually into the human water supply.

The teratogenicity of Sevin to vertebrates has been clearly shown by Dr. Judith Weiss of Rutgers University. Are other animal forms including humans susceptible to the same type of damage? And is there any reason to think that they would not be? Of course not!

Sevin has been shown to be mutagenic to many types of bacteria. This mutagenicity can alter the bacterial antibiotic susceptibility patterns and therefore under certain antibiotics useless against the mutated bacteria. This can have a profound effect on man.

The foundation of the argument which favors the use of Sevin relies strongly on the absence of concrete evidence implicating Sevin as a toxic agent. Since the absence of evidence is not evidence of absence only more careful and complete investigations will vindicate Sevin as a potential environmental and health hazard. To date these have not been done. However the small amount of evidence that is valid only incriminates Sevin as an agent whose potential dangers far outweigh the potential benefits.

These are but a few brief "uncommon" contrary arguments against the use of Sevin. There are many, many others but space forbids elaboration.

Norwood Board of Health held a similar meeting on Sevin on May 5th, 1980 which I attended. We had representatives from Union Carbide and the Department of Agriculture at that meeting. The arguments presented by these representatives were S.O.S. (same old song) about how innocuous and safe the product Sevin is. The outcome of that meeting was that the Board of Health recommended that the borough of Norwood not spray with Sevin. Afterwards I was asked by

the Mayor's Council to present a report on the pros and cons of using BT for the borough's spray program. I did this study and recommended that BT also not be used for the reasons below:

- because more research is needed using BT under more varied experimental conditions; b
- because additional earthworm studies should be performed to fully define the toxicity of BT to this organism;
- because there is evidence that the early 80's will be a "crash" or "collapse" period for the gypsy moth;
- because defoliation may actually be important and helpful in the maintenance of ecological stability of forest areas;
- because xylene is used as the solvent in most BT preparations and is teratogenic and possibly carcinogenic;
- because most strains of BT have proteolytic and nonproteolytic enzymes which give these organisms a potential for pathogenicity;
- because there is a possibility that hypersensitivity (allergic) reactions may occur in susceptible persons;
- because the importance and position of the gypsy moth in the food web is not yet clear;
- because the potential risks (all of which may not be immediately apparent) outweighs the potential benefits intervention in any natural defoliation (especially in forested areas) is not recommended.

These represent but a few reasons for not spraying with BT. There are many others.

In attempting to alleviate any "critical" environmental condition scientists must carefully evaluate the benefit/risk ratio of all applicable methods - be they chemical or biological. Any approaches may be extremely hazardous if action is taken without a clear and acute awareness of its short and long range ecological impact. In

nature, animals and plants interact with each other and their environment in ways which are often subtle, complex and impossible to isolate. Failure to recognize the essential aspects of such relationships may eventually cause the remedy to create much more mayhem than that which was initially targeted for cure.

In conclusion the municipality of Norwood chose to spray with NOTHING and this is what I heartily recommend be done by your association. If I can be of any further assistance, please advise.

I remain,

Sincerely yours,

Shirley M. Sterne

P.S. I would appreciate it if this letter could be read at your conference in lieu of my appearance.

Thank you

15

NPS

January 23, 1981

Harry C. Mussman, Administrator
USDA - APHIS
Washington, D.C. 20250

Dear Mr. Mussman:

The following is a list of our specific comments and questions regarding the 1981 Draft Programmatic Environmental Impact Statement for the USDA Cooperative Gypsy Moth Suppression and Regulatory Program:

p.IV, par.2: "These insecticides [e.g. carbaryl] are not proposed for use near sensitive areas." Last year, "sensitive areas" was defined as: "permanent residences; schools, churches; domestic apiaries; agricultural croplands; public recreational areas; wildlife refuges. . ., publicly maintained highways; and areas of commerce, i.e., shopping centers, malls and etc. In addition, . . . municipal water supplies and intakes as well as other waters including but not limited to rivers, streams, ponds, and lakes . . ." a

Please define, once again, "sensitive areas"; it should be clear that the USDA does not propose the use of carbaryl near the aforementioned areas.

p.IV, par.2: "Chemical insecticides used for gypsy moth suppression and regulation have a short residual life in soil and water." This contradicts page 37: "Residues of carbaryl in soil monitored in one gypsy moth suppression project were detectable up to 64 days after treatment." b

p.IV, par.2: "Implementation of the chemical insecticide treatment alternative will not result in irreversible or irretrievable impacts on the environment." This is a misleading statement; you don't know for certain. We are just now seeing the adverse impact of chemicals used 20 - 30 years ago. We have no way of knowing what the impact of today's chemicals will be in the future. c

1/27/81

1

p.V, par.1: "Economic efficiency for IPM would be less than for the chemical insecticide alternative . . ." While initially the dollar outlay for the chemical alternative would be less, certainly the health risk factor is greater. Let's look at the long term costs! d

p.4, par.1: "Federal involvement . . . favors the use of chemical insecticides." Doesn't this contradict the USDA stated preferred alternative (IPM)? e

p.15, par.5: As regards insecticide treatment accountancy, it is the fate of those exposed and NOT the insecticide that is important. f

p.17, par.3, 4, 5: What about also monitoring indigenous populations, i.e., human beings, animals, insects, plants and bacteria to insecticide exposure. g

p.23, par.4: If chemical "insecticides have successfully achieved the desired objectives in previous suppression and regulatory projects", why is there an annual chemical spray and why was 5 million acres devastated by the gypsy moth in 1980? h

p.24, par.1: No explanation of risk to human welfare is given in the Management Requirements on page 14. i

p.26, par.1: The statement that "no documented evidence exists that chemical insecticides as used in gypsy moth suppression projects and regulatory programs have an adverse impact on human health" is misleading and probably false. It should be stated that the Government had NOT done a long-term extensive monitoring or testing of residents in spray areas. In order for the above quoted statement to be valid, epidemiological studies would have had to be conducted over a span of time before, during and after a chemical treatment program. Also note that page 31 of the draft mentions the results of the University of Maine tests which showed sevin-4-oil to be a viral enhancer. j

p.26, par.1: Regarding public anxieties, since the federal government is responsible to the general public, that anxiety should be shared. k

p.26, par.4: How do you know subsequent sprays are needed due to re-infestations and not because of the failure of the spray (especially in the same year!)? l

p.28, par.5, 6: The carbaryl studies cited on this page are 8 to 15 years old; are they still valid? What about the studies cited by Susan Reynolds Shaw in last year's EIS; are they valid? If not, please explain. If so, please explain. m

p.28, par.7: "Carbaryl lowers the cholinesterase levels in many animals." Since this include human beings, please so state. n

p.29, par.7: The reasons cited in Appendix D for NOT subjecting carbaryl to RPAR is ambiguous at best. ". . . the existence of a trigger is very uncertain because of the large amount of uncertainty in our assessment of a low risk. We believe in this case the responsible call is not to begin an RPAR." If the EPA admits uncertainty and a possibility of terotogenic and/or fetotoxic effects and/or mutagenicity from carbaryl exposure, wouldn't it be responsible to begin an RPAR? o

p.30, par.1: The conclusion that "there is little likelihood of oral exposure to humans in a gypsy moth suppression or regulatory project" is unfounded. p

People traveling through the spray area, residents going to work, children playing in the grass after the spray are all exposed to the carbaryl, unknowingly and unwillingly.

p.30, par.2: All causes or contributing agents of Reye's Syndrome are not known. Because certain substances known to cause Reyes are not present in the carrying agent and emulsion, that does not preclude the fact that other agents could pose a threat. q

p.31, par.4: What were the original recommendations of the medical advisory panel reviewing viral potentiation of Sevin-4-oil and who sat on the panel? r

p.30, par.4: While it may be "highly unlikely that a single application of carbaryl such as that applied to treatment areas during gypsy moth suppression or regulatory projects would pose any human health hazard" there is always that possibility that it will. s

p.30, par.4: Is a forested community the same as a residential community with trees? If so, can it be unequivocally stated that an aerial application of carbaryl poses no measurable threat to human health? t

p.31, par.1,2 &3: Is is correct to say that, in summary, Mr. Campt of the EPA cites that carbaryl has the potential to cause birth defects in humans. u

p.37, par4: "Residues of carbaryl in soil detectable up to 64 days after treatment." Again, how do you prevent exposure to children! v

p.40, par.1: How can you conclude that with the carbaryl application the only "human resources irretrievably committed are dollars and manpower", when on page 31 you talk of birth defects and viral enhancement? w

We have found many deficiencies and contradictions in the 1981 draft. Although the IPM alternative is better than the chemical alternative, we feel that the present IPM favors chemical controls too much, and urge that biological and manual methods be more rigorously recommended. x

In 1980, McHenry, Illinois, was included for the first time in the USDA gypsy moth eradication treatment plan. The proposed program would have used the chemical Sevin-4-Oil. However, many residents were concerned about the possible harmful effects of this project, and questioned the adequacy of the 1980 Environmental Impact Statement. In May, 1980, a Federal court issued a Temporary Injunction against the Sevin spraying program; at the same time, Government officials cancelled the Sevin spraying program in McHenry.

Since there are safe and viable alternatives to the use of carbaryl to control the gypsy moth, residents of McHenry, in conjunction with the USDA and Illinois Department of Agriculture (IDOA), volunteered their time to implement a non-poisonous program. In brief, the program used in McHenry consisted of four phases:

1. Wrapping trees with burlap strips and monitoring for the presence of caterpillars;

2. Two aerial sprayings of Bacillus Thuringiensis (BT) in a water suspension;

3. Ground/in-tree spraying of BT in a water suspension on those trees whose burlap larval traps indicated the presence of caterpillars; and,

4. Setting of pheromone traps in a high concentration (3 per acre).

Past experience had shown that when only one of the above methods is used, control of the gypsy moth may not be achieved. However, a combination of the above efforts will provide the most successful results. In McHenry, only 84 moths were found in the pheromone traps as compared with the projected 16,500 to 66,000. Furthermore, an egg mass survey conducted by the USDA/IDOA found <u>zero</u> egg masses.

Because of the success of the McHenry program, and the fact that the citizens of McHenry were not exposed to a potentially harmful chemical, we support the use of this kind of program. We feel the gypsy moth can and should be dealt with by using methods that are ecologically sound and pose no possible threat to human health. y

Enclosed is literature from: University of Maine; Washington University, St. Louis, Missouri; and Dr. Robert Ginsburg, Toxicologist, citing reasons why we would NOT want Sevin sprayed on us, especially when safe alternatives exist. z

We regret that a scoping meeting was not scheduled in Illinois as we would have enjoyed the opportunity to have personally shared our information and questions with you. We believe that the methods we used were successful for our remote infestation, should be offered to other areas with remote infestations and perhaps be used in residential areas that are now heavily infested. In the future, please schedule scoping meetings in areas that have had remote infestations; their experience may prove valuable. aa

Sincerely,

CITIZENS CONCERNED FOR THE ENVIRONMENT

Louis E. Marchi

Michael R. Teta
1129 Manchester Mall
McHenry, IL 60050

Louis E. Marchi
7319 W. Trey Road
McHenry, Ill. 60050

Patricia W. Buhrman

cc: President Ronald W. Reagan
Secretary of Agriculture, Mr. Block
Secretary of Interior, Mr. Watt
U.S. Senator, Mr. Charles Percy
U.S. Senator, Mr. A. Dixon
U.S. Representative, L. Martin
U.S. Representative, R. McClory
Illinois Senator, Mr. J. Schafer
Illinois Representative, J. Zwick
Illinois Representative, T. Hanahan
Illinois Representative R. Klemm
Chief Peterson, USDA Forest Service
Governor James Thompson

MAINE AUDUBON SOCIETY

Gilsland Farm • 118 Old Route One • Falmouth, Maine 04105 • 781-2330

TO: R. Max Peterson, USDA Forest Service
Harry C. Mussman, USDA Animal and Plant Health Inspection Service (APHIS)

FROM: Cheryl Ring, Maine Audubon Society

DATE: January 23, 1981

RE: Comments on the Draft Programmatic Environmental Impact Statement (PEIS) for the USDA Cooperative Gypsy Moth Suppression and Regulatory Program 1981

The Maine Audubon Society disagrees with the preferred alternative chosen by the USDA Forest Service and APHIS in the 1981 PEIS for gypsy moth control in Maine. a

We recommend that the selected IPM approach be modified to exclude public financial support for chemical insecticide controls against gypsy moth. In the case of gypsy moth control, federal financial assistance to cooperating state agencies cannot be justified for chemical insecticide treatment. b The components of the IPM strategy we are recommending include biological insecticide application, parasite and predator population management, application of the gypsy moth mating disruption pheromone, homeowner self-help, sterile male moth release, and perhaps forest stand manipulation. c Chemical insecticides would be used at the expense and option of the landowner only; not financed by federal tax dollars.

There are a number of issues suporting our recommendation that are not thoroughly described or considered in the draft PEIS. d For example:

1. Chemical insecticide programs for gypsy moth have limited effectiveness.

Ever since the importation of a few gypsy moths to Medford, Massachusetts in 1869, gypsy moth control programs have doused caterpillars with a number of extremely toxic chemical insecticides. Prior to World War II, lead arsenate was used in an attempt to control the moth infestation. When gypsy moths continued to spread, DDT was used for over 15 years. Since 1959, Carbaryl (Sevin-4 Oil) has been the pesticide of choice. Spraying peaked in 1957 when 3,000,000 acres were sprayed in the northeast with DDT at a cost of hundreds of millions of dollars. Despite this program of intense chemical warfare,

Only a few gypsy caterpillars, whether picked up from a heavily infested campground or from a mildly infested roadside resting stop are needed to begin epidemics in an uninfected area.

In addition, although chemical sprays may dramatically reduce the gypsy moth population in selected areas temporarily, these same areas can be quickly repopulated by gypsy moths moving in from unsprayed outlying areas.

5. Draft from aerial application of chemical insecticide is impossible to prevent.

Performance standards for chemical insecticide application as listed on page 16 of the PEIS are overly simplistic and unrealistic, as demonstrated by the Maine experience with spruce budworm control.

Every conceivable drift prevention measure was in use during the 1980 spruce budworm suppression program in Maine. Mitigating measures such as wind velocity, buffer zones, nozzle angle, boom pressure, spray release height, swath width, pre-application overflights, and monitor planes were in place to prevent contamination of non-target areas.

Despite these elaborate precautions, a recently released report from the Maine Department of Human Services entitled, "Long Range Carbaryl Monitoring and Population Exposure Attributable to the 1980 Spruce Budworm Spray Program," revealed that chemical insecticides drifted up to 80 miles from their point of application. The report also stated that not one person living in Aroostook County remains uncontaminated by the chemicals.

6. The health impacts of introducing chemical insecticides into the environment are unknown.

The impacts of widespread chemical insecticide spraying on human health are largely unknown. More specifically, the application of many of the chemicals that could be used to control gypsy moth have been either banned or sharply curtailed in Maine's spruce budworm control program.

* In 1979, Dylox was banned from being sprayed in all of Washington County and parts of Penobscot County.

* The U.S. EPA recommended that Acephate (Orthene Forest Spray) not be used in the 1980 Maine spruce budworm program. The EPA also recommended that Carbaryl (Sevin-4 Oil), trichlorofon (Dylox 4), and Bacillus thuringensis (Thuricide 16B) be used only under very specific and stringent conditions.

Furthermore, the draft PEIS fails to point out decisively that a gypsy moth epidemic is more a cosmetic nuisance than a real threat to health or the environment. Manual or biological controls can effectively protect single trees.

Clearly, there is a role for federal involvement in Maine's struggle with the gypsy moth. Federal cooperation with state agencies can provide for adequate public education about the gypsy infestation, focus attention on effective, long-term controls, and can provide public funding for an IPM strategy that excludes chemical insecticides.

Gypsy moth epidemics will be curtailed only by comprehensive public understanding, by the cumulative biological pressure exerted by a number of non-chemical insecticide control options, and by time.

TOMPKINS COUNTY
ENVIRONMENTAL MANAGEMENT COUNCIL

NPBS 17

January 22, 1981

Mr. Harry C. Mussman, Administrator
USDA Animal and Plant Health Inspection Service
Washington, D.C. 20250

Re: 1981 DPEIS, Gypsy Moth Control Programs

Dear Mr. Mussman:

Thank you for the opportunity to respond to the Draft Programmatic Environmental Impact Statement for the "Proposed Cooperative Gypsy Moth Suppression and Regulatory Program Activities". We believe this years EIS has significant improvements over the previous years, and commend the USDA's effort to identify the environmental impacts associated with the control program.

After review of the aforementioned document, we would like to offer the following comments:

(1) The DPEIS was a joint effort assessing the Forest Service Suppression Program and the APHIS Regulatory Program. It is important to clearly identify the goals of each program and the preferred alternative to accomplish these goals. The Forest Service in the past supported the IPM approach whereas the APHIS supported only chemical insecticide treatment. Throughout the text, the IPM approach is suggested to be the preferred alternative for both agencies in 1981. We are supportive of this more sensitive approach by the USDA. However, we were informed recently by an administrator of APHIS that the IPM will be used experimentally only in Pennsylvania and that in the rest of the treatment areas, chemical insecticide applications will be the preferred alternative. We are concerned with this discrepancy as the information in DPEIS may be misleading. a

(2) The biological efficiency, economic feasibility, and environmental effects of the various treatment alternatives were evaluated in terms of "in the year of treatment" or on a short-term basis. No long-term assessments have been made evaluating each treatment alternative. Gypsy Moth Control Programs have been in existance for nearly a century and no relief from the infestations, other than the natural cyclic collapse of the species is expected in the near future. It appears to us that the USDA has been and will continue to be committed to the control of Gypsy Moths. This necessitates the need for long-term assessments to evaluate the most economically efficient alternative, with the least adverse environmental impacts. b

1/27/81
14 mile 2

128 East Buffalo Street, Ithaca, New York, 14850 Telephone (607) 274·5286/274·5287

(3) Previous Environmental Impact Statements documented the magnitude of the past and proposed Regulatory and Suppression Program. Details on the location, land use, acreage, and treatment used were included. This information is particularly useful in assessing the effectiveness of the Regulatory Program. We would suggest including this data in the FPEIS. c

(4) Pg. IV, III Par. 1 & 2 - The comparison of adverse effects on human health of chemical insecticides vs. biological insecticides were not evaluated on the same basis. According to the Pesticide Incident Monitoring System (PIMS) Reports, numerous cases can be documented of the adverse health effects of human exposure to the chemical insecticides proposed in the Gypsy Moth Treatment Programs. Either evaluate both insecticides for accidental exposure or delete the statement about NPV. d

(5) Pg. V, III last sentence, Pg. 47, Par. 4 - We are unable to agree with this statement. It is doubtful whether each state or the private property owner could organize as extensive a control program without the influx of federal dollars as the one proposed by the USDA. Some individual sites might receive increased levels of treatment, but in our judgement, the amount of pesticides applied when looking at the total picture would be significantly less. Also, it can be expected that with the reduction of pesticide applications impact on beneficial insects would also decrease. e

(6) Pg. 14, Par. 3 - Many field evaluations are completed either before or during the winter months. This information usually determines the need for treatment. It is important that spot checks be undertaken in the spring prior to treatment to re-evaluate egg mass viability. Extended periods of temperatures below -15° to -23° Fahrenheit have been known to have significant effects on Gypsy Moth egg mortality. Some entomologists are suggesting that due to the extreme sub-zero temperatures in the Northeast, that this factor should be evaluated, prior to a commitment to spray. What is the USDA doing to evaluate this concern? f

(7) Pg. 17, Monitoring Procedures - Monitoring procedures has been a part of the USDA programs for some time now. What has been done to evaluate past treatment programs, to avoid duplication of ineffective insecticides, or the treatment criteria used? g

(8) Pg. 20, Par. 1 - This statement acknowledges that throughout the affected environment the majority of visitors will frequent areas where no chemical insecticides are applied. Furthermore, remote infestations have spread, in spite of the APHIS Campground Treatment Program. No recent study has been published by APHIS to support this program. We must urge a re-evaluation of this aspect of the APHIS Program until evidence points to its benefit. h

(9) Pg. 28, Par. 5 - Carbaryl is toxic to honeybees but it is also extremely toxic to other relatives of the honeybee that belong to the order Hymentoptera. A large number of Hymentoptera species are beneficial parasites on pest insects of the forest. How much of an increase in these potential pests will occur when their preditors are killed by Sevin? Hymentoptera is also an important pollinator in our forests. What will be the impact on woodlands with the reduction of these pollinators?

