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Minnesota's
**FEDERAL
DUTCHELM
DISEASE
DEMONSTRATION
PROJECT**

Accomplishment
Report
1980

Minnesota Department of Natural Resources
Division of Forestry

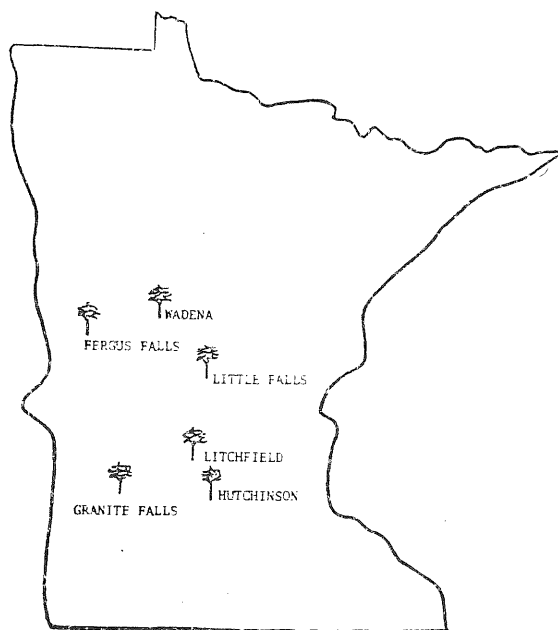
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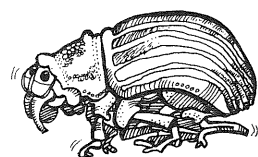
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MINNESOTA DEMONSTRATION CITIES

INTRODUCTION



A STATEMENT OF THE DISEASE SITUATION IN MINNESOTA

Although Dutch elm disease was confirmed in Minnesota as early as 1961, interest in its possible effects was minimal until elm losses in southern Minnesota cities reached epidemic proportions. As Dutch elm disease encroached upon the Twin City area, municipal concern surfaced. In 1977, directly addressing the problem of shade tree diseases, the Minnesota Legislature passed a large and comprehensive grants-in-aid program. Of the \$28.6 million biennial appropriation, \$27 million was to be used to assist state and local governmental units in absorbing the costs encumbered when implementing shade tree disease management and reforestation activities.

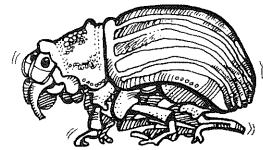
With this extensive grants-in-aid program, the Minnesota Legislature acknowledged that Dutch elm disease had indeed reached epidemic proportions in many cities throughout the State. Today, Dutch elm disease has been confirmed in nearly all of Minnesota's eighty-seven counties. Since 1971, over 508,000 diseased elm trees have been removed from Minnesota's seven county metropolitan area, alone. When Dutch elm disease continued to spread in Minnesota, legislators again passed a \$25.7 million grants-in-aid program to deal with shade tree diseases in the 1979-1980 biennium. Another program yet, this one totalling \$22.7 million, is being discussed for 1981-1982.

Rules and regulations detailing the ways in which to develop shade tree disease management programs were passed and are now enforced by the Minnesota Department of Agriculture's Shade Tree Program. These rules and regulations include making each participating municipality responsible for maintaining a certified tree inspector, carrying-out two to three intensive

disease detection surveys throughout the growing season, removing all dead, dying, and/or diseased elm trees within twenty (20) days of detection, and disposing of all non-debarked elm material by burying, burning, chipping, or utilizing in some other manner.

Since Minnesota was making such a large commitment to suppressing Dutch elm disease, it became apparent that there was a need for establishing demonstration sites where a combination of recommended disease management practices could be implemented and carried-out. The United States Forest Service provided funds to the Minnesota Department of Natural Resources for the establishment of six such municipal "best management" Dutch elm disease programs. This federally sponsored program of technical assistance and education, together with active state and municipal cooperation, could provide the coordination necessary for communities to develop effective Dutch elm disease management programs of their own. Through this demonstration project, the value of municipal disease management programs could be examined in terms of the expenses incurred when implementing a disease management program as well as in the terms of the aesthetic considerations which become necessary when having to remove and eventually replace a large portion of the tree population.

PROGRAM NARRATIVE



PROGRAM NARRATIVE

In fiscal year 1978, Congress granted the United States Forest Service \$2.5 million in General Forestry Assistance funds for Dutch elm disease special projects. This appropriation would allow State and Private Forestry to provide technical and educational assistance in establishing disease management and utilization projects. The objectives of this assistance program were 1) to make available, on a nationwide basis, information and education to communities, municipal governments, landowners, and individual homeowners on the history, incidence, severity, and management of Dutch elm disease; 2) to make available information and education on the utilization of elm trees infected and killed by Dutch elm disease; and 3) to establish and maintain, in selected areas of the United States, demonstration sites to show the application and results of effective Dutch elm disease management and utilization programs.

Minnesota was one of the states selected to participate in this Forest Service Dutch elm disease and utilization program. At the end of 1978, the State's project had completed the initial stages of establishing high performance Dutch elm disease management programs in six selected Minnesota cities--Fergus Falls, Granite Falls, Hutchinson, Litchfield, Little Falls, and Wadena--to augment the basic tree removal program already existing in each of the communities. The year 1978, was one of organization, the demonstration program being structured and its future years being planned. The year 1979, was one of implementation, disease management programs replacing existing tree removal programs. This year, 1980, has been one of evaluation and further implementation.

The intent of Minnesota's federally funded Dutch elm disease program has been, and still is, to demonstrate the effectiveness of known disease management practices--inspection, sanitation, root graft barrier placement, systemic fungicide injection, therapeutic pruning, etc. Primary emphasis is placed on disease survey techniques with sanitation (the timely removal of diseased trees) being second in priority. The other management techniques such as root graft barrier installation and systemic fungicide injections, follow inspection surveys and tree removal in priority, but are the control measures which differentiate a disease management program from a simple removal program. It is hoped that with the additional federal assistance--both financial and technical--the increase in tree losses due to Dutch elm disease can be slowed-down and eventually reduced to a level which can be handled economically by each city with its own finances. Suppressing Dutch elm disease over a period of time will enable each city to develop an economical and orderly transition from its now predominant urban elm forest to one of mixed stands of shade trees.

Public acceptance of this Dutch elm disease demonstration program is also a major concern. This federal program can succeed only if each demonstration city is an active participant. City residents are concerned about the cost of removing elm trees, the disruption of their yards when a root graft barrier is placed, and what is to them, the unfairness of having to dispose of stockpiled elm wood. Education has been, and will continue to be, promoted so as to increase public awareness of the benefits of Dutch elm disease management. Incorporating more disease control techniques and utilization ideas into the overall management program will provide city residents with visual evidence of the program's effectiveness.

Although the Department of Natural Resources has the position of "leader" in this demonstration project, it works cooperatively with the United States Forest Service, the Minnesota Department of Agriculture, the Extension Service of the University of Minnesota, and of course, the six selected cities. The Department of Natural Resources is responsible for distributing the money to all program participants except the Extension Service which is funded separately.

To reiterate, the intent of Minnesota's federally funded Dutch elm disease program is to demonstrate the effectiveness of known disease management practices. This program's purpose in each participating city is not just to provide funding, not just to provide technical and educational services, and/or not just to bring Dutch elm disease to a manageable level. Rather, the purpose of this program is to combine all the previously mentioned goals. This resulting combination should encourage each city to actively maintain its own Dutch elm disease management program at a high enough level so that elm losses are minimized over the years, without the assistance of the federal program.

Background

This community demonstration program is anticipated to run for a five-year period (1978-1982). At the end of this time, the program should provide the evidence that Dutch elm disease can be suppressed over enough years so as to document a workable disease management system for each of the six demonstration cities.

Minnesota's program was developed around the idea that two types of sites would be used, each site to be replicated three times. The first demonstration site was to

- 1) cover an area of one to two square miles
- 2) have a population of 5-15,000 people
- 3) have 6-10,000 elm trees which comprised at least 60-70% of the total tree population
- 4) have a Dutch elm disease incidence of 1-3%, and
- 5) be well isolated from wild elm populations.

The second demonstration site was to

- 1) cover an area of one to two square miles
- 2) have a population of 5-15,000 people
- 3) have 5-15,000 elm trees which comprised at least 60-70% of the total tree population
- 4) have a Dutch elm disease incidence of 1-5%, and
- 5) have a wild elm population in, or adjacent to, the control area.

The cities selected for this demonstration program were those that best fit the aforementioned criteria. Each city that was selected had already made, by participating in the Minnesota Department of Agriculture's Shade Tree Program, a financial commitment of its own to support a shade tree disease management plan. A few of the selected demonstration communities were also located on or near a river. Thus, the problem of disease running rampant in wild elm populations so prevalent in, or near, many Minnesota cities, could be addressed.

The cooperating agencies

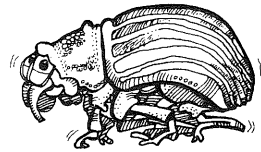
United States Forest Service
Minnesota Department of Agriculture
Minnesota Department of Natural Resources
University of Minnesota Extension Service

agreed that the following disease management practices (listed on a priority basis) should be implemented by the demonstration program--

- A) Conduct a thorough late winter and early spring inspection for the detection of all downed elm wood, elm firewood piles, felled elm trees, stumps, and brush.
- B) Destroy all detected, non-debarked elm material by April 1.
- C) Conduct on a continuous basis throughout the year, thorough inspections for the detection of all diseased elm trees.
- D) Therapeutically prune diseased branches from those trees identified by project personnel as showing early Dutch elm disease symptoms.
- E) Immediately remove all diseased elm trees with a greater than 5% wilt infection. Those diseased trees having a wilt infection of less than 5% and not selected by project personnel for therapeutic pruning or systemic fungicide injection should also be immediately removed. A strong effort should be made to remove diseased trees detected before June 1, by June 1, and to remove diseased trees detected before July 15, by July 15. June 1 and July 15 coincide with the main emergence periods of elm bark beetles.
- F) Remove all felled elm trees to a disposal site approved by the Department of Agriculture (regulatory agency). Once at the site, burn, bury, chip, debark, or in other ways, render the elm wood pest-risk free.

- G) Provide and install root graft barriers in areas where an elm tree with a greater than 5% disease infection is within forty (40) feet of other healthy elm trees.
- H) Remove from healthy elm trees all dead and dying branches during the period extending from late October to late February/March.
- I) Reduce the Dutch elm disease control area when project personnel feel that high level management can no longer be provided within the boundaries originally designated.
- J) Inject, protectively or therapeutically, high value elm trees with systemic fungicides.
- K) Destroy low-vigor, non-diseased elm trees which in the opinion of the tree inspector are a hazard to the overall effectiveness of the project. In conjunction with said destruction, debark or cause to be removed the remaining tree stumps.
- L) Remove those wild elm populations located within and adjacent to the control area which are, or could be, hazardous to the overall disease management program.

PROGRAM ORGANIZATION



PROGRAM ORGANIZATION

Minnesota's federally funded Dutch elm disease program is a cooperative effort among the Department of Natural Resources, the Department of Agriculture, the Extension Service of the University of Minnesota, and, of course, the participating demonstration communities. The Department of Natural Resources has assumed the position of "leader" and is responsible for seeing to completion, the establishment of the six municipal "best management" Dutch elm disease programs. The role of the Department of Agriculture's Shade Tree Program is a regulatory one, its main responsibility being to ensure that each demonstration community has incorporated into its management program, Minnesota's rules and regulations pertaining to Dutch elm disease. The Extension Service of the University of Minnesota provides a large portion of the technical and educational assistance needed by the participating municipalities. Each demonstration city has taken advantage of this available financial, technical, and educational assistance in an effort to bring Dutch elm disease to a manageable level now, instead of waiting several more years when state and federal assistance is no longer available.

Two committees are responsible for having developed the goals and performance guidelines of the demonstration program. The steering committee is made-up of those people who can administratively, as well as technically, provide the directives and guidelines so necessary when organizing and implementing the many facets of this federal program. The members of the technical committee have the capability of taking these directives and guidelines of the steering committee and incorporating them into the daily operation of each municipal disease management program.

The Steering Committee

1. Dr. Mark Ascerno
Assistant Professor and Extension Specialist
Department of Entomology, Fisheries and Wildlife
University of Minnesota
2. Dr. David French
Department Head of Plant Pathology
University of Minnesota
3. Meg Hanisch
Supervisor, Federal Dutch Elm Disease Program
Division of Forestry
Minnesota Department of Natural Resources
4. James Hanson
Field Representative
Forest Insect and Disease Management
United States Forest Service
Northeastern Area, State and Private Forestry
5. Richard Hasket
Shade Tree Program Director
Minnesota Department of Agriculture
6. Arthur Hastings
Dutch Elm Disease Coordinator
Forest Insect and Disease Management
United States Forest Service
Northeastern Area, State and Private Forestry
7. S. Olin Phillips
Supervisor, Forest Insect and Disease Management
Division of Forestry
Minnesota Department of Natural Resources
8. Dr. Ward Stienstra
Associate Professor and Extension Specialist
Department of Plant Pathology
University of Minnesota

The Technical Committee

1. Dr. Asimina Gkinis
Assistant Extension Specialist
Department of Plant Pathology
University of Minnesota
2. Meg Hanisch
Supervisor, Federal Dutch Elm Disease Program
Division of Forestry
Minnesota Department of Natural Resources

The Technical Committee (continued)

3. Arthur Hastings
Dutch Elm Disease Coordinator
Forest Insect and Disease Management
United States Forest Service
Northeastern Area, State and Private Forestry
4. Dr. William Phillipsen
Assistant Extension Specialist
Department of Entomology, Fisheries and Wildlife
University of Minnesota
5. Greg Ustruck
Plant Health Specialist
Minnesota Department of Agriculture
6. Regional Coordinators
Federal Dutch Elm Disease Program
Division of Forestry
Minnesota Department of Natural Resources

CALENDAR OF EVENTS, JANUARY, 1980 - JANUARY, 1981

January, 1980Participants

- | | |
|---|-------------------|
| .Determine the program's lay-out for 1980 | DNR, DA, CES, DC* |
| .Advise the participating communities on the achievements of 1979's program and what to expect in 1980 | DNR, DA, CES |
| .Begin to prepare for the United States Forest Service all forms and reports necessary to "free" the appropriated money | DNR |

February, 1980Participants

- | | |
|---|-------------|
| .Help municipalities prepare tree removal contracts | DNR, DA, DC |
| .Begin to trim dead wood from elm trees | DNR, DC |

*DNR - Minnesota Department of Natural Resources
 DA - Minnesota Department of Agriculture
 CES - Cooperative Extension Service, University of Minnesota
 DC - Demonstration Communities

February, 1980 (continued)Participants

- .Complete and submit all necessary forms and reports to the United States Forest Service to "free" the appropriated money
- .Meet with local Extension staff to identify the groups and individuals who will be good supporters of the program

DNR

DNR,CES

March, 1980Participants

- .Attend meeting to discuss program with other state representatives participating in the federal program
- .Develop and complete contracts with participating agencies and municipalities which receive a federal appropriation
- .Advertise for full-time, seasonal tree inspectors and/or workers
- .Concentrate heavily on woodpile inspections
- .Begin to organize utilization project--select equipment
- .Begin to develop tree inventory
- .Continue to prepare municipal tree removal contracts
- .Continue to trim dead wood from elm trees
- .Begin to organize "advisory councils" (members are those individuals who are supportive of the program and will help to develop it within their community)
- .Develop TREE WATCH series using current disease information from each participating community

DNR,CES

DNR

DNR,DC
DNR,DA,DC

DNR

DNR

DNR,DA,DC
DNR,DC

DNR,CES,DC

CES

April, 1980Participants

- .Implement Dursban spraying programs in those demonstration communities where it is considered necessary
- .Begin the hiring of all full-time seasonal tree inspectors and/or workers
- .Begin monitoring beetle populations in the city control areas (native elm bark beetles)
- .Determine the boundaries of each municipality's disease control area
- .Hold a meeting between the representatives from the demonstration communities and the participating agencies
- .Continue to work on organizing the utilization project
- .Continue to develop the tree inventory

DNR,DA,CES,DC

DNR,DC

DNR,DA,CES

DNR,DA,CES,DC

DNR,DA,CES,DC

DNR

DNR

April, 1980 (continued)Participants

.Continue to prepare municipal tree removal contracts	DNR,DA,DC
.Complete woodpile inspection	DNR,DA,DC
.Complete the trimming of dead wood from elm trees	DNR,DC
.Continue to organize advisory councils	DNR,CES,DC
.Begin to prepare news releases for the media concerning Dutch elm disease	DNR,CES,DC
.Begin to distribute TREE WATCH series to participating communities	CES
.Begin to distribute educational materials concerning Dutch elm disease	CES
.Begin presentations to schools and concerned civic groups	DNR,DA,CES,DC

May, 1980Participants

.Begin intensive disease detection surveys	DNR,DA,DC
.Advertise for additional, temporary tree inspectors	DNR,DC
.Continue monitoring beetle populations in the city control areas (native and smaller European elm bark beetles)	DNR,DA,CES
.Continue to work on organizing the utilization project--receive purchased/leased equipment and hire personnel	DNR
.Continue to develop tree inventory	DNR
.Complete the hiring of all full-time, seasonal tree inspectors and/or workers	DNR,DC
.Finalize municipal tree removal contracts	DNR,DA,DC
.Finish "setting-up" advisory councils	DNR,CES,DC
.Continue to prepare news releases for the media	DNR,CES,DC
.Continue to distribute TREE WATCH series to participating communities	CES
.Continue to distribute educational materials	CES
.Continue presentations to schools and concerned civic groups	DNR,DA,CES,DC

June, 1980Participants

.Begin tree removal work	DC
.Begin placing root graft barriers	DNR,DA,CES,DC
.Begin to initiate therapeutic pruning of selected, minimally diseased elm trees	DNR,DA,CES,DC
.Begin the injection of selected trees with systemic fungicides	DNR,DA,CES,DC
.Begin operation of the utilization project	DNR
.Begin to monitor elm bark beetle populations and fungus survival at utilization sites	DNR,DA,CES
.Continue intensive disease detection surveys	DNR,DA,DC
.Hire additional, temporary tree inspectors	DNR,DC

June, 1980 (continued)Participants

.Continue monitoring beetle populations in the city control areas	DNR,DA,CES
.Continue to develop tree inventory	DNR
.Hold supplemental training workshops for all tree inspectors and/or seasonal workers	DNR,DA,CES
.Continue to prepare news releases for the media	DNR,CES,DC
.Continue to distribute TREE WATCH series to participating communities	CES
.Continue to distribute educational materials	CES
.Continue presentations to concerned civic groups	DNR,DA,CES,DC

July, 1980Participants

.Intensify tree removal work	DC
.Continue placing root graft barriers	DNR,DA,CES,DC
.Continue the therapeutic pruning of selected, minimally diseased elm trees	DNR,DA,CES,DC
.Continue the injection of selected trees with systemic fungicides	DNR,DA,CES,DC
.Continue the operation of the utilization project	DNR
.Continue to monitor elm bark beetle populations and fungus survival at utilization sites	DNR,DA,CES
.Continue intensive disease detection surveys	DNR,DA,DC
.Continue monitoring beetle populations in the city control areas	DNR,DA,CES
.Continue to develop tree inventory	DNR
.Continue to prepare news releases for the media	DNR,CES,DC
.Continue to distribute TREE WATCH series to participating communities	CES
.Continue to distribute educational materials	CES
.Continue presentations to concerned civic groups	DNR,DA,CES,DC

August, 1980Participants

.Begin to collect data necessary for the tree inventory	DNR
.Continue intensive tree removal work	DC
.Continue placing root graft barriers	DNR,DA,CES,DC
.Finish-up therapeutically pruning selected, minimally diseased elm trees	DNR,DA,CES,DC
.Continue the injection of selected trees with systemic fungicides	DNR,DA,CES,DC
.Continue the operation of the utilization project	DNR
.Continue to monitor elm bark beetle populations and fungus survival at utilization sites	DNR,DA,CES
.Continue intensive disease detection surveys	DNR,DA,DC
.Continue monitoring beetle populations in the city control areas	DNR,DA,CES
.Prepare Dutch elm disease exhibits for county fairs	DNR,DA,CES,DC

August, 1980 (continued)Participants

.Continue to prepare news releases for the media	DNR,CES,DC
.Continue to distribute TREE WATCH series to participating communities	CES
.Continue to distribute educational materials	CES
.Continue presentations to concerned civic groups	DNR,DA,CES,DC

September, 1980Participants

.Initiate a tour of the demonstration communities	DNR,DA,CES,DC
.Implement Dursban spraying programs in those demonstration communities where its is considered necessary	DNR,DA,CES,DC
.Continue to collect data necessary for the tree inventory	DNR
.Continue tree removal work	DC
.Finish-up root graft barrier placement	DNR,DA,CES,DC
.Complete the injection of selected trees with systemic fungicides	DNR,DA,CES,DC
.Continue the operation of the utilization project	DNR
.Continue to monitor elm bark beetle populations and fungus survival at the utilization sites	DNR,DA,CES
.Start to "wind-down" disease detection surveys because of beginning fall coloration	DNR,DA,DC
.Continue monitoring beetle populations in city control areas	DNR,DA,CES
.Lay-off extra tree inspectors	DNR,DC
.Continue to prepare news releases for the media	DNR,CES,DC
.Continue to distribute TREE WATCH series to participating communities	CES
.Continue to distribute educational materials	CES
.Continue presentations to concerned civic groups and schools	DNR,DA,CES,DC

October, 1980Participants

.Continue to collect data necessary for the tree inventory	DNR
.Continue the operation of the utilization project--split debarked elm into firewood lengths	DNR
.Complete tree removal work	DC
.Complete monitoring elm bark beetle populations and fungus survival in city control areas and at utilization sites	DNR,DA,CES
.Complete disease detection surveys as fall coloration is predominant	DNR,DA,DC
.Begin to distribute educational material concerning the effects of keeping non-debarked elm firewood	DNR,DA,CES
.Continue to prepare news releases for the media	DNR,CES,DC
.Continue presentations to concerned civic groups and schools	DNR,DA,CES,DC
.Finish the distribution of the TREE WATCH series to participating communities	CES

