BUREAU OF FORESTRY
FOREST HEALTH PROTECTION
ANNUAL REPORT FISCAL YEAR 1996
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With the passage of Chapter 39 of the Acts of 1995 the Bureau of Shade Tree Management and Pest Control was abolished and the program functions were merged with the Bureau of Forest Development. The new Bureau would be known as the Bureau of Forestry. After many meetings and input provided by many of the program supporters it was determined that all of the functions provided by the former Bureau of Shade Tree Management and Pest control would be divided into two programs. One program, to be called Forest Health, would be responsible for monitoring, assessing, reporting and managing the stresses of the forest and shade tree resources. The Forest Health Program would continue to provide arboricultural services to the recreation areas within the Division. All field staff of the former Bureau of Shade Tree Management and Pest Control would remain as part of the Forest Health Program. The other program, Urban Forestry would be composed of the Urban Forester and the MASS ReLEAF Coordinator.

AERIAL SURVEY: 1996

The Forest Health Program relies heavily on the use of aircraft to detect and document the distribution of insect and disease problems across the Commonwealth. The general statewide flights are scheduled for early July when most of the damage by the early season defoliators is most visible. Special flights, targeted at specific problems are scheduled as needed throughout the year. Ground surveys are conducted following the aerial survey to document the cause and severity of the infestations. In 1996 a total of 20.6 hours of flight time was require to complete the aerial surveys.

The results of this year's survey are included in a summary of conditions later in this report.

FOREST HEALTH MONITORING

This year the program continued to be a cooperator in the National Forest Health Monitoring Program. Early in this fiscal year the national program management notified us that due to the withdrawal of Federal EPA funding the collection of data in Massachusetts would be suspended for a year or possible longer. In the spring of 1996 we were notified that the USDA Forest

Service had managed to secure funding which would enable the continuation of data collection but on a reduced scale. It was determined that 1/4 of the total plots would be measured annually with an additional 1/12 of the plots measured the previous year being remeasured. For Massachusetts that meant that 11 plots would be measured in 1996. With this reduction of plots visited each year the entire plot would be evaluated rather that collecting only the crown evaluation data. One member of the program staff, Mr. Kenneth Gooch was selected to become part of the Northeast Area Training Team. As such he would be required to attend a week-long special training session in Ashville, North Carolina and then with other team members be responsible for the training of all field crews in the Northeast Area. Prior to the field season, the program staff involved in data collection attended the regional training and certification meeting held in Portsmouth, New Hampshire. All plot and ozone data was collected and submitted to the national program office within the established time frame.

NORTH AMERICAN MAPLE PROJECT

The North American Maple Project was established in 1987 to address the concerns of the health of sugar maple in North America. The project involves 10 states and 4 Canadian provinces that annually collect tree health and mortality data on a total of 233 plots. Two members of the program staff (Kenneth Gooch, Region 5 and Michael Geryk, Region 4) were selected to participate in the program. This participation would involve attending pre-field season training in St. Albans, Vermont and the collection of data on the 10 Massachusetts plots. The plots are divided equally between natural stands and managed sugar bushes. The data collected as part of this project indicates that the sugar maple in Massachusetts is generally in good health and there appears to be little differences between the natural and managed stands. This could be attributed to careful management practices of most of the sugar producers.

GYPSY MOTH MONITORING

The series of gypsy moth monitoring plots established in 1982 were continued again this year. Each plot consists of 20 trees of a favored food species of the gypsy moth having burlap bands applied in the spring. The gypsy moth uses these burlap bands as a place to pupate and lay eggs making this an ideal way to sample the insect population. This system has been copied by other states involved in gypsy moth monitoring and is considered as one of the best in the country by the USDA Forest Service. The data collected in the fall of 1996 indicates that there will be very little gypsy moth defoliation in the spring of 1997.

HEMLOCK WOOLLY ADELGID COLD HARDINESS AND TREE RESISTANCE STUDIES

The forest health program cooperated in two studies being conducted on the hemlock woolly adelgid.