We look forward to reviewing additional information that might be added to the Final PEIS. We support the USDA's public education and public involvement position andsstand ready to work with our local APHIS office in reviewing the site specific environmental documents for this years and subsequent years Regulatory Program in Tompkins County.

Sincerely,

Paul Finger

Paul Finger, Coordinator
Tompkins County Environmental Management Council

PF:ls

NPPS

January 21, 1981 18

Harry C. Mussman, Administrator
USDA, APHIS
Washington, D.C. 20250

Dear Sir;

Having just read the draft of the Envirionmental Impact Statement for 1981, I am both cheered by your leanings towards Integrated Pest Management, and saddened by a still persistent reliance on chemical insecticides.

To begin with, on page IV it is stated that "the application of chemical insecticides may reduce populations of non-target insects, including some beneficial insects". This should be amended to state that non-target insects will be affected, most importantly populations of natural predators and parasites. Furthermore, it is then stated that "these insecticides are not proposed for use near sensitive areas". No definition of a sensitive area follows, and I would like to know what it is. A park? A school? My backyard? Some clarification of this is a definite must. a b

I have been told many times in the past year that chemical insecticides are used to "eradicate" gypsy moth infestations; that their ability to "eradicate" is the justification for their use. With this I must strongly disagree. Chemical insecticides have not successfully achieved their desired objectives, as you state on page 23. On the contrary, the gypsy moth is stronger than ever! "Chemical insecticide treatment will, in the year of treatment, reduce gypsy moth populations" (page 26); it is, therefore, a temporary measure designed to give quick, cheap relief with no long term benefits. In fact, by destroying parasites and predators within the spray area, chemical spraying may actually contribute to the spread of the gypsy moth. In short, human beings and all other organisms existing within our fragile and irreplaceable envirionment are subjected to repeated applications of a poisonous substance in order to provide temporary and short-lived relief. c

Also, a great deal of mention was made of economic factors and the fact that biological insecticides are three to four times as costly as chemical insecticides. Human health and a stable, healthy and pure envirionment are too valuable for price tags. Economic factors have no place in planning a suppression program that will affect millions. d

The gypsy moth is a hardy, resilient insect that has been doused with everything from lead arsenic to Sevin and still it flourishes. It is time to take a reasonable approach to this problem. The gypsy moth will not be eradicated in the near future, if ever. Instead we must control it until natural predators and parasites exist in sufficient numbers to take over for us, or until totally safe measures such as male sterilization are functioning on a large scale. e

1/27/81

Since control, rather than eradication, is the only measure available to us, what form should it take? Obviously it should take the safest, sanest form, which is in this case biological control. Biological control measures worked in McHenry, Illinois in 1980 and will work again in 1981. McHenry had a four step plan developed by concerned citizens:

1) larval traps to pinpoint trouble spots
2) aerial spraying of Bt twice over the infested area
3) ground spraying of Bt on trees known to be infested
4) massive pheromone trapping

Not only did we succeed in reducing the number of moths, but a survey last fall turned up NO egg masses.

These same measures will work in other communities if given the chance. Subjecting people and the envirionment to unnecessary exposure to poisonous chemicals can not be justified when safe non-poisonous measures will work as well, if not better.

Sincerely,

Patricia Shanholtzer
414 Kensington Drive
McHenry, Illinois 60050

cc: President Ronald W. Reagan
C. Percy
A. Dixon
R. M. Peterson
L. Martin
R. McClory
J. Zwick
J. Schafet
T. Hanahan
R. Klemm
J. Block

JAN 2 8 1981

19

DEPARTMENT OF THE ARMY
US ARMY NATICK RESEARCH and DEVELOPMENT LABORATORIES
NATICK, MASSACHUSETTS 01760

REPLY TO ATTENTION OF:

DRDNA-WP

23 January 1981

Mr. Allen J. Schacht
Area Director
USDA-Forest Service
Northeastern Area State and Private Forestry
270 Reed Road
Broomall, PA 19008

FIDM
Director
Programs
Methods
Coordination
Pesticides
Environmental
File

Dear Mr. Schacht:

Thank you for the privilege of reviewing the inclosed draft Gypsy Moth EIS.

I took the liberty of discussing some of my comments with Mr. Wolfe. My main areas of criticism will include the following suggested changes as additions:

a. A glossary of terms would contribute to better understanding of the vast array of terms which would be so foreign to your lay readers. a

b. I think that all acronyms and acronym-like words should be spelled out in the beginning and followed by the acronym and then used thereafter as acronyms only. This, hopefully, would teach the lay reader a few things. b

c. I have indicated changes by making a red mark in the left margin for each paragraph or sentence containing errors. c

d. The public relations section should be expanded. There is the nucleus of excellent material here, but we scientists are just too conservative when we deal with the public. I realize that the last word in the foregoing sentence has been interesting for you, at least in regard to page 56, paragraph one, of the draft EIS. d

e. As you know, the Bacillus thuringrensis are rather interesting and there are probably more species involved than just one, so you might e

DRDNA-WP 23 January 1981
Mr. Allen J. Schacht

want to include and expand recent Bacillus thuringrensis information in next year's EIS.

Again, I thank you for the opportunity of reviewing the draft EIS and regret that I did not have more time to put into it. A copy of the final report would be appreciated.

Sincerely,

Lawrence W. Smith, Jr.

1 Incl
As stated

LAWRENCE W. SMITH, JR.
Research Entomologist
Food Packaging and Processing Group
Food Technology Division
Food Engineering Laboratory

4 Crawford Road
Morris Plains, NJ 07950
January 22, 1981

R. Max Peterson, Chief
U.S.D.A. Forest Service
PO Box 2417
Washington, DC 20013

Dear Mr. Peterson:

In reviewing the U.S.D.A.'s Programmatic Environmental Impact Statement For The Proposed Cooperative Gypsy Moth Suppression And Regulatory Program Activities, I submit the following comments and questions:

1. Why has the E.I.S. not addressed the subject of notification to the public that participation is voluntary and that individual homeowners have the right to refuse to participate? a

2. What are the uniform notification procedures for those who do not what to participate, both to local government personnel running the program and to aircraft pilots? b

3. How can exclusion methods such as a helium balloon attached to a particular homeowner's mailbox or a white sheet placed on a front lawn be an accurate guide for a pilot to recognize a non-participating property? These were two methods used in my township. Why is there not a standard for exclusion area designations? c

4. Page 14, paragraphs 2 and 3 -- How can it be stated that public involvement is an integral part of treatment area selection and that local residents decide whether or not to participate in a suppression program? There is no standard for public involvement or notification and this is not done properly in most eligible areas until as late as ten days prior to the spraying. d

5. What is the standard for proportion of egg mass studies per acre to determine eligibility? Should the standard be left up to State personnel whose employments depend upon the yearly spraying program? Only two study sites were used in my development of almost 300 homes last year. e

6. Page 15, paragraph 5 -- If "The ultimate fate of insecticides released in the atmosphere" is "not fully understood", then how can this program be offered? Unless some agency is willing to make guarantees to the public, the public should not be subjected to such a program. f

7. Page 16, first paragraph --

   a. How does "minimizing" insecticide drift protect the rights of all individuals? g

   b. What is the recourse of those who are subject to spray or spray drift against their will or have themselves or their properties accidently sprayed? h

   c. Who determines environmentally sensitive areas? i

8. Page 16, Paragraph 3 -- What if these guidelines are not adhered to? j

   a. To whom or what agency can a citizen complain? j

   b. Whose responsibility is it to suspend treatment? j

   c. What is the individual's recourse if the treatment is not suspended by the appropriate authority? j

9. Page 21, paragraph 2 -- Since "The amount of money that property owners are willing to spend on suppression efforts is often determined by the importance they attach to a particular goods or service", shouldn't the burden of the financial output fall upon those who consider the program worthwhile? Should those property owners who do not want the program as well as those taxpayers not in the spraying block have their federal, state and local tax dollars spent on such an effort? k

10. Page 21, paragraph 3 --

   a. Why are property owners who feel the program is necessary in order to protect the loss of property value not reassured that there are many areas and even entire states who do not participate in this program and survive the cyclic nuisance of the pest? l

   b. In addition, the U.S.D.A. should remind homeowners that tree mortality if a fact of life and that new trees and seedlings grow as a result of occasional tree death. m

11. Page 21, paragraph 3 -- Who is responsible for setting up public involvement standards? n

12. Page 23, paragraph 5 -- Who determines where buffer strips are necessary and where are they necessary? o

13. Page 23, paragraph 6 --

    a. What if minimization of exposure to insecticide is not good enough? Where are the rights of those who do not want any exposure? p

    b. How can individuals remain indoors when exact times and places of spraying are not known and those in authority can and do change both without being required to notify the public? q

    c. How can individuals avoid exposure when schools and businesses do not close during the spraying? r

14. Page 24, paragraph 1 -- When will safety plans be developed and by whom? Who will notify the public of these plans? s

15. Page 24, paragraph 3 --

    a. As with chemical spraying, how is it possible to avoid exposure (see questions in number 13). t

    b. Who would take the responsibility if, in the future, adverse effects to human health are proved (i.e., petro-chemical carriers are proven to cause Reyes Syndrome)? u

16. Page 26, paragraph 1 -- Do adverse effects to human health have to be proven before caution is taken? Who is going to guarantee the public that none exist and who will take the responsibility if harm is proven in future years? v

17. Page 26, paragraph 3 -- Will 90 percent of all insects be affected including parasites and predators of the moth? w

    a. Can treatment with chemical insecticides postpone the crash of a moth population in an area? x

    b. Have any published studies been done to determine if chemical treatments interfere with the normal cycle of the moth and delay the eventual slacking off to an innocuous state? y

18. Page 29, paragraph 6 --

    a. Who is responsible for warning the public of the effect of carbaryl combining with sodium nitrites? z

    b. Shouldn't the public be aware that the U.S.D.A. feels that, "carbamate insecticides should not produce any aa

significant" adverse effects in this area?

c. Who is taking the responsibility that carbaryl-containing insecticides do not affect humans in this way? bb

d. Isn't it up to each individual who would or could be exposed to the spraying to spray drift to decide for himself whether or not he cares for the odds of exposure? cc

19. Page 29, paragraph 7 --

a. Shouldn't the public be advised that the E.P.A.'s registration of carbaryl does not necessarily comprise an approval. Registration is due merely because a lack of evidence exists, at the present time, that the risks to human health outweigh the benefits to plants and crops. dd

b. Shouldn't the decision be in the hands of the individuals who would be taking the risk? ee

c. Is the public aware that the E.P.A.'s hazardous profile of carbaryl, which is the basis for its review of the chemical, does not consider, in great depth, breakdown products or viral potentiation? Is the public going to be informed that research in these areas is not complete? ff

d. Why were carbaryl-containing pesticides being used prior to the E.P.A.'s decision in these programs? gg

20. Page 30, paragraph 2 --

a. Is the U.S.D.A. stating that Sevin-4-Oil is not related in any way to Reyes Syndrome? hh

b. Is the U.S.D.A. stating that they guarantee this? ii

21. Page 30, paragraph 4 --

a. Is the U.S.D.A. going to inform the public that it already has exposure to carbaryl through our store bought foods? jj

b. Is the U.S.D.A. or state or local government giving a guarantee to the public that no one will exceed the Food and Drug Administration's recommended maximum levels of carbaryl due to the spraying? kk

22. Page 30, paragraph 4 -- If carbaryl remains toxic to insects for up to 15 days (Union Carbide)to 60 or 64 days (studies

cited in this E.I.S.), what will prevent exposure after spraying is over? ll

23. Page 31, paragraph 1 -- What rights do women who may be pregnant have who disagree with the E.P.A.' s opinion that "teratogenic potential...is not great", and "Once the spray settles, any further exposure is greatly reduced, and should be of no concern". Carbaryl remains toxic for up to 64 days after spraying and these women and their unborn babies should have the right not to be exposed even through secondary sources such as lawns, trees and shrubs. mm

24. Page 31, paragraph 2 --

    a. Who completed the follow-up study to which the E.I.S. refers which determines which of the Sevin-4-Oil constituents was viral enhancing and when was the study published? nn

    b. Is the U.S.D.A. aware that other studies seem to point to the hydrocarbon emulsifiers or carriers which are contained in many insecticides? oo

    c. Has the public been properly notified that most pesticides have a viral enhancement effect ranging from slight to 4 or 5 fold? pp

25. Page 35 -- I question the third paragraph on this page. Is the U.S.D.A. stating that those who do not want to be exposed at all have no rights? qq

26. Page 37, paragraph 3 and 4 --

    a. Will the public be notified of these residues so that individuals may act accordingly? rr

    b. Whose responsibility is it to inform the public of this? ss

27. Page 37, paragraph 5 -- What would the effect on aquatic life be after such a mishap? tt

28. Page 38, last paragraph --

    a. What would natural tree mortality have been over that period of time? uu

    b. Was this study the only study of gypsy moth defoliation of forest stands considered by the U.S.D.A. in its evaluation of economic effects? vv

    c. Did the U.S.D.A. consider "The Impact of Defoliation by Gypsy Moths on the Forest at Morristown National ww

Historical Park, N.J." by Joan G. Ehrenfeld as presented in the Proceedings of the First Conference on Scientific Research in the National Parks 1979?

29. Page 39, paragraph 1 -- What were the results in this study of properties which were not treated? Were there any complaints of massive tree death? Were homeowners give self-help instructions? xx

30. Page 39, paragraph 4 --

    a. Are there any studies that sight allergic reactions to larval excrement and larval hairs as being a major problem? yy

    b. Have there been any documented cases of accidents occurring from stepping on or driving over gypsy moth larvae? zz

31. Page 39, paragraph 5 -- What is this mechanism for early public involvement? aaa

32. Page 39, paragraph 6 --

    a. How can one know if he might be subject to a potential allergic reaction? bbb

    b. Is this public involvement left up to local municipalities' personnel? ccc

    c. Is it required that this potential be state to each resident within the spray block? ddd

33. Page 39, paragraph 7 -- Where is the standard for the notification process? To whom can the public turn if it finds the notification lacking or nil? eee

34. Page 40, paragraph 1 -- Is the U.S.D.A. guarantying no irreversible or irretrievable impacts on the environment? fff

35. Page 41, paragraph 4 -- Is the U.S.D.A. saying that the use of only one application has no impact and never works? ggg

36. Page 41, paragraph 5 --

    a. Does the U.S.D.A. say that the larvae will continue feeding for 3 weeks? hhh

    b. Is the U.S.D.A. aware that Abbott Laboratories claims that larvae cease to eat within an hour after ingestion of Dipel 4L and will die within several days (NOT WEEKS)? iii

37. Page 42, paragraph 3 -- When and where are environmental concerns not critical? jjj

38. Page 44, paragraph 3,4 and 5 and Page 45, Paragraph 1 -- Who is responsible for giving the public this necessary information on the gypsy moth. Who is responsible for educating the public in this area? kkk

39. Page 45, paragraph 2 -- How can the U.S.D.A. make a statement that homeowner self-help techniques alone will not prevent defoliation? Is the agency aware that many homeowners have been very successful in controlling defoliation almost completely? I would be willing to educate the U.S.D.A. in the success of homeowner self-help if needed! lll

40. Page 47, paragraph 6 -- Isn't it true that large moth populations usually occur in only small areas such as an acre or less and therefore would probably not affect streams and ponds in this way? mmm

41. Page 48, paragraph 1 -- Shouldn't the burden of the cost be left up to those who want to participate in a suppression program? nnn

42. Page 48, paragraph 3 -- How many documented cases of excessive tree mortality on city rights of way and residential properties exist? Are there any studies which sight mass tree mortality? ooo

43. Page 52, paragraph 5 -- Is the U.S.D.A. claiming that suppression programs of individual homeowners or small groups will have the over-all result of introducing MORE pesticides into the environment than the mass aerial spray programs offered by the U.S.D.A.? Is the U.S.D.A. saying that individuals who don't want the spraying have to be protected , for their own benefit and against their wills, by accepting mass aerial spraying? ppp

44. Why was this year's supplemental annual site specific environmental documents, which seems to be the responsibility of the specific states involved, not included with the draft Programmatic E.I.S. so that they, too, might be reviewed. Where may the public obtain these documents? qqq

I feel that the Draft Programmatic Environmental Impact Statement was lacking in the addressing of the issues and concerns expressed at the scoping sessions in the Fall of 1980. Most of the above questions were raised during the session in New Jersey and yet were not covered in enough detail to answer the questions.

Considering the fact that gypsy moth suppression programs infringe upon the rights of many people, it is the obligation of the U.S.D.A. to answer all these questions.

Very truly yours,

Nancy B. Coleman

Nancy B. Coleman

Executive Committee

President
Miriam Moss
Wyncote Audubon Society

President
James Lanard
Clean Air Council

Treasurer
Mary Ann Skaziak
Friends of the Earth

Secretary
Caron Chess
Environmental Cancer Prevention Ctr. of the Public Interest Law Ctr.

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Jerome Balter, Esq.
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Right to Know Comm.
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Phila. Area Project on Occupational Safety and Health

Air Pollution Comm.
Robert Kumosinski
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Drinking Water Comm.
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21

Delaware Valley Toxics Coalition
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January 22, 1981

FIDM
Director
Programs
Methods
Coordination
Pesticides
Environmental
File

FEB 4 1981

R. Max Peterson, Chief
USDA Forest Service
P.O. Box 2417
Washington, D.C. 20250

Dear Mr. Peterson:

The Delaware Valley Toxics Coalition, an organization of environmental, Labor, and community groups is committed to reducing the human health risks posed by toxic substances in the Delaware Valley. Our Pesticides Committee has endeavored to present scientific information to individuals and groups who request it.

Our organization wishes to comment on the Draft Programmatic Environmental Impact Statement for Cooperative Gypsy Moth Suppression and Regulatory Program Activities for 1981. These comments are enclosed but we also wish to stress the importance of public participation and notification in designated spray areas. Forums are needed where <u>independent</u> experts from entomology, biology and forest pest management can meet with the concerned public in order to evaluate present and future methods of gypsy moth control.