November, 1980

- .Inspect for tree removal work not completed
- .Begin to trim elm trees (removal of dead wood)
- .Lay-off full-time, seasonal tree inspectors
- .Continue to collect data necessary for the tree inventory
- .Continue the operation of the utilization project--split debarked elm into firewood lengths
- .Prepare the program budget for 1981
- .Analyze 1980's tree loss data-make tree loss and program cost projections for 1981
- .Review 1980's program--the goals achieved, the problems incurred, the possibilities for 1981's program, etc.
- .Begin to prepare annual report
- .Continue to distribute educational material concerning the effects of keeping non-debarked elm firewood
- .Continue to prepare news releases for the media
- .Continue presentations to concerned civic groups and schools

Participants

DNR,DA,DC
 DNR,DC
 DNR,DC

 DNR

 DNR
 DNR,DA,CES,DC

 DNR,DA,CES

 DNR,DA,CES
 DNR

 DNR,DA,CES
 DNR,CES,DC

 DNR,DA,CES,DC

December, 1980

- .Begin working on the program's lay-out for 1981
- .Continue to trim dead wood from elm trees
- .Continue to collect data necessary for the tree inventory
- .Continue the operation of the utilization project--split debarked elm into firewood lengths
- .Complete annual report
- .Continue to distribute educational material concerning the effects of keeping non-debarked elm firewood
- .Continue to prepare news releases for the media
- .Continue presentations to concerned civic groups and schools

Participants

DNR,DA,CES,DC
 DNR,DC

 DNR

 DNR
 DNR

 DNR,DA,CES
 DNR,CES,DC

 DNR,DA,CES,DC

January, 1981

- .Determine the program's lay-out for 1981
- .Advise the participating communities on the achievements of 1980's program and what to expect in 1981
- .Begin to prepare for the United States Forest Service all forms and reports necessary to "free" the appropriated money
- .Begin to prepare publications detailing the results obtained by the demonstration program
- .Begin to compile a slide show on each demonstration city--from the first year of the program up to the present

Participants

DNR,DA,CES,DC

 DNR,DA,CES

 DNR

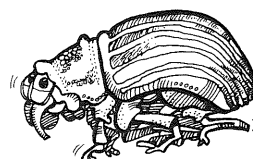
 DNR,DA,CES

 DNR

January, 1981 (continued)Participants

.Continue to trim dead wood from elm trees	DNR,DC
.Continue to collect data necessary for the tree inventory	DNR
.Continue the operation of the utilization project-- split debarked elm into firewood lengths	DNR
.Develop educational materials for upcoming tree inspector workshops	DNR,DA,CES
.Continue to distribute educational material concerning the effects of keeping non-debarked elm firewood	DNR,DA,CES
.Continue to prepare news releases for the media	DNR,CES,DC
.Continue presentations to concerned civic groups and schools	DNR,DA,CES,DC

ACCOMPLISHMENTS AND PROBLEMS



ACCOMPLISHMENTS AND PROBLEMS

Significant progress has been made since funds were first provided for the establishment of six municipal "best management" Dutch elm disease programs. At the end of 1978, Minnesota's project had completed the initial stages of establishing high performance Dutch elm disease management programs in six selected cities--Fergus Falls, Granite Falls, Hutchinson, Litchfield, Little Falls, and Wadena--to augment the basic tree removal program already existing in each of the communities. The year 1978, then, was one of organization, the demonstration program being structured and its future years being planned. The year 1979, was one of implementation, disease management programs replacing existing tree removal programs. This year, 1980, was one of evaluation and further implementation.

A "recap", or summary, of the accomplishments made in the first two years-1978, 1979-of the program is as follows--

1. Tree losses due to Dutch elm disease dropped significantly in the demonstration communities.
2. With each additional year of the program, the cities participated more and required less technical assistance.
3. Due in part to the project's influence, each of the six demonstration cities hired a permanent forester or tree inspector.
4. Additional management practices were implemented and/or previously used management practices were improved. New in 1979 was the injection of selected trees with Arbotech, the pruning, therapeutically, of selected trees, and the incorporation of an annual elm tree trimming program in each of the communities. Practices which were continued in 1979 were the use of better and more numerous inspection surveys

(this included diseased tree and woodpile detection surveys), an increased promptness in diseased tree removal, and the more extensive use of root graft barrier installation.

5. Two reference (or control) cities were selected for each demonstration community. The Dutch elm disease situation in each reference city resembles as closely as possible the disease situation in the demonstration community to which it is being compared. Through the process of comparing, these "controls" should enable the level of success attained in each of the demonstration cities to be confirmed.

Program Accomplishments - 1980

1. The utilization project to process diseased elm into firewood was brought from its 1979 planning stage into full operation. In the cities of Granite Falls, Hutchinson, Litchfield, and Little Falls (disease losses were not great enough to justify transporting the utilization equipment to Fergus Falls and Wadena) all trees removed in 1980 have been debarked and are now being split into saleable firewood lengths.
2. The tree inventory project which involves counting each tree in the demonstration and reference communities, cataloging each elm as to its disease history, and computerizing the aforementioned information, was organized and implemented this year. The eight (8) person project crew has finished in Fergus Falls, Litchfield, and Wadena; it is now in Hutchinson and will move shortly to Granite Falls and then to Little Falls.
3. On September 2-4, 1980, Minnesota's demonstration program hosted a tour. The goal of this tour was to show others what Minnesota has accomplished in incorporating known disease management practices into "real" urban environments. A total of forty-two (42) people participated in one or more of the "tour days". Attendants were from Minnesota, California, Georgia, Wisconsin, Michigan, North Dakota, Ohio, and Canada.

4. Tree losses due to Dutch elm disease did not increase significantly as had been projected. Due to the mild winter of 1979, program personnel anticipated losing more trees than had at first been expected because of an increase in beetle survival. As it turned-out, disease losses were kept at much the same level as that of 1979, due, program personnel feel, to the excellent management programs implemented by each demonstration community. Indeed, most of the increases in loss figures reflect trees taken down not because of Dutch elm disease, but because of severe storm damage.

Tree Losses

	1979	1980		
		Projected	Actual	
Fergus Falls	100	150	217	(64 due to Dutch elm disease)
Granite Falls	408	315	479	(246 due to Dutch elm disease)
Hutchinson	600	600	509	(469 due to Dutch elm disease)
Litchfield	232	230	230	(217 due to Dutch elm disease)
Little Falls	516	500	365	(279 due to Dutch elm disease)
Wadena	64	75	88	(65 due to Dutch elm disease)

In 1980, disease incidence was maintained below the 5% level in all the demonstration cities.

5. A newsletter, "the Demonstration Six", has been developed and is being circulated. It has been enthusiastically received because it provides information on the demonstration program in one, concise form, and is available to any interested person or agency.
6. Four cities--Fergus Falls, Granite Falls, Hutchinson, and Little Falls-- received TREE CITY, USA recognition. This is an award which is given to those cities that have a legally constituted tree body, a community tree ordinance, an active community forestry program supported by public funds, and an arbor day proclamation and planting. This type of recognition is important because it shows that these cities have not only established a Dutch elm disease program, but have also worked with other aspects of urban forestry as well. This is the second year that Fergus Falls has received this award. In fact, Fergus Falls was the first Minnesota city to ever receive TREE CITY, USA recognition.

7. Additional management practices were implemented and/or previously used management practices were intensified and/or improved. In 1980, the use of Dursban to control native elm bark beetle populations was increased. During the fall of 1979, a large portion of elms in Granite Falls was sprayed. In the spring of 1980, elms in Little Falls were sprayed; in the fall of 1980, elms in Hutchinson and Wadena were sprayed. Lower beetle counts in Little Falls seem to indicate that Dursban can be an effective management tool when used with other sanitation practices. Further monitoring of the effects of this treatment will be done in 1981 by Dr. William Phillipsen, Extension Entomologist at the University of Minnesota. Practices which were continued in 1980 were the injection of selected elm trees with Arbotect; the pruning, therapeutically, of selected trees; the removal of dead wood from a portion of each city's elm population; the prompt removal of diseased trees; the increased use of root graft barrier installation; and, the completion of numerous, good inspection surveys (this included woodpile detection surveys, too.)
8. On June 18-19, 1980, the Extension Service of the University of Minnesota and the Minnesota Department of Natural Resources held a training session in Hutchinson for the foresters and tree inspectors of the demonstration cities. This was the second year that a "hands-on" workshop had been organized as part of the demonstration program. Participants had the opportunity to properly inject a tree with Arbotect and sample a tree for Dutch elm disease. All disease management practices were reviewed and their importance emphasized. Program personnel feel that this type of training session is largely responsible for the willingness of the cities to increase their use of systemic fungicides, therapeutic pruning, root graft barriers, and other control practices which elevate a tree removal program to a disease management program.
9. This year, 1980, was no different from previous years in that the cities played a more active role in the demonstration program and required less technical assistance than the year before.
10. With the help of the Minnesota Department of Agriculture, the reference cities, whose disease situations resemble as closely as possible that of one of the demonstration communities, were monitored.

Through this process of comparing, it is hoped that the success of the management practices recommended by the demonstration program can be measured.

<u>Demonstration City</u>	<u>Reference Cities</u>
Fergus Falls	Alexandria Elbow Lake
Granite Falls	Ortonville Redwood Falls
Hutchinson	Glencoe Olivia
Litchfield	Hector Renville
Little Falls	Princeton Cambridge
Wadena	Sauk Centre Staples



REFERENCE CITIES

Program Problems - 1980

1. The two regional coordinators who were very much responsible for helping the demonstration cities implement recommended disease management practices into their tree removal programs, quit at the end of the summer. The program ran smoothly in 1980 due in part to the work done by these individuals. The positions are still open, a situation that will hopefully be alleviated as soon as possible in 1981.
2. Elm losses were increased in some of the demonstration cities because of severe storm damage. During the summer, heavy rains, lightning, and tornadoes toppled many trees, or so severely damaged them that they had to be removed.
3. In all the demonstration cities but Little Falls, beetle populations have increased over the last two seasons. Because of this, disease losses in 1981 could also increase significantly. In the spring of 1980, Little Falls sprayed a large portion of its elm trees with Dursban. Program personnel feel that it could be due to this chemical application that native elm bark beetle numbers have remained at a low level. Hopefully, the spray applications done in the fall of 1980, and those which are planned for the spring of 1981, will help to reduce the number of beetles which survive through the winter.

UTILIZATION PROJECT

Project intent. To develop and maintain a system which processes unmarketable elm material into non-hazardous firewood. With this goal attained, each city involved in the project will complete the Dutch elm disease management cycle--disease detection-sanitation-utilization. In 1980, this utilization project was brought from its 1979 planning stage into full operation. A debarker now renders the elm logs pest-risk free and a log splitter cuts them into firewood lengths. All processed wood is to be sold at a fair, marketable price (to be determined by each participating city and the Department of Natural Resources) with the income, as directed by resolution, going into each city's disease management program.

Project development. A mechanical method of utilization (debarking and splitting) was put to use in the demonstration communities because it was thought to be a reliable way to efficiently process a large number of logs. A morbark portable log debarker was purchased and since it is a mobile unit, was transported easily from utilization site to utilization site. At these utilization sites, one person "fed" logs to the debarker with the help of a front-end loader as the other person ran them through the debarking process. Each demonstration community is participating in the Department of Agriculture's Shade Tree Program and must conform to a regulation which states that non-debarked elm wood, stockpiled for utilization purposes, must be processed within five (5) days. Therefore, in order that this regulation be adhered to, all logs were debarked in each city before the splitting process was started. Debarking of the wood began in July and was finally completed in October. Splitting of the debarked logs was then started and will continue through March. Although no firewood has yet been sold, it is hoped that the cities will soon be able to start. Some of

the elm is still very green and will probably have to "weather" for another season before it is dry enough to be sold as firewood. Any elm material which was too small, or in some other way not useable, was either burned or buried.

Calendar of events.

June, 1980

- .All equipment was leased or purchased
- .Employees (2) were hired and their training on the equipment completed
- .Debarking operation was begun in Granite Falls

July, 1980

- .Debarking operation still going in Granite Falls (processing took the longest here because the crew was still getting used to operating the equipment, and there was a large volume of trees due to several wild areas having been clear-cut of elm the previous winter season and the trees stockpiled for utilization)

August, 1980

- .Debarking operation finished in Granite Falls and moved to Hutchinson

September, 1980

- .Debarking operation moved from Hutchinson to Little Falls (the utilization project was set-up in Little Falls so that the people attending the demonstration program's tour could see it in operation)
- .Debarking completed in Little Falls--the equipment moved back to Hutchinson
- .Debarking completed in Hutchinson--the equipment moved to Litchfield

October, 1980

- .Debarking completed in Litchfield
- .Splitting of debarked logs begun

November, 1980

- .Splitting process continues in Litchfield
- .Splitting process is taking longer than expected--employee positions (2) extended through March, 1981
- .One crew member quits

December, 1980

- .Vacancy filled--there are again two (2) workers on the project
- .Splitting process mostly completed in Litchfield--equipment is moved to Granite Falls
- .Debarker stored for the winter at a forestry office

What's next? The splitting of the logs into firewood lengths should be completed by March, 1981. By this time, much of the firewood will have been sold. That which is still too wet to sell will be kept through the season and sold in the fall. The timetable now calls for the project to shut-down during the months of April and May. The debarking process will be started-up once again in June when the cities are beginning their tree removal work. With this being the second season of the utilization project, it is hoped that many of the "kinks" have been worked-out and the process can be more efficiently handled so that the debarking and splitting operation this year is completed by December, 1981. Because funding may not be available for the fifth and final year of the program, plans will be made for the dispersement of the equipment. Some of the participating cities have expressed interest in purchasing the equipment and maintaining the utilization project when federal assistance is no longer available. This next season, too, will show project personnel pulling together the "figures" for this utilization process--how much was invested; how many logs were brought to each city's utilization site; how many logs were processed at each utilization site; how many cords of firewood were processed; what was the selling price of a cord of firewood in each city; and, how much was made on the firewood sale compared to how much was invested in the project. Although elm wood utilization is still often criticized because it is too expensive and/or too impractical, it can bring about much public support for Dutch elm disease management programs. In the demonstration cities where the utilization process has taken place, public support has been increased in all areas of Dutch elm disease management. People have been somewhat appeased and encouraged that this available wood resource is not being destroyed, but is finally being utilized.

Initial Purchases

--Debarker	\$ 67,500.00
--Truck	11,000.00
--Log Splitter	4,870.00
--Chain saws and accessories	2,564.00
--Miscellaneous small equipment and supplies	<u>1,780.00</u>
	\$ 87,714.00

Rentals (through March, 1981)

--Skid steer loader (\$2,000/month)	\$ 12,000.00
--Trailer (\$355/month)	2,995.00
--Transporting of debarker	<u>2,000.00</u>
	\$ 16,995.00

<u>Positions</u> (two people through March, 1981)	\$ 18,773.82
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<u>Miscellaneous</u> (fuel, repairs, travelling expenses of crew-through March, 1981)	\$ 16,144.80
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<u>TOTAL</u>	<u>\$139,627.62</u>
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RESOLUTION
1980-43

RESOLUTION REGARDING THE UTILIZATION
AND SALE OF DEBARKED ELM WOOD FOR THE
DUTCH ELM PROGRAM


WHEREAS, the City of Little Falls and the Minnesota Department of Natural Resources are cooperating in a Dutch Elm Disease Shade Tree program, and

WHEREAS, as part of the program, the City is debarking cut elm logs at the old City landfill site, and

WHEREAS, the City and Department of Natural Resources intend to sell the debarked elm wood at a fair market value with receipts from such wood sales to be dedicated for the City's Shade Tree Program,

THEREFORE, be it resolved that the City of Little Falls and the Minnesota Department of Natural Resources have agreed to cooperate in the Shade Tree wood utilization program and sale with funds to be placed in the city's Shade Tree Program fund.

Passed this 8th day of September, 1980.



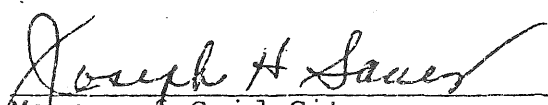
President of City Council

ATTEST:



City Administrator

Approved this 8th day of September, 1980.



Mayor of Said City

NEWSPAPER COVERAGE OF THE
UTILIZATION PROJECT

State Begins Debarking Elms

by Anne Tyler

Along with control efforts of Dutch elm disease, the Department of Natural Resources (DNR) has decided that there should be a utilization program for the wood from infected elm trees, according to Steve Cook, regional coordinator.

That's what brings the \$67,500 Morback debarking machine to Granite Falls for the next few weeks.

A traveling crew of woodsmen from the Minnesota DNR began stripping the bark off approximately a thousand elm trees at the city wood pile north of Granite Falls Wednesday.

The debarking of the diseased elms is part of the federally funded Dutch elm disease demonstration project that Granite Falls is a part of.

The beetle that carries Dutch elm disease lays its

eggs between the wood and the bark of the elm tree. It's essential for the eggs to have the protection of the bark, so once the bark is removed, the trees no longer carry a threat of infecting other elms, explained Cook.

The debarked wood will be left at the wood pile and will later be cut, split and stacked as firewood by the DNR. The city will then be responsible for distributing the wood as they want. The only stipulation, according to Cook, is that the wood must be sold, since federally funded projects cannot be in competition with private enterprise.

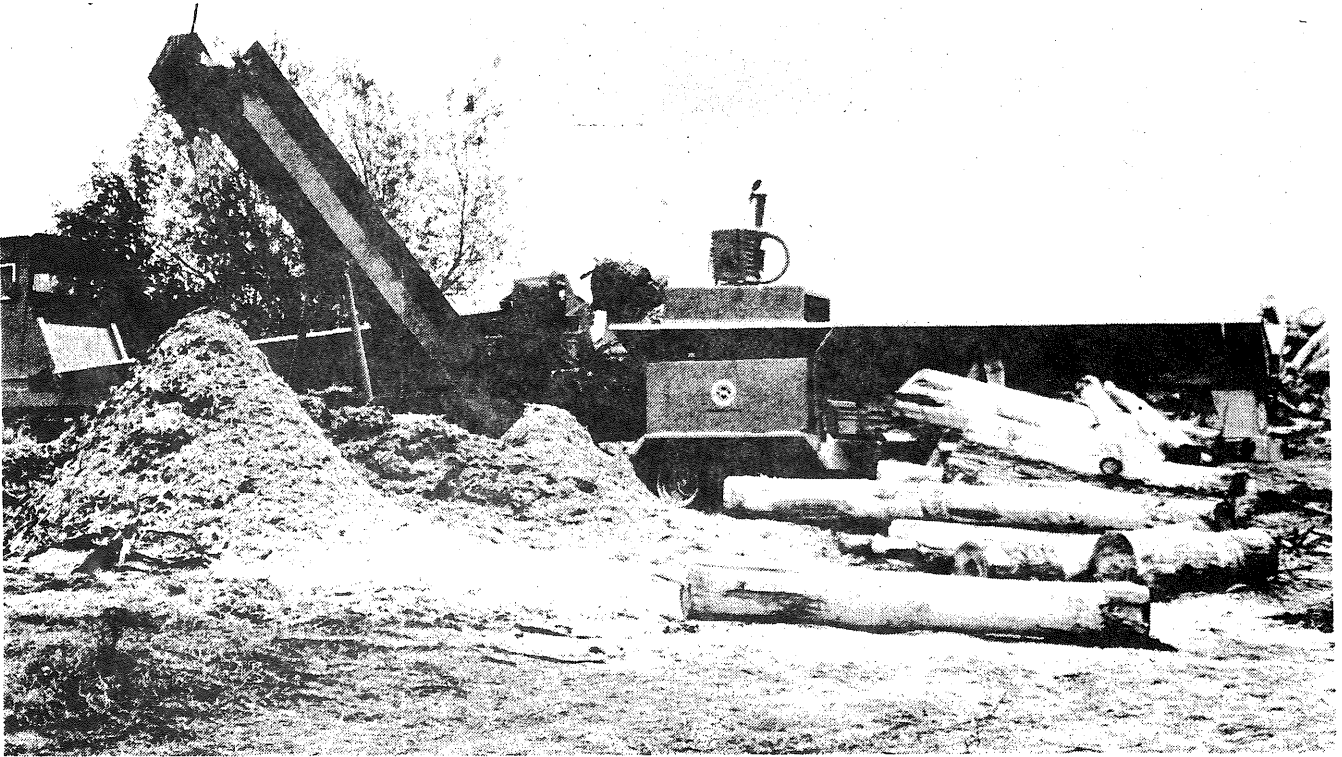
The men running the debarking machine are DNR employees and Granite Falls has contracted with Snyder Tree Service, Carroll, IA for the removal of diseased elms.

Cooperation between the two is imperative, said Cook. Trees debarked by the machine must not be under three feet in length, and must be between a six and 40-inch diameter. The trees must also be fairly straight and free from forks and flare ends.

Most of the elms being debarked came from a clean cutting operation on an area of infected elms in Campsite Park.

The DNR intends for the debarking unit to travel between Granite Falls and three other Minnesota cities in the demonstration project: Litchfield, Hutchinson and Little Falls. Fergus Falls and Wadena are also part of the demonstration project but will not make use of the debarker because they do not have the volume of trees in the other communities, added Cook.

Granite Falls Tribune - Thursday, July 10, 1980



DEBARKER AT WORK---The Department of Natural Resources tree-debarking machine, a unit worth \$67,000, was at work in Litchfield last week debarking diseased elm trees which had been cut down this summer in Litchfield. When the elm wood has been debarked it'll be sawed up in fireplace lengths, and be available for sale to the public.

Wood being debarked this fall may not be available until next fall, according to City Forester Steve Cook, since it probably won't be properly dried till then. About 230 trees have been lost to Dutch Elm Disease in Litchfield this summer.