The first study was funded by the USDA Forest Service, Forest Health Protection. This project was to determine the cold hardiness of this insect. The study is being conducted jointly with the Maine Forest Service, the Vermont Division of Forest, Parks and Recreation, the University of Vermont and this agency. The object is to determine if the insect will survive at the low temperatures experienced in the states to our north. Samples were collected in the most northerly infestation in Massachusetts (Mt. Tom State Reservation) and transported to the University of Vermont where they were held in a quarantine facility at different temperatures and various time intervals normally experienced in southern Maine and Vermont. Following these exposures the insects were examined under a microscope to determine the percent of survivability. This experiment is expected to continue in the winter of 1996-97 with time and temperatures that are normally experienced in the northern parts of these states being tested.

Preliminary results indicated that the insects will survive the temperatures to which they were exposed but their numbers will be reduced. With the information presently available it does not appear that temperature will be a factor in limiting the northward spread of this insect.

The second experiment again funded by the USDA Forest Service in cooperation with the University of Tennessee was to determine if the hemlock trees in Massachusetts were genetically different and therefore resistant or more susceptible to feeding of the hemlock woolly adelgid. Cones were collected from various locations and elevations in western Massachusetts and shipped to the University of Tennessee for germination and growth. When they reach an appropriate size they will be exposed to the hemlock woolly adelgid and the effects of the insects feeding documented. At the present time the seeds collected have germinated and the seedlings are being cared for in a greenhouse. No further action on this agency's part is expected until the seedlings need to be exposed to the insects feeding.

OAK LEAF TIER POPULATION MONITORING

In the 1980's an infestation of the oak leaf tier was reported in Franklin and Norfolk counties. This insect had never been reported in the state before and considerable time was involved in monitoring and assessing the damage from this insect. Several attempts were made to secure funds to control this pest but to no avail. As a result considerable timber loss was experienced in the Wendell State Forest. The presence on an unknown insect pathogen resulted in the collapse of the insect population. As a result of the severe timber loss experienced in the 80's the program continues to monitor the population of this insect by the using of pheromone traps.

PEAR THRIPS MONITORING

In the late 1980's a severe infestation of pear thrips caused severe early season defoliation to the sugar maple in the northeast. As a result of this infestation the quantity and quality of maple syrup was reduced and the overall health of the sugar maple was severely stressed. In an effort to keep the maple producers informed of the potential damage to their sugar bushes the department annually monitors the insect population by the use of sticky traps. The results of this survey indicated that there would be little or no damage from this insect in the spring of 1997.

HEMLOCK LOOPER MONITORING

In the spring of 1995 the Department treated Tolland State Forest for an infestation of Hemlock Looper. To assess the effectiveness of this control program, four sets of pheromone traps were deployed at the time of moth flight. Additionally branch samples were collected and processed for egg counts to confirm the results of the trap catches. The trap catches were minimal within the control area and the results of the branch sample processing confirmed there would be very little damage for this insect in the spring of 1996.

TREE PLANTING ON DEM PROPERTIES

At the conclusion of the Small Business Administration tree-planting program a small sum of money remained available. It was decided to divide the money between the 5 regions. Each region selected areas and working with the forest health supervisor species appropriate for the sites were selected. The areas receiving trees were Massasoit, Wompatuck, Rutland, Elwell, Mt. Graylock, October Mt. and the courtyard in the rear of the Saltonstall Building in Boston. Contractors were selected to supply and plant the trees. All contract administration was handled through the Boston office.

MT. GREYLOCK TREE NURSERY

As a result of a grant from the National Tree Trust a shade tree nursery was established at the Mt. Greylock administration building. A total of 500 seedlings were planted for future use in Arbor Day programs, for local cities and towns, and for use within the Forest and Park system.