Thank you for the opportunity to address these concerns.

Sincerely,

Beverly Goulding
Morley Felton
Pesticides Committee
Delaware Valley Toxics Coalition
Gypsy Moth Project

Enclosure: Comments on 1981 draft EIS

COMMENTS OF THE DELAWARE VALLEY TOXICS COALITION, PESTICIDES COMMITTEE, GYPSY MOTH PROJECT ON THE UNITED STATES DEPARTMENT OF AGRICULTURE COOPERATIVE GYPSY MOTH SUPRESSION & REGULATORY PROGRAM DRAFT PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT, 1980.

BY MORELY FELTON-RESEARCH DIRECTOR, DELAWARE VALLEY TOXICS COALITION, PESTICIDES COMMITTEE, GYPSY MOTH PROJECT. 37 CRAWFORD RD., AUDUBON, PA., 19403. JANUARY, 1980.

I

"EFFECTS OF IMPLEMENTATION; CHEMICAL INSECTICIDE TREATMENT; BIOLOGICAL EFFECTS; DIFLUBENZURON",Page 28, Paragraph 5--- The Draft in its discussion of diflubenzuron toxicity cites the manufacturer's studies submitted to the Environmental Protection Agency which claim that it is non-carcinogenic and non-mutagenic (mutagens cause damage to cell genetic material) in mice & rats(1). However, the Environmental Protection Agency in its review of the same studies found diflubenzuron caused a "statistically significant increase" in cancer in female mice. They also found the manufacturer's rat carcinogenicity study invalid because of erroneous experimental methods used. The Environmental Protection Agency review also noted that the mammalian metabolite 4-chloroaniline was a weak carcinogen in mice and rats in a National Cancer Institure study(2). The Draft also cites a study done by the manufacturer showing negative dominant lethal mutagenicity in mice (chromosomal damage to sperm that results in fetal deaths). This finding possibly indicates that diflubenzuron or its mouse metabolites do not cross into the testes of mice from the blood, but it doesn't prove that it is not mutagenic in other body sites-which is very possible considering the fact that it is a mouse carcinogen and most cancers start from cell mutations(3). a

"EFFECTS OF IMPLEMENTATION; CHEMICAL INSECTICIDE TREATMENT; CARBARYL", P. 25, Par.5--- Regarding the discussion of carbaryl toxicity to non target insects it should be noted that compared to other pesticides it has a high toxicity. In a lab test of 61 pesticides- including parathion- for toxicity to 11 hymenopterous insect parasites & 7 coccinelid insect predators carbaryl was rated highly lethal to all of these food pest parasites and predators. Also it was rated at medium to high persistence, as compared to the medium persistence rating given the two other pesticides with the same level of lethality, malathion & mexacarb (4). b

P.29, Par.6--- The carcinogen N-nitrosocarbaryl is formed in the stomachs of guinea pigs & rats fed carbaryl & sodium nitrite in addition to in vitro (test tube) formation which you mention. Also neglected is mention of studies where feeding high amounts of carbaryl & sodium nitrite to rats produced cancers, and feeding the two substances to pregnant rats produced cancers in the newly born offspring. Also, the carcinogenic response in humans to the doses of carbaryl & sodium nitrite given rats would be much higher since the human stomach is more acidic than the rat stomach (pH 2 vs. 4.5) & N-nitrosocarbaryl formation increases exponentially with increased stomach acidity(5). c

P.30, Par.3--- Regarding the discusssion of carbaryl teratogenicity we have several comments. First, the document notes that the Smalley et al study found no teratogenic effects at the lowest dose tested, 3.25 milligrams per kilogram body weight per day throughout pregnancy in beagles. However Smalley et al did not examine the pups for fetal deaths. Imming et al (which you erroneously refer to as "Innes et al ") in another beagle study of pregnant beagles fed carbaryl found fetal deaths (stillbirths) at the lowest dose tested which was 2 mg per kg per day. These were not at statistically significant levels at the low dose. The findings of Smalley et al of no teratogenic effects at 3.25 mg per kg body weight among 39 pups examined means that a rate of 2.5% or lower for pups with carbaryl induced teratogenesis would be undetected(6). d

P.31, Par.1-3--- Regarding the letter of W. Cranston (which is mispelled "Cranstown") in which teratogenicity studies on monkeys are used to estimate human risk, most studies on human and monkey carbaryl metabolism show that the monkey is an inappropriate animal for extrapolation of the risk of carbaryl teratogenicity to man since it metabolizes the compound differently. The dog on the other hand probably metabolizes carbaryl similarly to man(7). e

Regarding the discussion of carbaryl viral potentiation, it should be noted that carbaryl in human cell cultures enhances the growth of varicella zoster, one of the viruses associated with Reyes Syndrome, up to 1500%(8). Reyes Syndrome affects children and kills about 25%(9) to 30%(10) of its victims. Viral potentiating chemicals usually work by inhibiting cell uptake & use of interferon which defends cells against invasion by viruses. Interferon is also one of the major body defense mechanisms against cancer cells, which it kills(11A). Dr. F. Lawrence of the Maine Poison Control Center who was Chairman of the Maine Bureau of Forestry Health Effects Panel you mention stated that use of Sevin-4-Oil(R) in the Maine spruce budworm aerial spraying program probably posed a risk of increasing the incidence of Reyes Syndrome and of inhibiting interferon response in exposed and susceptible individuals (11B). To protect citizens from these possible health threats the Maine Bureau of Forestry spruce budworm program requires that people entering sprayed areas be warned of the possible danger of viral enhancement , and also restricted most aerial spraying with Sevin-4-Oil to the northwest quadrant of the state where the only access in most cases is by private paper company owned log hauling roads. The areas closest to population centers were sprayed with Bacillus thuringiensis(12). f

P.30, Par.1 & 4--- Regarding the Wills Et Al 6 week human study and the 6 year New Jersey Epidemiological Studies Program study of carbaryl formulators which found "no chronic adverse health effects" - these clinical studies were confined to examination of major damage to organs and tissues & did not examine the subjects for more subtle and difficult to detect damage , other effects such as viral enhancement & cellular interferon response inhibition & reproductive effects such as teratogenicity and fetal deaths. One area not examined by the study was sperm effects. A later study of carbaryl production workers found increased levels of sperm head abnormalities & decreased sperm counts. It is not clear however whether these effects are due to exposure to carbaryl, or to the chemicals used in synthesizing it such as phosgene(13). In studies of other chemicals in mice these effects are f

associated with sperm mutations(14). Low sperm counts are often associated with higher levels of birth defects and fetal deaths in offspring of affected men(15).

"EFFECTS OF IMPLEMENTATION; CHEMICAL INSECTICIDE TREATMENT; BIOLOGICAL EFFECTS; TRICHLORFON",P.35, PAR. 26--- On p. 26 of the Draft it is noted that more detailed information on the toxicity & other characteristics of trichlorfon is in the 1974 Final Environmental Impact Statement for Cooperative Gypsy Moth Suppression & Regulatory Program. The latter document on p. 91 cites Mobay Chemical Co. studies done for Environmental Protection Agency registration that found trichlorfon when administered at high doses to be non-cancer causing in dogs, non-birth defect causing in rats & non-dominant lethal mutation causing in mice (dominant lethal mutations are sperm chromosomal aberrations which result in fetal deaths in offspring). The same studies are also cited on p. 4 of the Pa. Department of Environmental Resources, Bureau of Forestry, Division of Forest Pest Management 1980 Factsheet on Dylox & the Gypsy Moth Spraying Program which is distributed to people inquiring about the Gypsy Moth Cooperative Supression Project there. These studies are not available to the public. g

However, the U.S. Environmental Protection Agency has reviewed the toxicity of trichlorfon since 1978(16), and has recently found the Mobay Chemical Co. studies invalid because they used improper experimental procedures(17). Therefore they are basing their present deliberations on whether or not to subject it to the Rebuttable Presumption Against Registration process which would either continue its present registration, limit its uses, or cancel(ban) it on other studies(18). h

This body of experimental data includes one study showing carcinogenicity in rats using trichlorfon manufactured by the Mobay Chemical Co. parent firm, F. Bayer A.G. Also four studies showing rat carcinogenicity, four showing mouse dominant lethal mutagenicity (sperm chromosomal damage causing fetal deaths), & one showing mouse somatic cell mutagenicity (somatic cells are all cells other than the sperm & ova) were done with East German manufactured trichlorfon(19). It is also mutagenic in bacteria (the Ames Test) and most substances that are mutagenic in that test are also carcinogenic in experimental animals(20). Another indicator that trichlorfon is probably carcinogenic is its mutagenicity in the two host mediated assays. Trichlorfon mutates bacteria injected into the intraperitoneal cavity of mice and bacteria cultured with the urine from mice fed it. These positive tests probably demonstrate that trichlorfon or its metabolites are not changed into non mutagenic compounds after digestion and that these metabolites diffuse into the circulatory system & excretory system(21). In this context it should be noted that all substances with the possible exception of one arsenic compound that cause cancer in man also cause it in experimental animals, although the converse hasn't always been shown(22). As is the case with cancer causing substances, all substances causing birth defects in humans have also produced them in experimental

animals, with the converse not always being proven(23). Mobay Chemical Co. trichlorfon has produced birth defects in rats(24),as have Russian manufactured formulations(25).

The document notes that trichlorfon has been used as a human drug since the 1960's without serious known side effects. However the publicly available studies cited only considered effects such as damage to vital organs and tissues that could be detected within 2-18 days after administration. These studies didn't check for other effects that can occur at much lower levels of exposure than the levels of exposure needed to cause organ & tissue damage within such a short time span. Low level effects could possibly include various disorders related to the propensity of the substance to cause cell mutations such as metabolic diseases, immune system disorders,atherosclerosis, female or male caused birth defects and fetal deaths and cancers.

"EFFECTS OF IMPLEMENTATION; CHEMICAL INSECTICIDES; BIOLOGICAL EFFECTS, P.26-35--- Mention of the toxicity of the inert ingredients mixed with diflubenzuron, carbaryl & trichlorfon has been neglected in the discussion of their "Biological Effects". One or more of the commercial formulations of each of these insecticide active ingredients as used in the Animal & Plant Health Inspection Service Gypsy Moth Regulatory Program and in the Forest Service Cooperative Gypsy Moth Supression Projects contain what are labeled as "petroleum distillates" or "petroleum hydrocarbons". The specific identity of these ingredients is usually unknown because they are held as trade secrets by the manufacturers. Many of the nuclear aromatic hydrocarbons (containing one benzene ring) or polynuclear (containing a chain of benzene rings) aromatic hydrocarbons making up these inert ingredients are highly toxic. Some are carcinogenic, mutagenic or teratogenic in experimental animals(26). Some are carcinogenic in humans(27). Some potentiate viruses and interfere with interferon response in cell cultures & experimental animals(28), and possibley also in humans(29). They have also been linked to chronic, long term allergic disorders which are usually caused by damage to the body immune system(30).

"EFFECTS OF IMPLEMENTATION; CHEMICAL INSECTICIDES; PHYSICAL EFFECTS; DIFLUBENZURON, P.36-37--- It is noted that diflubenzuron had a soil halflife in lab experiments of .5 to 1.0 weeks. However its soil breakdown product 4-chloroaniline shows little degradation after 4 weeks and its exact long term soil persistence is unknown(31). 4-chloroaniline is a mouse carcinogen, as noted above in the "Diflubenzuron,Biological Effects" comments.

Long term studies havn't been done on the terminal soil breakdown products of 4-chloroaniline. In the event that it does completely degrade into its constituent atoms the chlorine atom could possibly form trichloromethane (chloroform) by a mechanism similar to the formation of trichloromethane by the soil breakdown products of the herbicide metolachlor. Metolachlor releases free chlorine when it breaks down. The chlorine atom then combines with carbon & hydrogen from soil organic matter to form trichloromethane, which can be taken up from the soil by food plants such as grains(32). Trichloromethane is a rat & mouse carcinogen according to a National Cancer Institute Bioassay(33), a bacterial mutagen, a rat teratogen (34), & a probable human carcinogen(35).

Diflubenzuron's known terminal water metabolite is 4-chloroaniline(36). The metabolic precursor of 4-chloroaniline, 4-chlorophenylurea, was detected as the leachate in a lab soil leaching study of diflubenzuron which indicates the possibliity that one or the other of these compounds could leach into groundwater(37). Another possible consequence of diflubenzuron residues in surface water is bioaccumulation by aquatic life. Fish accumulate diflubenzuron or its metabolites at concentrations in their tissues 800 to 7100% higher than the levels in their water. However they eliminate 65-98% of these residues 5-15 days after exposure to the compound is terminated(38).

Diflubenzuron is highly persistent in plant foliage & 30-60 days after treatment up to 90% remains on sprayed foliage(39). Ingestion of residues from treated food plants could result in accumulation in body tissues.

"EFFECTS OF IMPLEMENTATION; CHEMICAL INSECTICIDES; PHYSICAL EFFECTS; CARBARYL",P.37--- The Statement notes that residues of carbaryl were found in soil up to 64 days after treatment. Such residues could possible leach into groundwater, as carbaryl sprayed on an experimental plot was found to leach into groundwater (1.1 meter under the surface) up to 8 months after application(40).

Soil residues could also possibly be taken up by food plants. Carbaryl applied to the roots of peas, beans & turnips was taken up into the fruit after a 2 to 6 day period(41).

Another concern is that carbaryl shows significant persistence within plant foliage. When applied to tomato leaves at 1.6 lb. active ingredient per acre & treated with a simulated rain the residue on the leaves was reduced 59% after a 16 day period(42). When applied to okra fruits at a simulated low level with a .25% carbaryl solution spray 34% of the residue remained after washing(43).

"EFFECTS OF IMPLEMENTATION; CHEMICAL INSECTICIDES; PHYSICAL EFFECTS; TRICHLORFON", P.37---Long term studies havn't been done on trichlorfon soil breakdown products & their uptake by food plants. It is known that it completely breaks down into it's constituent atoms(44). The release of the three chlorine atoms in the form of free chlorine resembles the release of free chlorine from the herbicide metolachlor. In the case of metolachlor this results in the formation of the highly toxic substance trichloromethane, which can be taken up from the soil by food plants (see comments above on" Diflubenzuron Physical Effects", P.36-37).

"EFFECTS OF IMPLEMENTATION; CHEMICAL INSECTICIDES; PHYSICAL EFFECTS", P. 36-37---One or more of the commercial formulations of diflubenzuron, carbaryl & trichlorfon as used in the Animal & Plant Health Inspection Service Gypsy Moth Regulatory Program & in the Forest Service Gypsy Moth Cooperative Supression Projects contain "petroleum distillates" or "petroleum hydrocarbons". Many of the nuclear aromatic hydrocarbons & polynuclear aromatic hydrocarbons that make up these inert ingredients are highly persistent in water

& other environmental media(45). Many also have a propensity to accumulate in aquatic organisms, & probably also in non-aquatic organisms eating food contaminated with them(46).

"EFFECTS OF IMPLEMENTATION; "BIOLOGICAL INSECTICIDE TREATMENT; BIOLOGICAL EFFECTS", P.40-41--- The nucleopolyhedrosis spray Gypchek(R) will not be available this year from the Forest Service which manufactures it(47).

The Statement states the Bacillus thuringiensis (Bt) is approximately as effective as nucleopolyhedrosis , which killed 75% of larvae in experimental trials. However applications in the New Jersey Department of Agriculture Cooperative Supression Project show lesser effectiveness than this. In 1980 they found an average level of larvae reduction of 38% with one application at 8 billion IU, with a range of reductions in various municipalities from 5% to 70%. With two applications the range of larval reduction was 16% to 98%, with an average level of 69%. The municipalities with the very poor results usually had the most severe infestations(48).

The low effectiveness of Bt in highly infested areas might be increased through several methods. One is addition of molassas which has experimentally been shown to eliminate the propensity of the larvae to preferentially feed on leaves and foliage left unsprayed by the Dipel(R) or Thuricide(R) commercial formulations(49). Another possible innovation would be Bt-acephate mixtures which have increased the effectiveness of Bt in aerial spruce budworm applications in Canada without adversely affecting larval, pupal or egg parasites(51). o p

The same potential health hazards we have noted in the concluding comments on the"Chemical Insecticides, Biological Effects" section apply to the nuclear & polynuclear aromatic hydrocarbons in the inert ingredients of the Gypchek(R) formulation of nucleopolyhedrosis and in the liquid formulations of Bt such as Dipel 4L(R) or Thuricide HPC(R). For example the Thuricide 16B(R) formulation contains mixed xylenes (1,2 dimethylbenzene; 1,3 dimethylbenzene & 1,4 dimethylbenzene). These are nuclear aromatic hydrocarbons. They have been shown to be weak teratogen in mice and to reduce mouse birth weights in a National Toxicology Program study(52). q

"EFFECTS OF IMPLEMENTATION; BIOLOGICAL INSECTICIDE TREATMENT; PHYSICAL EFFECTS", P.41--- The same environmental persistence problems described above in the"Chemical Insecticide Treatment, Physical Effects"section comments apply to the nuclear & polynuclear aromatic hydrocarbons in the inert ingredients of the Gypchek(R) formulation of nucelopolyhedrosis and the liquid formulations of Bt such as Thuricide 16B(R), Thuricide HPC(R) & Dipel 4L(R). r

All of the chemical & biological insecticides proposed have various toxic effects to the biosphere and various forms of environmental persistence. We thus recommend that research & development be done on alternative forms of gypsy moth elimination such as systemic injection insecticides. These are injected into the tree trunks and are translocated into the leaves where they accumulate and kill the s

larvae when eaten. This control method would enable homeowners who are opposed to the aerial or ground spraying of their properties to prevent defoliation of the most valuable trees and trees that are most attractive to gypsy moth larvae such as oaks. A formulation of acephate , Medicap(R) is now being tested for this use by the manufacturer, Creative Sales Inc., but the product has not been registered for sale by the Environmental Protection Agency(57).

"APPENDIX C", (ENVIRONMENTAL PROTECTION AGENCY AERIAL SPRAY BUFFER ZONES FOR THE COOPERATIVE GYPSY MOTH SUPRESSION & REGULATORY PROGRAM)--- The Environmental Protection Agency in this letter sets spray buffer zones for the Cooperative Gypsy Moth Supression & Regulatory Program in cases where public participation in decision-making & advance notification are not used, or in cases where public participation in decisionmaking & advance notification is used but buffers have to be set for property owners who don't want to be sprayed. In "Table II" a 500 ft. buffer zone is set for private property owners who qualify under the two cases noted above. The Environmantal Protection Agency in a 1975 study found that air application of agricultural sprays to trees using a boom sprayer with low volume spray nozzles- as are used in the Pa. Department of Environmental Resources Cooperative Supression Project- with a 3-5 mph wind, neutral atmospheric stability, temperature above 60°, & relative humidity of 50% or less results in 10-40% of spray drifting over 1000 ft. from the target. Extrapolating from these figures, 20-80% of the spray could possibly drift outside the 500 ft. Cooperative Gypsy Moth Supression & Regulatory Program buffers onto property owners not participating in the program. The spray drift situation should be made more clear in information directed to the public from the various agencies involved in the Cooperative Gypsy Moth Supression & Regulatory Program (53).