Litchfield Independent Review - Thursday, September 25, 1980



Morrison County Record

Monday,
September 8, 1980

Machine Makes Mulch out of Beetle

The Dutch elm beetle may have felled many beautiful Dutch elm trees in Little Falls but the story is far from over. Al Taylor of Bloomington, operates the bobcat which feeds the logs to the debarking machine, operated by John Bryant of Anoka. The debarking machine strips the bark, where underneath the insects deposit eggs, causing the insect habitat to be destroyed. The log is fed through the rotator [similar to a pencil going through a pencil sharpener] which kicks out the stripped log and mulches the bark. Later the wood will be cut and split for use as firewood to be sold by the city of Little Falls. The Department of Natural Resources, Forestry division, contracts with seasonal workers through city, state and federal funding. Uses for debarked wood includes landscaping, containers and log cabins but this Little Falls project is mainly for firewood. The shredded bark, minus the beetle which no longer survives, will be used for trail bedding, mulch and bedding insulation.

[Record photo by Patty Buck]

INVENTORY PROJECT

The inventory project originated from the idea that it would be beneficial for the demonstration program to computerize its disease statistics. Not only would "computerization" provide permanent, documented data, but the information would be more accessible and easier to retrieve than that held in hand-written records. Personnel also felt that before the demonstration program was completed, an updated tree inventory would be necessary.

Since some of the cities had expressed an interest in developing an urban tree management plan, it seemed to follow that as long as trees were being individually counted, other information could be gathered at the same time. Each city, then, would have the information necessary to complete the first step of a management plan. The information now being collected on each tree is its location (this includes private trees as well as public), its species, its dbh, its condition, and its site condition. The system used to computerize this data will allow each city to add or delete information when desired. The disease history of each elm will also be computerized so that information on a certain tree can be retrieved--for example, the date it was injected, its condition when it was injected, the date it had all dead wood removed, the date it was found to have Dutch elm disease, the type of infection it was carrying (beetle or root graft), the date it was removed, etc.

Because this is an ambitious project, an eight (8) person crew was hired for an eight (8) month term to collect all the necessary information. So far, progress has been good--inventorying in the fifth demonstration community is now being completed. When the demonstration cities are done, a "sample"

population of trees in the reference cities will be inventoried. This is necessary so that the program has a documented record of the number of trees in each reference city and will not have to rely on outdated municipal tree counts. The eight (8) members of the inventory crew have worked very well together and only one person has quit. This vacant position was filled as soon as possible, so the crew is again numbering eight (8). Before the crew moves into a new city, an article is placed in the municipal newspaper describing the project. This "publicity" has a two-fold purpose. First, residents are very interested in the project and often stop the crew members to ask them questions. Newspaper articles explain the nature of the crew's work and request that people do not hold them up by asking numerous questions. Therefore, this publicity can save time for the inventory crew. Second, although each crew member wears a cruiser vest identifying him/her as part of the project, the newspaper articles explain that these inventory people are entering private yards on legitimate business. Most people are not alarmed or angered, then, when they see someone looking at trees in their yards. Even though the inventorying is progressing well, problems have occurred. Some of the cities did not have clearly defined corporate limits and/or did not have up-to-date maps which accurately outlined the blocks and streets. Tree identification at times can also be a problem, but the short course held at the University of Minnesota for the purpose of familiarizing the crew with the types of trees it would encounter, helped alleviate trouble in this area. Books with good winter keys have also helped the crew during the winter months when tree identification is most difficult in Minnesota. The thing most responsible for the inventory crew having been able to move so quickly, however, is the mild winter Minnesota has experienced thus far.

The weather has been exceptionally warm, allowing people to work out-of-doors for most of the day. The end of 1981 should see the completion of this computerized system, with all information available and easily retrievable.

Amount budgeted to carry the project through eight (8) months...

Salary for eight (8) people	\$ 63,805.44
Miscellaneous expenses	58,601.12
(printing of inventory sheets; purchase of tree identification books, diameter tapes, cruiser vests, other miscellaneous small equipment; crew lodging and living expenses)	
Computer work and time	30,000.00

TOTAL \$152,406.56

1 2 3 4 5 6 7 8 9 10 11 12
 Date

 /

 City

 Area

 Survey Unit

 Survey Crew

[illegible]

INVENTORY CODE SHEET

City

01 Fergus Falls
 02 Granite Falls
 03 Hutchinson
 04 Litchfield
 05 Little Falls
 06 Wadena
 07 Alexandria
 08 Elbow Lake
 09 Ortonville
 10 Redwood Falls
 11 Glencoe
 12 Olivia
 13 Hector
 14 Renville
 15 Princeton
 16 Cambridge
 17 Sauk Centre
 18 Staples

Site Class

01 residential - house
 02 residential - apartment
 03 private developed
 (non residential)
 04 private institutional
 05 private cemetery
 06 private undeveloped
 07
 08
 09
 10 boulevard
 11 public developed
 open space (parks, etc.)
 12 public institutional
 13 public cemetery
 14 public undeveloped

DBH

00 managed tree
 2" to 4" (at
 least one ft. high)
 04 4" to 8"
 08 8" to 12"
 12 12" to 16"
 16 16" to 20"
 20 20" to 24"
 24 24" to 28"
 28 28" to 32"
 32 32" to 36"
 36 36" and over

Condition

Code 1 - Really vigorous tree. No
 (good) apparent signs of insect,
 disease, or mechanical
 injury. Little or no
 corrective work required.
 Form representative of species.

Code 2 - Average condition and
 (fair) vigor for area. May need
 corrective pruning or repair.
 May lack desirable form
 characteristic of species.
 May show minor insect injury,
 disease, or physiological
 problem.

Code 3 - General state of decline.
 (poor) May show severe mechanical,
 insect, or disease damage,
 but death not imminent. May
 require major repair or
 renovation.

Code 4 - Dead or death imminent from
 (dead Dutch elm disease or other
 or causes.
 dying)

Survey Crew

01 Brett Bahr	05 Gerald Kluthe
02 Joni Book	06 Ken Simonsen
03 Ricardo Dirk	07 Steven Stegmeier
04 David Flink	08 James Traun

Site Condition

1 streambank, riverbank,
 or lakeshore
 2 wet or swampy
 3 pavement
 4 foundation (building)
 5 bare ground
 6 wooded
 7 lawn
 8 grass (non-lawn)
 9 other ground cover
 (garden plants, shrubs,
 low vegetation etc.)
 0 other-specify in remarks

09 Joni, Brett	22 David, Ricardo
10 Ricardo, Brett	23 Gerald, Ricardo
11 David, Brett	24 Ken, Ricardo
12 Gerald, Brett	25 Steve, Ricardo
13 Ken, Brett	26 Jim, Ricardo
14 Steve, Brett	
15 Jim, Brett	27 Gerald, David
	28 Ken, David
16 Ricardo, Joni	29 Steve, David
17 David, Joni	30 Jim, David
18 Gerald, Joni	
19 Ken, Joni	31 Ken, Gerald
20 Steve, Joni	32 Steve, Gerald
21 Jim, Joni	33 Jim, Gerald

Dead Wood

0 all conifers
 1 less than 10% dead wood
 2 10% to 25% dead wood
 3 25% to 50% dead wood
 4 over 50% deadwood

Wetwood

0 non elm
 1 no evidence of wetwood
 2 wetwood evident but
 not active
 3 active wetwood evident

INVENTORY CODE SHEET

Tree Species

00	No tree present	47	Russian olive	90
01	American elm	48	winged spindle tree	91
02	Siberian (and	49	Japanese tree lilac	92
	Chinese elm)	50	other ornamentals	93
03	red elm		(Angiosperms)	94
04	rock elm	51	cottonwood	95
05	hackberry	52	willow	96
06	white oak	53	balsam poplar	97
07	bur oak	54	trembling aspen	98
08	northern red oak	55	bigtooth aspen	forked tree-species
09	northern pin oak	56	European poplar	same as previous tree
10	other oak	57	Bolleana poplar	99
11	beech	58	other poplar	pavement
12	sugar maple	59	mountain ash	
13	norway maple	60	Prunus (cherry, plum)	
14	silver maple	61	Malus (apple, crabapple)	
15	red maple		Pyrus (Pear)	
16	boxelder	62	hawthorne	
17	other maple	63	Amelanchier	
18	green ash		(Juneberry)	
19	black ash	64	mulberry	
20	white ash	65	cucumbertree	
21	blue ash	66	yellow poplar	
22	other ash	67	ginko	
23	American basswood	68	red pine	
24	littleleaf linden	69	Austrian pine	
25	other linden	70	Scots pine	
26	honeylocust	71	eastern white pine	
27	Kentucky coffeetree	72	jack pine	
28	black locust	73	Ponderosa pine	
29	eastern redbud	74	other hard pines	
30	walnut	75	other soft pines	
31	butternut	76	white spruce	
32	hickory	77	Colorado blue spruce	
33	paper birch	78	Norway spruce	
34	ironwood	79	black spruce	
35	river birch	80	other spruce	
36	yellow birch	81	balsam fir	
37	other birch	82	Douglas fir	
38	alder	83	hemlock	
39	American hornbeam	84	other fir	
	(bluebeech)	85	northern white cedar	
40	Ohio buckeye	86	eastern red cedar	
41	horse chestnut	87	larch	
42	buckthorne	88	other Gymnosperms	
43	northern catalpa	89	Common hoptree	
44	sumac			
45	sycamore			
46	dogwood			

NEWSPAPER COVERAGE OF THE
INVENTORY PROJECT

DNR conducting citywide comprehensive tree inventory

1984

If you are a Hutchinson resident and you notice someone walking around your yard admiring your trees and taking notes, he's not some nut: he's one of seven state Department of Natural Resources (DNR) employees conducting a city tree inventory.

The inventory was started Dec. 8 and is expected to continue through the next two or three weeks. The goal of the inventory, the first of its kind to be done in Hutchinson, is to make a comprehensive study of all city trees.

Not only the numbers of trees will be included in the inventory. Other characteristics noted will be site conditions and class (residential, public property), tree sizes and types, dead wood and the presence of any disease.

The DNR is administering the inventory in five other Federal Dutch Elm Disease demonstration program communities beside Hutchinson, as well as 12 other communities which do not have a comprehensive Dutch elm disease prevention program. No city funds are involved in the count, which will include all trees with a two-inch diameter standing at least one foot off the ground.

The information collected will be fed into a DNR computer

program, according to Dave Flink of the DNR. Preliminary reports from the study will be available in about two months and the final report will be completed by next summer or fall.

The DNR members conducting the study are working out of the office of city forester Mark Schnobrich.

"This survey is unique in several ways," Flink said, explaining that private trees will

be surveyed (all other studies have included only trees on public property) and the exact location of each tree in each block quadrant will also be noted.

The results of the inventory will be used for budgeting and tree planting plans, Flink added, and will provide "more in-

formation for the city foresters than they have ever had before.

"Hutchinson has a very diverse tree population as compared to other project cities," Flink said. More detailed information on Hutchinson's tree population will be available once the inventory results are finalized.



IF YOU SEE someone like this in your backyard during the next couple weeks, don't worry: he's one of seven state Department of Natural Resources (DNR) employees conducting a complete tree inventory of Hutchinson. Here, Jerry Kluthe inspects the condition and characteristics of a sycamore tree at the Milo Wegner residence, 105 Tenth Ave. NE. The crews started the inventory Dec. 8 and will continue through the next two or three weeks.

SUMMARY OF THE DEMONSTRATION TOUR

SEPTEMBER 2-4, 1980

The Minnesota Federal Dutch Elm Disease Demonstration Program hosted a tour on September 2-4, 1980. The goal of this tour was to show others what Minnesota has accomplished in incorporating known disease management practices into "real" urban environments. A total of forty-two (42) people participated in one or more of the "tour days". Attendants were from Minnesota, California, Georgia, Wisconsin, Michigan, North Dakota, Ohio, and Canada. The tour was successful in that the entire group was very congenial and information promoting new techniques in Dutch elm disease management or information reaffirming the "soundness" of known, basic management concepts was passed freely from one person to another.

The following is a brief summary of what took place.

September 2, 1980.

At an evening reception, everyone was introduced to Dutch elm disease in Minnesota. At this time, Dr. David French, Richard Haskett, and Meg Hanisch^{1/} discussed "The History of Dutch Elm Disease in Minnesota" and "Minnesota's Commitment to Dutch Elm Disease Management". Program personnel felt that an evening session would be a good opportunity to discuss all aspects of the disease in Minnesota, not just the demonstration program. Each visitor, it seemed, learned more from hearing how the demonstration program "fits" into the whole Minnesota disease picture--how it works cooperatively with the United States Forest Service, the Minnesota Department of

1/ Department Head of Plant Pathology, University of Minnesota; Shade Tree Program Director, Minnesota Department of Agriculture; and, Supervisor, Federal Dutch Elm Disease Program, Minnesota Department of Natural Resources; respectively.

Agriculture's Shade Tree Program, and the University of Minnesota's Extension Service. Several people remarked that this two-hour evening session was long enough to generate interest in the next two days, but short enough to prevent restlessness and boredom.

September 3, 1980.

This day was spent in the City of Litchfield observing systemic fungicide injection, root graft barrier placement, and therapeutic pruning demonstrations. Steve Cook, a former regional coordinator of the program and at that time Litchfield City Forester, spent a great deal of time and effort in preparing these demonstration sites. The nice weather was a major contributor to the success of the tour this day, and being able to stay outside for long periods of time enabled everyone to observe that Litchfield is a very attractive city. Indeed, many members of the tour group remarked that Litchfield is one of the better-looking cities they have visited and complimented the citizenry for taking such an active interest in preserving its large urban tree population. People were impressed with seeing a root graft barrier installed with a vibratory plow since many of them were familiar with this technique only through literature. Having the time to therapeutically prune-out infected portions of diseased elm trees impressed people, too, for many of them work with programs that still advocate only removal, not treatment. The City Clerk and the Mayor of Litchfield discussed with the tour group their thoughts on the disease management program. This was an important contribution since projects such as this demonstration program are useful only when they are understood, implemented, and supported by the cities in which they are being carried-out. The tour group spent the night in St. Cloud amidst thunderstorms and tornadoes. The weather had been "picture-perfect" during the day, but changed during the night.

September 4, 1980

This last day of the tour was spent in Little Falls observing the elm firewood utilization project and how Dursban is applied in an attempt to reduce native elm bark beetle populations. The utilization equipment was set-up and operating. This project consists of some impressive machinery (debarker and wood splitter) and Harlan Petersen, University of Minnesota Extension Specialist, was on hand to help explain its operation as well as to discuss the other attempts being made in Minnesota to somehow find a use for these diseased trees. Dr. William Phillipsen, who has done much of the research work with Dursban, demonstrated the application methods used by the program. This topic generated a good discussion since the chemical has been labelled for use in Canada much longer than it has been here, and the Canadians had much to tell us about the ways in which it is used in their country. Again, the weather cooperated, the schedule was adhered to, and everyone was returned to St. Paul in time to catch their flight home.

In conclusion, the Minnesota Federal Dutch Elm Disease Demonstration Program achieved one of its more important goals--getting people together from other states and Canada to observe the management practices advocated in Minnesota and the utilization project which produces non-hazardous elm firewood.

A Tour — September 2-4, 1980

In 1978, Minnesota was selected to participate in a Dutch elm disease management and utilization program funded by the United States Forest Service. Basic tree removal programs were replaced by high performance Dutch elm disease management programs in six selected Minnesota communities. You are invited to accompany program personnel on a tour of some of these communities to observe the management practices being implemented and the utilization project which produces non-hazardous elm firewood.

The agenda will be as follows:

September 2, 7:00 pm

A reception will be held at the Capitol Holiday Inn in St. Paul. Visitors will be acquainted with program personnel who will familiarize them with the events of the next two days.

September 3

The tour will begin with a look at the City of Litchfield's Dutch elm disease management program. Representatives from the City, the University of Minnesota, and the Minnesota Department of Natural Resources will be present to demonstrate control practices and explain why they have been implemented.

September 4

On this last day, the tour will proceed to the City of Little Falls. Control techniques not demonstrated the previous day will be reviewed. Program personnel will again be available to discuss why these management practices have been implemented. Everyone will be returned to the Twin Cities area by early afternoon.

PLEASE, your attendance is very important! With Minnesota's Dutch Elm Disease Demonstration Program now into its third year, it is time to show others what has been accomplished in implementing known disease management practices into "real" urban environments.

For further information, please read the accompanying letter, and on the form provided, fill in the names of those who wish to attend. A stamped, addressed envelope is enclosed for your convenience. All replies must be in no later than August 19, 1980. A finalized agenda will be sent at a later date to those who wish to participate.

HOPE TO SEE YOU THERE!

F I N A L I Z E D A G E N D A

September 2 - Tuesday Evening

- 6:30 - 7:00 Getting Together
A cash bar will be available during this time when everyone is gathering in the Buffington Room of the Capitol Holiday Inn to register.
- 7:00 - 7:10 Greetings and Introduction
Meg Hanisch, Minnesota Department of Natural Resources
- 7:10 - 7:35 The History of Dutch Elm Disease in Minnesota
Dr. David French, University of Minnesota
- 7:35 - 8:00 Minnesota's Commitment to Dutch Elm Disease Management
Richard Haskett, Minnesota Department of Agriculture-Shade Tree Program
- 8:00 - 8:30 REFRESHMENTS
The cash bar will again be open and appetizers served during this time when people can "mingle" and get to know one another.
- 8:30 - 9:00 Becoming Familiar with the Demonstration Cities of Litchfield and Little Falls
Meg Hanisch, Minnesota Department of Natural Resources

September 3 - Wednesday

- 8:00 - 10:00 Travelling to Litchfield
A bus will be waiting for everyone in front of the Capitol Holiday Inn
- 10:00 - 10:30 A Tour of the City (by bus)
- 10:30 - 11:00 BREAK

Finalized Agenda
Page Two

September 3 - Wednesday continued

11:00 - 12:30	Demonstration and Discussion Systemic Fungicide Injection
12:30 - 1:30	LUNCH at the Farmer's Daughter
1:30 - 2:45	Demonstration and Discussion Root Graft Barrier Placement, Mechanical and Chemical Methods
2:45 - 3:00	BREAK
3:00 - 4:00	Demonstration and Discussion Therapeutic Pruning
4:00 - 4:30	Demonstration and Discussion Tree Inventory and Disease Data Collecting
4:30 - 5:00	The City of Litchfield's View of Its Dutch Elm Disease Management Program Goals, Accomplishments, and Problems
5:00 - 6:00	Travelling to St. Cloud Reservations have been made at the St. Cloud Holiday Inn. The evening is free to enable people to get to know one another better or to fit that discussion in that there wasn't time for during the day.

September 4 - Thursday

8:00 - 8:45	Travelling to Little Falls
8:45 - 10:15	Demonstration and Discussion Federal Dutch Elm Disease Utilization Project

Finalized Agenda
Page Three

September 4 - Thursday continued

10:15 - 10:30	BREAK
10:30 - 12:30	Tour of the City Demonstration and Discussion The Use of Dursban
12:30 - 1:30	LUNCH at the Pine Edge Motor Inn
1:30 - 2:00	Demonstration and Discussion Clear-cutting
2:00 - 4:30	Return to the Twin Cities (Capitol Holiday Inn). A shuttle bus will be available to take those leaving to the airport.