SUMMARY OF PROGRAMS PRESENTED BY THE FOREST HEALTH STAFF

Site	Audience	Topic	Attendees	Presenter
F. Gilbert Hills State Forest	Boy Scouts	Forestry Merit Badge	12	LaChance
F. Gilbert Hills State Forest	Sharon High School Students,	Gypsy Moth	2	LaChance
Rehoboth	Boy Scouts	Forestry Merit Badge	12	LaChance
Dover Elementary School	Elementary Schools Students	Arbor Day	100	LaChance
Hull Public School	Elementary Schools Students	Arbor Day	125	LaChance
Braintree	Elementary Schools Students	Arbor Day	130	LaChance
Southboro	Elementary Schools Students	Career Day	30	Hubley
Billerica	Elementary Schools Students	Arbor Day	40	Hubley
Holy Cross College	MA Environmental Educators	Gypsy Moth	15	Larson
Berkshire Community College	Environmental Education Students	Forest Insects and Diseases	20	Gooch
Mohawk Regional High School	Mass Maple Producers	Report on results of Maple Project	125	Gooch
City of Pittsfield	Pittsfield Beautiful	Tree Pruning	15	Gooch
Region 4 Hdqts	General Public	Mass ReLEAF Workshop	10	Gooch
DAR State Forest	General Public	Tree ID	15	Gooch
DAR State Forest	General Public	Tree ID	15	Gooch
DAR State Forest	General Public	Tree ID	15	Gooch
Groton	Eagle Eye Institute	Learn about the Forest	30	Gooch
Peru	Eagle Eye Institute	Learn about the Forest	30	Gooch
Pittsfield	Springside Park Greenhouse Group	Tree ID and Pruning	15	Gooch
Freeport Maine	New England/New York Pest Supt.	Pest Conditions	30	Burnham
Albany New York	Northeastern Forest Pest Council	Pest Conditions	50	Burnham
UMASS Amherst	Arboricultural Class	DEM Programs	75	Burnham
Total Programs 21				
Total Attendees 909				

SUMMARY OF INSECT AND DISEASE CONDITIONS

GYPSY MOTH defoliation continued to decline. The total area recorded in the annual aerial survey was 6,960 acres. The towns of Hingham and Cohassett experienced the majority of the defoliation. Very little heavy defoliation occurred due to the presence of the fungus *Entomophaga maimaiga*, which kills the larval stage of this insect. Preliminary surveys indicate that there will be only minimal defoliation in this area in 1997. See Map "A" for the area of defoliation.

HEMLOCK WOOLLY ADELGID continues to spread. New infestations have been identified in Gloucester (Magnolia), Hingham, Wilbraham, Sutton and Fall River. This insect alone does not appear to be causing the mortality reported by other states. However, where other stress factors such as soil compaction or drought are involved the presence of the hemlock woolly adelgid seems to be the deciding factor if the trees will survive of not. See Map "B" for location of known infestation of this insect.

OAK LEAF TIER populations remain low. No defoliation was noted from this insect. No adults of this pest were trapped in the pheromone traps.

HEMLOCK LOOPER populations treated in 1995 are showing no signs of a buildup. Mortality is beginning to appear in the hemlock stands outside of the treatment area. This is due in part to the defoliation caused by the hemlock looper, the recent drought and an increase in the presence of the hemlock borer in weakened trees.

GIANT TAR SPOT remains a serious problem in Berkshire County. This is due partially to the cool, wet weather of this spring and the large number of norway maples, the preferred host of this leaf pathogen.

BEECH BARK DISEASE is a combination of beech scale and the nectria canker fungus. The feeding of the beech scale provides an entry point for the nectria fungus. Once established the fungus causes cankers, which encompass the tree truck and eventually kills the tree. This disease complex has been present in the state for many years causing only scattered mortality. Recently an increase in mortality has been noted in Berkshire County and on Mt. Wachusett in

Princeton. This increase in mortality could be associated with the prior drought that weakened the tree thus giving the disease an opportunity to spread.

