



**SASKATCHEWAN
DUTCH ELM
DISEASE
ASSOCIATION**

APreserving the American elm in Saskatchewan®

**A REPORT ON THE STATUS OF DUTCH ELM DISEASE
IN SASKATCHEWAN**

September - 2002

1.0 Executive Summary

Dutch elm disease (DED) is a deadly fungus that can kill a tree in as little as three weeks. It is spread in Saskatchewan by the native elm bark beetle that carries the sticky spores of the fungus to healthy trees as it feeds, breeds, and overwinters. DED is now fairly well established across the eastern side of the province, and is primarily making inroads into central Saskatchewan along river corridors that have stands of naturally occurring elms.

Saskatchewan has in excess of 300,000 American elms in urban areas alone, an asset valued at over one billion dollars. This doesn't even begin to take into account the indirect benefits of urban forests on such things as heating and cooling costs. The bad news is that once DED strikes, **communities that choose to do nothing will lose 90% of their elms in as few as 10 years.** This doesn't need to happen! While we can never eliminate DED, we do know how to manage it and with a pro-active management program in place we can keep our losses from DED down to well below 2% per year. This allows us to spread out the costs associated with tree removals and replacement over many decades instead of just a few years.

As expected, we are seeing that the number of infections decrease or remain low in areas that are actively managing DED. For example, Estevan lost fewer trees this year than in the past two years, while Carnduff has lost the lowest number of trees ever in the nine years it has had DED. We saw 102 infected trees identified for summer removal in eight communities and associated buffer zones across the province. A further 20 infected trees will be removed in communities and 443 trees removed in buffer zones this winter. An additional 340 elms will be removed in the Condie Nature Refuge (NW of Regina) as a precautionary measure due to the poor health of these trees and their proximity to the city. This means that 565 trees were lost to DED in surveyed communities and buffer zones in 2002 versus 641 trees (adjusted to reflect Moose Jaw buffer removals) removed in 2001, however 905 elms will be eliminated overall. Of particular note, several communities that had infections last year, namely Moose Jaw, Weyburn, Carlyle, Moosomin, and White City, were disease free in 2002. No infections have re-appeared in Davidson since their first removal in 1999.

The two main areas of concern in Saskatchewan are Lumsden, with the highest removal numbers in the province (67 trees), and Regina that after years of having only one infection per year, had 8 trees removed last year and 14 removed this year. The numbers in Lumsden are not surprising as there has not been any capacity to deal with the disease in the natural areas around the town, therefore making it very difficult to control infections within the town itself. It is also worthwhile noting that the City of Regina's loss of approximately 0.014% of its elms in 2002 is still far below the 2% loss rate that is seen in communities that are doing an exemplary job of DED management such as Winnipeg. Regina is still doing remarkably well for a community that has had the disease for more than 20 years and increased efforts to establish a true buffer zone for the city should help to keep these infections numbers low.

The areas that are not being represented in these numbers are the natural areas and small communities where no organized sampling is occurring. For example, it was confirmed this year that a number of elms in the Rendek Elm Forest NE of Hudson Bay tested positive for DED, however we do not have accurate information on the extent of the infection. We also know that new infections outside of the cost-share program were detected in Wapella, a farmyard SE of Weyburn, Boundary Dam, and on a farmyard on Highway 11 near the Regina Beach turn-off, however infections in many other areas are no doubt being missed. While efforts are prolonging the life of trees in larger urban centres, we need to recognize that we are still losing a significant number of elms in natural areas and smaller communities.

We are pleased to see that funding was not cut to the provincial DED budget in spite of a fiscally challenging budget for the year. The provincial program in 2002 was able to:

- increase communities in the "cost-share" program from 32 to 33
- prepare inventories of Emerald Park, White City, and Pilot Butte as part of the Regina buffer, as well as in Regina Beach and north of Tisdale as part of the cost-share program
- expand the buffer zone around Regina as well as begin the inventory for a buffer zone around Moose Jaw
- continue surveillance work in 43 selected communities
- cover costs for removals in most cost-share communities and buffer zones
- continue public education activities in conjunction with the Saskatchewan Dutch Elm Disease Association and the SOS Elms Coalition

Overall we see that we are slowing down the spread of DED and keeping losses down to minimal numbers in infected areas where support can be offered. In order to continue this ability to manage the disease we need to focus on the following:

- **As funding is made available it should be directed towards inflationary increases, addition of qualified cost-share communities, better support for buffer zone establishment, and removal/disposal programs for smaller communities (including provincial parks).**
- **Developing alternatives for Dursban through research into areas such as kairomone traps or products like NEEM.**
- **Completion of the DED Regulations under the new Forest Resources Management Act along with an organized implementation of changes.**

2.0 Background

2.1 What is Dutch elm disease and how is it spread?

Dutch elm disease (DED) is a deadly fungus that can kill a tree in as little as three weeks and usually within one or two seasons. The fungus kills elms by triggering a reaction that shuts down the water conducting vessels of the tree. American elms are the most likely to contract DED, however other elms are also susceptible.