ATTENDANCE LIST

Minnesota's Federal Dutch
Elm Disease Demonstration Program
Tour

September 2-4, 1980

Kenneth Bailey
Georgia Forestry Commission
6835 Memorial Avenue
Stone Mountain, Georgia 30083

Bruce Berggren
PFM Forester
Minnesota Department of Natural Resources
6163 Rice Lake Road
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Edward A. Brown
Extension Plant Pathologist
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Athens, Georgia 30602

Vincent Brown
Planning Director
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Steve Cook
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Wayne Damerow
District Forester
Minnesota Department of Natural Resources
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Charles Evenson
Regional Coordinator, Federal Dutch Elm Disease Program (former)
Minnesota Department of Natural Resources
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St. Paul, Minnesota 55155

Dr. David French
304 Stakman Hall of Plant Pathology
University of Minnesota
St. Paul, Minnesota 55108

*Attendance List**Minnesota's Federal Dutch Elm Disease Demonstration Program Tour**Page Two**Joanne Gallaher**Urban and Community Forestry Specialist**United States Forest Service**Northeastern Area, State and Private Forestry**1992 Folwell Avenue**St. Paul, Minnesota 55108**Dr. Asimina Gkinis**216 Stakman Hall of Plant Pathology**University of Minnesota**St. Paul, Minnesota 55108**Laurie Groth**Wisconsin Department of Natural Resources**3911 Fish Hatchery Road**Madison, Wisconsin 53711**Meg Hanisch**Supervisor, Federal Dutch Elm Disease Program**Minnesota Department of Natural Resources**Division of Forestry, Box 44**Centennial Office Building**St. Paul, Minnesota 55155**James Hanson**United States Forest Service**Northeastern Area, State and Private Forestry**1992 Folwell Avenue**St. Paul, Minnesota 55108**Richard Haskett**Director, Minnesota Shade Tree Program**Department of Agriculture**90 West Plato Boulevard**St. Paul, Minnesota 55107**Art Hastings**Dutch Elm Disease Coordinator**United States Forest Service**Northeastern Area, State and Private Forestry**1992 Folwell Avenue**St. Paul, Minnesota 55108*

Attendance List

Minnesota's Federal Dutch Elm Disease Demonstration Program Tour
Page Three

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Regional Parks and Operations Division
City of Winnipeg
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C. Allan Jeffrey
Provincial Manager
Forest Protection and Dutch Elm Disease
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Dutch Elm Disease Coordinator
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University of Wisconsin
Madison, Wisconsin 53706

Dr. Arthur Lamey
Plant Pathologist
Cooperative Extension Service
North Dakota State University
Fargo, North Dakota 58102

Attendance List
Minnesota's Federal Dutch Elm Disease Demonstration Program Tour
Page Four

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Branch Manager - Manufacturing Division
Hopkins Agricultural Chemical Company
2020 Broadway Street Northeast
Minneapolis, Minnesota 55413

Wendell Mathews
City of Hutchinson
37 Washington Avenue West
Hutchinson, Minnesota 55350

Jim Olmstead
Urban Forester
Forest Management Division
Michigan Department of Natural Resources
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David Paulson
City Forester
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Dr. John W. Peacock
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Harlan Petersen
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S. Olin Phillips
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Attendance List

Minnesota's Federal Dutch Elm Disease Demonstration Program Tour
Page Five

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St. Paul, Minnesota 55108

Gary Plotz
Administrative Assistant
37 Washington Avenue West
Hutchinson, Minnesota 55350

Bernie Pretts
City Forester
City Hall
Fergus Falls, Minnesota 56537

Vernon Quam
Tree Inspector
100 Northeast Seventh Avenue
Little Falls, Minnesota 56345

Ernie Radunz
Tree Inspector
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Doug Rau
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Attendance List

Minnesota's Federal Dutch Elm Disease Demonstration Program Tour
Page Six

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University of Minnesota
St. Paul, Minnesota 55108

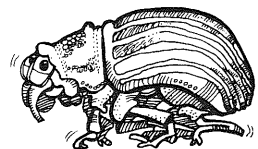
Dr. Pavel Svihra
Dutch Elm Disease Specialist
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University of California
Berkley, California 94720

John Van Ells
Staff Forester - Field Operations
NDSU - Bottineau Branch
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James Walters
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Northeastern Area, State and Private Forestry
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Jeff Welker
DOW Chemical U. S. A.
Agricultural Products Department
11100 Bren Road West
Minnetonka, Minnesota 55343

DISEASE STATISTICS



DISEASE STATISTICS - 1980

FERGUS FALLS

.Total number of elm trees--16,500

.Elms lost in 1977--40 trees

.1978 Projected elm loss--initially, 90 trees-revised, 100 trees

1978 Actual elm loss--117 trees

.1979 Projected elm loss--215 trees

1979 Actual elm loss--100 trees

.1980 Projected elm loss--150 trees

1980 Actual elm loss--217 trees

Trees removed due to Dutch elm disease--64

public property--19 trees removed; all American elm
14 beetle infections
5 root graft infections

private property--45 trees removed; 44 American elm, 1 red elm
38 beetle infections
7 root graft infections

Trees removed due to other causes--72

(This category includes those dead or weakened elm trees still standing, as well as those trees heavily damaged due to weather. Fergus Falls had a severe storm on July 10, 1980, and many trees were so badly damaged that they were removed.)

public property--43 trees removed; 38 American elm, 5 Siberian elm

private property--29 trees removed; 24 American elm, 5 Siberian elm

Although they were not diseased, 31 additional American elm trees were removed from private property because they were harboring bark beetles.

Total cost of tree removal work--\$11,696.00

Average cost per tree--\$86.00

.1981 Projected elm loss--115 trees

Disease Statistics - 1980
Fergus Falls (continued)

.All trees are to be removed within the twenty (20) day time limit required by the Minnesota Department of Agriculture's Shade Tree Program. The remaining stumps must be removed or debarked.

.All trees removed due to Dutch elm disease were laboratory tested. A total of 81 samples were cultured; 68 were positive (this includes the sixty-four trees removed due to Dutch elm disease and the four trees therapeutically pruned).

.The native elm bark beetle is the insect vector present in Fergus Falls.

.Other disease management practices implemented--

Root graft barriers installed--1,161 feet
 mechanical barriers (trencher) - 40 feet
 chemical barriers (vapam) - 1,121 feet
 Systemic fungicide injections (Arbotect)-- 9 elm trees preventively treated
 Trees therapeutically pruned--5 (four elms have remained healthy)
 Pruning of dead wood--1,448 elm trees
 Woodpiles detected--433 (seven contained elm, all of which was debarked)

.1978 Federal grant -----	\$18,870.75
Supplemental federal grant -----	<u>8,500.00</u>
	\$27,370.75 in total

1978 Municipal budget for Dutch elm disease	
City's contribution -----	\$18,340.00
Minnesota Shade Tree Program's contribution-----	<u>14,410.00</u>
	\$32,750.00 in total

.1979 Federal grant ----- \$55,260.40

1979 Municipal budget for Dutch elm disease	
City's contribution -----	\$20,990.28
Minnesota Shade Tree Program's contribution -----	<u>19,318.38</u>
	\$40,308.66 in total

.1980 Federal grant ----- \$33,907.50

1980 Municipal shade tree program budget ----- \$47,556.50

.1981 Requested federal grant ----- \$32,822.88

DISEASE STATISTICS - 1980

GRANITE FALLS

.Total number of elm trees--6,920

.Elms lost in 1977--77 trees

.1978 Projected elm loss--initially, 300 trees-revised, 500-600 trees

1978 Actual elm loss--532 trees

.1979 Projected elm loss--525 trees

1979 Actual elm loss--408 trees

.1980 Projected elm loss--375 trees

1980 Actual elm loss--479 trees

public property-321 trees removed

private property-158 trees removed

Trees removed due to Dutch elm disease--246

149 beetle infections

97 root graft infections

Weakened/dead/storm damaged elms removed--197 trees

Elms removed due to other causes--36 trees

American elms removed--404 trees

Siberian elms removed--23 trees

Red elms removed--50 trees

Rock elms removed--2 trees

Total cost of tree removal work--\$27,237.10

Average cost per tree--\$56.86

.1981 Projected elm loss--450 trees

.All trees are to be removed within the twenty (20) day time limit required by the Minnesota Department of Agriculture's Shade Tree Program. Of the remaining stumps, 117 were ground-out and 362 were debarked.

.Questionable trees were laboratory tested for Dutch elm disease. A total of 15 samples were cultured; 6 were positive (culturing was made difficult due to contamination problems).

Disease Statistics - 1980
Granite Falls (continued)

.Both the native elm bark beetle and the smaller European bark beetle are present in Granite Falls.

.Other disease management practices implemented---

Root Graft barriers installed---461 feet (vapam)
Systemic fungicide injections (Arbotect)---45 trees
Trees therapeutically pruned---4 (all are still healthy)
Pruning of dead wood---394 elm trees
Woodpiles detected---18 (hazardous wood was removed by the City, or debarked)

.1978 Federal grant -----	\$30,680.00
Supplemental federal grant -----	<u>12,500.00</u>
	\$43,180.00 in total

1978 Municipal budget for Dutch elm disease	
City's contribution -----	\$15,573.60
Minnesota Shade Tree Program's contribution -----	<u>12,236.40</u>
	\$27,810.00 in total

.1979 Federal grant ----- \$74,747.00

1979 Municipal budget for Dutch elm disease	
City's contribution -----	\$13,989.60
Minnesota Shade Tree Program's contribution -----	<u>16,010.40</u>
	\$30,000.00 in total

.1980 Federal grant ----- \$44,990.00

1980 Municipal shade tree program budget ----- \$30,000.00

.1981 Requested federal grant ----- \$32,565.00

DISEASE STATISTICS - 1980

HUTCHINSON

.Total number of elm trees--16,000

.Elms lost in 1977--141 trees

.1978 Projected elm loss--initially, 600 trees-revised, 850-900 trees

1978 Actual elm loss--875 trees

.1979 Projected elm loss--1,750 trees

1979 Actual elm loss--600 trees

.1980 Projected elm loss--600 trees

1980 Actual elm loss--509 trees

public property-142 trees removed
private property-367 trees removed

Trees removed due to Dutch elm disease--469

262 beetle infections
207 root graft infections

Weakened/dead/storm damaged elms removed--17 trees
Elms removed due to other causes--23 trees

American elms removed--427 trees
Siberian elms removed--13 trees
Red elms removed--65 trees
Rock elms removed--4 trees

Total cost of tree removal work--\$50,362.80
Average cost per tree--\$98.94

.1981 Projected elm loss--400 trees

.By city ordinance, all diseased trees are to be removed within fourteen (14) days and even problem trees do not stand longer than the twenty (20) day removal time limit required by the Minnesota Department of Agriculture's Shade Tree Program. Of the remaining stumps, 413 were ground-out and 96 were debarked.

Disease Statistics - 1980
Hutchinson (continued)

.Questionable trees were laboratory tested for Dutch elm disease. A total of 5 samples were cultured; 2 were positive.

.Both the native elm bark beetle and the smaller European bark beetle are present in Hutchinson.

Other disease management practices implemented--

Root graft barriers installed--3,017 feet
mechanical barriers (vibratory plow) - 2,736 feet
chemical barriers (vapam) - 281 feet

Systemic fungicide injections (Arbotect)-- 79 trees
preventively - 78 trees
therapeutically - 1 tree

Trees therapeutically pruned--29 (twenty-eight elms have remained healthy)

Pruning of dead wood---839 elm trees

Woodpiles detected--25 (all hazardous wood was debarked or removed)

Elms treated with Dursban (Fall of 1980)--entire urban elm population--
private and public

.1978 Federal grant -----	\$11,388.00
Supplemental federal grant ----	<u>10,000.00</u>
	\$21,388.00 in total

1978 Municipal budget for Dutch elm disease	
City's contribution -----	\$41,126.96
Minnesota Shade Tree Program's contribution -----	<u>32,314.04</u>
	\$73,441.00 in total

.1979 Federal grant ----- \$174,159.00

1979 Municipal budget for Dutch elm disease	
City's contribution -----	\$26,129.76
Minnesota Shade Tree Program's contribution -----	<u>26,129.76</u>
	\$52,259.52 in total

.1980 Federal grant ~~was~~ \$63,946.00

1980 Municipal shade tree program budget ~~was was was~~ \$88,254.00

.1981 Requested federal grant ~~7200 0000 0000 0000~~ \$38,540.00

DISEASE STATISTICS - 1980

LITCHFIELD

.Total number of elm trees--7,798

.Elms lost in 1977--91 trees

.1978 Projected elm loss--250 trees

1978 Actual elm loss--267 trees

.1979 Projected elm loss--385 trees

1979 Actual elm loss--232 trees

.1980 Projected elm loss--230 trees

1980 Actual elm loss--230 trees

public property-82 trees removed

private property-148 trees removed

Trees removed due to Dutch elm disease--217

173 beetle infections

44 root graft infections

Weakened/dead/storm damaged elms removed--13 trees

Elms removed due to other causes--0 trees

American elms removed--219 trees

Siberian elms removed--9 trees

Red elms removed--2 trees

Rock elms removed--0 trees

Total cost of tree removal--\$11,832.82 (this amount was spent on a private contractor removing 144 trees-the remaining 86 trees were removed by city crews)

Average cost per tree--\$82.17

.1981 Projected elm loss--230 trees

.All trees are to be removed within the twenty (20) day time limit required by the Minnesota Department of Agriculture's Shade Tree Program. Of the remaining stumps, 193 were ground-out and 37 were debarked.

Disease Statistics - 1980
Litchfield (continued)

.Questionable trees were laboratory tested for Dutch elm disease. A total of 9 samples were cultured; 6 were positive.

.Both the native elm bark beetle and the smaller European bark beetle are present in Litchfield.

.Other disease management practices implemented--

Root graft barriers installed--611 feet
mechanical barriers (trencher) - 561 feet
chemical barriers (vapam) - 50 feet

note: Root graft barriers were placed at ten (10) locations. A mechanical trencher was used at eight (8) of these locations, and a combination of mechanical trencher and vapam was used at two (2).

Systemic fungicide injections (Arbotect)-- 59 trees
preventively - 58 trees
therapeutically - 1 tree

Trees therapeutically pruned--31

note: Dutch elm disease had been confirmed in twenty-six (26) of these trees. Five (5) trees were "possibly" diseased.

Success rate--12 - trees remaining healthy
14 - the stain was found to have progressed too far when the therapeutic pruning was attempted
5 - trees found not to be infected with Dutch elm disease

Pruning of dead wood--684 trees; 501 pruned by private contractor
183 pruned by city crews

Woodpiles detected--55 (all hazardous wood was debarked or removed)
Girdling--12 diseased trees were treated in this manner at locations where root graft barriers could not be placed in time.
These trees were then removed as soon as possible--not one remained longer than two (2) weeks.

.1978 Federal grant ----- \$28,756.60

1978 Municipal budget for Dutch elm disease

City's contribution -----	\$ 6,944.00
Minnesota Shade Tree Program's contribution -----	<u>5,456.00</u>
	\$12,400.00 in total

.1979 Federal grant ----- \$64,188.00

1979 Municipal budget for Dutch elm disease

City's contribution -----	\$13,891.13
Minnesota Shade Tree Program's contribution -----	<u>10,834.63</u>
	\$24,725.76 in total

Disease Statistics - 1980
Litchfield (continued)

.1980 Federal grant ----- \$45,150.00

1980 Municipal shade tree program budget ----- \$18,000.00

.1981 Requested federal grant ----- \$30,980.00

DISEASE STATISTICS - 1980

LITTLE FALLS

.Total number of elm trees---7,174

.Elms lost in 1977--350 trees

.1978 Projected elm loss--initially, 500 trees-revised, 640-690 trees

1978 Actual elm loss--677 trees

.1979 Projected elm loss--715 trees

1979 Actual elm loss--516 trees

.1980 Projected elm loss--500 trees

1980 Actual elm loss--365 trees

public property-107 trees removed
private property-258 trees removed

Trees removed due to Dutch elm disease--279
Weakened/dead/storm damaged elms removed--84
Elms removed due to other causes--2

American elms removed--342 trees
Siberian elms removed--22 trees
Red elms removed--1 tree
Rock elms removed--0 trees

Total cost of tree removal work--\$21,109.45
Average cost per tree--\$57.83

.1981 Projected elm loss--350 trees

.All trees are to be removed within the twenty (20) day time limit required by the Minnesota Department of Agriculture's Shade Tree Program. Of the remaining stumps, 297 were ground-out and 68 were debarked.

.The native elm bark beetle is the insect vector most prevalent in Little Falls. The smaller European bark beetle has not been found in significant numbers.

Disease Statistics - 1980
 Little Falls (continued)

.Other disease management practices implemented--

Root graft barriers installed--42 locations
 mechanical barriers (trencher) - 23 locations
 chemical barriers (vapam) - 19 locations
 Systemic fungicide injections (Arbotect)-- 17 trees
 preventively - 16 trees
 therapeutically - 1 tree
 Trees therapeutically pruned--9
 Pruning of dead wood--1000 elm trees
 Woodpiles detected--61 (all hazardous wood was debarked or removed)
 Elms treated with Dursban (Spring of 1980)--5000

.1978 Federal grant -----	\$60,817.00
Supplemental federal grant -----	<u>2,500.00</u>
	\$63,317.00 in total

1978 Municipal budget for Dutch elm disease	
City's contribution -----	\$1,176.00
Minnesota Shade Tree Program's contribution -----	<u>924.00</u>
	\$2,100.00 in total

.1979 Federal grant ----- \$91,498.85

1979 Municipal budget for Dutch elm disease	
City's contribution -----	\$ 6,879.28
Minnesota Shade Tree Program's contribution -----	<u>6,879.28</u>
	\$13,758.56

.1980 Federal grant ----- \$53,647.50

1980 Municipal shade tree program budget ----- \$51,022.50

.1981 Requested federal grant ----- \$32,326.40

DISEASE STATISTICS - 1980

WADENA

.Total number of elm trees--4,800

.Elms lost in 1977--4 trees

.1978 Projected elm loss--100 trees

1978 Actual elm loss--81 trees

.1979 Projected elm loss--140 trees

1979 Actual elm loss--64 trees

.1980 Projected elm loss--75 trees

1980 Actual elm loss--88 trees

public property-51 trees removed
private property-37 trees removed

Trees removed due to Dutch elm disease--65

51 beetle infections
14 root graft infections

Weakened/dead elms removed--8 trees

Elms removed due to other causes including storm damage--15 trees

American elms removed--79 trees

Siberian elms removed--7 trees

Red elms removed--2 trees

Rock elms removed-- 0 trees

Total cost of tree removal work--\$16,991.68

Average cost per tree--\$193.09 (includes stump removal)

.1981 Projected elm loss--75 trees

.All trees are to be removed within the twenty (20) day time limit required by the Minnesota Department of Agriculture's Shade Tree Program. The remaining stumps of all trees must be removed or debarked.

.Samples from all trees thought to be diseased were laboratory tested. A total of 127 samples were cultured; 70 were positive

Disease Statistics - 1980
Wadena (continued)

.The native elm bark beetle is the insect vector present in Wadena.

.Other disease management practices implemented--

Root graft barriers installed--2,136.5 feet (27 locations)

mechanical barriers (vibratory plow) - 1,328.5 feet

chemical barriers (vapam) - 808 feet

Systemic fungicide injections (Arbotect)-- 4 trees

preventively - 2 trees

therapeutically - 2 trees

Trees therapeutically pruned--11

Pruning of dead wood--trees were trimmed by the City's Electrical Department, but a record of the number of trees done was not kept

Woodpiles detected--250 (seventy contained elm, all of which was debarked or removed)

Elms treated with Dursban (Fall of 1980)--1,100

Girdling--5 diseased trees were treated in this manner at locations where root graft barriers could not be placed in time. These trees were then removed as soon as possible.

.1978 Federal grant ----- \$11,592.00

1978 Municipal budget for Dutch elm disease

City's contribution ----- \$11,200.00

Minnesota Shade Tree Program's contribution ----- 8,800.00

\$20,000.00 in total

.1979 Federal grant ----- \$27,466.75

1979 Municipal budget for Dutch elm disease

City's contribution ----- \$2,436.84

Minnesota Shade Tree Program's contribution ----- 2,436.84

\$4,873.68 in total

.1980 Federal grant ----- \$26,150.00

1980 Municipal shade tree program budget ----- \$20,500.00

.1981 Requested federal grant ----- \$23,350.00

Tree Losses Due to Other Causes
(weakened/dead trees, storm damaged trees, etc.)

Losses Due to Dutch Elm Disease

1980 Tree Loss - Total

TREE LOSSES

Category	Tree Losses (Estimated)
Tree Losses Due to Other Causes (weakened/dead trees, storm damaged trees, etc.)	~55
Losses Due to Dutch Elm Disease	~65
1980 Tree Loss - Total	~225

GRANITE FALLS

Tree Losses Due to Other Causes
(weakened/dead trees, storm damaged trees, etc.)

Losses Due to Dutch Elm Disease

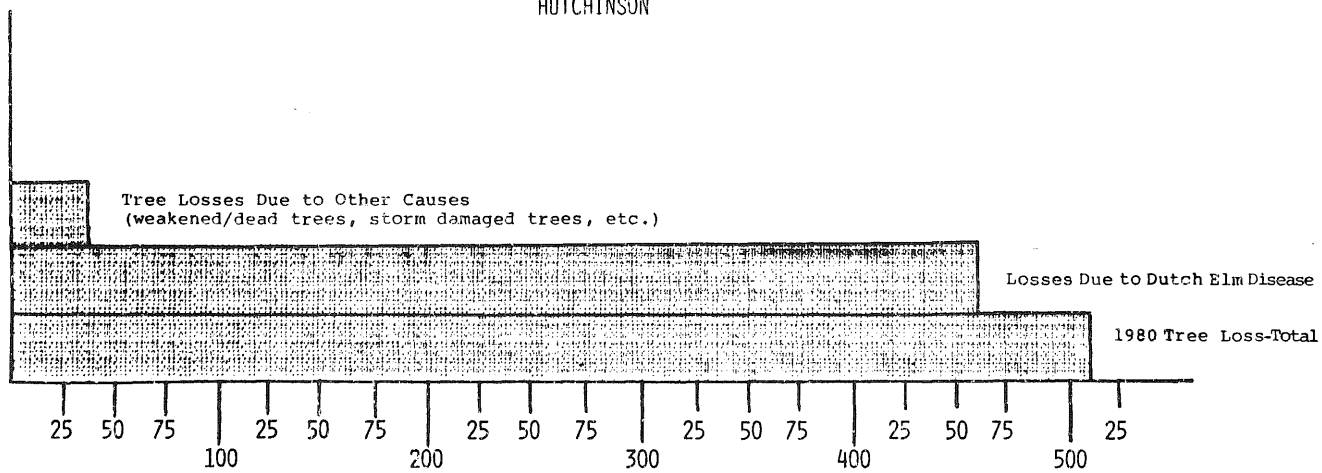
1980 Tree Loss - Total

TREE LOSSES

Category	Tree Losses (Estimated)
Tree Losses Due to Other Causes (weakened/dead trees, storm damaged trees, etc.)	275
Losses Due to Dutch Elm Disease	300
1980 Tree Loss - Total	475