NOTES

1- H. Willcox & T. Coffey, Forest Insect & Disease Management-Environmental Impacts of Diflubenzuron (Dimilin^{R}) Insecticide, U.S. Department of Agriculture, Forest Service, Northeastern Area State & Private Forestry, '78, 2. This pamphlet cites manufacturer's studies not available to the public.

2- R. Troast Et Al, U.S. Environmental Protection Agency, Office of Pesticides & Toxic Substances, Office of Pesticide Programs, Special Pesticide Review Division, Diflubenzuron Decision Document, '79, 29-39, 40-44, 45. The National Cancer Institute bioassay on 4-chloroaniline noted on p.44-45 of above citation is National Cancer Institute Technical Report No. 189, & is available from the National Toxicology Program, Carcinogenesis Testing Program, Landow Bldg., Rm. A306, Bethesda, Md., 20205.

3- B. Ames, "Identifying Environmental Chemicals Causing Mutations & Cancer, Science, Vol. 204, '79, 587-593. Cited in D. Kreibel, The Dioxins' Genetic Risks, '79, 4. Available from Center for the Biology of Natural Syst. Washington University, Campus Box:, St. Louis Mo., 63130.

4- B. Bartlett, "The Contact Toxicity of Some Pesticide Residues to Hymenopterous Parasites & Coccinellid Predators", Journal of Economic Entomology , Vol. 56, No.5,'63, 694-698.

5- U.S. Environmental Protection Agency, Office of Pesticides & Toxic Substances, Office of Pesticide Programs, Special Pesticide Review Division, Carbaryl Decision Document, '79, A-1, B-2 to B-6, A-1.

6- P. Dolinger Et Al, Carbaryl-Monograph No. 1, Environmental Health Evaluations of California Restricted Insecticides, '79, 102-105. Available from P. Dolinger Associates, Chemical Regulatory Consultants, Menlo Park, Cal., 94025. This document was done for the Cal. Department of Food & Agriculture. It reviews the Smalley Et Al study cited in the Draft Programmitic Environmental Impact Statement & the summary of the Imming Et Al study(that was done for the manufacturer & is confidential)in World Health Organization, Food Additives. 1969 Evaluations of Some Pesticide Residues in Food. The Monographs, No. 70.38; '70.

7- U.S. Environmental Protection Agency, Op. Cit., 7-12; P. Dolinger Et Al, Op. Cit., 52, 53, 46-58.

8- U.S. Environmental Protection Agency, Op. Cit., 56-57.

9- Medical Reporter-Researcher, "Medicine:New Plagues for Old", Time, 11/24/'80, 60. Time & Life Bldg., Rockefeller Ctr., N.Y., N.Y., 10020 .

10-L.Lack,"Reyes Syndrome-Searching for the Cause", Maine Times, 3/28/'80 Bowdoinham, Me., 04008 . On Reyes Syndrome also see D. Weber, Reyes Syndrome: The Case for the Chemical Connection,'80. Available from Rachel Carson Council, 8940 Jones Mill Rd., Wash. D.C., 20015.

11A- C.Richards, Interferon, Virus Enhancement & Pesticides:A Brief to the New Brunswick Pesticides Advisory Board,Dec. 14, 1979, included in E. Jansson, Health Effects of Sevin,'80, 14-15. Available from Friends of the Earth-D.C., 530 7th St., S.E., Wash. D.C., 20003. D. Weber, Op. Cit.. E. Cameron, Vitamin C & Cancer, '79.

11B- Letter from Dr. F. Lawrence to John Born of the Natural Resources Council of Maine, with responses from F. Lawrence written in. Included in E. Jansson, Op. Cit., 9. J. Born can be contacted at the Natural Resources Council of Maine, 335 Water St., Augusta, Me., 04330, 207-622-3101.

12- L. Lack & R. Brownstein, "Trees Vs. People", The Amicus Journal, Summ., '80, 25. Available from Natural Resources Defense Council, 122 E. 42 St., N.Y., N.Y., 10168. L. Lack can be contacted at the Maine Times , Bowdoinham, Me., 04008.

13- U.S. Environmental Protection Agency, Op. Cit., 42-44. On chemicals used in synthesizing carbaryl see P. Dolinger, Op. Cit.,14-15.

14- A. Wyrobek, "The Induction of Sperm Head Abnormalities in Mice & Humans, Chemical Mutagens:Principles & Methods for Their Detection, Vol. 5, '78, 257-280. E. Jansson, A Short Review of Some of the Literature on the Relationship of Chromosome Integrity to Birth Defects, Miscarriages & Stillbirths, 7-10, 26, '80. Available from Friends of the Earth-D.C., 530 7th St., S.E., Wash., D.C., 20003.

15- E. Jansson, Op. Cit., 7-10.

16- See "Pre-RPAR" sections of the U.S. Environmental Protection Agency, Office of Pesticides & Toxic Substances, Office of Pesticide Programs, Special Pesticide Review Division, Status Report on Rebuttable Presumptions Against Registration & Registration Standards, issued quarterly.

17- Interview with P. Scelfo, Trichlorfon Project Manager, U.S. Environmental Protection Agency, Office of Pesticides & Toxic Substances, Office of Pesticide Programs, Special Pesticide Review Division, 10/15/'80. The Mobay Chemical Co. studies were reviewed for correct experimental procedure by the Special Pesticide Review Division, Regulatory Analysis & Lab Audits Branch, Validation Assistance Team (consisting of the Environmental Protection Agency, the Food & Drug Administration and the Mobay Chemical Co. laboratory contractor Industrial Bio-Test Labs). The Delaware Valley Toxics Coalition, Pesticides Committee, Gypsy Moth Project has requested the titles of the Mobay Chemical Co. trichlorfon tests , and copies of the Environmental Protection Agency invalidation studies of these tests but they have not responded to our requests. The titles of confidential manufacturer's studies submitted to the Environmental Protection Agency are available under existing law according to R. Shearer, "Testing Pesticides for Health Hazards", 5/'80. Available from R.Shearer, Consultant in Genetic Toxicology, 2017 E. Beaver Lake Dr., S.E., Issaquah, Wash., 98027.

18- P. Scelfo interview , Op. Cit. The Environmental Protection Agancy decision on whether or not to issue a Rebuttable Presumption Against Registration for trichlorfon will be made later this year.

The studies listed in our"Comments" are in the "TCF Bibliography-1"which is used by the Trichlorfon Pre-Rebuttable Presumption Against Registration Project.

German Carcinogenicity Studies: W. Gibel, "Tierexperimentelle Untersuchungen Uber Die Hepatotoxische Und Kanzerogene Wirkung Phosphororganischer Verbindunge. I.Mitteilung: Trichlorphon", Archiv Fur Geschwulstforschung, Vol. 37, No.4, '71, 303-312. One run in which rats dosed intragastrically, and one subcutaneously . W. Gibel Et Al, "Uber Die Kanzerogene, Hamatoxische Und Hepatotoxische Wirkung Pestizider Organischer Phosphorverbindungen", Archiv Fur Geschwulstforschung, Vol. 41, No. 4, '73, 311-328.One run where rats dosed orally in feed & one run intramuscularly.

German Mutagenicity Studies: S. Schiemann, "Untersuchungen Zur Mutagenen Wirkung Non Trichlorfon Auf Die Hausmaus-Unter Besonderer

Berucksichtigung Des Dominanten Letaltestes", Wissenschaftliche Zeitschrift Der Martin Luther Universitat Halle Wittenberg, Mathematisch-Naturwissenschaftliche Reihe, Vol. 24, No. 3, '75. Data appears in W. Dedek, "Zur Mutagenitat Von Desmethyl-Trichlorphon Im Dominanten-Letal-Test An Der Hausmaus", Archiv Fur Toxikologie, Vol. 33, No.2, 163-168. Schiemann found dominant lethal mutagenicity in mice in a run with a single intraperitoneal dose, and in a run with daily doses over 20 days. G. Fischer, Et Al, "Zur Mutagenitat Von Dichloracetaldehyd Und 2,2-Dichlor-1,1-Dihydroxy-Ethanphosphonsauremethylester, Moglichen Metaboliten Des Phosphororganischen Pestizides Trichlorphon", Chemico-Biological Interactions, Vol. 19, '77, 205-213. Fischer Et Al found dominant lethal mutagenicity in two strains of mice.

The study showing bone marrow cell mutations is A. Kurinnyi, "Comparative Study of the Cytogenetic Effect of Certain Organophosphorus Pesticides", Soviet Genetics, Nov. '76, 1534-1538. A study showing somatic cell (body cells other than the sperm & ova) mutations in mice with East German manufactured trichlorfon is W. Dedek, "Alkylation of Guanine in Mice In Vivo By Organophosphorus Insecticides. I. Trichlorphone & Butonate", Pesticide Biochemistry & Physiology, Vol.6, No.2, '76, 101.

19- A. Davis, Et Al, "Metrifonate in Urinary Schistosomi", Bulletin of the World Health Organization, Vol. 41, '69, 209.

20- B. Ames Et Al, "Methods for Detecting Carcinogens & Mutagens With the Salmonella/Mammalian Microsome Mutagenicity Test", Mutation Research, Vol. 31, '75, 347-364. Ames Et Al found 90% of 174 known rodent carcinogens tested positive in the Ames Test.

T. Maugh, "Chemical Carcinogens:The Scientific Basis for Regulation", Science, Vol. 201, '78, 1200-1205. Cites the unpublished S. Rinkus study which found 77% of 273 known rodent carcinogens tested positive in the Ames Test.

21- R. Batzinger Et Al,"Mutagenic Activities In Vitro & In Vivo of 5 Antischistomal Compounds", Journal of Pharmacology & Experimental Therapeutics, Vol. 200, '77, 1.

22- M. Reuber, "Carcinogenicity Testing of Chemicals, With Particular Reference to Organochlorine Pesticides", Science of the Total Environment, Vol. 10, '78, 105. F. Sunderman, "A Review of the Carcinogenicities of Nickel, Chromium & Arsenic Compounds in Men & Animals", Preventive Medicine, Vol. 5, '76, 279-294.

23- U.S. Food & Drug Administration, Advisory Committee on Protocols For Safety Evaluation, Toxicology & Applied Pharmacology, Vol. 16, '70, 264-296.

24- R. Staples, Et Al,"Dipterex Teratogenicity in the Rat, Hamster & Mouse When Given By Gavage", Environmental Health Perspectives, Vol. 30 '79, 105-113. R. Staples Et Al, "Developmental Toxicity in the Rat After Ingestion or Gavage of Organophosphorus Pesticides", Environmental Health Perspectives, Vol. 13, '76, 136.

25- L. Martson Et Al, "Experimental Study of the Effect of a Series of Phosphororganic Pesticides on Embryogenesis", Environmental Health Perspectives, Vol. 13, '76, 123. Several East German studies using E. German manufactured trichlorfon produced birth defects in mice or rats. These are listed in the "TCF Bibliography-1" used by the Trichlorfon Pre-Rebuttable Presumption Against Registration Project.

26- U.S. Department of Health & Human Services, Public Health Service, Center for Disease Control, National Institute for Occupational Safety & Health, Registry of Toxic Effects of Chemical Substances, annual.

27- U.S. Department of Health & Human Services, Public Health Service, National Institutes of Health, National Cancer Institute, International Cancer Research Data Bank, Cancergram CK02-Environmental & Occupational Carcinogenesis, monthly.

On possible increases in skin cancer rates in New Brunswick compared to the rest of Canada due to being the only Lower Maritime province with a public aerial spruce budworm spray program (using seven or more insecticides or inert ingredients containing petroleum distillates that are virus potentiators) see C. Richards, Op. Cit., 19.

28- On virus potentiation & interferon response inhibition by chemicals see our comments on the "CHEMICAL INSECTICIDES, BIOLOGICAL EFFECTS, CARBARYL" section of the Statement , p. 31, par. 4. Also see C. Richards, Op. Cit., 15-17; & D. Weber, Op. Cit.

29- See C. Richards, Op. Cit. , 18 on the increased Reyes Syndrome rate in New Brunswick over Nova Scotia. New Brunswick has a public aerial spray program, while Nova Scotia doesn't according to L.Lack, "Reyes Syndrome", Maine Times, Bowdoinham, 3/28/'80.

30- T. Randolph, Human Ecology & Susceptibility to the Chemical Environment, '62; L. Dicky, Clinical Ecology, ; The Ecologist, monthly, available from the Human Ecology Action League, 505 N. Lakeshore Dr., Suite 6506, Chicago, 60611.

31- Metcalf, Journal of Agricultural & Food Chemistry, Vol. 23, '75, 359-364

32- U.S. Environmental Protection Agency, Office of Pesticides & Toxic Substances, Office of Pesticide Programs, Special Pesticide Review Division, Metolachlor-A Sample Pesticide Registration Standard, '80, 55, 25-26, 21.

33- National Cancer Institute Technical Report, Chloroform , available from National Toxicology Program, Carcinogenesis Testing Program, Landow Bldg., Rm. A306, Bethesda, Md., 20205.

34- U.S. Department of Health & Human Services, Public Health Service, Center for Disease Control, National Institute for Occupational Safety & Health, Registry of Toxic Effects of Chemical Substances, '80.

35- U.S. Department of Health & Human Services, Public Health Service, National Institutes of Health, National Cancer Institute, International Cancer Research Data Bank, L. Houten Et Al, Oncology Overview- Selected Abstracts on Carcinogenic Contaminants of Water Supplies, '80, VI, 14-15.

36- U.S. Environmental Protection Agency, Office of Pesticides & Toxic Substances, Office of Pesticide Programs, Special Pesticide Review Division, Diflubenzuron Decision Document, '79, 16-23.

37- H. Willcox & T. Coffey, Op. Cit. , 9.

38- Ibid., 9-10; U.S. Environmental Protection Agency, Office of Pesticides & Toxic Substances, Office of Pesticide Programs, Special Pesticide Review Division, Diflubenzuron Decision Document, 14, 60-61.

39- H. Willcox & T. Coffey, Op. Cit., 8.

40- P. Dolinger Et Al, Op. Cit. , 76-77.

41- Ibid., 70.

42- Ibid. , 58.

43- Ibid. , 30,32.

44- Pa. Department of Environmental Resources, Bureau of Forestry, Division of Forest Pest Management, Factsheet on Dylox & the Gypsy Moth Spraying Program, '80, 8.

45- U.S. Environmental Protection Agency, Office of Water Planning & Standards, Office of Water & Waste Management, Monitoring & Data Support Division, M. Callahan Et Al, Water Related Environmental Fate of 129 Priority Pollutants,Vol II, '79, Ch. 71-93 & Ch. 95-98; U.S. Department of Health & Human Services, Public Health Service, National Institutes of Health, National Cancer Institute, International Cancer Research Data Bank, Cancergram CK13- Chemical Carcinogenesis- Miscellaneous Agents, monthly; Cancergram CK07- Chemical Carcinogenesis- Polycyclic Aromatic Hydrocarbons , monthly.

46- U.S. Environmental Protection Agency, Ofice of water Planning & Standards, Criteria & Standards Division, Criteria Branch, Ambient Water Quality Criteria: Polynuclear Aromatic Hydrocarbons, '78. See the Publications-A Quarterly Guide , '79, 72-78 for Water Quality Criteria for individual nuclear aromatic hydrocarbons.

Publications- A Quarterly Guide,'78-'79 available from E.P.A. Printing Management. On herring gull bioaccumulation of poly-nuclear aromatic hydrocarbons see J. Highland, Et Al, Benign Neglect, '79, 95. Environmental Defense Fund, 1525 18th,NW, Wash., D.C.,20036.

47- Interview with R. Wolfe, Staff Pathologist, U.S. Department of Agriculture, Forest Service, Northeastern Area State & Private Forestry, 12/15/'80.

48- J. Kegg, N.J. Forest Pest Reporter, Vol. 15, No.3, '80, 3. Available from N.J. Department of Agriculture, Division of Plant Industry.

The apparant lower levels of larval reduction after one Bt application don't take into account possible increased levels of larval reduction in following years because single applications take a longer time to kill the larvae & thus allow more eggs to be laid in the larvae by parasitic flies & wasps(Interview with R. Fusco, Biological Control Section Chief, Pa. Department of Environmental Resources, Bureau of Forestry, Division of Forest Pest Managment, 11/15/'80. They have studied this phenomenon on test plots, using Dipel 4L(R)).

49- L. Laub, Bacillus Thuringiensis, '80,29. This is a packet of mainly technical articles & reports. Avaialble from Center for the Integration of Applied Sciences, John Muir Institute, 1010 Grayson St., Berkely, Cal.

51- Ibid., 35-37.

52- National Toxicology Program Technical Bulletin, Vol. 1, Issue 3, '80, 8. Available from National Toxicology Program, Box 12233, Research Triangle Park, N.C., 27709.

53- Interview with R. Wolfe, U.S. Department of Agriculture, Forest Service, Northeastern Area State & Private Forestry, 1/15/'81. Manufacturer's adress is 222 Park Ave., Fremont, Neb., 68025.

54- U.S. Environmental Protection Agency, Office of Pesticides & Toxic Substances, Office of Pesticide Programs, R. Von Rumker Et Al, A Study of the Efficiency of the Use of Pesticides in Agriculture - Final Report, '75, Chart 1. Included in E. Jansson Et Al, Study I- What Can Be Done to Reduce Pesticide Damages & Injuries in the United States Due to Overflights of Spray Planes & From Pesticide Spray Drift, Friends of the Earth,'80, 6.

FPM 1205-RPE 22

NEW YORK STATE PARKS & RECREATION Agency Building 1 Empire State Plaza Albany, New York 12238 Information 518 474-0456
Orin Lehman, Commissioner

JAN 29 1981

FIDM
Director
✓Programs
Methods
Coordination
Pesticides
Environmental
File

January 16, 1981

R. Max Peterson
USDA Forest Service
P.O. Box 2417
Washington, DC 20013

Re: USDA FS-DEIS 81-01
Gypsy Moth Suppression

Dear Max:

Thank you for providing us the above-referenced draft environmental statement on "Proposed Cooperative Gypsy Moth Suppression and Regulatory Program Activities."

This document has been reviewed by staff of the N.Y.S. Office of Parks and Recreation, including its Long Island, Saratoga/Capital District, Taconic and Palisades subdivisions that are particularly affected by gypsy moth infestations on their respective park resources.

Your forest-pest management staff has done a fine job in pulling together the appropriate "state-of-the-art" information that exists on gyspy moth, and we are generally satisfied with the draft statement.

There are, however, several points that various individuals have brought to my attention that might properly be addressed in the final statement. These are:

i. mention of any specific safeguards or recommendations that might be particularly relevant to arboreta, golf courses, and such recreation intensive-use areas as campgrounds and picnic areas; a

ii. effects, if any, of prolonged low temperature, such as now being experienced in the Northeast, on hatching of eggs; b

iii. greater elaboration on the "no action" alternative; and, c

iv. more information on why "Dimilin" is restricted from use in inhabited forests. d

RECEIVED FS-WO
JAN 22 1981
FIDR

An Equal Opportunity Employer

Again, we appreciate the opportunity to review the draft environmental statement which, at a minimum, has been valuable in our understanding of the gypsy moth problem that confronts us.