When the native elm bark beetle (the main vector of the disease in Saskatchewan) comes in contact with infected wood, the sticky spores of the DED fungus become attached to the beetle and are spread as the beetle feeds or over-winters in healthy elms. The transportation of elm firewood from an infected to a disease-free area can bring DED into a community overnight. One two-foot log of elm firewood alone can harbour up to 1800 infested native elm bark beetles!

2.2 Where is the disease found in Saskatchewan?

DED first appeared in Saskatchewan in 1981 when one infected tree was found in Regina. In 1990 DED was detected in Woodlawn Regional Park near Estevan. Since then the disease has become well established in the eastern part of the province, particularly in the Carrot River, Souris, Pipestone and Qu'Appelle valleys. Hundreds of thousands of elms in native stands have already been killed in Saskatchewan.

As the disease spreads out of the valleys and into our communities, hundreds of elms within municipalities have become infected and hundreds of thousands more are at risk of being destroyed including the mature boulevard trees that shade the streets of our towns and cities. Fortunately, some communities are isolated from areas of infection as they are surrounded by farmland, however they are still at risk through the transportation of infected firewood and through farm shelterbelts. The appearance of DED in Davidson is a prime example of how this can happen as the nearest infection to it was more than 100 km away. So far 57 Saskatchewan communities have had DED of which 13 communities and at least four natural areas have reported infections in 2002.

2.3 Can DED be prevented?

While we can likely never eliminate DED, with proper management the spread of the disease can be slowed substantially. Many well organized programs such as those in Fredericton and Winnipeg have kept their loss rates to under 2% per year. Communities who chose to do nothing have lost over 90% of their elms in just 10 years!

In spite of having higher losses of late, the City of Regina has done an admirable job of protecting its 100,000 American elms from DED. In the 21 years of having the disease the city has lost only 28 trees, with the 14 trees lost in 2002 still representing a loss rate of only 0.014% (versus the 2% loss rates found in other successful DED management

programs). Mature elms have an estimated value of \$3,600 per tree. If Regina chose to “do nothing” they would likely have **lost an urban forest worth at least \$324 million dollars**, without even taking into account the cost of removing and replacing 90,000 mature trees. DED management is an investment that makes good financial sense especially when you consider that the province has over 300,000 American elms valued at over one billion dollars in urban areas alone!

A comprehensive DED management program consists of the following steps:

- inventory of elms in order to know the location and condition of community trees
- surveillance of elms for symptoms of DED followed by testing for the disease
- prompt removal and disposal of infected elms in a designated disposal site
- elimination of elm firewood as it is a breeding site for the native elm bark beetle
- pruning of elms to remove dead and dying wood where the beetle also breeds
- basal spraying to reduce native elm bark beetle populations
- when all of the above steps have been put in place, a community with a large number of elms may also consider instituting a similar program in a buffer zone extending 2 km or more around the town or city.

2.4 The Economics of DED

There have been a number of cost-benefit studies done in Canada and the United States that have studied the percentage of tree losses from DED based on whether or not communities took the actions needed to manage the disease. What all of these studies show is that *any community not operating a strict sanitation program should expect to lose 80 to 95 percent of its total elm population within ten years (Overstory, May 1982).*

This is what we can expect to happen in Saskatchewan as well unless communities receive the financial support and provincial leadership needed to fight DED successfully. Applying these statistics to the Saskatchewan situation, we can project that within ten years of DED infections covering the province, **only 25,346 urban American elms would be left** in our communities if no management program was in place. If a comprehensive program was implemented instead, the province would still have over 280,000 urban American elms!