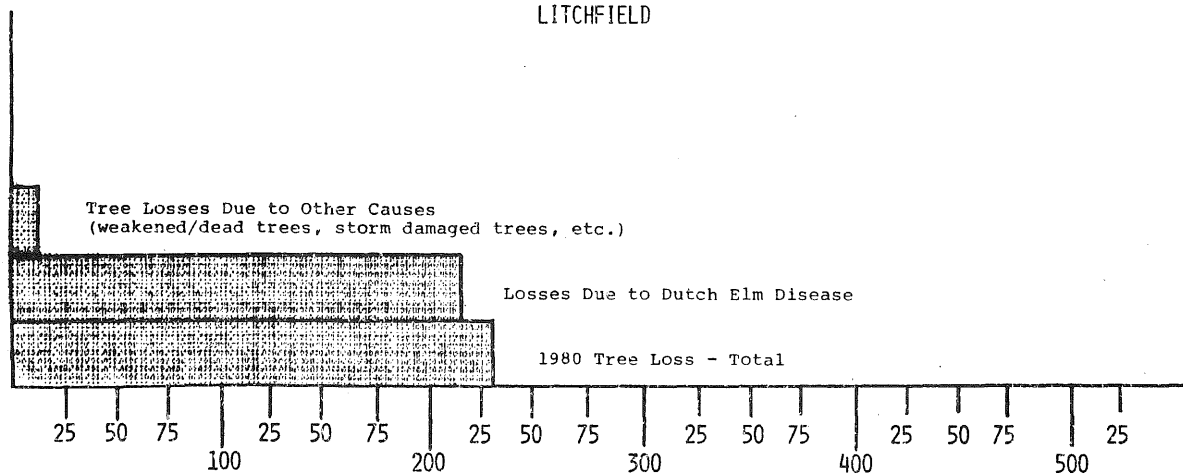
1980 MUNICIPAL TREE LOSSES

HUTCHINSON



TREE LOSSES

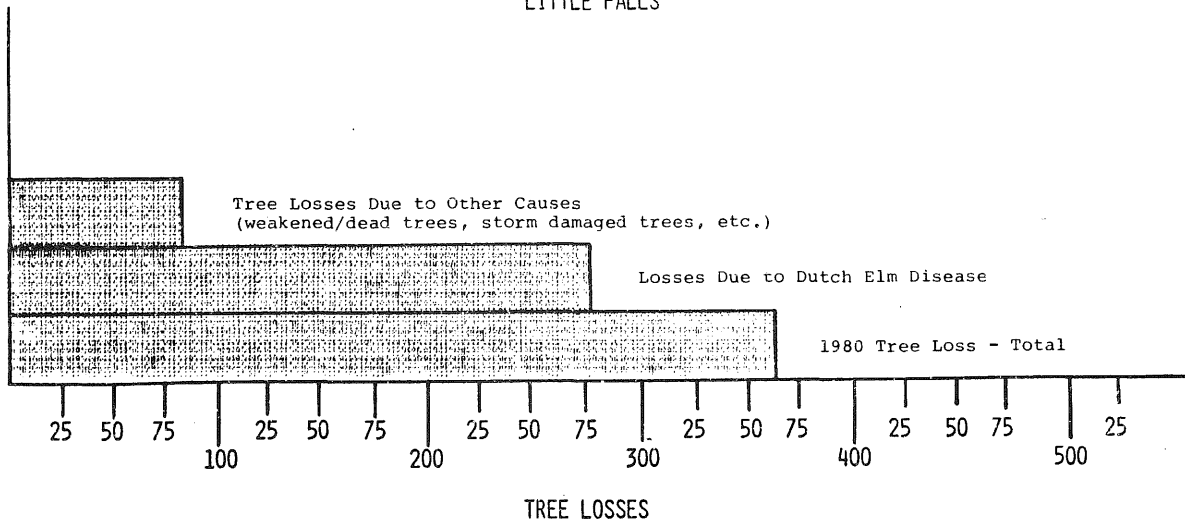
LITCHFIELD



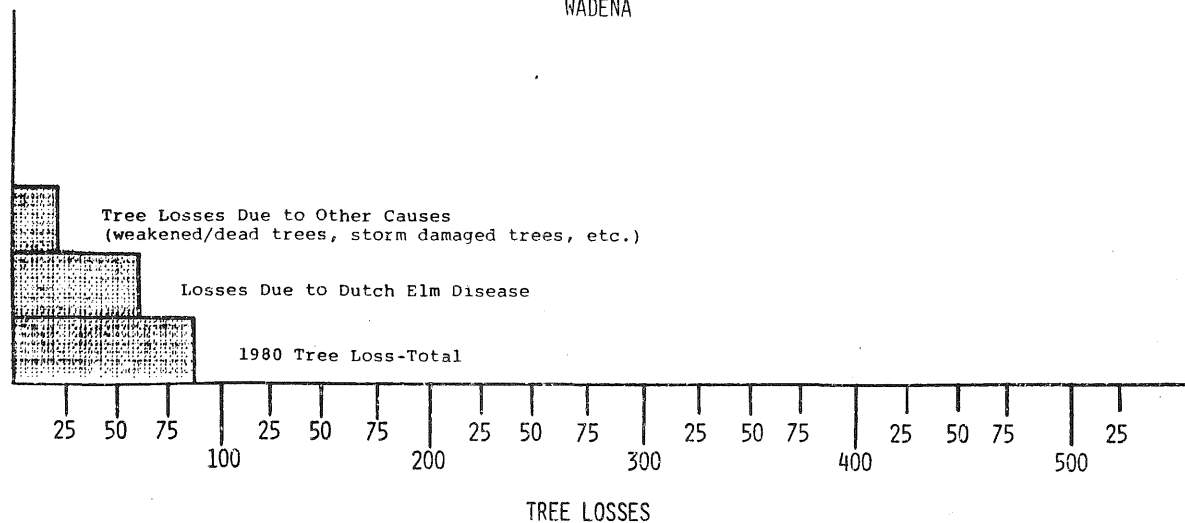
TREE LOSSES

1980 MUNICIPAL TREE LOSSES

LITTLE FALLS



WADENA



FERGUS FALLS

<u>Year</u>	<u>Elm Population</u>	<u>Dutch Elm Disease Losses</u>	<u>Disease Incidence</u>
1977	16,500	40	0.24%
1978	16,460	117	0.71%
1979	16,343	100	0.61%
1980	16,243	<u>64</u>	0.39%
		321	TOTAL TREES

There has been a 1.95% tree loss due to Dutch elm disease from 1977-1980.

GRANITE FALLS

<u>Year</u>	<u>Elm Population</u>	<u>Dutch Elm Disease Losses</u>	<u>Disease Incidence</u>
1977	6,920	77	1.11%
1978	6,843	532	7.77%
1979	6,311	408	6.46%
1980	5,903	<u>246</u>	4.17%
		1,263	TOTAL TREES

There has been a 18.25% tree loss due to Dutch elm disease from 1977-1980.

HUTCHINSON

<u>Year</u>	<u>Elm Population</u>	<u>Dutch Elm Disease Losses</u>	<u>Disease Incidence</u>
1977	16,000	141	0.88%
1978	15,859	875	5.52%
1979	14,984	600	4.00%
1980	14,384	<u>469</u>	3.26%
		2,085	TOTAL TREES

There has been a 13.03% tree loss due to Dutch elm disease from 1977-1980.

LITCHFIELD

<u>Year</u>	<u>Elm Population</u>	<u>Dutch Elm Disease Losses</u>	<u>Disease Incidence</u>
1977	7,798	91	1.17%
1978	7,707	267	3.46%
1979	7,440	232	3.12%
1980	7,208	<u>217</u>	3.01%
		807	TOTAL TREES

There has been a 10.35% tree loss due to Dutch elm disease from 1977-1980.

LITTLE FALLS

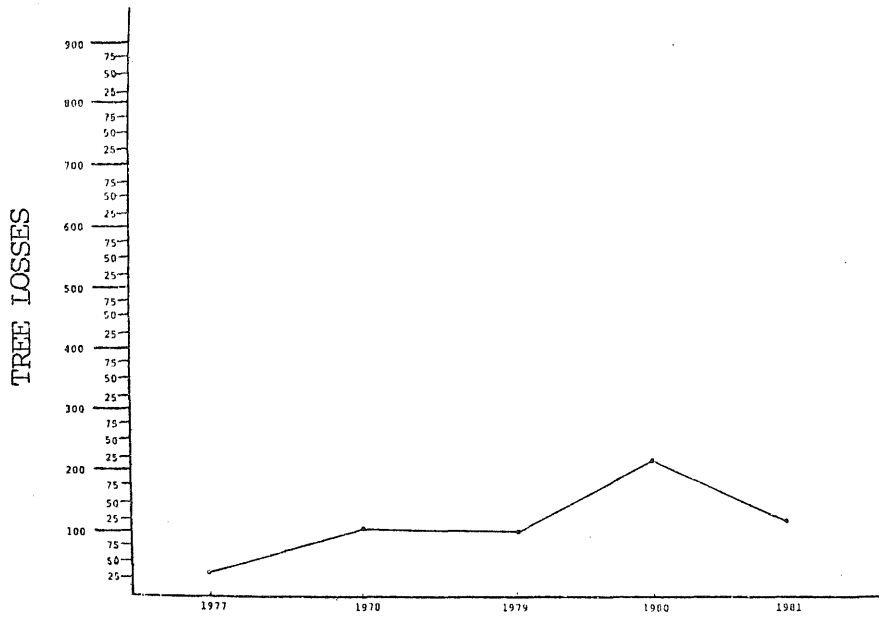
<u>Year</u>	<u>Elm Population</u>	<u>Dutch Elm Disease Losses</u>	<u>Disease Incidence</u>
1977	7,174	350	4.88%
1978	6,824	677	9.92%
1979	6,147	516	8.39%
1980	5,631	<u>279</u>	4.95%
		1,822	TOTAL TREES

There has been a 25.40% tree loss due to Dutch elm disease from 1977-1980.

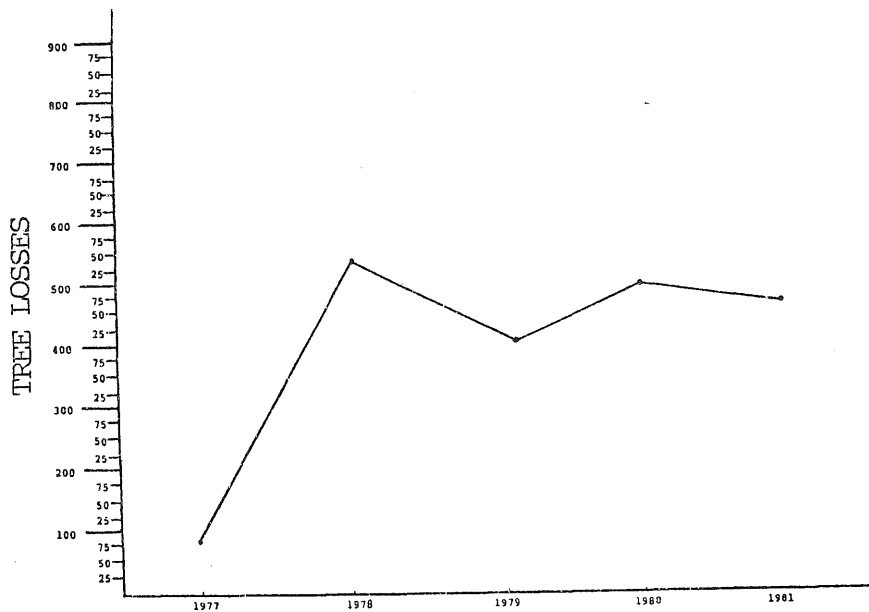
WADENA

<u>Year</u>	<u>Elm Population</u>	<u>Dutch Elm Disease Losses</u>	<u>Disease Incidence</u>
1977	4,800	4	0.08%
1978	4,796	81	1.69%
1979	4,715	64	1.36%
1980	4,651	<u>65</u>	1.40%
		214	TOTAL TREES

There has been a 4.46% tree loss due to Dutch elm disease from 1977-1980.

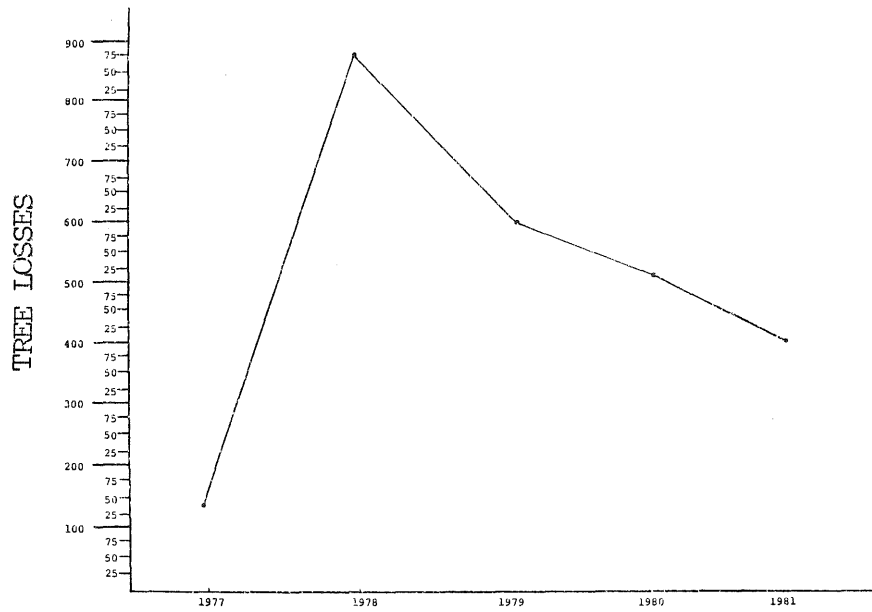


Fergus Falls - Elm Tree Loss Trend

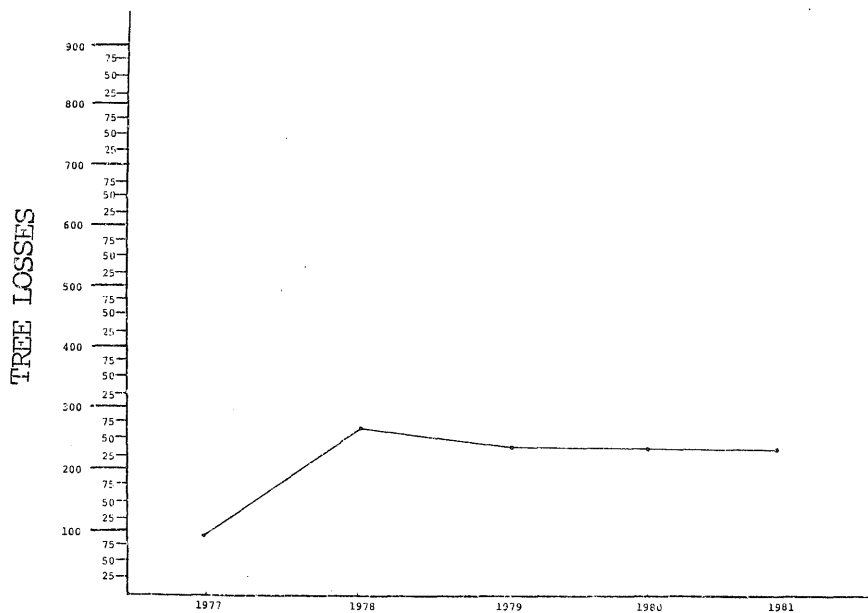


Granite Falls - Elm Tree Loss Trend

All 1981 figures are projected tree losses

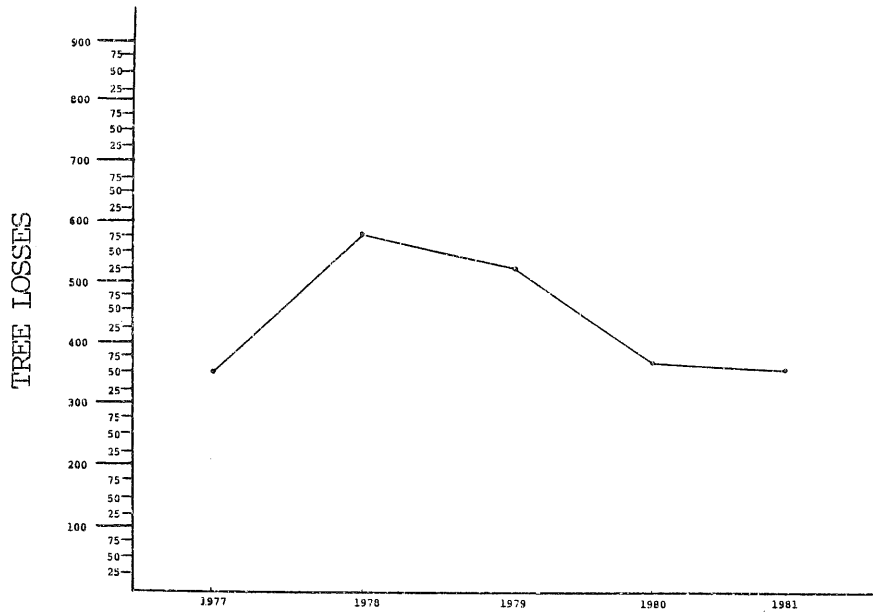


Hutchinson - Elm Tree Loss Trend

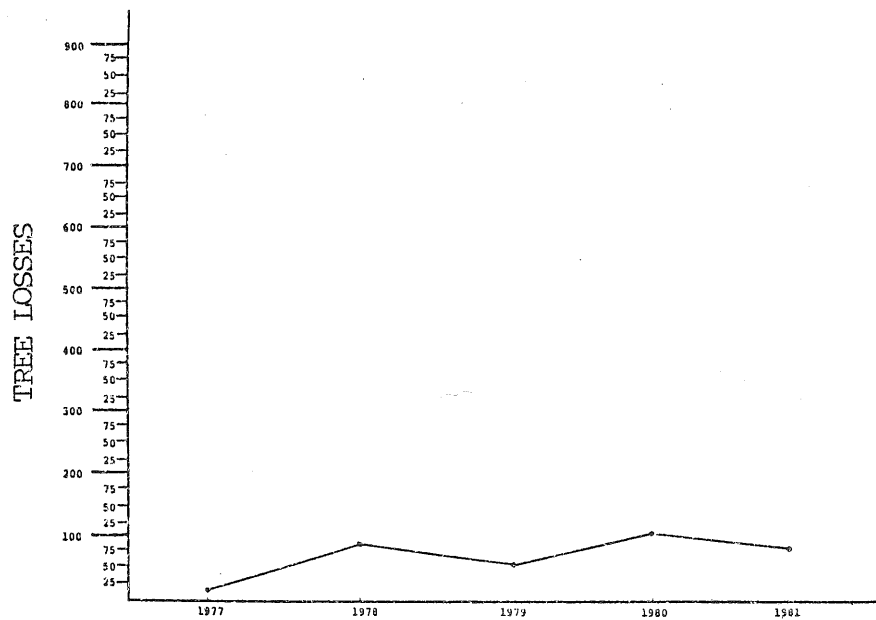


Litchfield - Elm Tree Loss Trend

All 1981 figures are projected tree losses



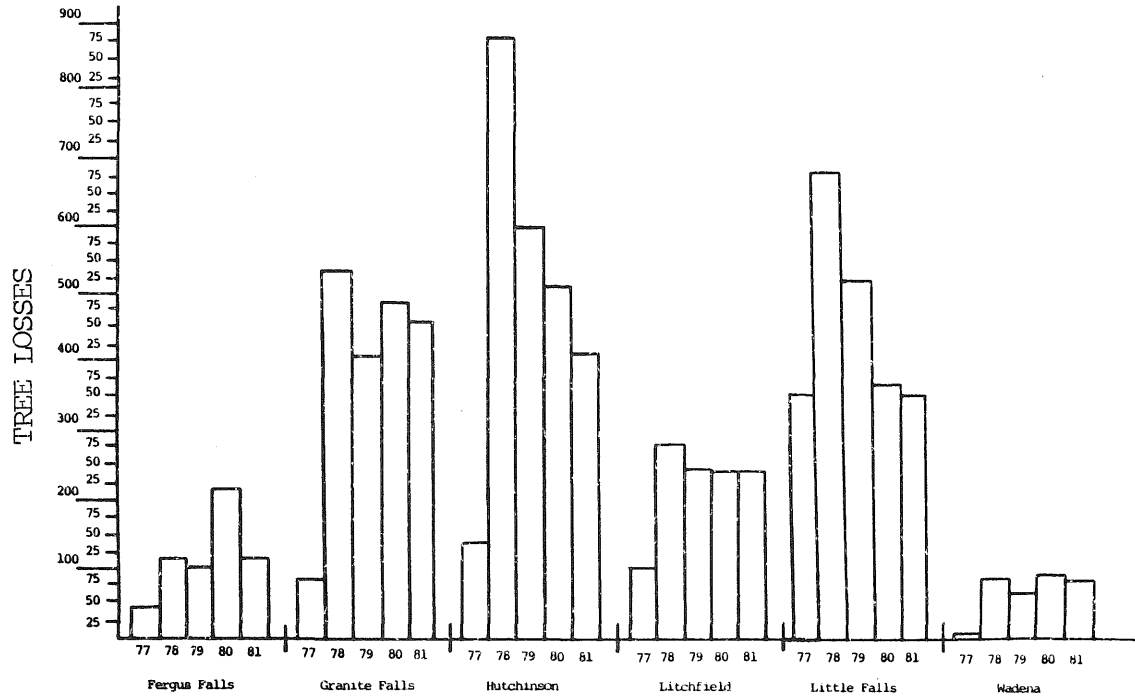
Little Falls - Elm Tree Loss Trend



Wadena - Elm Tree Loss Trend

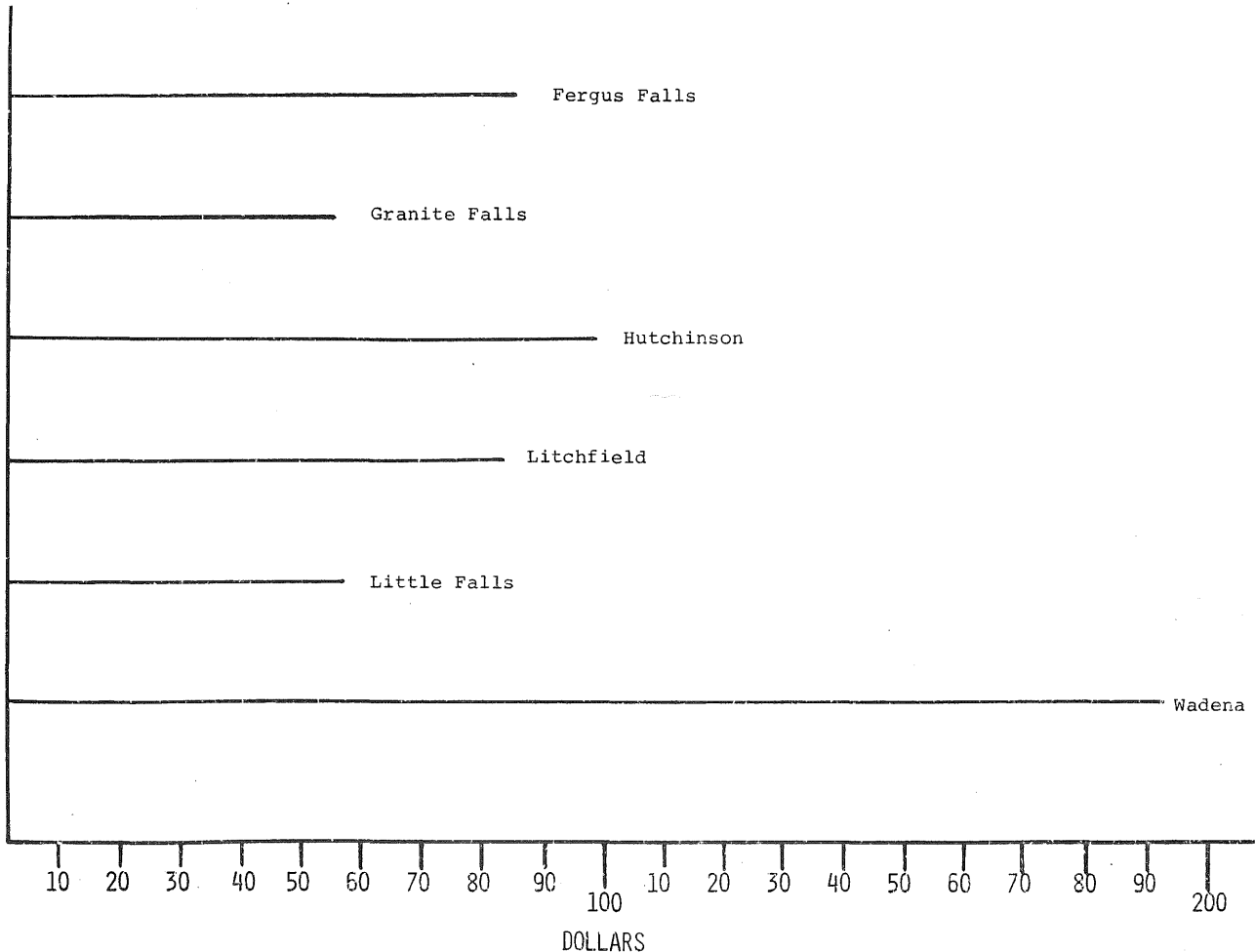
All 1981 figures are projected tree losses