On Mt Wachusett in Princeton there appears to be other factors causing the beech mortality. The presence of beech scale was noted but the nectria fungus was not evident. Samples collected at the site and processed at the diagnostic lab at the University Of Massachusetts identified the bleeding canker fungus *Phytophthora* or the bacterium *Pseudomonas* and the fungus *Cytospora*. All of these organisms attack weakened trees. The two very dry years of 1993 and 1995, the large quantity of snow experienced in the winter of 1995-96, which caused site flooding, and the poor growing conditions where these trees exist have caused the fine roots to die. It is therefore believed that the mortality is caused by a combination of environmental factors weakening the trees allowing the opportunistic pathogens identified above to become established.

LEAF DISEASES particularly apple scab, leaf spots, anthracnose, fireblight, and leaf blotch were extremely prevalent because of the cool wet spring.

DROUGHT STRESS caused by the extremely dry growing seasons of 1993 and 1995 are beginning to become evident. May urban trees that are already weakened by other factors are beginning to succumb. The trees that appear to be the most effected are the maples and ash. This stress is also noted in woodland trees, which are growing in sites with shallow soils.

GOUTY OAK GALL occurrences have been increasing over the past several years in Plymouth County. Severe dieback is being documented in red oak stands in the towns of Plymouth, Carver and Wrentham.

SPRING AND FALL CANKERWORM caused defoliation in the towns of Weymouth, Hingham, Cohasset, Situate, and parts of Norwell and Marshfield. Much of this same area is infested with gypsy moth and with all three species competing for a limited food supply it is expected that the population will collapse in 1997. This expectation is supported by sticky traps which were deployed in the late fall to capture the adult female moths of the fall cankerworms.

OAK LEAF SKELETONIZER caused approximately 900 acres of defoliation in the towns of Holden, Paxton, Petersham, Wrentham, Franklin and Sharon. Generally speaking it is the second generation of this insect which caused the most defoliation. This insect caused little permanent damage to the trees.

FALL WEBWORM continued to cause many inquires from the residents of Middlesex, Essex and Worcester Counties. Although unsightly this late season defoliator causes little harm to the trees.

EASTERN TENT CATERPILLAR caused many homeowners in Worcester Middlesex and Essex Counties to call mistakenly reporting infestations of gypsy moth.