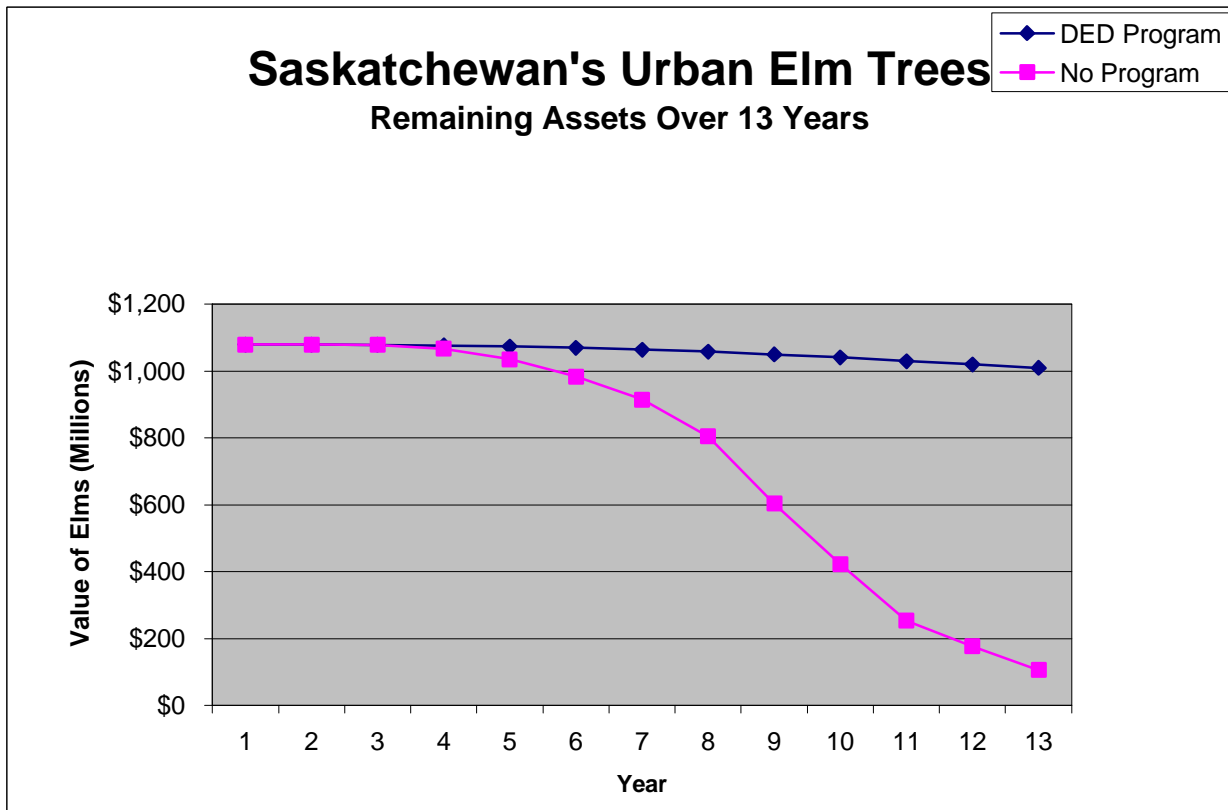
The following summarizes some of the studies done and what they found:

1. In *Dutch Elm Disease Control: Performance and Costs*, William Cannon, Jr. and David Worley, (1976) studied 39 communities in the Midwest United States over a period of 18 years. They found that if no DED management program was in place only 10 to 15% of the elms were still alive after 12 years.
2. Similarly, in the greater Chicago Area over an eleven year period, five municipalities with no Dutch elm disease program lost 80 to 94 percent of their elms to the disease, while another 28 communities in the same area undertook preventative activities that kept their losses from 5 to 15 percent (*Overstory, Volume 2, Number 5, May 1982, St. Paul, Minnesota*).

3. Closer to home, Fredericton, New Brunswick after 20 years of managing DED, had preserved about 75% of their elm trees. In adjoining communities with no program in place, all the elms were dead after a period of only seven years.

4. In Manitoba, a comprehensive, province-wide DED management program has allowed cost-share communities in that province to keep their annual tree losses due to DED from 1975 to 1990 to an average of approximately 2% per year including hazard tree removals.

As an analysis of projected tree losses shows (see below), without a comprehensive, preventative DED management program, large numbers of trees would die in Saskatchewan over a short period of time. Responding to DED in this way is very expensive as communities not only lose valuable trees, but also face huge tree removal and replacement costs in a fairly short span of time. It can be shown to be 8 times more cost-effective over 10 years to commit sufficient funds to carry out a comprehensive DED program, than it is to do nothing at all.