TREE LOSSES IN THE DEMONSTRATION CITIES

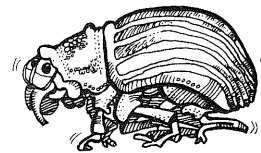


All 1981 figures are projected tree losses

AVERAGE TREE REMOVAL COST -- 1980



MUNICIPAL BUDGETS - 1981



PROPOSED BUDGET - 1981

FERGUS FALLS

Personal Services \$13,636.00

- one full-time forester = \$7,500.00
(one-half of requested salary - city must contribute remaining one-half)
- one seasonal, full-time tree inspector
\$5.60/hour, 40 hours/week for fourteen weeks = \$3,136.00
- fringe benefits for above positions = \$3,000.00

Equipment Rental \$ 4,161.88

- one, half-ton pick-up for city forester
\$201.25/month for six months = \$1,207.50
(city is responsible for funding the vehicle for the other six months)
- one, half-ton pick-up for seasonal tree inspector
\$201.25/month for three and one-half months = \$704.38
- one aerial bucket truck for tree sampling
50 hours at \$45/hour = \$2,250.00

Disease Management Practices \$14,725.00

- to assist in the removal of trees and stumps, \$5,000.00
- trimming of dead wood from elm trees = \$6,000.00
- installation of root graft barriers
35 barriers at \$15.00 each = \$525.00
- use of systemic fungicides
15 trees at \$80.00 each = \$1,200.00
- use of Dursban to control native elm bark beetle populations = \$2,000.00

Miscellaneous Small Equipment and Supplies \$ 200.00Office Expenses \$ 100.00Total Federal Contribution Requested \$32,822.88

1978 Federal Grant -- \$27,370.75
 1979 Federal Grant -- \$55,260.40
 1980 Federal Grant -- \$33,907.50

PROPOSED BUDGET - 1981

GRANITE FALLS

Personal Services \$ 6,640.00

- one seasonal, full-time assistant tree inspector
\$5.00/hour, 40 hours/week for sixteen weeks = \$3,200.00
- fringe benefits for above position = \$640.00
- two seasonal laborers (to assist with root graft barrier
placement, tree injection, etc.)
\$4.00/hour, 350 hours/season x 2 = \$2,800.00

Disease Management Practices \$25,625.00

- to assist in the removal of trees and stumps, \$12,500.00
- trimming of dead wood from elm trees = \$4,500.00
- therapeutic pruning of an estimated 20 trees = \$1,400.00
- installation of root graft barriers = \$1,000.00
- use of systemic fungicides
45 trees at \$125.00 each = \$5,625.00
- removal of firewood piles = \$600.00

Miscellaneous Small Equipment and Supplies \$ 200.00

Office Expenses \$ 100.00

Total Federal Contribution Requested \$32,565.00

1978 Federal Grant -- \$43,180.00
1979 Federal Grant -- \$74,747.00
1980 Federal Grant -- \$44,990.00

PROPOSED BUDGET - 1981

HUTCHINSON

<u>Personal Services</u>	<u>\$10,260.00</u>
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- three seasonal, full-time tree inspectors
\$4.75/hour, 40 hours/week for thirteen weeks x 3 = \$7,410.00
- two seasonal laborers (to assist with root graft barrier
placement, tree injection, etc.)
\$4.75/hour, 300 hours/season x 2 = \$2,850.00

<u>Disease Management Practices</u>	<u>\$27,980.00</u>
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- to assist in the removal of trees and stumps, \$13,000.00
- trimming of dead wood from elm trees = \$6,000.00
- therapeutic pruning of an estimated 30 trees = \$1,500.00
- installation of root graft barriers = \$4,000.00
- use of systemic fungicides
30 trees at \$100.00 each = \$3,000.00
- removal of firewood piles = \$480.00

<u>Miscellaneous Small Equipment and Supplies</u>	<u>\$ 200.00</u>
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<u>Office Expenses</u>	<u>\$ 100.00</u>
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<u>Total Federal Contribution Requested</u>	<u>\$38,540.00</u>
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1978 Federal Grant -- \$ 21,388.00
 1979 Federal Grant -- \$174,159.00
 1980 Federal Grant -- \$ 63,946.00

PROPOSED BUDGET - 1981

LITCHFIELD

Personal Services \$ 6,800.00

- one assistant tree inspector
\$7.50/hour, 40 hours/week for sixteen weeks = \$4,800.00
- two seasonal laborers (to assist with root graft barrier
placement, tree injection, etc.)
\$4.00/hour, 250 hours/season x 2 = \$2,000.00

Equipment Rental \$ 480.00

- mileage for assistant tree inspector's vehicle
\$.20/mile - 150 miles/week for sixteen weeks = \$480.00

Disease Management Practices \$23,400.00

- to assist in the removal of trees and stumps, \$4,900.00
- trimming of dead wood from elm trees = \$6,000.00
- therapeutic pruning of an estimated 30 trees = \$2,100.00
- installation of root graft barriers = \$2,500.00
- use of systemic fungicides = \$5,300.00
- use of Dursban to control native elm bark beetle
populations = \$2,000.00
- removal of firewood piles = \$600.00

Miscellaneous Small Equipment and Supplies \$ 200.00Office Expenses \$ 100.00

Total Federal Contribution Requested \$30,980.00

1978 Federal Grant -- \$28,756.60
1979 Federal Grant -- \$64,188.00
1980 Federal Grant -- \$45,150.00

PROPOSED BUDGET - 1981

LITTLE FALLS

Personal Services \$11,431.40

- one full-time tree inspector
\$6.43/hour, 40 hours/week for seventeen weeks = \$4,372.40
(one-half of requested salary - city must contribute remaining one-half)
- one seasonal, full-time tree inspector
\$5.90/hour, 40 hours/week for fourteen weeks = \$3,304.00
- fringe benefits for above positions = \$2,675.00
- one seasonal laborer (to assist with root graft barrier placement, tree injection, etc.)
\$4.50/hour, 240 hours/season = \$1,080.00

Equipment Rental \$ 870.00

- mileage for seasonal tree inspector's vehicle
\$.20/mile - 150 miles/week for fourteen weeks = \$420.00
- one aerial bucket truck for tree sampling
10 hours at \$45/hour = \$450.00

Disease Management Practices \$19,725.00

- to assist in the removal of trees and stumps; to therapeutically prune those elm trees specifically designated by program personnel; \$11,000.00
(the city will be responsible for assuming one-half of the total of all tree removal costs incurred with the city's Dutch elm disease management program)
- trimming of dead wood from elm trees = \$6,000.00
- installation of root graft barriers
50 barriers at \$16.50 each = \$825.00
- use of systemic fungicides
20 trees at \$95.00 each = \$1,900.00

Miscellaneous Small Equipment and Supplies \$ 200.00Office Expenses \$ 100.00Total Federal Contribution Requested \$32,326.40

1978 Federal Grant -- \$63,317.00
 1979 Federal Grant -- \$91,498.85
 1980 Federal Grant -- \$53,647.50

PROPOSED BUDGET - 1981

WADENA

Personal Services \$ 6,175.00

- one full-time tree inspector
\$5.50/hour, 40 hours/week for twenty weeks = \$4,400.00
- one temporary, full-time assistant tree inspector
\$4.00/hour, 40 hours/week for five weeks = \$800.00
- fringe benefits for above positions = \$975.00

Equipment Rental \$ 2,435.00

- one half-ton pick-up for tree inspector
\$78/week for twenty weeks = \$1,560.00
- one aerial bucket truck for tree sampling
25 hours at \$35/hour = \$875.00

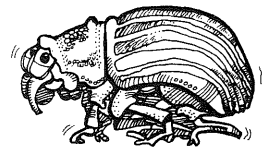
Disease Management Practices \$14,440.00

- to assist in the removal of trees and stumps; to therapeutically prune those elm trees specifically designated by program personnel; \$7,200.00
(the city will be responsible for assuming one-half of the total of all tree removal costs incurred with the city's Dutch elm disease management program)
- trimming of dead wood from elm trees = \$5,000.00
- installation of root graft barriers
30 barriers at \$20.00 each = \$600.00
- use of systemic fungicides
8 trees at \$80.00 each = \$640.00
- use of Dursban to control native elm bark beetle populations = \$1,000.00

Miscellaneous Small Equipment and Supplies \$ 200.00Office Expenses \$ 100.00Total Federal Contribution Requested \$23,350.00

1978 Federal Grant -- \$11,592.00
 1979 Federal Grant -- \$27,466.75
 1980 Federal Grant -- \$26,150.00

THE PROGRAM - 1981



THE PROGRAM - 1981

The year 1978 was one of organization, the demonstration program being structured and its future years being planned. The year 1979 was one of implementation, disease management programs beginning to replace existing tree removal programs. The year 1980 has been one of evaluation and further implementation. Hopefully, the year 1981 will be one in which the following program goals are attained:

1. Complete the tree loss data system. This involves inventorying the tree population in each demonstration and reference city, cataloging each elm as to its disease history, and finally, computerizing the aforementioned information. This system will be one of the highlights of the demonstration program since the computerized data will provide the documentation needed to prove that certain disease management concepts are workable.
2. Maintain the system which was developed to process unmarketable elm material into non-hazardous firewood. With this goal attained, each city will complete the Dutch elm disease management cycle---disease detection-sanitation-utilization. This processing system involved the purchase of a debarker to render the elm logs pest-risk free and a log splitter to produce the firewood lengths. All processed wood is to be sold at a fair, marketable price (to be determined by each participating city and the Department of Natural Resources) with the income, as directed by resolution, going into each city's disease management program.
3. Organize training workshops and tours of the demonstration cities. The workshops will be developed in cooperation with the University of Minnesota and will be designed to train municipal foresters and tree inspectors in the application of Dutch elm disease management practices "endorsed" by the demonstration program. The tours to be developed can be broken-down into three categories: 1) inviting

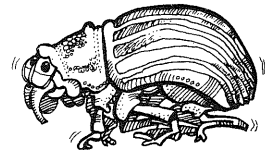
people from other states and countries (Canada), interested in Dutch elm disease management, to tour the demonstration cities; 2) inviting municipal officials from other Minnesota communities to visit the demonstration sites to show them that their cities can do similar things in disease management; and, 3) inviting state and federal legislators to visit the demonstration cities to see how the program has developed and to illustrate the importance of maintaining the program through its fifth and final year. These tours and workshops will be especially important to the program this year because it is now time to show others what has been accomplished in implementing known disease management practices into "real" urban environments.

4. Continue to emphasize the importance of using disease management practices such as root graft barrier installation, systemic fungicide injection, and therapeutic pruning of minimally diseased trees. Continue spraying Dursban to help control native elm bark beetle populations in those demonstration communities where it is considered necessary. Attempt to maintain a 5% (or lower) disease incidence rate in each of the participating cities.
5. Continue to monitor reference cities. More time will be spent on comparing the Dutch elm disease programs of these "controls" with those of the demonstration communities. The differences between the program of each reference city and its comparable demonstration community will help to evaluate the level of success achieved in disease management in each of the demonstration cities.
6. Write and publish articles on the Federal Dutch Elm Disease Demonstration Program. This will involve attempts at getting something about the program published in magazines such as the "Journal of Arboriculture" and the Department of Natural Resources' "Volunteer". Under this category, it is anticipated that the most important end product will be a "Dutch Elm Disease Management Guide". Something must be written that describes the how and why of each aspect of the disease management program. This "guide" will hopefully be something that a city official can pick-up, turn to a particular page, and find-out what a

community, with a certain disease incidence and budget, can do to bring Dutch elm disease to a manageable level. Also, develop a "slide show" on each demonstration city--the history of each community from the first year of the program to the present.

7. Evaluate the entire demonstration program. A comprehensive review by participants of the United States Forest Service, the Department of Natural Resources, the Department of Agriculture, and the University of Minnesota is needed. It must be determined if the progress made by the program is satisfactory and whether or not it has deviated from its original goals. There is still time to change policies and/or implement new practices to ensure the continued success of the program and to get it the recognition that it deserves.
8. Maintain a high performance disease management program in each demonstration city when financial and technical aid is no longer available. In these last years of the program, the monetary appropriations to each city will be smaller and smaller. With the remaining time, it will be important to continue minimizing the disease losses in each community, and to convince the cities that they can and should maintain a high level of disease management on their own with their own finances.
9. Maintain strong state and federal support. Since the demonstration program must rely on yearly appropriations made by Congress, it is essential to keep legislators up-to-date on any progress made. Continuation into a fourth year looks promising, but the projections for a fifth are rather dim. With the accomplishment of the previously mentioned goals, interest can hopefully be kept alive long enough for Congress to grant funds to ensure a fifth and final program year.

TOTAL PROPOSED BUDGET



FEDERAL DUTCH ELM DISEASE DEMONSTRATION PROJECT

TOTAL PROPOSED BUDGET - 1981

<u>Department of Natural Resources</u>	<u>\$ 85,100.00</u>
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--Communications = \$4,000.00	
--Travel expenses = \$11,500.00	
--Local purchases = \$2,000.00	
--Salaries (including fringe benefits) = \$59,800.00	
--Contingency fund = \$7,800.00	

<u>Community Demonstration Programs</u>	<u>\$190,583.78</u>
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see itemized budgets on pages 74 - 79

<u>Tours and Workshops</u>	<u>\$ 4,000.00</u>
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<u>Total 1981 Federal Contribution Requested</u>	<u>\$279,683.78</u>
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The 1978, 1979, and 1980 appropriations for Minnesota's Federal Dutch Elm Disease Demonstration Project total \$1,517,657.00.

1978

Minnesota Department of Natural Resources	\$ 92,500.00	
Minnesota Department of Agriculture	12,000.00	
Demonstration Communities	<u>206,000.00</u>	
	\$310,500.00	Total

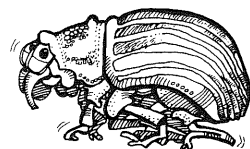
1979

Minnesota Department of Natural Resources	\$132,900.00	
Minnesota Department of Agriculture	18,000.00	
Demonstration Communities	489,920.00	
Utilization Program	<u>126,837.00</u>	
	\$767,657.00	Total

1980

Minnesota Department of Natural Resources	\$ 99,000.00	
Minnesota Department of Agriculture	19,500.00	
Demonstration Communities	267,791.00	
Utilization Program	18,384.00	
Tree Loss Data System	<u>34,825.00</u>	
	\$439,500.00	Total

CONCLUSION



THE "WHYS" OF DUTCH ELM DISEASE MANAGEMENT

In Minnesota, the American elm has been the most highly valued and most widely planted shade tree. It is also the most susceptible to Dutch elm disease. The elm's popularity, therefore, has provided a monoculture which in turn has provided a perfect habitat for an epidemic of Dutch elm disease. Although a strict management program will not bring this disease to a complete halt, it can greatly decrease the rate of death, allowing for long-term budgeting and a head start on tree replacement.

The intent of Minnesota's federally funded Dutch elm disease project is to demonstrate the effectiveness of known disease management practices. It is hoped that with additional federal assistance--both financial and technical--the increase in elm losses due to Dutch elm disease can be stopped and eventually reduced to a level which can be handled economically by each city with its own finances. Suppressing Dutch elm disease over a period of time will enable each city to develop an economical and orderly transition from its predominant urban elm forest to one of mixed stands of shade trees.

A discussion as to what each disease management practice involves and to how important each one is to the overall demonstration program was included in the 1979 Accomplishment Report. Since Minnesota's demonstration program is based upon these management concepts, it is important to re-emphasize the "why" of each one. The following are these disease management practices whose effectiveness has been, or will be, demonstrated by the federal Dutch elm disease project.

1. WOODPILE AND DISEASED TREE INSPECTION

What it involves. The surveying of each demonstration city to find and mark for removal all hazardous elm wood and all trees with Dutch elm disease. When one survey of each city is completed, another will follow so that inspections are continuous.

Its importance to the program. Since bark beetles breed in non-debarked elm wood, the removal and subsequent destruction of this "brood" material can help to reduce beetle populations. The beginning of any good Dutch elm disease program is the inspecting for, and the marking of, all diseased elm trees.

2. THERAPEUTIC PRUNING

What it involves. Pruning the diseased branches from those trees showing early Dutch elm disease symptoms. For most effective results, no more than 5% of the tree's crown should show early disease symptoms, and pruning must be completed immediately after detection. Infected branches should be pruned back to the main trunk.

Its importance to the program. Therapeutic pruning is a management practice that is often ignored and discredited. It can become an important approach to managing Dutch elm disease, however, if removing infected branches can prevent the sacrifice of the entire tree.

3. DISEASED TREE REMOVAL

What it involves. The removing and disposing of those trees infected with Dutch elm disease. In conjunction with this, the removing or debarking of the remaining tree stumps.

Its importance to the program. Prompt tree removal is the basis of any good Dutch elm disease management program. Removing diseased trees quickly prevents other healthy elms from getting root graft infections. Since bark beetles tend to breed in dead and dying elms, prompt removal also eliminates possible beetle "brood" material. Debarking or removing tree stumps will eliminate, too, this additional source of "brood" material.

4. ROOT GRAFT BARRIER PLACEMENT

What it involves. The severing of roots which are shared between two or more elm trees. Root graft barriers should be placed in those areas where an elm tree with a greater than 5% disease infection is within forty (40) feet of other healthy elm trees. Mechanical methods (vibratory plow, trencher) and chemical methods (vapam) are available for disrupting these common root grafts.

Its importance to the program. Until this management practice is extensively used, the disease fungus is simply going to walk up and down the streets of each demonstration city, reducing the effectiveness of all other management efforts.

5. RE-DEFINING CONTROL AREAS

What it involves. Reducing the boundaries of a city's disease control area to include only those residential sections containing a heavy population of elm.

Its importance to the program. Since managing a disease program is costly in both time and dollars, it is necessary to apply management practices only in those areas where they will be most effective. Places where management of the disease will be, at best, minimal, should be designated as a lower priority or excluded entirely from the municipal control area.

6. INJECTION

What it involves. The injecting of high value elm trees with a systemic fungicide (Arbotect), protectively or therapeutically. Therapeutic injections should not be applied to any elm tree if more than 5% of the upper crown is wilting. Since injection does not fully guarantee that elm trees will be immune to, or cured of Dutch elm disease, it is not to be used in place of other disease management practices (tree removal, for instance) but rather, is to be used as an additional management effort (for instance, injection combined with therapeutic pruning).

Its importance to the program. It is hoped that injecting high value elm trees with a systemic fungicide will provide them with some protection against the disease fungus. This method of treatment could also have some beneficial effect as far as preventing the movement of the fungus into adjacent healthy elm trees.

7. TRIMMING/REMOVAL OF WEAKENED OR DEAD ELMS

What it involves. The removing of dead wood from healthy elm trees. Also, the taking down of those elms which are dead or in a weakened condition.

Its importance to the program. Any dead branch in an otherwise healthy elm tree is a potential breeding site for bark beetles. Trees can still be sending nutrients and water (at a reduced rate, however) to nearly dead branches. Removing these dead or dying branches, therefore, enables the nutrients and water to be redirected to healthy parts of the tree. Weakened elms are more susceptible to disease infections, the primary one being, of course, Dutch elm disease. Dead elms which remain standing are yet another source of beetle "brood" material.

8. APPLICATION OF DURSBAN

What it involves. The spraying with Dursban of a designated portion of the urban elm population in an attempt to reduce native elm bark beetle populations.

Its importance to the program. In those areas where the native elm bark beetle is a predominant vector, reducing its population levels could also reduce the rate of disease infection. Following the mild winters Minnesota has experienced in the last two years, Dursban could help to prevent a substantial build-up of this beetle vector.

9. ELIMINATION OF WILD ELMS

What it involves. Removing or in some way killing those elms which are growing wild. Often these wild areas are not easily accessible to men and equipment, so tree removal is not practical. Killing the trees quickly, perhaps by using chemicals, may be the only possible way in which to eliminate these trees.