STATISTICAL SUMMARY OF ACTIVITIES

DISTRICT SUPERVISORS ACTIVITIES

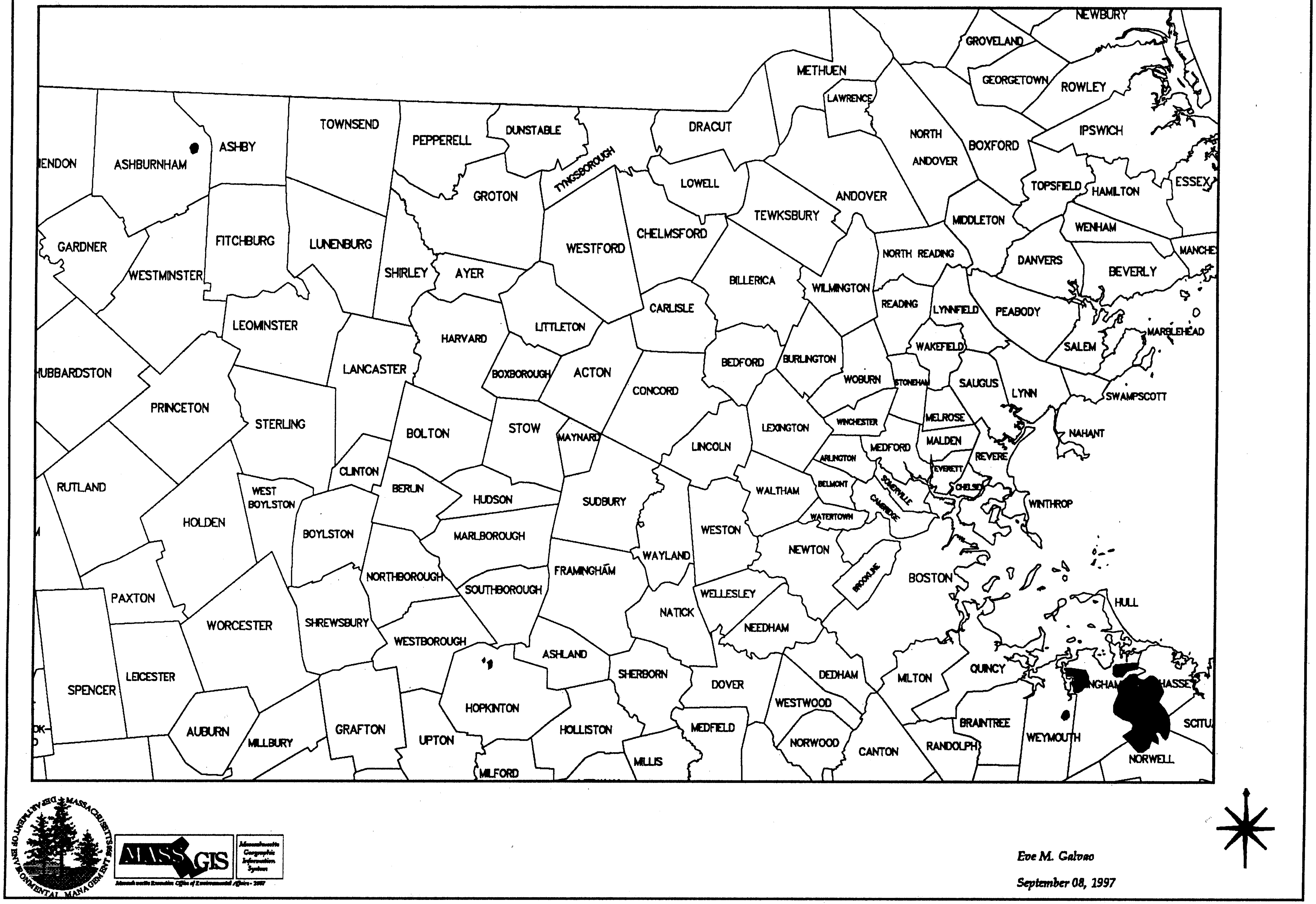
Municipality's Assisted:	131
Small Business Administration Grant Activities:	
Number of Site Visits	33
Number of Man-Days Required	31
Educational Programs:	
Attended	15
Conducted	21
Arbor Day Programs:	
Number of Programs	39
Number of Seedlings Distributed	17,000
Number of Telephone Inquires answered:	501
Number of Property Owners Assisted:	87
Special Projects:	
Forest Health Monitoring	69 Man-Days
Street Tree Inventories	4 Man-Days
Survey Activities	84 Man-Days
Emergency Storm Responses	6 Man-Days
Measurement of Champion Trees	3 Man-Days
Regional Planting Inspections	5 Man-Days
Clean Lakes and Ponds	4 Man-Days
Aerial Survey	4 Man-Days
Gypsy Moth Plots	84 Man-Days
North American Maple Project	17 Man-Days
Mt. Greylock Tree Nursery	8 Man-Days
Wildflower Planting	10 Man-Days
Hemlock Woolly Adelgid Research	12 Man-Days

TREE CREW ACTIVITIES

Number of Areas Assisted	83
Number of Trees Pruned	1660
Number of Trees Removed	3852
Number of Stumps Removed	194
Pesticide Application	65 Man-Days
Equipment Maintenance	357 Man-Days
Assistance to Other DEM Programs	999 Man-Days
Emergency Storm Responses	23 Man-Days