A comprehensive program allows the province to spread out its costs over a longer period of time, while at the same time allowing controlled removal and replanting programs that will allow the urban forests of Saskatchewan to remain relatively intact. Studies have repeatedly shown that:

The implications for managers in terms of budget requirements is that even the costliest control program would create less of an impact on the annual budget than the tree removal costs of no control (Cannon & Worley, 1976).

Similarly, Richard Westwood in his 1991 publication, *A Cost-Benefit Analysis of Manitoba's Integrated Dutch Elm Disease Management Program* concludes that since 1981 the Province of Manitoba has realized a minimum savings of over 5 million dollars in rural cost-share communities alone by managing DED. It simply makes good economic sense to invest in DED prevention.

2.5 History of the provincial DED program

The provincial government has been involved in DED management as early as the mid 1970s when Saskatchewan Agriculture and Food had responsibility for the program. Starting in 1981, SERM (now Saskatchewan Environment) became the lead agency involved in managing DED. From 1986 to 1989 the program was discontinued, with the result that diseased trees were left standing and DED spread rapidly through the eastern part of the province. The Forest Ecosystems Branch of Saskatchewan Environment has overseen DED related surveillance, removals, and public education from 1990 through to today.

The DED program received direct funding for the first time in 1995/96, with a budget of \$600,000. In reality only \$45,000 of this went directly to DED management - the rest was spent on forest fire suppression. From 1996 to 1999 the DED program budget was frozen at \$300,000, while the program demands continued to grow. The budget was finally increased by \$200,000 in 2000 allowing the development of a much expanded program.

2.6 History of the Saskatchewan Dutch Elm Disease Association

In 1995 the Saskatchewan Dutch Elm Disease Strategic Planning Committee was formed to prepare a long-term strategy for managing DED in the province. This Committee subsequently evolved into the Saskatchewan Dutch Elm Disease Management Advisory Committee whose mandate was to serve as an advisory body to the provincial DED program. In February of 1998, the committee became the board of the newly incorporated Saskatchewan Dutch Elm Disease Association (SDEDA) whose mandate is to "preserve the American elm in Saskatchewan".

The SDEDA has province-wide representation including members from SARM, SUMA, ASUPCA, Regina, Saskatoon, Prince Albert, INAC, SOS Elms and municipalities throughout the province. Aside from its continued advisory capacity, the SDEDA works to increase awareness of DED through education projects, speaking engagements, advertising, newsletters and an annual training workshop.

3.0 Current Status of DED in Saskatchewan

3.1 Results of the 2002 DED Survey

While DED is still slowly progressing in the province, it would appear that overall infection numbers in surveyed communities are down slightly for 2002 (565 in 2002 versus 641 in 2001 – the latter is adjusted for additional Moose Jaw buffer removals). Summer removals through the provincial program took place in eight communities with 102 trees being disposed of. The communities of Regina and Lumsden are of particular concern with 14 and 67 infected trees respectively, whereas the communities of Estevan and Carnduff saw decreased losses of 18 and 2 elms respectively.

Winter removals will see another 20 trees removed from the five cost-share communities and an additional 443 trees removed in the buffer zones around Regina (295), Estevan (114) and Fort Qu'Appelle (34). There will be an additional 340 elms removed in the Condie Nature Refuge this fall as a precautionary measure as the trees are in poor health and DED was already found in this area of the Regina buffer zone. This overall decrease in infections is certainly due to efforts to manage the disease, as well as a reflection of the number of trees that are still left in buffer zones, and possibly the impact of a cooler, late spring. It was particularly encouraging that several of the communities that had infections last year such as Moose Jaw, Weyburn, Carlyle, Moosomin, and White City were disease free this year. Even in communities where infection numbers increased it is important to note that this still speaks to the effectiveness of the DED program as without a management program in place the numbers of infections would be far higher and most of the infected communities would now be facing a financial crisis as removal and replacement costs mount.

The two main areas of concern in Saskatchewan are Lumsden, with the highest removal numbers in the province (67 trees), and Regina, that after years of having only one infection per year, had 8 trees removed last year and 14 removed this year. The numbers in Lumsden are not surprising as there has not been any capacity to deal with the disease in the natural areas around the town, therefore making it very difficult to control infections within the town itself. It is also worthwhile noting that the City of Regina's loss of approximately 0.014% of its elms in 2002 is still far below the 2% loss rate that is seen in communities that are doing an exemplary job of DED management such as Winnipeg. Regina is still doing remarkably well for a community that has had the disease for more than 20 years and increased efforts to establish a true buffer zone for the city should help to keep these infection numbers low.