Its importance to the program. Wild areas containing a good number of elms border some of the demonstration cities. Disease management is impractical in these areas due to poor cost effectiveness and men and equipment not being able to find easy access to the trees. Dutch elm disease is usually running rampant in these areas and has threatened to spread to the urban elm populations. These trees must be removed or in some way rendered harmless in order that the urban elms are protected.

10. ESTABLISHMENT OF REFERENCE CITIES

What it involves. The selection and monitoring of cities whose disease management programs can be compared to those of the demonstration cities.

Its importance to the program. Two reference cities were selected for each demonstration community. Through monitoring the disease programs of these cities, the success of those management practices implemented by the federal demonstration program in each of its participating cities can be effectively evaluated.

11. COMPUTERIZATION OF TREE LOSS DATA

What it involves. Getting an inventory of the elm population in each demonstration city, cataloging each elm tree as to its disease history, and finally, computerizing the aforementioned information.

Its importance to the program. The three years of each demonstration city's disease history (1978, 1979, 1980) are contained in hand-written records. There is always the possibility of these records being lost or damaged in some way as well as the information recorded in this manner being very difficult and time-consuming to retrieve. New elm inventories are necessary since some of the existing ones are now out-of-date or were quickly done and not as thorough as they should have been. Computerizing the tree inventories as well as the disease history of each tree will enable program personnel to locate any elm and know instantly what has been done to it in the way of disease treatment (has the tree been removed, has it been injected, has a root graft barrier been placed, etc.). Also, corrections and additions to the tree loss data can be made quickly and easily.

12. IMPLEMENTATION OF UTILIZATION PROJECT

What it involves. The processing of unmarketable elm material into non-hazardous firewood.

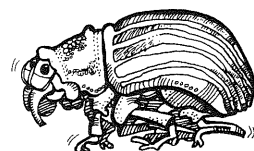
Its importance to the program. The majority of diseased trees removed in the demonstration cities are disposed of by burning. Everyone concedes that it is a great waste not to utilize this resource in some way, especially now with firewood in demand because of the energy "crunch". Each city's disease management program will be made complete if the unmarketable elm material can be processed into non-hazardous firewood.

FOOD FOR THOUGHT:

"A number of studies have been undertaken to evaluate the impact of sanitation on DED's spread. After thirteen years of good sanitation in Syracuse, NY, elm losses amounted to thirteen percent of the initial population. In a study of a number of localities in Illinois, communities practicing only sanitation showed mean mortality of four percent annually over more than a decade; comparable communities without such cleanup lost 80 percent to 95 percent of their original elm population in little more than ten years. In Fredericton, New Brunswick, fifteen years of careful sanitation have resulted in only five percent loss (less than one-half of one percent per year); in neighboring, uncontrolled areas, an average of sixty percent of the initial elm populations has died (up to fifteen percent per year). In short, strict sanitation often reduces elm mortality to less than two percent per year; without sanitation, the disease may claim 10 to 20 percent per year."¹

1. John L. Hart, "Tragedy of Dutch Elm Disease Bears Hope for Modern Control," Weeds, Trees & Turf, Vol. 19, No. 11 (November, 1980), pp. 19-24.

APPENDIX



THE DEMONSTRATION SIX

Minnesota Department of Natural Resources
Division of Forestry



JUNE/JULY 1980

VOLUME I - ISSUE TWO

It has become evident that there are those receiving this newsletter who are not familiar with many aspects of the Federal Dutch Elm Disease Demonstration Program. Therefore, this second issue of the "Demonstration Six" will begin with a brief description of how the program originated, what it has accomplished, and what it still hopes to do.

In fiscal year 1978, Congress granted the United States Forest Service \$2.5 million in General Forestry Assistance funds for Dutch elm disease special projects. This appropriation would allow State and Private Forestry and the Agricultural Extension Service to provide technical and educational assistance in establishing disease management and utilization projects. The objectives of this assistance program were 1) to make available, on a nationwide basis, information and education to communities, municipal governments, landowners, and individual homeowners on the history, incidence, severity, and management of Dutch elm disease; 2) to make available information and education on the utilization of elm trees infected and killed by Dutch elm disease; and 3) to establish and maintain, in selected areas of the United States, demonstration sites to show the application and results of effective Dutch elm disease management and utilization programs.

Minnesota was one of the states selected to participate in this Forest Service Dutch elm disease and utilization program. At the end of 1978, the State's project had completed the initial stages of establishing high performance Dutch elm disease management programs in six selected Minnesota cities--Fergus Falls, Granite Falls, Hutchinson, Litchfield, Little Falls, and Wadena--to augment the basic tree removal program already existing in each of the communities. The year 1978, was one of organization, the demonstration program being structured and its future years being planned. The year 1979, was one of implementation, disease management programs replacing existing tree removal programs. This year, 1980, has been one of evaluation and further implementation.

This community demonstration program is anticipated to run for a five-year period. Federal appropriations, however, are granted on a yearly basis. If Congress funds its remaining two years, the demonstration program will have developed a workable management system whereby Dutch elm disease can be suppressed over a number of years, giving communities time to re-establish their urban forests with mixed stands of shade trees. The intent of Minnesota's federally funded Dutch elm disease program has been, and still is, to demonstrate the effectiveness of known disease management practices--inspection, sanitation, root graft barrier placement, systemic fungicide injection,

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therapeutic pruning, etc. It is hoped that with the additional federal assistance--both financial and technical--the increase in elm losses due to Dutch elm disease can be stopped and eventually reduced to a level which can be handled economically by each city with its own finances.

GUEST EDITORIAL

The City of Fergus Falls feels fortunate that it was selected as one of the participants in the Federal Dutch Elm Disease Demonstration Program. Annual continuation of this demonstration program will depend on the availability of funds each year. This program not only benefits Fergus Falls and other demonstration cities, but also people and communities, whether in Minnesota or other areas, who are concerned about their elm trees. When this program is completed, the information derived from it will be available to anyone, on what to do and what not to do, in the management of Dutch elm disease. I feel that it is the responsibility of all concerned to express to state and federal congressman the importance of this program so as to help secure funds for continuation into yet another year. In this way only, will the federal legislature become aware of the seriousness of the Dutch elm disease situation and of the commitment the people in Minnesota are willing to make in bringing this disease to a manageable level.

The City of Fergus Falls is proud of its trees and was selected to receive the TREE CITY USA award in 1978 and 1979. Newspaper publicity and radio coverage have brought to Fergus Falls an even greater awareness of the aesthetic and environmental value of its elm population.

Financial assistance from this program has made it possible for the City of

Fergus Falls to expand its Dutch elm disease management practices. Some activities made possible by this program were:

1. Creating the position of full-time "City Forester",
2. Hiring an additional tree inspector when survey work was at its "peak",
3. Installing root graft barriers,
4. Using systemic fungicides,
5. Setting-up laboratory facilities to test samples for Dutch elm disease, and
6. Providing a detailed record-keeping system.

We feel this project is preparing the City with the knowledge and background which will enable it to continue with Dutch elm disease management after the federal program is no longer available.

Bernie Pretts
Fergus Falls City Forester

ITEMS OF INTEREST

.On September 2-4, 1980, the demonstration program will conduct a tour. Litchfield and Little Falls will be the two communities visited, due to their close proximity to the Twin Cities. People from all over the United States and even Canada have been invited to observe the management practices being implemented and the utilization project which produces non-hazardous elm firewood. With Minnesota's Dutch Elm Disease Demonstration Program now into its third year, it is time to show others what has been accomplished in implementing known disease management practices into "real" urban environments. Invitations have been mailed, and it is hoped that a large number will attend.

.Regional Coordinators Steve Cook and Charlie Evenson are no longer with the demonstration program. Steve is now the City Forester of Litchfield, and Charlie, when he gets back from his Alaskan vacation, will probably be returning to school. Both Steve and Charlie have been with the program since the beginning, and their contribution to its success has been great. Although they will be difficult to replace, it is the program's intention to find two new people as soon as possible to fill the vacancies.

.Each demonstration city should now have its original copy of the agreement it made with the Department of Natural Resources concerning its participation in this, the third year of the demonstration program. The check for the amount designated in the agreement will follow shortly.

.It is time again to make an appeal to the demonstration cities and all concerned individuals to write their legislators in support of the continuation of the demonstration program. These letters contribute so very much toward convincing legislators of the importance of continuing the program through the next two years. Please, the program needs your help--write a letter.

.On August 25, 1980, the inventory project will finally begin. It will include inventorying the entire tree population in each demonstration city, cataloging each elm tree as to its disease history, and computerizing the aforementioned information. The inventory crew of eight will begin in Litchfield.

.The utilization project involving the debarking and splitting of diseased elm trees began operation in late June. The "bugs" have now been worked-out of the equipment and much progress has been made in producing non-debarked elm firewood at Granite Falls' disposal site. In a short time, the equipment will be moving to Hutchinson.

CALENDAR OF EVENTS, AUGUST-SEPTEMBER, 1980

August Participant

- .Begin to collect data necessary for the tree inventory DNR
- .Continue intensive tree removal work DC
- .Continue placing root graft barriers DNR, DA, CES, DC
- .Finish-up therapeutically pruning selected, minimally diseased elm trees DNR, DA, CES, DC
- .Continue the injection of selected trees with systemic fungicides DNR, DA, CES, DC
- .Continue the operation of the utilization project DNR
- .Continue to monitor elm bark beetle populations and fungus survival at utilization sites DNR, DA, CES
- .Continue intensive disease detection surveys DNR, DA, DC
- .Continue monitoring beetle populations in the city control areas DNR, DA, CES
- .Prepare Dutch elm disease exhibits for county fairs DNR, DA, CES
- .Continue to distribute TREE WATCH series to participating communities CES
- .Continue to distribute educational materials CES
- .Continue presentations to concerned civic groups DNR, DA, CES

September Participant

- .Initiate a tour of the demonstration communities DNR, DA, CES

-
- *DNR - Minnesota Department of Natural Resources
 - DA - Minnesota Department of Agriculture
 - CES - Cooperative Extension Service, University of Minnesota
 - DC - Demonstration Communities

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<u>September continued</u>	<u>Participants*</u>
.Implement Dursban spraying programs in those demonstration communities where it is considered necessary	DNR, DA, CES, DC
.Continue to collect data necessary for the tree inventory	DNR
.Continue tree removal work	DC
.Finish-up root graft barrier placement	DNR, DA, CES, DC
.Complete the injection of selected trees with systemic fungicides	DNR, DA, CES, DC
.Continue the operation of the utilization project	DNR
.Continue to monitor elm bark beetle populations and fungus survival at the utilization sites	DNR, DA, CES
.Start to "wind-down" disease detection surveys because of beginning fall coloration	DNR, DA, DC
.Continue monitoring beetle populations in city control areas	DNR, DA, CES
.Lay-off extra tree inspectors	DNR, DC
.Continue to distribute TREE WATCH series to participating communities	CES
.Continue to distribute education materials	CES
.Continue presentations to concerned civic groups and schools	DNR, DA, CES, DC

DUTCH ELM DISEASE (DED) BEETLE COUNTS

In Hutchinson, sampling for native elm bark beetle adults overwintering at the base of healthy elms revealed an

average of 21.2 beetles per tree. Four (4) boulevard areas were sampled in the city proper. This indicates that the beetle is not confined to wild areas in southern Minnesota communities as was previously believed. A beetle population of 10 per tree is cause for concern. In Litchfield, three (3) boulevard areas were sampled, and an average of 4.5 beetles per tree was found.

The sampling was done in mid-April as the beetles were preparing to leave the base of elms and fly to the tops of the trees to feed. The sampling was conducted by Mark Schnobrich, the City Forester in Hutchinson, and Ernie Radunz, the Tree Inspector in Litchfield. They were assisted by Steve Cook, Minnesota DNR, and William Phillipsen, Extension Entomologist-University of Minnesota. The sampling counts are used to determine if an elm trunk spray program should be conducted. Hutchinson, with over 20 beetles per tree, looks like a good candidate for such a technique. Litchfield low native elm bark beetle numbers, however indicate that a trunk spray program is not needed at this time.

An elm trunk spray program that included the application of 0.5 percent Dursban[®] to the lowest two feet of 5,000 elms was completed in Little Falls on April 21, 1980. Public and private elms were treated on a community-wide basis. A crew of five (5) men completed the task in eight (8) days. The projected impact of controlling the overwintering bark beetles should be a 3 percent drop in the Dutch elm disease rate based on 1) fall and spring sampling counts, 2) number of contaminated beetles, and 3) last year's disease rate. This kind of application is viewed only as a supplement to Dutch elm disease sanitation efforts in areas where native elm bark beetle populations are monitored.

*DNR - Minnesota Department of Natural Resources
DA - Minnesota Department of Agriculture
CES - Cooperative Extension Service
University of Minnesota
DC - Demonstration Communities

Little Falls' spray program was supervised by City Tree Inspector, Chuck Donnelly, with assistance from Charlie Evenson, Minnesota DNR, and William Phillipsen, Extension Entomologist. Spraying will reduce the native elm bark beetle population if all the elms in a community are sprayed, but the disease fungus is not affected and a treated tree is still susceptible to Dutch elm disease. Dursban merely reduces the beetle population so that the disease will not spread as efficiently. Dutch elm disease program personnel are optimistic that the use of Dursban, as an augment to the existing intensive sanitation program in Little Falls, will help to further reduce Dutch elm disease losses this season. However, Dursban cannot be expected to control Dutch elm disease by itself.

Last fall (1979), City Forester Greg Ustruck and Steve Cook, Minnesota DNR, conducted a trunk spray program in Granite Falls. The City of Wadena looks like a good candidate for this approach this fall, whereas most of Fergus Falls has low beetle numbers.

Dr. William J. Phillipsen
Extension Entomologist
University of Minnesota

THE MIRACLE CURE

Much publicity has been recently generated concerning the bacterium that in the laboratory was found to inhibit the growth of the Dutch elm disease fungus. Radio, television, and newspaper articles have linked the University of Minnesota to that research being done by a Montana professor. The Department of Plant Pathology has never been involved with, or consulted by, Dr. Strobel of Montana who is doing this research. The Freshwater Biological Institute, a part of the University of Minnesota,

is funding the project. The biologists at the Freshwater Biological Institute are very apprehensive of the immense publicity these preliminary studies have received. The news has been spread nation-wide and the Department of Plant Pathology is receiving phone calls from as far away as California on the subject.

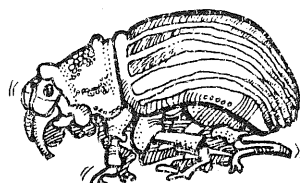
What we know at this time is that the corporation formed between the Freshwater Biological Institute and Montana State University has contracted the production of this bacterium with Chevron Chemical Company. Experiments with the bacterium are going to be conducted in Minnesota for the first time this year (1980). The Department of Plant Pathology will be monitoring these experiments and so, will have an involvement in the project. The excessive publicity was generated by the Public Relations Section of the Freshwater Biological Institute.

Dr. Asimina Gkinis
Extension Plant Pathologist
University of Minnesota

* * * * *

If you would like to make a contribution to this newsletter, please contact:

Meg Hanisch
Supervisor, Federal Dutch Elm
Disease Program
330 Centennial Office Building
Division of Forestry, Box 44
St. Paul, Minnesota 55155
Phone: (612) 296-5958



MASTER LOG -- DUTCH ELM DISEASE

DATE _____

[illegible]

Field Sheet and Master Log Key

Tree Number: one number per tree
Address: Residential areas-use street address - make it up if necessary
 Wild areas-describe site referring to known reference points
Owner: City Property - C
 Private Property - P (owner's name if required)
Area: number code for area from city map (same codes as inventory)
High Risk: 0 - not high risk
 1 - beetle emergence possible within 20 days
 2 - root graft spread likely
 3 - both 1 and 2
dbh: diameter at 4½ feet (inches and tenths)
Species: 01 - American elm
 02 - Asian elm
 03 - red elm
 04 - rock elm
Stump: G - grind-out
 D - debark
Date removal completed: (tree and stump) month/day
Removed by: C - City Crews
 T - City tree contractor
 P - Private individual or contractor
Date marked: month/day
Reported by: C - City tree inspector
 P - Private individual
Date of notification: month/day (leave blank if notice not given)
Type of notice: P - Personal (private property only)
 M - Mail
% infection: (DED only) 1 - up to 10% 6 - 50 - 60%
 2 - 10 - 20% 7 - 60 - 70%
 3 - 20 - 30% 8 - 70 - 80%
 4 - 30 - 40% 9 - 80 - 90%
 5 - 40 - 50% 0 - 90 - 100%
Cause for removal: B - beetle infection
 R - root graft infection
 W - weakened or dying tree
 D - dead tree (note in remarks
 S - storm damage if this is only
 O - other (specify in remarks) a guess)
Determining factor: F - field diagnosis
 L - lab diagnosis
Past treatment: I - injected (date, chemical, dosage & tag number in remarks)
 R - root graft barrier (date and type in remarks)
 T - therapeutic pruning (date in remarks)
 P - dead wood pruning (year performed in remarks)
 H - pruned recently by homeowner (approximate date in remarks)
 N - none
Distance to closest elm: estimate in feet
Direction to closest elm: 1 - North 5 - South
 2 - Northeast 6 - Southwest
 3 - East 7 - West
 4 - Southeast 8 - Northwest
Number of elms
within 60 feet : (including closest elm)
Closest Tree
within 60 feet : insert species code for closest (non-elm) tree in each direction
Remarks: include additional details and any non-coded information

TREE REMOVAL RECORD FIELD SHEET

Tree # _____ Area _____ High Risk _____

Address: _____

Owner: _____

Location on property: _____

DBH _____ Species _____ Stump _____ RGB _____

Date removal completed ____/____ Removed by: _____

Date marked ____/____ Reported by: _____

Date of notification ____/____ Type of notice _____

% infection _____ Cause for removal _____

Determining factors _____ Past treatment _____

Distance to closest elm _____ Closest non-elm within

Direction to closest elm _____ sixty (60) feet _____

Number of elms within 60 feet _____

Remarks: _____

N	E	S	W

MAP

5-USE LOG

☐ HAZARDOUS WOOD

☐ RGB

☐ THERAPEUTIC TRIM

☐ INJECTION

☐ SAMPLE

1

2

3

4

5

6

7

8

9

10

11

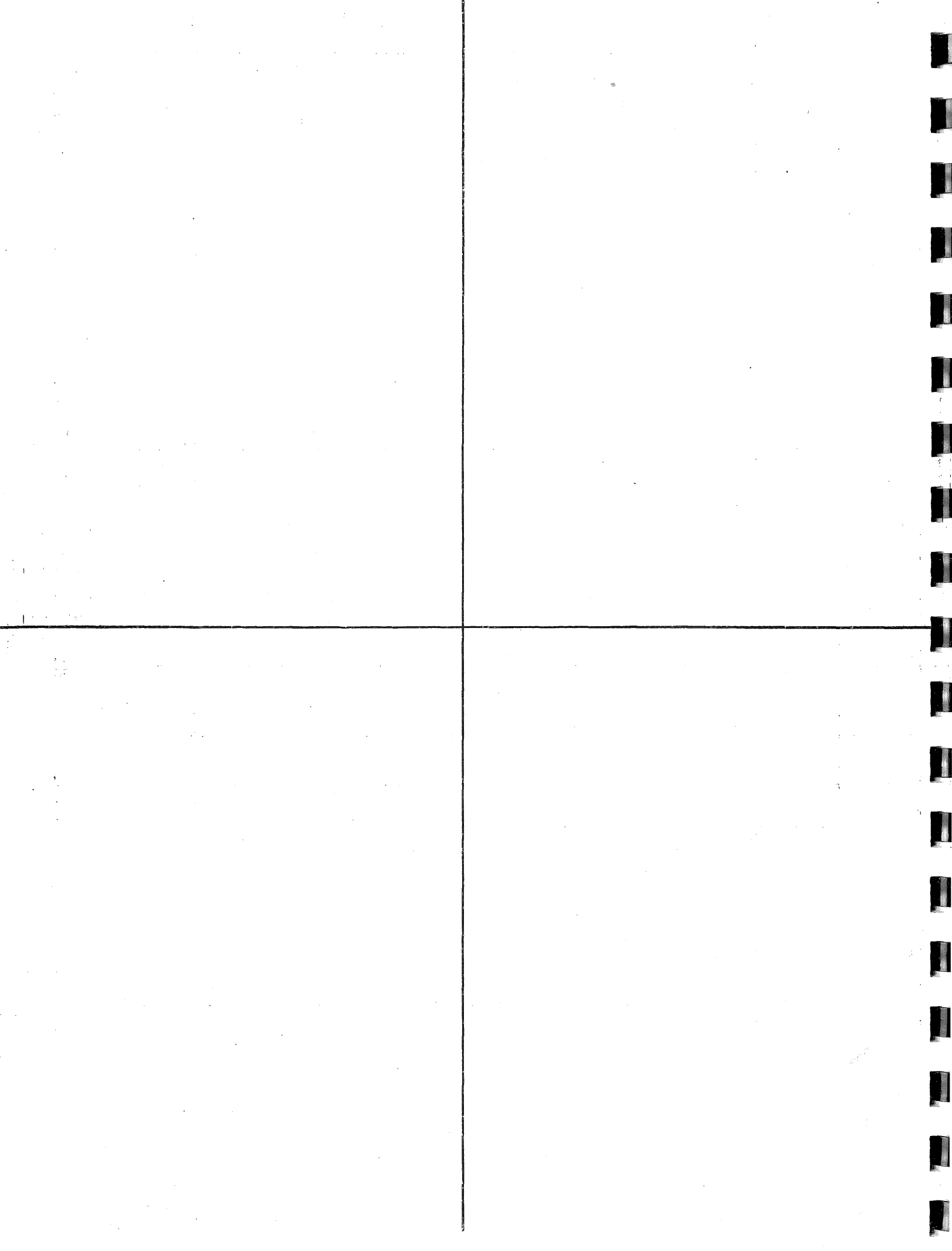
12

13

14

15

96



5-USE LOG KEY ⁹⁷

Hazardous Wood Log

1. Hazardous wood number
2. Address (include area number in upper right hand corner)
3. Owner
4. Date of notice
5. Date hazard eliminated
- 6.
- 7.
8. Type of notice
P-Personal
N-Mail
9. Species
10. Form of wood
F-Firewood
L-Logs
S-Stumps
11. Evidence of bark beetles
N-Native
E-European
B-Both
A-Absent
12. Solution
D-debarked by property owner
R-disposed of by property owner
C-disposed of by city
U-unknown
- 13.
- 14.
15. Remarks

Root Graft Barrier Log

1. Barrier number
2. Address (include area number in upper right hand corner)
3. Reason barrier site selected (write in explanation)
4. Date recommended
5. Date installed
6. Date infected tree(s) removed
7. Field sheet number for map
8. Type of barrier
P-Plow
T-Trencher
V-Vapam
9. Feet of barrier
10. Man hours used (nearest 1/4 hour)
11. Number of personnel
12. Barrier failed
- 13.
- 14.
15. Remarks

Therapeutic Pruning Log

1. Treated tree number
2. Address (include area number in upper right hand corner)
3. Reason tree selected (write in explanation)
4. Date recommended
5. Date performed
6. DBH
7. Species
8. % infection
9. Confirmed DED
10. Wound dressing applied (N-None, Code for type)
11. Man hours used
12. Number of personnel
13. Pruning failed - tree condemned
14. Additional Treatment
I-Injection
R-Root Graft Barrier
N-None
15. Remarks (include other treatments, tree #, etc.)