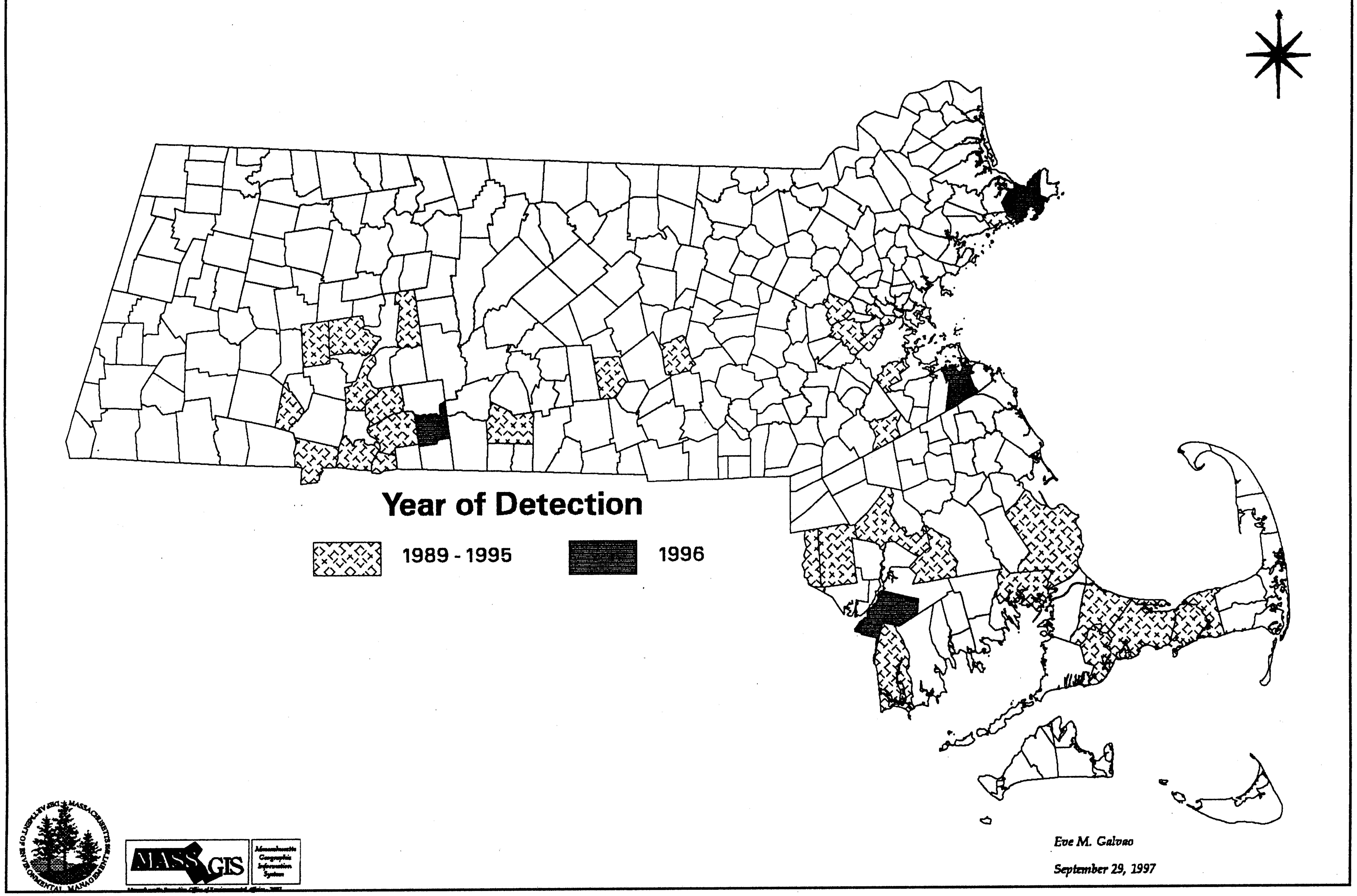
Assistance to Other State Agencies	9
Time Required	35 Man-Days

1996 GYPSY MOTH DEFOLATION



MAP A

HEMLOCK WOOLLY ADELGID INFESTATIONS 1989 - 1996



MAP B