Sincerely,

Thomas L. Cobb, Ph.D.
Environmental Management Bureau

TLC:vld

cc: M.J. Birmingham, NYS Dept.
of Environmental Conservation

STATE OF CALIFORNIA — EDMUND G. BROWN JR., Governor

DEPARTMENT OF FOOD AND AGRICULTURE

1220 N Street
Sacramento
95814

FEB 3 1981

23

January 23, 1981

Dr. Harry C. Mussman, Administrator
USDA, APHIS
Administration Bldg. (East Wing)
14th & Independence Avenue
Washington, D. C. 20050

Dear Dr. Mussman

It was through the courtesy of Mr. Norman Seaborg, Illinois Department of Agriculture, that we became aware of the draft Environmental Impact Statement, "Proposed Cooperative Gypsy Moth Suppression and Regulatory Program Activities." The draft statement was received by this Department on January 20, 1981, leaving only three working days to review the document and submit our comments. We have requested an extension period to respond on January 21, 1981, through Ms. Kathi Wilson, Office of Environmental Review, E.P.A., Washington, D. C. Mr. Robert Wolfe, U. S. Forest Service, telephoned at noon today to say that California's comments will be included with other responses.

The draft statement does not meet the needs for gypsy moth in California. a

The statement speaks to only a generally infested forest situation. California's localized infestations, resulting from the movement of outdoor household goods arriving from the infested areas in eastern United States, occur in urban and suburban areas. The statement should speak to this fact. b

The recommended IPM alternative for treatment will only lower the population level and are unproved for eradication. This increases the danger of outbreak and permanent establishment. California cannot afford to live with this alien pest. We believe that the chemical insecticide treatment alternative be included in the recommendation for use in isolated, localized areas which are the type of infestations California has and will continually be faced with due to the movement into the state of infested outdoor household goods shipped from the heavily infested areas. c

Since California's infestations are in urban and suburban areas, chemical insecticides should be permitted to be used in "sensitive areas", of a remote, isolated infestation. d

Sincerely

for R. E. Rominger
Director
(916) 445-7126

Thompson-Hayward Chemical Company
5200 Speaker Road Kansas City, Kansas 66106
Reply To: P.O. Box 2383
Kansas City, Kansas 66110 913/321-3131
Telex TH CHEMCO KSCK 426271

January 20, 1981

Mr. R. Max Peterson, Chief
USDA Forest Service
P.O. Box 2417
Washington, D.C. 20013

Dear Mr. Peterson:

We have received the 1981 Draft Environmental Statement for Cooperative Gypsy Moth Suppression and Regulatory Program Activities and appreciate the opportunity to make the following comments.

Ref. DIMILIN® Diflubenzuron
page 28, para. 3
'...for use in uninhibited* hardwood forests' a

To clarify the present label restrictions imposed on the use of DIMILIN for gypsy moth control, the product is labeled for "forest use only". According to EPA's definition of the term "forest" under section 171-2(N) of 40 C.F.R., it is a concentration of trees and related vegetation in a non-urban area sparsely inhabited by or infrequently used by human beings. DIMILIN is not specifically restricted from use in inhabited areas.

Whereas this definition severely limits the present scope of the product's registered usefulness, DIMILIN has been useful for control purposes in many areas, for example in Pennsylvania, Virginia, West Virginia, North Carolina, New York, New Jersey, Maryland and Michigan.

In considering the organized approach to the USDA Gypsy Moth Suppression and Regulatory Programs, utilizing the procedures of public notification, insect treatment accountancy, performance b standards and monitoring procedures, DIMILIN, under its present labeling, should be useful for treatment of forested campgrounds, parks and recreational areas during the spring season - a period of time characterized by infrequent human habitation. Indeed, DIMILIN has been utilized for said purposes, and judged the preferred choice in these and other sensitive forest use areas.

*typo error - should have read '...uninhabited...'

page 36-37, para. 9

'The rapid degradation...'

There appears to be a typographical error in which the two ending lines on page 36 are repeated at the top of page 37. c

page 37, para. 2

'The persistence of DIMILIN in water and soil water systems is...'

The sentence continues with a reference to oil alone. This statement has no bearing in regard to the gypsy moth program where diflubenzuron is utilized in water without the presence of oil. The reference, ...as with oil alone, is best deleted from the statement. d

page 49, table 4

The table indicates no tolerance for diflubenzuron has been established in agricultural crops. In 1979 a tolerance was established on cotton seed. This should be so indicated in the table. e

Again, thank you for allowing us to review the draft and to offer our comments.

Sincerely,

THOMPSON-HAYWARD CHEMICAL COMPANY

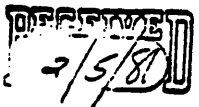
R.H. Sparnicht

R.H. Sparnicht, Ph. D.
DIMILIN Marketing Manager
Southeast Region

RHS:djs

cc: Mr. Harry C. Mussman/USDA-APHIS

FEB 9 1981 S&PF



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

25

JAN 29 1981

OFFICE OF
THE ADMINISTRATOR

Mr. R. Max Peterson
Chief
USDA Forest Service
P.O. Box 2417
Washington, D.C. 20013

Dear Mr. Peterson:

In accordance with our responsibilities under Section 309 of the Clean Air Act, EPA has reviewed the Draft Environmental Impact Statement for the Proposed Cooperative Gypsy Moth Suppression Program - 1981 activities. EPA is in general agreement with the choice of an integrated pest management approach (IPM) to gypsy moth control.

EPA is pleased to see that many of the comments made on the 1980 program activities have been incorporated into this draft. In particular we are gratified to see that an emphasis has been placed on public participation and awareness activities and that our recommendations concerning spray practices to protect the public from involuntary exposure have been incorporated into this document. We do, however, feel that additional attention could be given to the public involvement and notification aspects of the program. Since the Forest Service and the Animal and Plant Health Inspection Service (APHIS) are providing guidance and expertise as well as funding to State and local governments, it is appropriate that this document provide well defined criteria that can act as guidelines for local decision-making. Our more detailed comments on this point are enclosed. a

EPA commends the USDA for moving away from eradication policies of earlier eras, but notes that the short-term objectives of this program -- immediate nuisance reduction and short-term cost effectiveness -- may not be fully compatible with the goals of implementing an eventual IPM approach to b

pest control. Sometimes this may mean accepting higher levels of defoliation for a time, but in the long run, it may be more effective and far more economical than annual chemical applications on a large scale. We caution against the overemphasis of the immediate nuisance reduction and short-term cost effectiveness goal where it may bias the selection of treatment methods towards chemical insecticides. We are confident, however, that with USDA's expertise there will be an appropriate balance between this short-term objective and the longer term goal for developing an IPM strategy with emphasis on controls selective for gypsy moth.

EPA is also concerned that this Draft EIS does not distinguish between management strategies to be employed in areas of general infestation and those to be used in areas of isolated infestation. In October 1980, APHIS held a scoping meeting in Seattle to discuss the gypsy moth suppression program. During that meeting APHIS staff described the program for Washington State as consisting only of nonchemical approaches. C
This draft does not, however, describe any distinct program for isolated infestations employing only nonchemical techniques. The final EIS should clarify this inconsistency by providing details on treatment techniques to be used for isolated infestations and/or by discussing why the preferred approach for treatment of these areas differs from that previously presented to the public.

In accordance with EPA's EIS rating criteria, we have rated this Draft EIS as LO-2 (Lack of Objections/Insufficient Information). An explanation of EPA's rating system is enclosed for your convenience. The EPA does, however, reserve the right to supplement these comments. This reservation has been made necessary because of the incomplete distribution by USDA of this impact statement. We may wish, therefore, to provide additional comments after all EPA Regions have had an opportunity to review this document.

Thank you for the opportunity to comment on this draft EIS. If you have any questions concerning our comments please contact Margaret Schneider of my staff (755-9394).

Sincerely yours,

William N. Hedeman, Jr.
Director
Office of Environmental Review (A-104)

Enclosures

ENVIRONMENTAL PROTECTION AGENCY's
DETAILED COMMENTS ON THE DRAFT ENVIRONMENTAL
IMPACT STATEMENT FOR THE COOPERATIVE GYPSY MOTH
CONTROL AND SUPPRESSION PROGRAM ACTIVITIES

Management Requirements (p. 14)
EPA feels that it is important that this programmatic DEIS establish minimum guidelines or performance standards for public involvement and notification as well as for pesticide selection and application. We would urge USDA to require that site specific environmental documents contain detailed plans for soliciting public involvement and for notification of spray activities. As noted in last year's comments, public notification procedures should incorporate measures to ensure that non-permanent as well as permanent residents are advised of the applications. Given the probability of heavy use of outdoor recreational facilties during the application season, a notification system such as placarding or posting at entrance to campgrounds, hiking trails, boat launching ramps and other recreational sites located in the proposed treatment area should be an integral part of the information dissemination/ notification system. Guidelines for judging the adequacy of such plans should also be included in the programmatic EIS.

To further facilitate public review of both the programmatic and site specific documents, USDA should provide more detailed information within this programmatic document such as:

- a more thorough explanation, geared toward the public, of the IPM approach;
- specific criteria for choosing a site for treatment- including definitions of site categories, levels of infestation, levels of natural predators precluding treatment;
- estimates of the acreage expected to be treated with each chemical;
- criteria for evaluating the effectiveness of the treatment and its relationship to the overall management strategy.

To address one of the recurring criticisms of this program we suggest that USDA ensure that both the programmatic and site specific environmental documents are circulated for review to EPA and other appropriate Agencies and individuals.

JAN 3 0 1981

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE
FOOD AND DRUG ADMINISTRATION
WASHINGTON, D.C. 20204

26 A

January 16,1981

R. Max Peterson, Chief,
USDA Forest Service
P.O. 2417
Washington, D.C. 20013

I have attached, as FDA's response to request for comment on the DEIS for the Cooperative Gypsy Moth Suppression and Regulatory Program, comments prepared by Dr. William Trotter of the Analytical Chemistry and Physics Branch, Bureau of Foods.

Any questions you may have regarding these comments should be directed to Dr. Trotter. He may be reached at 202-245-1366.

Sincerely,

Buzz L. Hoffmann
Environmental Impact Section

FOREST SERVICE
RECEIVED

OFFICE OF THE CHIEF

MEMORANDUM

DEPARTMENT OF HEALTH AND HUMAN SERVICES
PUBLIC HEALTH SERVICE
FOOD AND DRUG ADMINISTRATION

TO : Buzz Hoffman, Ph.D.
Environmental and Economic Impact Staff
HFF-407

DATE: January 13, 1981

THROUGH : Chief, Analytical Chemistry and Physics Branch, HFF-456

FROM : Analytical Chemistry and Physics Branch, HFF-456

SUBJECT: Review of the Draft Environmental Impact Statement (DEIS) for Cooperative Gypsy Moth Suppression and Regulatory Program (1981)

In Marion Clower's memo of 1-28-80 to you concerning the 1980 Spruce Budworm Project in Maine, he stated that some monitoring of the crops grown near the spray area should be done. You question if this should be done for the gypsy moth suppression program. The gypsy moth suppression program covers a much larger geographical area involving many states. The integrated pest management program for the gypsy moth involves different control systems depending upon location. It would seem that monitoring the food grown in only a few areas near treated sites may not give an adequate view of the total picture of possible contamination. Adequate buffer zones of the treated areas from agricultural land and also watersheds (as noted in the appendix) would provide better guarantees that contamination of the food supply would be minimal. Public notification of treatment areas and schedules, consultation with local officials, and close monitoring of the spraying procedures, e.g., using application treatment deposit cards, should reduce contamination of the food supply to a minimum. It would seem from the DEIS that these procedures will be followed. However, some monitoring of crops grown in relatively close proximity to areas treated with insecticides might be useful. The document seems to explore adequately the environmental impact of the use of the pesticides to be used in the program, viz., diflubenzuron, trichlorfon, carbaryl, acephate, bacillus thuringiensis and nucleopolyhedrosis virus.

William J. Trotter

William J. Trotter, Ph.D.

RECD ECO 1/23/81

27

STATE OF MAINE

Department of Environmental Protection

MAIN OFFICE: RAY BUILDING, HOSPITAL STREET, AUGUSTA
MAIL ADDRESS: State House Station 17, Augusta, 04333

JOSEPH E. BRENNAN
GOVERNOR

HENRY E. WARREN
COMMISSIONER

January 13, 1981

Mr. R. May Peterson, Chief
USDA Forest Service
P.O. Box 2417
Washington, D.C. 20013

Dear Mr. Peterson:

As per the letter of 12/1/80 from Allen Schacht we have reviewed your 1981 Programmatic Environmental Impact Statement (PEIS) for gypsy moth suppression.

In general the document is well prepared with a logical format for the discussion of the four alternatives. However, the literature regarding the impact of carbaryl, especially to aquatic life, has been neglected. In Maine there has been considerable documentation of the effects carbaryl has had on certain aquatic species. a

My Chief of Biological Staff has reviewed the document and concludes that the Maine DEP should support alternative two of the four alternatives presented in the PEIS. Biological insecticide treatment will provide the best protection to aquatic life since many of the Maine sites are located around lakes and ponds. This is especially true along the coastal sections of Maine. The use of Bacillus thuringiensis is in our opinion the most sound and has the least impact to non-target organisms. We do, however, like the IPM approach which is your alternative three but the potential impact of the chemicals proposed to aquatic life and humans is a potential problem. b

Performance standard of 2 to 10 mph for wind speed is a range not acceptable due to drift problems. Speeds of 2-6 mph is much more reasonable and environmentally acceptable. c

Also in comparing the costs of treatment per acre on the ground for chemicals such as carbaryl of $16.00 to $50.00 per acre to $30.00 per acre for Bt, we conclude that cost is perhaps not so significant. It appears that Bt would be less costly if aquatic life is to be protected. d

On page 51, Table 5, is the "Evaluation Criteria" for all four alternatives. Based on the review we see little difference between alternative #2 or #3 and therefore we select alternative two. The use of it is much better as far as protecting the environment and meeting our responsibilities of that job. e

FOREST PROTECT
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OFFICE OF THE CHIEF

Finally, as you probably know, we have very cold weather in Maine this winter. According to the life cycle literature, the gypsy moth does not survive at temperatures of -22°F or less. We have had temperatures ranging from -26°F to -30°F throughout the gypsy moth range in Maine. Hopefully this precludes the need to do anything for 1981 to suppress gypsy moth in Maine. Based on my biological staff review of minimum temperatures for the Augusta FAA we find the following:

Temp. °F	Date
-14	1/21/75
-19	1/11/76
- 8	1/18/77
- 5	2/5/78
-16	2/6/79
-22	12/26/80

One can conclude rather quickly from the above table that we have been in a warming trend for four winters until 1979. This climatic condition was very favorable to the gypsy moth's survival. Since Maine is the eastern and northern limit, it's obvious that a cold spell could reduce survival. It appears that 1980-81 is the year for nature to do its thing.

We thank you for the opportunity to review the PEIS.

Yours truly,

Henry Warren,
Commissioner

HEW/MS/ad

REC'D ECO 1/23/81

DEPARTMENT OF THE NAVY
NORTHERN DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
PHILADELPHIA, PENNSYLVANIA 19112

TELEPHONE NO.
Autovon 443
215-755-4807

28

R. Max Peterson, Chief
USDA, Forest Service
P.O. Box 2417
Washington, DC 20013

20 JAN 1981

Re: Draft Programmatic Environmental Impact Statement, Cooperative Gypsy Moth Suppression and Regulatory Program

Dear Mr. Peterson:

In accordance with OMB Circular A-95, "Evaluation, Review and Coordination of Federal and Federally Assisted Programs and Projects", the subject document was forwarded to our office by the New Jersey State Clearinghouse for review and comment.

Overall, this office is in general agreement with the integrated pest management program and its approach. As a federal agency with significant land holdings, our major concern would be early notification and review opportunities regarding site specific moth control projects, particularly those involving land owned by the Navy or land adjacent to naval installations. In these situations the Navy would like to participate in the State scoping sessions. a

This office is also interested to know whether a detailed plan to monitor the extent and impacts of aerial spray drift has been prepared. Additionally, in the DEIS there are no criteria given for identifying "critical environmentally sensitive areas". We would be interested in receiving this information. b

We appreciate the opportunity to comment and would like to be added to your distribution list to receive further information related to gypsy moth (and other pest) spray programs in the vicinity of Naval facilities. c

The appropriate point of contact in this office for the distribution list and further questions concerning this review is: Mr. Harvey Shultz, Head, Applied Biology Section, Code 1142, Northern Division, Naval Facilities Engineering Command, Philadelphia Naval Base, Philadelphia, PA 19112, telephone 215-755-3656.

Sincerely yours,

R. D. YEATER
Head, Master Planning Branch
By direction of the Commanding Officer

Copy to:
Mr. Vincent Amico
Trenton, NJ 08625

DEC 11-2151

STATE CLEARINGHOUSE

30 EAST BROAD STREET • 39TH FLOOR • COLUMBUS, OHIO 43215 • 614 / 466-7461

81-01-20 P 29
09

Mr. R. Max Peterson, Chief
U.S. Dept. of Agriculture
USDA Forest Service
P.O. Box 2417
Washington, D.C. 20013

RE: Review of Environmental Impact Statement/Assessment
Title: Draft Programmatic EIS-Cooperative Gypsy Moth Suppression and Regulatory Program Activities. 81-01, 12 Months
SAI Number: 36-445-0006

Dear Mr. Peterson:

The State Clearinghouse coordinated the review of the above referenced environmental impact statement/assessment.

This environmental report was reviewed by all interested State agencies. No reviewers have stated concerns relating to this report.

Thank you for the opportunity to review this statement/assessment.

Sincerely,

Judith Y. Brachman

Judith Y. Brachman
Administering Officer

JYB:rmr

cc: DNR, Mike Colvin
EPA, Mary Rhodes

REC'D DEC 01/22/81

DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service

Centers for Disease Control
Atlanta, Georgia 30333
(404) 262-6649

30

January 14, 1981

Mr. Harry C. Mussman
Administrator
USDA Animal and Plant Health
Inspection Service
Washington, D.C. 20250

Dear Mr. Mussmann:

We have reviewed the Draft Programmatic Environmental Impact Statement (EIS) for the Proposed Cooperative Gypsy Moth Suppression and Regulatory Program Activities. We are responding on behalf of the Public Health Service.

We support the selection of the alternative preferred by the USDA Forest Service and APHIS for gypsy moth suppression. This alternative, in our view represents the most balanced approach to the problem in that it hinges upon Integrated Pest Management (IPM) techniques. When properly implemented, it represents the approach which minimizes human exposures to chemicals and allows the goal of reducing gypsy moth populations to be achieved.

We noticed one of the major issues or concerns expressed by participants in the scoping session was a need for increased education relating to the whole problem of effect and control of the gypsy moth. We hope your agency is planning to pursue these needs in the form of public education to the people who will be directly affected. We believe an informed group with current information regarding the gypsy moth would be more supportive of an IPA suppression program.