Injection Log

1. Treated tree number
2. Address (include area number in upper right hand corner)
3. Reason tree selected for injection (write in explanation)
4. Date of injection
5. DBH
6. Species
7. Type of injection
P-Preventative
T-Therapeutic
8. Number of injection sites
9. Injection sites per inch
10. Gallons of solution
11. Fluid ounces of Arbotect 20-S
12. Man hours used
13. Number of personnel
14. Failure - tree infected
15. Remarks (include tree, weather conditions, uptake time and other practices)

Sample Log

1. Address (include area number in upper right hand corner)
2. Location on property
3. Date sampled
4. Date of results
- 5.
6. DBH
7. Species
8. Results (+ or -)
- 9.
- 10.
- 11.
- 12.
- 13.
- 14.
15. Remarks

PUBLICATION NO. 2188

ORDINANCE NO. 581

SECTION 1020 - DUTCH ELM DISEASE

Section 1020:00. Declaration of Policy. The Council of Hutchinson has determined that the health of the elm trees within the municipal limits is threatened by a fatal disease known as Dutch elm disease. It has further determined that the loss of elm trees growing upon public and private property would substantially depreciate the value of property within the City and impair the safety, good order, general welfare and convenience of the public. It is declared to be the intention of the Council to control and prevent the spread of this disease and this ordinance is enacted for that purpose.

Section 1020:05. Forester.

Subd. 1. Position Created. The powers and duties of the Forester as set forth herein are conferred upon the City Forester.

Subd. 2. Duties of Forester. It is the duty of the Forester to coordinate, under the direction and control of the Council, all activities of the municipality relating to the control and prevention of Dutch elm disease. He shall recommend to the Council the details of a program for the control of Dutch elm disease, and perform the duties incident to such a program adopted by the Council.

Section 1020:10. Dutch Elm Disease Program.

Subd. 1. It is the intention of the Council of Hutchinson to conduct a program of plant pest control pursuant to the authority granted by Minnesota Statutes 1961, Section 18.022 and Minnesota Statutes 1974, Section 18.023. This program is directed specifically at the control and elimination of Dutch elm disease fungus and elm bark beetles and is undertaken at the recommendation of the Commissioner of Agriculture. The Forester shall act as coordinator between the Commissioner of Agriculture and the Council in the conduct of this program.

The Council hereby adopts, by reference, Minnesota Statutes 1961, Section 18.022 and 1974, Section 18.023 and all their amendments.

Section 1020:15. Nuisances Declared.

Subd. 1. The following things as set forth in the subdivisions which follow are public nuisances whenever they may be found within this municipality.

Subd. 2. Any living or standing elm tree, or part thereof, infected to any degree with the Dutch elm disease fungus Ceratocystis Ulmi (Buisman) Moreau.

Subd. 3. Any elm tree or part thereof, suffering from dieback, or any other disease or harmful condition, which, in the opinion of the City Forester, or his agents renders that tree or any parts thereof possible breeding or harboring sites of the elm bark beetles Scolytus Multistriatus (Eichh.) or Hylurgopinus Rufipes (Marsh).

Subd. 4. Elm trees or parts thereof as described in Subd. 2 and 3 hereby shall be termed Hazardous Trees and Portions.

Subd. 5. Any dead elm tree or part thereof, including logs, branches, stumps, firewood or other elm material from which the bark has not been removed. Termed Hazardous Wood. See Section 1021:00.

Section 1020:20. Abatement. It is unlawful for any person to cause or permit any public nuisance as defined in Section 1020:15 to remain on any premises owned or controlled by him within the corporate limits of this municipality. Such nuisances may be abated in the manner herein set forth.

Section 1020:25. Inspection and Investigation.

Subd. 1. Annual Inspection. The Forester shall inspect all premises and places within the corporate limits of this municipality as often as practicable to determine whether any condition described in Section 1020:15 of this ordinance exist thereon. He shall investigate all reported incidents of infestation of Dutch elm fungus and elm bark beetles.

Subd. 2. Entry on Private Premises. The Forester or duly authorized agents may enter upon private premises at any reasonable time for the purpose of carrying out any of the duties assigned under this ordinance.

Subd. 3. Diagnosis. The Forester shall, upon finding conditions indicating Dutch elm infestation, immediately send appropriate specimens or samples to the Commissioner of Agriculture for analysis, or take such other steps for diagnosis as may be recommended by the Commissioner.

Section 1020:30. Abatement of Dutch Elm Disease Nuisances.

Subd. 1. The abatement of the public nuisance of Hazardous Wood (as described in Sections 1020:15, Subd. 5 and Section 1021:00) is described in Section 1021:05, Subd. 1.

Subd. 2. In abating Dutch elm disease nuisances, the Forester shall cause the infected tree or wood to be sprayed, removed, burned, or otherwise effectively treated so as to destroy and prevent as fully as possible the spread of Dutch elm disease fungus and elm bark beetles. Such abatement procedures shall be carried out in accordance with current technical and expert opinions and plans as may be designated by the Commission of Agriculture.

Whenever the Forester finds with reasonable certainty that the Dutch elm disease infestation exists in any tree or wood in any public or private place in this municipality, the procedure shall be as set forth in the subdivisions which follow.

Subd. 3. If any elm tree, or any parts thereof, determined to be a nuisance (as described in Section 1020:15, Subd. 2 and 3) is discovered on public or private property within the municipal limits of the City, the Hazardous Trees and Portions shall be condemned, removed and disposed of or rendered incapable of breeding or harboring elm bark beetles in accordance with the Commission of Agriculture's rules, regulations and specifications. This shall hereby be termed proper disposal.

Subd. 4. For Hazardous Trees and Portions found on private property, the property owner shall be given no more than 7 days for Proper Disposal from the date of notification. Notification shall be given in the form of a written notice to be presented personally or by mail by the City Forester.

Subd. 5. Failure to abate the nuisance (or properly dispose of the Hazardous Trees and Portions) by the property owner within the time limit stated shall authorize the City Forester to have the nuisance abated. The City Forester may then charge all costs of the abatement to the property owner and bill him directly or have the monies due assessed to his taxes.

Subd. 6. The Forester shall keep a record of the costs of abatements done under this section and shall report monthly to the Clerk all work done for which billings and assessments are to be made stating and certifying the description of the land, lots, parcels involved and the amount chargeable to each.

Subd. 7. On or before September 1 of each year the Clerk shall list the total unpaid charges for each abatement against each separate lot of parcel to which they are attributable under this ordinance. The Council may then spread the charges or any portion thereof against the property involved as special assessment under Minnesota Statutes Sec. 429.101 and other pertinent statutes for certification to the county auditor and collection the following year along with current taxes.

Section 1020:40 Root Graft Barrier Placement.

Subd. 1. The City recognizing the problem of the spread of Dutch elm disease from infected trees to adjacent, healthy trees through root systems and common natural connections, intends to the best of its ability, to control and prevent this means of spread of the disease.

Subd. 2. To prevent the spread of the disease the City Forester shall place, or have placed, root graft barriers in the prescribed manners as currently recommended by the Commissioner of Agriculture and the University of Minnesota.

Subd. 3. Since root systems and root grafts of public trees do not restrict themselves to public property, and proper establishment of root graft barriers may require entrance and establishment on adjacent property, the City authorizes the City Forester to establish proper root graft barriers on adjacent private property when the following conditions are followed:

1. The root graft barrier is established to protect public trees.
2. The property owner's permission (in writing) is required.
3. If any damage or distortion to the property is caused the City shall be responsible for the reasonable restoration of the property to the condition that existed before the placement of the

4. The barrier will be placed at no expense to the property owner.

Subd. 4. Placement of root graft barriers on private property may be done to protect private trees when requested by the homeowner, however, payment will be received to cover costs.

Section 1020:50. Therapeutic Pruning. The City, recognizing the potential of therapeutic pruning (the "amputation" of infected branches) as a possible tool in the control of Dutch elm disease authorizes the City Forester to enter upon private property and carry out this procedure on private trees for the protection of public trees.

The same four conditions as stated in Section 1020:40, Subd. 3 as they apply to therapeutic pruning, shall apply.

Section 1020:60. Chemical Treatment. The City, recognizing the value of chemically treating trees either with approved fungicides or insecticides as a possible tool in the management of Dutch elm disease, and recognizing that the treatment of a private tree may help to protect other private and public trees, authorizes the City Forester to enter upon private property and chemically treat the private tree.

The same four conditions as stated in Section 1020:40, Subd. 3 as they apply to chemical treatment shall apply.

Section 1020:70. Payment of Monies Owed.

Subd. 1. The payment of monies owed to the City for the abatement of nuisances (as described in Section 1020:15) from private property shall be handled in the following manner.

Subd. 2. All expenses shall be kept by the City Forester or the City Accountant. All monies will be presented in the form of individual bills to the individual property owner stating the work done and the amount owed.

Payment shall be due on the entire amount owed within 30 calendar days from the date of the bill. If the property owner fails to pay the entire amount owed, the City may charge interest on the remainder due in the form 10% per annum.

Subd. 10. After the passage of the original 30 days the City may assess the remaining amount due (including all interests and penalties) to the owner's property or may present claims in Small Claims Court for payment against the individual property owners.

Section 1020:75. Transporting Elm Wood Prohibited. It is unlawful for any person to transport within the corporate limits of this municipality any bark-bearing elm wood without having obtained a permit from the Forester. The Forester shall grant such permits only when the purposes of this ordinance will be served thereby.

Section 1020:80. Interference Prohibited. It is unlawful for any person to prevent, delay or interfere with the Forester or his agents while they are engaged in the performance of duties imposed by this ordinance.

Hazardous Wood No. _____

Name: _____

Address: _____

Date: _____

Dear Resident:

Elm wood, found in the form of:

_____ firewood _____ non-debarked stump(s)

capable of adding to the spread of Dutch Elm Disease, has been detected on your property.

You are hereby notified that in accordance with State Law (Minnesota Statute Amendment 18.023) you are required to completely debark the wood, burn the wood under proper City burning regulations, or remove the wood from your premises and transport it to the designated City Disposal Site. As much as possible, the elm wood has been marked with paint so you can distinguish it from any other.

If you wish to have City crews transport the wood to the disposal site for you, you are allowed _____ days to place the wood on your boulevard. Please then inform the City that it is there, and it will be hauled away free of charge. (Call City Clerk's Office - 693-6334)

If you choose to remove the wood yourself, you may do so. The City Elm Wood Disposal Site is located approximately 1/2 mile south of the City Limits on Old Highway 22. The disposal site gate is locked. However, someone will unlock the gate for you by calling the City Clerk's Office (693-6334) during regular working hours, or the Police Department (693-2879) on Saturday and Sunday.

Under State Law and City Ordinance you are allowed _____ days to comply with the above regulations. Should you fail to comply within the _____ day period, the City is authorized under State Law to remove the wood or stump(s) and bill you directly or levy the total removal cost against your property. The City has a contractor or City crews available to make said removal if it becomes necessary.

If you have any questions, please feel free to contact the City Clerk's Office at 126 North Marshall, Litchfield, Minnesota 55355 (693-6334)

City Tree Inspector

I, the undersigned, have been notified that elm wood, capable of adding to the spread of Dutch Elm Disease, has been detected on my property and must either be debarked or removed according to the stipulations given on the attached notice.

Signature _____

Name: _____

Address: _____

Date: _____

H.W. No. _____

1
(If this notice was mailed to you, you do not have to return any portion of it.)

OFFICERS

VIDA HENDRICKSON, MAYOR
 WAYNE CARLSON, ADMINISTRATOR
 BETTY ANDERSON, CLERK-TREASURER
 GEORGE H. NEPERUD, CITY ATTORNEY
 BOB HENDRICKSON, STREET COMMISSIONER
 EDWARD KURZHALS, CITY ASSESSOR
 KENNETH R. NELSON, BLDG. INSPECTOR
 CHARLES DeWOLF, WASTE TREATMENT SUPT.
 McCOMBS-KNUTSON ASSOC., ENGINEERS

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City of Litchfield

126 MARSHALL AVENUE NORTH
 LITCHFIELD, MINNESOTA 55355
 612-693-6334

COUNCIL

RONALD JOHNSON, PRESIDENT
 PAUL JOHNSON
 DONALD KONIETZKO
 DAVID KELLER
 WILLARD NYSTROM
 KENNETH AGREN

Date: _____

Dear Resident:

A tree(s) on your property has recently been diagnosed and marked with paint by the City Forester as being a threat in the spread of Dutch Elm Disease or Oak Wilt.

You are hereby notified that in accordance with Minnesota Law (18.023) and/or City Ordinance, you are required to remove the tree(s) from your premises. Removal shall include all portions of the tree and either removal of the stump or complete debarking to just below ground level. All portions of non-debarked elm wood shall be transported to the City Elm Wood Disposal Site. You are allowed seven (7) days from receipt of this notice for complete removal. If you desire information about the Disposal Site, contact the City Forester, telephone numbers: (612) 693-3673 or (612) 693-7201.

Should you fail to comply with the 7 day period, the City is authorized under State Law to remove the tree(s) and bill the total removal costs to you or levy the costs against your taxes.

To be eligible for a subsidy of 100% of the cost of removal you must, within three (3) days of receipt of this notice, turn the tree(s) over to the City for removal by their contractor. At that time all costs of removal shall be paid by the City.

Costs of removal by any person other than the city contractor shall be paid by the tree owner with no subsidy from the City. Disposal of the tree(s) shall conform to the above mentioned specifications.

The following tree(s) on your property have been marked for removal:

Tree Number

Tree Diameter

If you desire to have the City Contractor remove your tree(s), please sign the release paragraph below and either mail the signed form to the City Forester at the City Hall or drop the signed form off at the City Hall. The signed portion of the notification letter will be our record for your 100% subsidy.

Minor damage is to be expected. The City Contractor is responsible for accidental damage to structures, fences, ornamental plantings and shrubs. If you experience any damage to these features, please advise your City Forester or the tree contractor within fourteen (14) days of removal.

In order to speed removal, a phone call to (612) 693-3673 or (612) 693-7201 regarding your decision will be greatly appreciated.

If you have any questions, please feel free to contact the City Forester or his agent at their office at the City Garage (along 4th St. NW), or at City Hall, Litchfield, Minnesota 55355 (1-693-3673 or 1-693-7201).

----- TEAR HERE -----

TREES NUMBERED: _____

I hereby grant the City of Litchfield the right to enter upon my property and remove _____ diseased tree(s). I understand that I will not be billed or assessed for the costs of such removal. I further understand that the diseased tree(s) become the property of the City of Litchfield.

Date: _____

Signature

Address

CERTIFICATION OF TREE REMOVAL OPERATORS

The following requirements are set forth by the City of Litchfield, Minnesota:

1. The Operator will inform property owners of the types and amounts of insurance coverage for any damage that may result. A copy of same shall be provided the City before certification is approved.
2. The Operator must claim full responsibility for all damage to private and public property during removal operations.
3. The Operator must provide an official receipt for payment for his work, and any payment in any form cannot be shared or returned to the property owner. A sample copy shall be submitted to the City before approval for certification is given.
4. The Operator shall be required to follow the City's policies and rules relative to tree removal:
 - a. All elm tree material removed shall be deposited at the City's disposal site.
 - b. The Litchfield Utilities, Litchfield Northwestern Bell Telephone Company, Litchfield Cable T.V., shall be contacted when removal is near overhead lines.
5. The Operator must have a business whose livelihood is tree removal. Ample information must be submitted to the City to verify same before certification is approved.

I hereby apply to the City of Litchfield, Minnesota, and agree to meet all the above requirements for the year 19 ____.

Signed by: _____

Title: _____

Company: _____

Date: _____

CITY USE

Approved by: _____

Title: _____

Date: _____

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CHARLES DEWOLF, WASTE TREATMENT SUPT.
MCOMBS-KNUTSON ASSOC., ENGINEERS

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City of Litchfield

126 MARSHALL AVENUE NORTH
LITCHFIELD, MINNESOTA 55355
612-693-6334

COUNCIL

RONALD JOHNSON, PRESIDENT
PAUL JOHNSON
DONALD KONIETZKO
DAVID KELLER
WILLARD NYSTROM
KENNETH AGREN

Re: Root Graph Barrier Installation

Dear

Since Dutch elm disease can be spread from elm tree to adjacent elm tree through common root graphs, it is recommended that we install a root graph barrier, by machine or chemical, for the abatement of Dutch elm disease. Due to some expected damage of sod or terrain, restoration will be made to your property by the City.

Sincerely,

Steven J. Cook
City Forester

SJC:gn

I do hereby allow the City of Litchfield the right to enter my property for the installation of a root graph barrier for Dutch elm disease abatement. I understand any damage to my property will be restored by the City.

Name: _____

Date: _____

OFFICERS

VIDA HENDRICKSON, MAYOR
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GEORGE M. NEPERUD, CITY ATTORNEY
BOB HENDRICKSON, STREET COMMISSIONER
EDWARD KURZHALS, CITY ASSESSOR
KENNETH R. NELSON, SLOD. INSPECTOR
CHARLES DEWOLF, WASTE TREATMENT SUPT.
MCCOMBS-KNUTSON ASSOC., ENGINEERS

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City of Litchfield

126 MARSHALL AVENUE NORTH
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COUNCIL

RONALD JOHNSON, PRESIDENT
PAUL JOHNSON
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DAVID KELLER
WILLARD MYSTRON
KENNETH AGREN

Re: Pruning of Elm for Dutch Elm Disease Abatement

Dear

Your elm tree has begun to show early signs of Dutch elm disease. When found in these early stages, the disease can be pruned out of the tree and the life of the tree can be prolonged.

The City of Litchfield will attempt to prune the disease out of your tree at no charge to you. This pruning in no way guarantees that the tree will not die of Dutch elm disease. The pruning is an attempt to prolong the life of your tree and, if successful, can rid your tree of Dutch elm disease for the present.

Sincerely,

Steven J. Cook
City Forester

SJC:gn

I do hereby allow the City of Litchfield the right to enter my property for the purpose of attempting a Dutch elm disease therapeutic pruning of my elm. I understand this pruning in no way guarantees that my tree will not become infected by Dutch elm disease at a future date.

NAME: _____

DATE: _____

ADDRESS: _____

WORK SHEET FOR EVALUATING THE SHADE
TREE PROGRAM ACTIVITIES OF THE
SELECTED CONTROL CITIES

1. Disease Control Area (include map)

2. Inspection Procedures
 - a. Public Property

 - b. Private Property
 - Notification

 - Method of Verifying Removal

 - c. Inspections Completed By (specific dates)

 - d. Firewood Inspections (specific dates)

 - e. Attach copies of the City Ordinances dealing with hazardous wood, tree removal notification, etc.

3. Tree Removal Procedures
 - a. Time limit for removing High Risk Trees on Public Property

 - b. Time limit for removing High Risk Trees on Private Property

 - c. Tree Removal Done By

City Crews	_____ %
Contractors	_____ %
Private	_____ %

4. Subsidy Policy

- a. Does the City reimburse homeowners for tree removal on private property? If so, what level of reimbursement is provided?
- b. Does the City special assess tree removal costs incurred on private property? If so, what is the percentage of the amount assessed?

5. Root Graft Disruption

- a. Mechanical
- b. Chemical

6. Stump Treatment

- a. Grind-out
- b. Debark
- c. Other

7. List the Chemicals used as a disease management practice (for example, systemic fungicides). Are these chemicals being used in an effective manner?

8. Disposal Policy

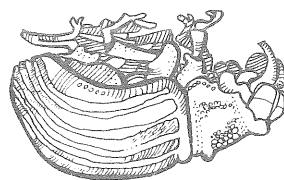
Burning _____

Burying _____

Chipping _____

Other _____

9. Reforestation Activities
 - a. List the species of trees planted.
 - b. Where is the planting stock obtained or purchased?
 - c. Who does the actual planting of the trees?
10. Information to be determined by person monitoring control cities
 - a. Number of diseased elm trees _____.
 - b. Number of diseased elm trees detected by the City _____.
 - c. Number of diseased trees removed _____.
 - d. Number of delinquent trees (trees not removed within the time limit established by City policy) _____.
11. Miscellaneous comments (What is the evaluator's opinion of the City's disease management program?)
12. Is the Agricultural Extension Service involved with the City's disease management program? (For instance, has the County Extension Agent held public meetings, produced radio and/or newspaper releases, etc., concerning shade tree diseases?)



The End