The areas that are not being represented in these numbers are the natural areas and small communities where no organized sampling is occurring. For example, it was confirmed this year that a number of elms in the Rendek Elm Forest NE of Hudson Bay tested positive for DED, however we do not have accurate information on the extent of the infection. We also know that new infections outside of the cost-share program were detected in Wapella, a farmyard SE of Weyburn, Boundry Dam, and on a farmyard on Highway 11 near the Regina Beach turn-off, however infections in many other areas are

no doubt being missed. While efforts are prolonging the life of trees in larger urban centres, we need to recognize that we are still losing a significant number of elms in natural areas and smaller communities.

3.2 Components of Provincial DED program

We are pleased to see that funding was not cut to the provincial DED budget in spite of a fiscally challenging budget for the year. The provincial program in 2002 was able to:

- increase communities in the “cost-share” program from 32 to 33
- prepare inventories of Emerald Park, White City, and Pilot Butte as part of the Regina buffer, as well as in Regina Beach and north of Tisdale as part of the cost-share program
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4.0 Areas of Concern

4.1 Areas in need of additional support

The amount of work being done for the level of funding directed to DED management in Saskatchewan is certainly impressive and is based on a very careful allocation of resources, however, it is clear that the current level of funding does not meet the needs of targeted communities with 400 or more elms and 800 or more people. For example, there are still approximately 15 qualifying communities that are not part of the cost-share program and many of the participating communities receive very nominal support, e.g. between \$1500 to \$2000. This situation is becoming increasingly worse as inflation eats away at the amount of work that can be accomplished with a set level of funding. Creative solutions are being considered, e.g. reducing the frequency of surveys in areas with less risk to focus on surveys in buffer zones, however compromises like this may mean that new infections remain undetected for some time in communities that are not as closely watched. To keep on top of the situation serious consideration should be given to:

- **at a minimum, providing an inflationary increase to DED funding in the province,**
- **if possible, providing sufficient funding to include all qualifying communities in the cost-share program and,**
- **increasing funding to communities with greater need, e.g. buffer zone establishment, to ensure management programs are complete.**

While Saskatchewan is doing very well in managing DED in areas where funding allows, the disease is being allowed to run its course in many of the province’s smaller communities (approximately 42 locations), natural areas, and some provincial parks. This inability to do more is directly related to the amount of funding available to do DED

management, as well as the challenges inherent to doing work in these areas (i.e. lack of personnel in some communities and difficulty of access in natural areas). Our concern is that hotbeds of infection are being allowed to develop in locations across the province. If funding can be found, **it would be wise to implement a removal and disposal program for smaller infected communities (and provincial parks)** to reduce the risk of disease transmission to other locations.

4.2 Continued challenges with the use of Dursban

While the chemical Dursban has been approved for continued use as a control measure for the native elm bark beetle, it would appear that the public's perception of this product (and the use of pesticides in general) has made it increasingly difficult to use this important tool for the management of DED. While work has started in the research of alternative strategies to use instead of this chemical at Simon Fraser University, **there are other possible replacements for the chemical that we would like to see tested**, e.g. the plant-based product NEEM. This type of research is extremely important to the success of future DED management programs and is in need of continued if not increased financial support.

4.3 Changes to DED Regulations (including Certification of Pruners)

While the Saskatchewan Dutch Elm Disease Association has been very pleased with progress made to date with changes to the Forest Resources Management Act (FRMA) and the DED Regulations, we feel that we must **continue to make this process a priority** until such time as the revised regulations are approved and attached to the FRMA. We must also make sure that all sectors work together to ensure the smooth implementation of these revised regulations (e.g. informing groups of their new responsibilities and requirements) and are looking for continued commitment to this process.

5.0 Future Directions

The fate of the American elm in Saskatchewan still remains in the balance. With continued financial support and leadership from the provincial government, Saskatchewan could become a model of how to manage a serious threat like DED. We now have in place an excellent partnership of organizations and individuals that are effectively slowing the spread of DED dramatically, however in order to maintain this success we need to focus on the following:

- **As funding is made available it should be directed towards inflationary increases, addition of qualified cost-share communities, better support for activities such as buffer zone establishment, and removal/disposal programs for smaller communities (including provincial parks).**
- **Developing alternatives for Dursban through research into areas such as kairomone traps or products like NEEM.**
- **Completion of the DED Regulations under the new Forest Resources Management Act along with an organized implementation of changes.**