Thank you for the opportunity of reviewing this document. We would appreciate receiving a copy of the Final EIS when it is issued.

Sincerely yours,

Frank S. Lisella, Ph.D.
Chief, Environmental Affairs Group
Environmental Health Services Division
Bureau of State Services

cc: Mr. R. Max Peterson, USDA Forest Service

FOREST SERVICE

OFFICE OF THE CHIEF

OFFICE OF SELECTMEN 31
TOPSHAM
INCORPORATED 1764

SELECTMEN
GERARD F. LAMARRE
CHARLES S. PETTIGREW
VERDI L. TRIPP

ROAD COMMISSIONER
TOWN CLERK
TAD HUNTER
LOUISE E. ST. ONGE

COLLECTOR
LOUISE E. ST. ONGE
TREASURER
MARJORIE E. RANDALL

Mr. R. Max Peterson, Chief
USDA Forest Service
Washington, D.C. 20013

January 22,1981

Mr. Peterson:

The town of Topsham, like many communities in the Eastern part of our country, is faced with Gypsy Moth infestation.

Last summer, many of our citizens in the urban area complained almost daily to us about the problem. After sympathetic words and promises to do "something", the summer finally passed.

We formed a Gypsy Moth Eradication Committee comprised mostly of citizens who had been faced with the nusiance.

An educational effort was launched to inform people what they might expect this spring, methods of control we might use, and most important, that we must have full community support.

The committee organized a one day effort last fall to creosote egg sacks in the most infested urban areas of our town. One Sunday morning, supplemented by a group of local Marines, we painted thousands of egg sacks. We also issued creosote by quarts to any resident who took the time to vote during a state referendum in September.. This effort drew attention by both the television and print media with positive results.

We have also been working closely with the Maine Department of Conservation and the Maine Forest Service. Urban Forester Jim McMullen has been most helpful in personal visits, providing acreage surveys of the town and other informational data.

Since the infestation in Maine is but one insect problem and so widespread, the Department of Conservation is limited in any concentrated help.

Because of that, we have taken the current information they have provided and given it to our citizens. Following guidelines provided by McMullen, we are conducting our own Overwintering Survival Surveys. In fact, a science class at our local high school is involved in the survey and will continue to collect data during the next nine months on other aspects of the Gypsy Moth.

Another class is developing the first slide-narrative presentation regarding the Gypsy Moth for the Maine Forestry Service. We have some slides of different stages of the insect and will be photographing more examples this summer.

However, it would be more effective if these slides were available to affected communities this spring for educating residents about what they can expect, and what they can do for themselves.

I have noticed in your Gypsy Moth Handbook--The Homeowner and the Gypsy Moth: Guidelines and Control, there are some excellent colored photographs.

Could these be made available, along with any others in the file, to the Maine Forestry Service for our use in supplementing our slide production? Please let me know as soon as possible because spring is just around the corner.

We would also like to obtain about 400 copies of the handbook for distribution to Topsham residents before spring.

Would you also send me a sample copy of other related Gypsy Moth publications, including bulletins 381, 225, 534, 224 and 223.

I am pleased to say that the Department of Conservation has available a community that is more than willing to help develop educational material for its residents and any others affected by the Gypsy Moth. Our school system will also benefit because of its interest in working on the research.

Sincerely,

Verdi L. Tripp
Selectman

VLT:ph
cc/Jim McMullen

Highlands Watershed Association

P.O. BOX 4
NEWFOUNDLAND, NEW JERSEY 07435

32

January 19, 1981

R. Max Peterson, Chief
USDA Forest Service
P.O. Box 2417
Washington, DC 20013

Dear Mr. Peterson:

It is our understanding that Integrated Pest Management programs rely on biological controls (parasites, predators, etc.) and use narrow-spectrum pesticides only when necessary; health emergencies, economic thresholds. One of the objects of IPM is the reduction of pesticide use. This interpretation is sustained by the work and writings of William and Helga Olkowski, Robert van den Bosch, and Dr. Samuel S. Epstein. Yet the USDA program relies on heavy use of a broad-spectrum pesticide (carbaryl). Biologicals play only a minor role in this program. This approach, with minor exceptions, seems to be the same as past, discredited programs.(History of Gypsy Moth Suppression, Pg.7) a

The Draft EIS does not indicate how private property owners are to be protected from unwanted spraying of pesticides. By what process will government obtain the consent of the property owner to use pesticides on his/her property for gypsy moth suppression? b

Sincerely,

Paul Twerdowsky

Paul Twerdowsky
Project Chairman

Chevron
ORTHO
Chevron Chemical Company
940 Hensley Street, Richmond, CA 94804
Agricultural Chemicals Division

33

January 23, 1981

Subject: Draft Programmatic EIS
USDA FS-DEIS 81-01

Mr. R. Max Peterson, Chief
USDA Forest Service
P.O. Box 2417
Washington, DC 20013

Dear Mr. Peterson:

We have reviewed subject Environmental Impact Statement as it relates to Acephate (ORTHENE Forest Spary). In the section on Physical Effects which begins on page 36 there are a couple of errors in the organization of the manuscript including the introductory part of the section on Acephate on page 38. The text at the top of page 38 begins in the middle of a paragraph unrelated to the paragraph at the bottom of page 37. We would appreciate your attention to correcting this omission.

We appreciate your fair treatment of ORTHENE in this EIS.

Very truly yours,

C. R. Freeman, Supervisor
Specialty Product Development
Research & Development

CRF:mla/D3-38

State of Vermont

34

AGENCY OF ENVIRONMENTAL CONSERVATION

Montpelier, Vermont 05602

Department of Fish and Game
Department of Forests, Parks, and Recreation
Department of Water Resources & Environmental Engineering
Division of Protection
Natural Resources Conservation Council

DEPARTMENT OF FORESTS, PARKS AND RECREATION

January 21, 1981

Mr. R. Max Peterson, Chief
USDA Forest Service
Post Office Box 2417
Washington, D. C. 20013

Dear Chief Peterson:

I have carefully read the proposed "Programmatic Environmental Impact Statement for Cooperative Gypsy Moth Suppression and Regulatory Program Activities" and have the following comments.

1. The document is well done and presents a fair picture of all the alternatives available to combat this serious problem.

2. The Vermont Agency of Environmental Conservation is in strong agreement with the preferred USDA alternative - Integrated Pest Management - and supports the adoption of this policy when federal financial assistance is provided to states involved in Cooperative Projects. By including biological and/or chemical insecticide application, parasite and predator population management, application of the gypsy moth mating disruption pheromone, home owner self-help, sterile male moth release and forest stand manipulation, the state pest manager has a wider range of options, allowing specific areas to receive specific treatments that maximize protection to the environment and yet provide protection to the landowner.

3. Home owner self-help methods, while getting the public more involved, have to be presented in a realistic manner, stressing what can be expected and not be overemphasized in importance.

We appreciate this opportunity to review and comment on this Environmental Impact Statement.

Sincerely yours,

H. Brenton Teillon mr

RECEIVED FS-WO
JAN 28 1980
FIDR

H. BRENTON TEILLON
Chief, Forest Resource Protection

HBT:mr

Copy to Eldon P. Morrison, Resources Planner

New York State College of Agriculture and Life Sciences
a Statutory College of the State University
Cornell University

Office of Apiculture
Department of Entomology
Ithaca, N. Y. 14853
Telephone: 607-256-5443

35

January 20, 1981

Mr. R. Max Peterson, Chief
USDA Forest Service
P.O. Box 2417
Washington, DC 20013

Mr. Harry C. Mussman, Administrator
USDA Animal and Plant Health Inspection
Washington, DC 20250

Gentlemen:

I have the Draft Programmatic Environmental Impact Statement (USDA FS-DEIS 81-01) concerning the proposed cooperative gypsy moth suppression and regulatory program. I find it inadequate. My chief concern is honey bees. The statement, as it now stands, is inaccurate, beguiling and gives the appearance of being hastily prepared regarding the impact this program will have on honey bees and other beneficial insects.

The most serious problems are as follows:

1. On page iv, paragraph 2, lines 9 and 10, the document reads as follows: "These insecticides are not proposed for use near sensitive areas." This statement refers to the insecticides carbaryl and acephate. What is meant by this statement? We are aware that honey bees may be affected by carbaryl sprayed within two or three miles of a hive of bees. Does this statement mean that no such spraying will occur? I doubt that, based on previous years' experience. I would be delighted if the statement means what it says. a

2. On page iv, paragraph 2, lines 4-6, it is stated: "The application of chemical insecticides may reduce populations of non-target insects, including some beneficial insects." The use of the word "may" in this statement is misleading. The data available, some of which is cited, shows clearly that many populations of a variety of beneficial insect species will suffer. b

3. Page 28, paragraph 5: This single paragraph is the only one devoted to honey bees. It fails to come to grips with the problem. I am concerned here with the financial losses which many beekeepers, both commercial and hobby, are bound to suffer if this program is implemented as proposed. No mention of this economic consequence is made anywhere in the statement; the cost in dollars to beekeepers is an important part of the

environmental impact. The use of the word "likely" in the second sentence is akin to item 2 above; the data we have indicate that spraying will affect beneficial insects. The sentence on lines 8 and 9 is wrong; the 80 S formulation of the insecticide Sevin (carbaryl) is more toxic to bees than Sevin-4-Oil. This blunder is inexcusable. No mention is made of the fact that recently new formulations of carbaryl have been developed that appear to be even less toxic; that this fact has been overlooked is incomprehensible. The last sentence in that paragraph is both misleading, and, in part, wrong. It is correct that moving bees out of the spray area will protect them; no mention is made concerning how this is done or who pays for having it done. No mention is made of the fact that it is physically impossible to move some hives. The last part of the sentence stating that the use of pollen traps on bee hives will prevent honey bee losses echoes a popular thought for which there is no supporting scientific data. c

4. There is an entry for "Honey bees" in the index. On two of the six pages listed as referring to honey bees, pages 5 and 34, there is no mention of them whatever. d

In general, I find the statement as a whole does not deal adequately with the way in which beneficial animals, especially insects, will suffer as a result of this program.

Sincerely yours,

Roger A. Morse
Professor of Apiculture

RAM/lb

UNITED STATES DEPARTMENT OF COMMERCE
The Assistant Secretary for Policy
Washington, D.C. 20230

36

JAN 26 1981

JAN 30 1981

Mr. Harry C. Mussman
Administrator
U.S. Department of Agriculture
Animal and Plant Health
Inspection Service
Washington, D.C. 20250

Dear Mr. Mussman:

The "Draft Programmatic Environmental Impact Statement for Proposed Cooperative Gypsy Moth Suppression and Regulatory Program Activities," which accompanied your letter of December 1, 1980, has been received by the Department of Commerce. The statement has been reviewed, and the following comment is offered for your consideration.

The draft programmatic environmental impact statement describes proposed USDA Forest Service cooperative suppression projects involving financial assistance to States for an Integrated Pest Management (IPM) approach to meet short-term objectives of reducing gypsy moth larval populations, tree defoliation, and tree mortality. The statement describes also the proposed USDA Animal and Plant Health Inspection Service (APHIS) cooperative regulatory program involving use of chemical and biological insecticides and pheromones, in an IPM approach to eradicate existing infestations in certain locations, and to retard the artificial spread of gypsy moth from generally infested areas.

While the draft statement treats the IPM approach to chemical suppression, and chemical, biological, and pheromone eradication of gypsy moth populations in great detail, we believe it does not adequately portray the full scope of APHIS regulatory activities. APHIS regulatory controls are mentioned briefly as consisting of Federal and State gypsy moth quarantines, and regulatory control treatments at infested sites (at page 13). Economic factors associated with regulatory aspects of the gypsy moth problem, such as control costs, are alluded to (at page 21) but costs of regulatory controls are not discussed in the text.

We believe that regulatory programs such as quarantines, which may involve restricting movement of campers into or out of specific campsites; or mandatory inspections and decontamination which may regulate the movement of household goods by highway or rail out of infested areas into other parts of the country, might have sufficient economic and social impact as to warrant their discussion in the draft programmatic environmental impact statement. Such discussion is pertinent, since it is stated (at page 56) that "the preferred alternative would guide new USDA gypsy moth ... regulatory projects ... "

Since the programmatic environmental impact statement will guide new APHIS regulatory projects, the APHIS regulatory program activities promised in the document's title should be treated more fully than is now the case.

Thank you for the opportunity to present this comment, which we hope will be of use to you. We would appreciate four (4) copies of the final environmental statement.

Sincerely,

Robert T. Miki
Deputy Assistant Secretary for
Regulatory Policy (Acting)

AGRICULTURAL PRODUCTS COMPANY, Inc.
[illegible]
JACKSONVILLE FLA. [illegible]
904: 731-4250

37

January 23, 1981

Dr. R. Max Peterson, Chief
USDA Forest Service
P. O. Box 2417
Washington, D. C. 20013

Dear Dr. Peterson:

I have reviewed the "Draft Programmatic Environmental Impact Statement-Proposed Gypsy Moth Suppression and Regulatory Program Activities" and found it to be well written and quite informative. The section pertaining to SEVIN® carbaryl insecticide provided an excellent review of environmental impact and significant toxicological studies with carbaryl. The information supplied concerning human exposure levels of carbaryl during gypsy moth control programs certainly indicates that this type of exposure constitutes negligible human health risks.

I believe there are a few places in the text where some minor clarification could enhance public understanding. These include:

Page 28 Lines 31-33. The statement, "Different formulations of carbaryl have varying toxicity to honeybees. It's known that SEVIN 80S® is less toxic than the SEVIN 4 Oil® formulation," may not be accurate. Laboratory studies conducted by Dr. Atkins at University California Riverside indicate that the honeybee LD_{50} with SEVIN 80S is significantly lower than that for SEVIN 4 Oil. Additionally, several field studies indicate that SEVIN 4 Oil residues are less hazardous to honeybees than SEVIN 80S. a

Page 29, Line 7-10 the statement, "Depressed brain acetylcholinesterase activity of forest birds was reported following application of 1.0 lb carbaryl per acre in Montana (Zinkl et al. 1977)", does not provide adequate information to allow the reader to accurately assess the real effect carbaryl has on bird populations. The effect of sublethal cholinesterase inhibition on birds is uncertain. In the Zinkl et al study, only 3 individual birds out of more than 75 examined exhibited acetylcholinesterase depression. Their conclusion was that "SEVIN 4 Oil at 1.13 kg/hectare (1 lb/acre-ai) had little effect on brain cholinesterase activities in birds." b

Page 29 Paragraphs 2 through 5: Several citations are used to review carbaryl's effect on breeding birds. I believe the inclusion of Richmond et al (Pac. S.W. For. and Range Exp. Sta. Bull., 724, 1974) may be beneficial. They monitored bird populations in forests one year prior and two years after the area was treated with carbaryl at 1 lb active ingredient per acre. They concluded that SEVIN did not adversely affect breeding bird denisty, species diversity, nesting success, brain cholinestrase activity or total bird census. c

Page 79, Paragraph 7: The Environmental Protection Agency has completed an exhaustive review of carbaryl and returned it to full registration. Announcement of this decision was made public in the Federal Register of December 12, 1980. d

I appreciate the opportunity to review this document. I hope you will not hesitate to contact me if you have any questions concerning my comments.

Sincerely yours,

Edwin C. Quattlebaum

Edwin C. Quattlebaum, Ph.D.
Product Specialist-Sevin

ECQ/dep

38

FOSTER AGRICULTURAL SERVICES

Box 224 Bridgepoint Road
Belle Mead, New Jersey 08502
(201) 359-2454

24 January 1981

Mr. Harry C. Mussman, Administrator
USDA Animal and Plant Health Inspection
Service
Washington, D. C. 20250

JAN 30 1981

Dear Mr. Mussman:

Re: Review of Draft Programmatic E.I.S., Proposed Gypsy Moth Suppression and Regulatory Program Activities.

The E.I.S. seems to completely discount the integrity and benefits of privately-organized and -implemented gypsy moth suppression programs carried out on private or public lands. Comments at the end of section III, page v, and the lack of mention of private industry-coordinated programs throughout the text, lead to this conclusion. a

Privately-coordinated programs have a significant role in gypsy moth suppression. They can benefit forested areas with population or damage estimates too low to be included in state programs, but high enough to warrant concern and action. They can also benefit private areas supporting very high gypsy moth populations within municipalities that lack the funding to participate in the programs subsidized by the Forest Service. Furthermore, private industry can promote and provide resources for implementing programs involving newly-EPA-registered products and applications. These programs can be carried out with state department of agriculture cooperation and/or supervision for mutual benefit.

Foster Agricultural Services coordinates private gypsy moth suppression programs as a result of strong customer demand. We stress the IPM approach, and through maximum customer contact we feel there is very good public involvement, including education. We also represent Summit Chemical Company, in the New Jersey region, directing the proper uses of Hercon's GYPSY MOTH TRAPS, LURETAPE with Disparlure, and DISRUPT FLAKES in community programs, promoting this relatively new addition to the gypsy moth IPM program.

Very truly yours,

J. Drew Foster
Entomologist.
Foster Agricultural Services

JDF/akf

cc: Mr. Lawrence E. Kase
Dr. Alberto R. Quisumbing

39

STATE OF MINNESOTA
DEPARTMENT OF AGRICULTURE
90 WEST PLATO BOULEVARD
SAINT PAUL, MINN. 55107
TELEPHONE: (612) 296-8448

LAND OF QUALITY FOODS

APHIS

FEB 09 1981

January 15, 1981

Dr. Harry C. Mussman, Administrator
USDA, APHIS
Room 312 - E
Administration Building
14th and Independence Avenue
Washington, D. C. 20050

Dear Dr. Mussman:

Although not solicited for comments to the draft Environmental Impact Statement (EIS) relating to the proposed cooperative Gypsy moth suppression and regulatory program activities, we feel that comments from the Minnesota Department of Agriculture are warranted. While Minnesota does not have known infestations of this pest, our 1980 multiple male moth catches and discovery of egg masses on imported nursery stock may be indicative of future control possibilities. If we should be faced with future control efforts in 1981, they would be directed toward eradication.

In our opinion, the EIS does not adequately address the eradication efforts outside the generally infested areas or of the regulatory aspects of the Gypsy moth control. a

We would suggest USDA, APHIS continue communication and cooperative efforts with the U.S. Forest Service. We would urge you to consider a separate Environmental Impact Statement that clearly identifies with regulatory concerns and eradication goals. b

Sincerely,

MINNESOTA DEPARTMENT OF AGRICULTURE

Robert Flaskerd, Director
Division of Plant Industry

RF:AM:jml

-1-1
NPFS

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS

40 A-

Department of Administration
STATEWIDE PLANNING PROGRAM
265 Melrose Street
Providence, Rhode Island 02907

January 13, 1981

Mr. Harry Mussman, Administrator
USDA Animal and Plant Health Inspection Service
Washington, D.C. 20250

Dear Mr. Mussman:

This office, in its capacity of clearinghouse designate, under OMB Circular #A-95, Part II, has reviewed the Draft Programmatic Environmental Impact Statement for Cooperative Gypsy Moth Suppression and Regulatory Program Activities.

The results of this review and the staff recommendation were presented to the Technical Committee of the Statewide Planning Program at its meeting of January 9, 1981. The following recommendation was adopted:

> "The Clearinghouse seconds the attached comment from the Rhode Island Department of Environmental Management's Division of Planning and Development."

Thank you for the opportunity to review this project.

Yours very truly,

Rene' J. Fontaine
A-95 Coordinator

RJF/KFR/sjc

Attachment
Reference File: EIS-80-11

1/21/81
2 mus.

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS

INTER-OFFICE MEMO

40B

TO: Rene Fontaine

DATE: January 2, 1981

DEPT: Office of State Planning

FROM: Lorraine Joubert
DEM, Planning & Development

DEPT:

SUBJECT: EIS-80-11 Cooperative Gypsy Moth Suppression and Regulatory Program Activities

The Department of Environmental Management would like to offer the following comments regarding the above referenced impact statement:

DEM generally supports the integrated pest management (IPM) alternative, proposed by the U.S. Forest Service, for the suppression of the gypsy moth in Rhode Island. This support is based on several facts: a) gypsy moth populations can not be controlled on a long-term basis, b) chemical sprays are ecologically undesirable for widespread efforts, and c) the actual undesirable effects of defoliation are limited to man-forest contact areas and high-value commercial forests comprised of suseptible tree species, especially those of the oak group.

It is evident that Rhode Island will undergo a high level of defoliation during 1981 which, in limited areas, may cause tree mortality and probable human aesthetic impacts. In discussing control methods it should be noted that little or no actual control of the gypsy moth has ever been attained; however, populations can be suppressed on an annual basis in an attempt to protect susceptible tree species. The impacts by the moths vary,in some cases being beneficial by improving wildlife habitat. In recognizing that negative impacts do occur, mostly as a nuisance factor in recreational areas or backyards, the integrated approach is desirable in suppressing the insect in those areas. Biological methods, in general, are the most environmentally safe materials currently available having no effect on beneficial life forms and being highly selective to gypsy moth larvae.

Chemical methods may be less expensive, however, these have significant impact upon the natural environment especially to non-target insect populations, including the actual predators and parasites of the gypsy moth. Also affected are aquatic insects, hymenopterous insects (bees), and other lepidopterans (butterflies and moths). The populations and benefits of many insects are now known--certainly some are rare or probably endangered (The Heritage Program has tentatively listed over 60 insects species which would fit this category in Rhode Island) -- and the widespread use of chemical insecticides could delete or eliminate certain populations before their benefit is discerned. If chemical suppression methods are deemed necessary by local communities (as part of IPM) and environmentally cost-effective, they should be restricted

to high-use, high-value areas alone. Criteria for selecting these areas needs to be established, (this is not covered in the E.I.S.), through the cooperation of all parties. The main objective in using suppressing measures should be to alleviate the nuisance problem in human contact areas or for protection of extremely valuable and suseptible tree stands. The objective should not be the wholesale, widespread application of chemical and/or biological agents statewide in an attempt to control the gypsy moth -- a result which will never be achieved. When all factors are considered, the actual areas requiring some sort of suppression will be limited. a

DEM is required to offer a gypsy moth suppression program to be adopted by local communities wishing to undertake suppression activities. A Gypsy Moth Task Force, composed of DEM internal groups, is currently formulating a suppression program in cooperation with other state agencies and interest groups. DEM will work with cities and towns to develop and conduct a gypsy moth public education program.

Although DEM will make the state program available to local communities, the decision to implement, or revise and implement the state program will be made at the local level.

RECEIVED 1/12/81

Elena

2w 3204

41

State of New Jersey

DEPARTMENT OF AGRICULTURE
PHILLIP ALAMPI, SECRETARY
TRENTON, N. J. 08625

DIVISION OF PLANT INDUSTRY

W. M. CRANSTOUN, DIRECTOR

January 7, 1980

Mr. R. Max Peterson, Chief
USDA Forest Service
P. O. Box 2417
Washington, D. C. 20013

Dear Mr. Peterson:

Thank you for the opportunity to comment on the D.P. Environmental Impact Statement concerning the 1981 Forest Service Suppression Project.

The document clearly presents the major issues, concerns and objectives of various controls for the gypsy moth in a concise and much improved format.

Regarding carbaryl usage, the New Jersey Department of Agriculture was glad to receive a copy of the "Carbaryl Decision Document" on December 23, 1980 which contains E.P.A.'s recommendation that carbaryl "be returned to the registration process" and be taken off the "Rebuttable Presumption Against Registration" listing.

Also, another recent development since our initial E.I. Statement was prepared, is the Department's new effort in "Augmentation Releases" of the egg parasite, Ooencyrtus kuwanai, next fall in New Jersey. These releases will be done in areas of collapsed gypsy moth populations. In addition to this I.P.M. strategy we are also planning to study the use of augmenting egg mass numbers in collapsed populations to maintain higher parasite levels over a longer period of time.

Thanks again for sending us the draft E.I.S. and we shall look forward to the continued cooperation of the Forest Service in combatting this serious pest problem.

Sincerely,

William M. Cranstoun

William M. Cranstoun
Director

42 A FEB 9 1981

STATE OF WASHINGTON

John Spellman
Governor

OFFICE OF FINANCIAL MANAGEMENT
House Office Building, Olympia, Washington 98504

January 24, 1981

FEB 5 1981

Mr. Harry C. Mussman
Administrator
U. S. Department of Agriculture
Animal and Plant Health Inspection
Service
Washington, D. C. 20250

Dear Mr. Mussman:

The Office of Financial Management has been designated by the Governor as the state clearinghouse for the coordination and review of environmental impact statements. Review of the draft EIS for the Proposed Cooperative Gypsy Moth Suppression and Regulatory Program Activities has been completed by state agencies.

Comments were provided by the Department of Transportation and the Department of Natural Resources. Details of their comments are enclosed. It is understood that the Department of Agriculture will respond directly to each of the agencies' concerns.

Thank you for the opportunity to review the document. We hope you find the comments useful in the preparation of the final EIS.

Sincerely,

Monica P. Jenkins

Monica P. Jenkins
Clearinghouse Coordinator

enclosures (2)

42 B

STATE OF WASHINGTON

Dixy Lee Ray
Governor

DEPARTMENT OF TRANSPORTATION
Highway Administration Building, Olympia, Washington 98504 206/753-6005

January 12, 1981

Mr. Lyle Jacobsen, Director
Office of Financial Management
Second Floor, House Office Building, AL-01
Olympia, Washington 98504

FEB 5 1981

Attention: Ms. Monica Jenkins
Policy Budget and Planning

U.S. Forest Service
Gypsy Moth Suppression Program
Draft Environmental Impact Statement

Dear Mr. Jacobsen:

We have received the subject document and have the following comment:

The Department's only concern would be the possible interruption of traffic by aerial applications. The interruption could be either by planned short term closure of highways to avoid overspray on vehicles, or overspray and/or priority of aircraft which would alarm drivers and/or cause traffic accidents.

a

If you have any questions, please call Jim Leonard at 753-6644.

Sincerely,

ROBERT S. NIELSEN
Assistant Secretary for
Public Transportation
and Planning

By: JOSEPH BELL, Manager
Planning Implementation
and Environmental Policy

RSN:kls
JB/WBH

cc: Donald R. Anderson/R.L. Berger

RECEIVED
JAN 14 1981
OFFICE OF FINANCIAL MANAGEMENT

STATE OF WASHINGTON **42c**

Department of

Natural Resources

Brian J. Boyle
COMMISSIONER

R. A. BESWICK
SUPERVISOR

OLYMPIA, WASHINGTON
98504

FEB 5 1981

January 15, 1981

Monica Jenkins
Budget and Policy Division
Office of Financial Management
Olympia, Washington 98504

Dear Ms. Jenkins:

We have reviewed the draft EIS entitled "Proposed Cooperative Gypsy Moth Suppression and Regulatory Program Activities" and find it to be generally acceptable.

We would draw the preparers attention to a recent paper, "Richmond, Merle L., et al 1979. Effects of Sevin-4-Oil, Dimilin and Orthene on forest birds in Northeastern Oregon. Res. Paper PSW-148, 19 p. Pacific Southwest Forest and Range Experiment Station, Forest Service, U.S. Department of Agriculture." In this paper the authors show Orthene to have a more severe effect on birds than is depicted in the draft EIS.

Sincerely,

Richard L. Johnsey

Richard L. Johnsey
Forest Entomologist

RJ:kb

AN EQUAL OPPORTUNITY EMPLOYER

FEB 9 1981 FIDM
Director
~~Programs~~
Methods
Coordination
Pesticides
Environmental
File

43

STATE OF NORTH CAROLINA

OFFICE OF STATE BUDGET AND MANAGEMENT

JAMES B. HUNT, JR., GOVERNOR
AND DIRECTOR OF THE BUDGET

JOHN A. WILLIAMS, JR.
EXECUTIVE ASSISTANT TO THE GOVERNOR
AND STATE BUDGET OFFICER

February 2, 1981

Mr. Allen J. Schacht
U.S. Department of Agriculture
Forest Service
Northeastern Area State and
Private Forestry
370 Reed Road
Broomall, Pennsylvania 19008

Dear Mr. Schacht:

RE: SCH File #E-81-0000-5097; FY 81 Draft Programmatic Environmental Impact Statement for Cooperative Gypsy Moth Suppression and Regulatory Program Activities

The State Clearinghouse has received and reviewed the above referenced project. As a result of this review, the State Clearinghouse has received the attached comments from the North Carolina Department of Agriculture.

Thank you for the opportunity to review the above referenced document.

Sincerely,

Chrys Baggett

Chrys Baggett (Mrs.)
Clearinghouse Director

CB/njh

Attachment(s)

New York State Department of Environmental Conservation
50 Wolf Road, Albany, New York 12233
Division of Regulatory Affairs

44

Robert F. Flacke
Commissioner

FPM 1205

January 28, 1981

R. Max Peterson, Chief
USDA Forest Service
P. O. Box 2417
Washington, D.C. 20013

Re: Programmatic EIS - Proposed Cooperative Gypsy Moth Suppression and Regulatory Program Activities; DEC #000-059.

Dear Mr. Peterson:

This Department has completed its review of the draft EIS and recognizes that the document serves to outline treatment proposals for an Integrated Pest Management (IPM) approach to the suppression of the gypsy moth, Lymantria dispar (L.). The IPM approach would make use of chemical insecticides bacteria, a virus, pheromones, predators, parasites and mechanical or manual control, and removal by individual property owners.

This Department is aware that the gypsy moth has been and will continue to be a severe problem in forested, residential and recreational areas in various parts of New York State. However, any program emphasizing the application of chemical insecticides will, at best, provide temporary relief from insect infestation. Areas not directly treated with chemicals may serve as a "refugia" from which future insect populations can develop and spread. It should be recognized that chemical control will only treat the symptoms of an infestation. The conditions that permit insect outbreaks to occur essentially remain, ensuring that future control methods such as spraying, will be needed.

a

The past history of chemical insecticides as a control for insects has resulted in undesired side effects. Acquired resistance of target species to chemicals is partially responsible for the failure of chemicals to perform as expected. Chemicals tend to reduce natural predators of target species either directly or through alteration of the biological community or the habitat. While short-term costs of applying chemical insecticides may be less expensive than biological insecticides, the long-term costs of developing new chemical insecticides and the general well being of the environment is open ended. b

The Department appreciates the opportunity for review and comment. We request the opportunity to review the final document when available. Specific comments to the document are included.

Very truly yours,

Louis M. Concra, Jr.

Louis M. Concra, Jr., Director
Division of Regulatory Affairs

LMC:ERM/ssf

cc: J. Corr
M. Birmingham
File

SPECIFIC COMMENTS

1. Page iii, paragraph 2, page 7, paragraph 3. To state that eradication of gypsy moth in certain areas is an objective is impractical. Past history indicates that suppression of the population is the most that can be achieved. c

2. Page 6, Table 1. A discussion of the methodology or criteria used to evaluate defoliated acreage would be useful. d

3. Page 7. A brief summary of the past effectiveness of the IPM program should be provided. e

4. Page 15. A mechanism for notifying the public and concerned agencies of the exact limits of the areas proposed for treatment and the nature of treatment for each area should be provided. f

5. Page 16. The performance standards should address the issue of how water bodies will be avoided during the aerial application of chemical insecticides. g

6. Page 17, paragraph 5. The word "change" should be substituted for the word "reduction". Treatment of insect infestations does not always produce the desired result of population reduction. h

7. Page 28. Chemical insecticides are not specific for gypsy mothds and are toxic to aquatic insects important as fish food. Carbaryl can adversely impact aquatic insects. Plecoptera, Ephemeroptera and Trichoptera are particularly vulnerable and mortality is likely. Some taxa in these orders may be dramatically reduced in abundance after spraying and elimination of some taxa cannot be automatically ruled out. Aquatic insect community structure could be altered over time, depending on future spray programs in the same watersheds. (Gibbs, et.al., 1979)* i

   Effects of fish are more subtle and less known at this time. However, Carbaryl has been shown to cause brain cholinesterase depressions in Atlantic salmon taken from waters with Sevin concentrations of 3 ppb approximately 24 hours after aerial application. Cholinesterase depression disrupts the transmission of nerve impulses. Cholinesterase depressions exceeding 48 hours post-spray have been recorded in salmonids taken from streams in Maine when Sevin was used for spruce budworm suppression. It is not known that recovery of cholinesterase levels after short term depressions can be equated with no adverse impact on fish. (Hulbert, 1978)**

8. Page 38. The benefit/cost evaluation provided is based solely on tree mortality. Additional benefits in the form of protected wildlife habitat, recreation, water quality, forest fire prevention, aesthetics, etc., are factors that should be included in the cost benefit analysis.

- -

*Gibbs, K.E., C.F. Rabeni, J.G. Stanley, and J.G. Trial. 1979. The effect of a split application of Sevin-4-oil on aquatic organisms. Report to Maine Forest Service. Department of Entomology and Maine Cooperative Fishery Research Unit. University of Maine, Orono, ME. 50 p.

**Hulbert, P.J. 1978. Mattawamkeag River Studies. II. Effects of Sevin insecticide on fish and invertebrates in 1976. Migratory Fish Res. Inst. and Me. Co-op Fishery Res. Unit. University of Maine at Orono.

RECEIVED 2/6/81

JAN. 28, 1981

MR. MAX PETERSON

CHIEF U.S.D.A. FOREST SERVICE
P.O. BOX 2417
WASHINGTON, D.C. 20013

RECEIVED FS-NO
FEB 3 1981
FIDR

DEAR MR. PETERSON:

I HAVE READ THE DRAFT OF THE ENVIRONMENTAL STUDIES ON THE GYPSY MOTH SUPPRESSION PROGRAM AND WOULD LIKE TO SHARE WITH YOU MY IMPRESSIONS ON THE PROGRAM.

I AM GLAD THE PREFERRED ALTERNATIVE IS AN INTIGRATED PEST MANAGEMENT APPROACH. FROM WHAT I HAVE OBSERVED OF THE GYPSY MOTH, THIS APPROACH SHOULD, IF CONSISTENTLY FOLLOWED FOR A TERM OF YEARS, YIELD A STABILIZED MOTH POPULATION. IF AN AGGRESSIVE PROGRAM WITH THIS APPROACH IS USED I BELIEVE IT WILL ALSO SHOW ITSELF TO BE THE MOST ECONOMICAL OF THE ALTERNATIVES, IN THE LONG TERM.

I HAVE SOME ~~[redacted]~~ DOUBTS ABOUT THE VALUE OF HAVING A CHEMICAL PESTICIDE COMPONENT IN THE IPM APPROACH, HOWEVER. IN USING CHEMICAL AGENTS WHICH HAVE BROADER EFFECTS THAN ON THE MOTH, THE NON-TARGETED INSECTS POPULATION ~~EXPANDING~~ DISRUPTS THE BIRD POPULATION, NOT TO MENTION ITS KILLING INSECTS, WHICH ARE NATURAL ENEMIES OF THE MOTH. IN THE STUDIES OF FORBUSH AND FERNALD A NUMBER OF BIRDS AND INSECTS

NATIVE TO THE INFESTED AREA ARE IDENTIFIED WHICH HAVE SOME IMPACT ON THE MOTH'S POPULATION. BY INFERENCE; THE NUMBER OF MOTHS DISTROYED IN THIS FASHION MUST BE OF SOME SIGNIFIGANCE; THE MORTALITY RATES FOR MOTING, INFERTILE EGGS ETC. DO NOT FULLY ACCOUNT FOR THE [redacted] RATE OF A COLONIES GROWTH. I FEEL MORE CARE SHOULD BE TAKEN OF THESE PREDATORS BY SUBSTITUTING SPECIFIC BIOLOGICAL AGENTS FOR THE BROADER SPECTRUM CHEMICAL ONES.

A COMPONENT WHICH I WOULD RECOMMEND ADDING TO THE IPM APPROACH IS A STRONG EDUCATIONAL ~~PROGRAM~~ PROGRAM FOR THE PUBLIC, PARTICULARLY FOCUSED ON WOODCUTTERS. WITH THE DRAMATIC INCREASE OF PEOPLE HEATING WITH WOOD THE INSTANCE OF NEW COLONIES MUST INCREASE. TRANSPORTING A NUMBER OF EGGMASSES WITH FIREWOOD IS NOT UNCOMMON, AS WELL AS IT IS NOT UNCOMMON TO HAVE A PILE OF FIREWOOD LEFT OVER IN THE SPRING. I BELIEVE THE AREA INFESTED COULD GROW [redacted] SOME EXTENT FROM THIS AS WELL AS OTHER HUMAN TRANSPORTATION CAUSES. A MORE AWARE PUBLIC MAY HELP.

I HOPE YOU FIND THESE COMMENTS AND SUGGESTIONS HELPFUL. IF I CAN BE OF ANY SERVICE TO THE PROGRAM PLEASE DO NOT HESITATE TO CONTACT ME.

SINCERELY YOURS

Jim J. Boyle

COMMENT RECEIVED TOO LATE FOR CONSIDERATION IN THE FINAL PEIS

RECEIVED 2/5/81

FPM 1205

STATE OF WEST VIRGINIA

GOVERNOR'S OFFICE
OF
ECONOMIC AND COMMUNITY DEVELOPMENT

CHARLESTON 25305

JOHN D. ROCKEFELLER IV
GOVERNOR

C. JOE MULLEN
DIRECTOR

January 29, 1981
File: PNRS-A
EIS

Mr. R. Max Peterson, Chief
United States Department of Agriculture
Forest Service
P. O. Box 2417
Washington, D. C. 20013

Re: Evnironmental Impact Statement - Proposed Cooperative Gypsy Moth Supression and Regulatory Program Activities

Dear Mr. Peterson:

The West Virginia State Clearinghouse has reviewed the Environmental Impact Statement submitted by your department in connection with the above-referenced proposal in accordance with the provisions of U. S. Circular No. A-95.

A copy of the comments of Mr. Albert E. Cole, Director, Plant Pest Control Division, West Virginia Department of Agriculture, is enclosed for your further information.

Sincerely,

Patrick M. Gallagher
Director
Community Development

PMG:am
Enc.

COMMENT RECEIVED TOO LATE FOR
CONSIDERATION IN THE FINAL PEIS

GOVERNOR'S OFFICE OF ECONOMIC AND COMMUNITY DEVELOPMENT
Community Development Division
WEST VIRGINIA STATE CLEARINGHOUSE
HOOM B-548, BUILDING #6
CHARLESTON, WEST VIRGINIA 25305

CLEARINGHOUSE USE ONLY

DATE: 12/9/80

FILE NO: FNRS-G

Comments concerning this DE should be received by this offi no later than: 1/9/81

(DRAFT) ENVIRONMENTAL IMPACT STATEMENT (DEIS)

TO: Albert E. Cole, Director
Plant Pest Division
W. Va. Dept. of Agriculture

FROM: Patrick M. Gallagher, Director
Community Development

DEIS DESCRIPTION: Draft Environmental Impact Statement - Proposed Cooperative Gypsy Moth Suppression and Regulatory Program Activities

The attached (Draft) Environmental Impact Statement is referred to your agency for REVIEW and COMMENTS. If your agency has an interest in this Statement and desires to comment on it please CHECK THE APPROPRIATE BOX. Your cooperation is asked in returning this memo to the State Clearinghouse Office, indicating your interest or not, 10 days from its receipt.

☐ No comment (Please Indicate Reason In Space Below) ☐ Comments being developed

☑ Comments submitted herewith ☐ Comments should more appropriately (or also) come from Agency(s) as listed below.

The West Virginia Department of Agriculture supports the USDA selection of the Integrated Pest Management alternative as detailed in the draft Environmental Impact Statement — Proposed Cooperative Gypsy Moth Suppression and Regulatory Program Activities for 1981.

Historically, in spite of comments to the contrary by various individuals, groups and federal agencies, USDA working in cooperation with affected states have had a keen interest in carrying out programs as environmentally safe as the technology of the time permitted. We feel that the options under the IPM alternative are all environmentally safe when carried on or used according to labels and recognized good practices.

West Virginia presently has a small established Gypsy Moth infestation in Jefferson County. We feel that maximum efforts to manage the Gypsy Moth in our neighboring northeastern states can only be a benefit to West Virginia by delaying the inevitable incursion into the state of widespread and devastating Gypsy Moth populations.

(Please use reverse side if additional space is needed)

Reviewer's Signature Albert E. Cole Date 12-11-80

Title Director, Plant Pest Control Divisi Telephone 348 2212

COMMENT RECEIVED TOO LATE FOR CONSIDERARION IN THE FINAL PEIS

APPENDIX D

CARBARYL DECISION DOCUMENT, DECEMBER 1980
Office of Pesticides & Toxic Substances
Environmental Protection Agency
401 M Street SW
Washington, DC 20460

A. Summary of Conclusions*

1. Teratogenic and Fetotoxic Effects. Based on the weight of evidence of currrently available studies which are valid and interpretable, the Agency has concluded that a rebuttable presumption on the basis of carbaryl-related teratogenic and fetotoxic effects is not warranted at this time. In the Agency's judgment, the extremely high doses of carbaryl used to elicit effects in the developing organism, coupled with the positive correlation of maternal and fetal toxicity in the multiple species tested (the dog being a possible exception), do not indicate that the pesticide carbaryl constitutes a potential human teratogenic or reproductive hazard under proper environmental usage. However, the Agency is considering whether another study in dogs should be conducted, with special attention paid to sufficient numbers of animals in the dose groups, the condition of the bitches throughout the period of dosing, and maternal and fetal blood levels of the compound.

2. Mutagenic Effects. Based on the weight of extensive existing evidence, the Agency has determined that the current data base does not support a conclusion that carbaryl poses a mutagenic hazard to humans. Due to the weak mutagenic responses which have measured, and due to the suggestive rather than conclusive nature of the evidence available as to the potential of carbaryl to reach the mammalian germinal tissues, the Agency believes that general exposure-reduction measures typical of those already on many of the labels, are appropriate and will be pursued prior to any further RPAR review. A rebuttable presumption on the basis of carbaryl-related mutagenic effects is therefore not warranted at this time.

3. Oncogenic Effects. Based on the weight of existing evidence, the Agency has concluded that the current data base does not indicate that carbaryl poses on oncogenic hazard to humans. A rebuttable presumption on the basis of carbaryl-related oncogenic effects is therefore not warranted at this time.

---

* From: With oral approval from EPA, retyped verbatim in order to produce a clear copy.

4. Neurotoxicity. Based on available evidence, the Agency has concluded that carbaryl does not pose a human health hazard in terms of neurotoxic effects. A rebuttable presumption on the basis of neurotoxicity is therefore not warranted at this time.

5. Viral Enhancement. The Agency's determination at this juncture is that research into viral enhancement as a possible adverse effect of exposure to carbaryl is preliminary in nature and that current information does not constitute a basis on which to conclude that carbaryl poses a human hazard in this area. A rebuttable presumption on the basis of viral enhancement is therefore not warranted at this time.

6. Overview—Determining Considerations. Recognizing that the data base on any chemical is necessarily a continuum, the Agency's determination not to proceed with an RPAR action against carbaryl at this time takes into account a number of considerations in connection with the present toxicological picture of the pesticide. As has been pointed out, the current data base under review is extensive, more extensive than has ordinarily been the case for pesticides which have come under Agency review. This is particularly true for teratogenicity/fetotoxicity and mutagenicity, which are the toxicological areas of primary concern, and it is unlikely that resource-intensive RPAR procedures would surface data not already in the Agency's possession via other channels.

Although the current data base is extensive, risk data are not unequivocal, and study results, again in the areas of teratogenicity/fetotoxicity and mutagenicity, have been inconsistent. The current toxicological picture of carbaryl thus reflects a degree of uncertainty. It is in the face of such uncertainty that the Agency must determine whether or not to proceed with an RPAR action and the detailed risk/benefit analysis the RPAR process is intended to implement. In the case of carbaryl, consideration of the overall weight of current evidence leads the Agency to conclude that the responsible call is not to initiate RPAR proceedings at this juncture but rather to address the concerns at issue via the recommendations made below. Should further review data indicate that current use patterns of the pesticide pose unreasonable adverse effects to human health or the environment, however, the Agency will re-open the case of carbaryl as an RPAR candidate.

B. Recommendations

Because the Agency has concluded that a rebuttable presumption against registration and continued registration of pesticide products containing carbaryl is not warranted at this time, the Agency's recommendation is that carbaryl be returned to the registration process. This recommendation is made with the following stipulations: 1) that a FIFRA sec. 3(c) (2) (B) action be considered for additional data on the effects of carbaryl, possible including another study of the teratogenic and fetotoxic effects of carbaryl in dogs 2) that appropriate label changes be implemented according the forthcoming negotiations between the Agency and registrants to ensure that exposure is minimized.

APPENDIX E

Letter from William N. Hedman, Jr., EPA to R. Max Peterson, Chief, USDA Forest Service, Concerning public notification and human exposure to pesticides, March 20, 1980.

MAR 2 6 1980

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

FIDM
Director
✓Programs
Methods
Coordination
Pesticides
Environmental
File
OFFICE OF THE
ADMINISTRATOR

MAR 2 6 1980

Mr. R. Max Peterson
Chief
USDA Forest Service
Washington, D.C. 20013

Dear Mr. Peterson:

On February 19, 1980 in accordance with our responsibilities under Section 309 of the Clean Air Act, EPA submitted to your office comments on the Draft Environmental Impact Statement for the Cooperative Gypsy Moth Suppression and Regulatory Program 1980 activities. On March 6, 1980, a meeting was held between members of EPA's Office of Environmental Review, the Office of Pesticides and Toxic Substances, USDA, and several state agencies to discuss the specific aerial application performance standards recommended in our letter of February 19. The discussion focused on EPA's recommendations of specific buffer zones to reduce pesticide drift into sensitive areas and the States' and USDA's ongoing efforts to accommodate public opinion regarding spray programs. Although USDA's effort to accommodate public opinion was mentioned in the Draft Environmental Impact Statement, the weight decision-makers in the States actually give to public opinion was not made clear to EPA until this meeting.

As a result of the March 6 meeting and further assessment of other issues, such as the appropriateness of buffer zones for the biological control agents, we are submitting revisions to our original comments. This revised set of comments details EPA recommended aerial application performance standards for recommended buffer zones to reduce pesticide drift into sensitive areas. We believe these comments also include our suggestions for encouraging public involvement in the decision-making process and recommended advance notification procedures.

We intend that the comments, rather than the previous submission, be used to represent our position regarding aerial application standards for the proposed 1980 Gypsy Moth Suppression and Regulatory Program.

Thank you for the opportunity to submit this revised set of comments on this Draft Environmental Impact Statement. If you have any questions regarding our comments please contact me or Susan Sarason of my staff (755-9394).

Sincerely yours,

William N. Hedeman, Jr.
Director
Office of Environmental Review (A-104)

Enclosures

REVISED COMMENTS

EPA has reviewed the Draft EIS for the 1980 Cooperative Gypsy Moth Suppression and Regulatory Program. We believe the States' and USDA's efforts to identify environmental concerns and to incorporate appropriate safeguards are commendable.

We are concerned, however, that despite the precautions proposed for spraying in each state there remains a potential for unwarranted exposure to pesticides. This concern is based on the premise that if a spray program is conducted without the knowledge and consent of the general public, the public must at least be provided the protection which observation of specified application practices is intended to accomplish.

We recommend implementation of the following practices to achieve adequate protection of human health and the environment.

For purposes of implementation, public involvement in decision-making could be accomplished through open meetings at which concerned citizens are invited to present their opinions before a panel of decision-makers; through personal, telephone, or mail surveys of citizens residing in the spray block; or through other mechanisms which would provide decision-makers with information on the public's concerns and wishes.

Advance notification could be accomplished through radio and television spots, newspaper articles, leaflets distributed to residents, etc. It is intended that such notification would include dates and times of day when spraying will occur, areas to be sprayed, identification of the pesticides which will be used, information on precautions to be taken (such as for protection of bees), and other information as appropriate.

In those cases where the public is allowed to participate in decision-making and where residents in the spray block are adequately informed through advance notification of spray plans, EPA would be satisfied that the public is provided adequate opportunity for protection from exposure to pesticides if use precautions contained on the pesticide label are followed. For purposes of clarifying label statements regarding avoidance of pesticide drift into lakes, streams, and ponds, applicators should be instructed not to apply the pesticide directly to any body of water.

In those cases where both the above measures are not taken, we believe that certain application practices must be used if adequate protection is to be provided. These use practices (outlined below and detailed in Tables I and II) are intended to supplement the use directions contained on the pesticide label. Pesticide labels as currently written do not, in all cases, provide adequate guidance on how spray drift is to be mitigated. Therefore, this additional information is provided to clarify the manner in which drift can be mitigated. These use practices are intended to reduce spray drift into sensitive areas. However, total elimination of all traces of spray drift into these areas is not expected to be attained.

Recommended wind speed, nozzle type, and angle, nozzle pressure, aircraft speed, and spray release height are listed in Table I. Buffer zones (defined as areas where direct application by aircraft and ground air carrier systems (mist blowers) is prohibited but are intended to receive spray drift fall-out) are provided in Table II. It should be noted that most buffer zones for the biological control agents have been eliminated; in addition, certain buffer zones for chemicals have been reduced.

Sensitive areas are defined as: permanent residences; schools, churches; domestic apiaries; agricultural croplands; public recreational areas; wildlife refuges for endangered species as identified by the U.S. Fish and Wildlife Service; publicly maintained highways; and areas of commerce, i.e., shopping centers, malls and etc. In addition, the terms also includes aquatic sites such as: critical fisheries (as identified by State Fish and Game Commissions), municipal water supplies and intakes as well as other waters including but not limited to rivers, streams, ponds, and lakes visible from an aircraft flying over the target site at time of treatment or as identified on a United States Geological Survey (USGS) Topographic Map scale 1/62,500.

In summary, we believe that where public participation in decision-making and advance notification are not used, applicators should observe the precautions and use practices contained in Tables I and II, in addition to those on the label; and that where this form of public involvement is used, applicators would be bound only to the use directions on the pesticide label. EPA also recognizes that in the course of public participation, the public and/or the final decision-makers may feel that additional precautions, such as any or all of those spelled out in this opinion, should be observed. In

such cases, EPA's position would be that compliance with such practices would be enforced at the discretion of the State. In all cases, however, applicators must follow all precautions and use practices contained in the produce labeling; in addition, the pesticides must not be applied directly over water.

EQUIPMENT TO BE USED WHEN SPECIFIED FORMS OF PUBLIC INVOLVEMENT ARE NOT USED

TABLE 1

	WIND SPEED	NOZZLE TYPE AND ANGLE	MAXIMUM NOZZLE PRESSURE	MAXIMUM AIRCRAFT SPEED	MAXIMUM SPRAY RELEASE HEIGHT[2]
Aerial					
Fixed Wing	Wind speed must not be less than 2 mph nor greater than 10 mph.	Nozzles must be capable of producing a spray droplet of 100 microns VMD in size or larger. Nozzles must be directed back with airstream.	Not exceeding 40 psig [1]	130 mph	150 feet
Aerial					
Rotary Wing	Same as aerial-fixed wing.	Nozzles must be capable of producing a spray droplet of 100 microns VMD in size or larger. If aircraft speed is more than 60 mph, nozzles must be directed back with the airstream. If aircraft speed is 60 mph or less, there is no restriction on nozzle angle.	Not exceeding 40 psig [1]	130 mph	150 feet
Ground					
Air carrier	Same as aerial-fixed wing.	Same as fixed wing	Not exceeding 40 psig [1]	Not applicable	Not applicable
Ground					
Hydraulic Systems	No minimum wind speed specified. Applications must be suspended if wind speed exceeds 10 mph, or cause visible drift in the direction of the sensitive area.	Nozzle size and pressure must deliver 0.2 gal/minute or more.	None	Not applicable	Not applicable

[1] An allowance of no more than (10%) ten percent, or an increase of 4 psig is acceptable when calibrating spray boom pressure.

[2] Maximum Spray Release Height is defined as the distance between the aircraft and the top of the forest canopy.

BUFFER ZONES FOR AERIAL AND GROUND AIR CARRIER [illegible] THE GYPSY MOTH SPRAY PROGRAM
WHEN SPECIFIED FORMS OF PUBLIC INVOLVEMENT ARE NOT USED[1]

TABLE II

Sensitive Area	Acephate	Carbaryl	diflubenzuron	trichlorfon	Bacillus thuringiensis	Cyrchek	Dispersly
Terrestrial:							
Permanent residences	500 feet	500 feet	500 feet	500 feet	N.R.	N.R.	N.R.
Churches	500 feet	500 feet	500 feet	500 feet	N.R.	N.R.	N.R.
Schools	500 feet	500 feet	500 feet	500 feet	N.R.	N.R.	N.R.
Publicly maintained highways[2]	500 feet	500 feet	500 feet	500 feet	N.R.	N.R.	N.R.
Domestic apiaries	500 feet	500 feet	N.R.	N.R.	N.R.	N.R.	N.R.
Public recreational areas	500 feet	500 feet	500 feet	500 feet	N.R.	N.R.	N.R.
Wildlife refuges for endangered species	500 feet	500 feet	500 feet	500 feet	N.R.	N.R	100 fee
Agricultural croplands	500 feet	500 feet	500 feet	500 feet	N.R.	N.R.	N.R.
Aquatic:							
Critical fisheries	150 feet	150 feet	150 feet	150 feet	N.R.	N.R.	100 fee
Other waters[3]	150 feet	150 feet	150 feet	150 feet	N.R.	N.R.	N.R.
Municipal water supplies and intakes	500 feet	500 feet	500 feet	500 feet	500 feet	500 feet	500 fee

N.R. - No restrictions other than listed in the product labeling.

1 These restrictions do not apply to ground hydraulic applications.

2 Publicly maintained highways - Any hard-surfaced roadways that are maintained with public funds.

3 Other waters - Any body of water including but not limited to lakes streams, ponds and rivers visible from an aircraft flying over the target site at the time of treatment, or as identified on a United States Geological Survey Topograph Map, scale 1/62,500.

APPENDIX F

Mailing List for Final Programmatic Environmental Impact Statement

FOREST SERVICE

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633 West Wisconsin Avenue
Milwaukee, WI 53202

Pacific Southwest Forest
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Berkeley, CA 94710

Methods Application Group
2810 Chiles Road, Suite E
Davis, CA 95616

USDA Forest Service
Field Representative - FPM
180 Canfield Street
Morgantown, WV 26505

USDA Forest Service
Field Representative - FPM
P. O. and Federal Building
80 Daniels Street
Portsmouth, NH 03801

USDA Forest Service
Field Representative - FPM
1992 Folwell Avenue
St. Paul, MN 51108

USDA Forest Service
Staff Director - FPM
1720 Peachtree Street, NW
Room 706
Atlanta, GA 30309

USDA Forest Service
Field Representative - FPM
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Asheville, NC 28803

USDA Forest Service
Staff Director FPM
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Portland, OR 97208

Dr. David P. Worley
Northeastern Forest Exper. Stat.
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Delaware, OH 43015

Dr. Frank Lewis
Forest Insect and Disease Lab.
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Hamden, CT 06514

Dr. Jack Barger
NEFES - USDA Forest Service
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Northeastern Forest Experiment
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EPA

Assistant Director
Resource Liaison Development Staff
Office of Federal Activities, A-104
537 West Tower, Waterside Mall
401 M. Street SW
Washington, DC 20460
ATTN: EIS Registration Section

Regional Administration - Region I
Environmental Protection Agency
John F. Kennedy Federal Bldg.
Room 2303
Boston, MA 02203
ATTN: EIS Review Coordinator

Regional Administrator - Region II
Environmental Protection Agency
26 Federal Plaza, Room 908
New York, NY 10007
ATTN: EIS Review Coordinator

Regional Administrator - Region III
Environmental Protection Agency
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Regional Administrator - Region IV
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Chicago, IL 60604
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EIS Review Coordinator
Environmental Protection Agency
Region VI
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Dallas, TX 75201

Douglas D. Campt, Acting Dir.
Registration Division, OPP (TS-767)
U.S. Environmental Protection Agency
401 M. Street SW
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Deputy Asst. Administrator
for Pesticide Programs
Environmental Protection Agency
Room E-539, TS-766
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Washington, DC 20460

A. E. Conroy, II, Director
Office of Pesticides and
Toxic Substances
Enforcement Division, EN-342
Environmental Protection Agency
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Washington, DC 20460

Regional Administrator - X
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Environmental Protection Agency
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ATTN: Ed Eckess

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USDA, APHIS, PPQ
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ATTN: Dist. Director

USDA, APHIS, PPQ
U.S. Courthouse and Federal Bldg.
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Roanoke, VA 24006
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USDA, APHIS, PPQ
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Charlestown, WV 25301
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APHIS (CON'T)

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USDA, APHIS, PPQ
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Heritage Plaza Shopping Center
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Gulfport, MS 39501
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USDA, APHIS, PPQ
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ATTN: Dist. Director

USDA, APHIS, PPQ
Strom Thurmond Federal Bldg.
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ATTN: Dist. Director

USDA, APHIS, PPQ
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Suite 400, Boca Chica Tower Bldg.
Brownsville, TX 78521
ATTN: Regional Director

APHIS (CON'T)

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