



Canadian Forestry Service-Maritimes TECHNICAL NOTE



1785 - 1985

STILL THE CITY OF STATELY ELMS: FREDERICTON

AFTER 25 YEARS OF DUTCH ELM DISEASE - 1985

Persistence pays off. This is clearly indicated by the decreasing loss of trees in Fredericton in the past five years. Even though the City's Dutch elm disease program in its first twenty years (from 1961 to 1980) must be considered a success, the increasing annual loss rate from 1975 to 1980 was alarming. With the continuation of climbing loss rates the City, although holding the tide as compared to losses experienced elsewhere, may have been losing ground.

Since 1980, however, the trend has been reversed. The loss rate declined steadily - and considerably - and in 1985 has receded to the level it was ten years previously, to 1.3% - based on current annual tree population - an excellent rate by most standards.

Due to consistent commitment to a management program by successive municipal governments, the City's old core is still hidden beneath a canopy of century old elms, and a young stand, comprised of a variety of species, is growing to replace them when necessary. The City still has over 70% of its original elm population while surrounding areas are pockmarked with skeletons of trees, an eyesore to residents and tourists and a hazard to life and property.

It is with pleasure and satisfaction that we bring this to the attention of the citizens of Fredericton in this, the Bicentennial year for the capital city of New Brunswick (to provide an update to an earlier report and to document to others) that persistent adherence to the principles of sanitation does indeed constitute the basis of successful Dutch elm disease programs.

NURSERIES

PLANTATIONS

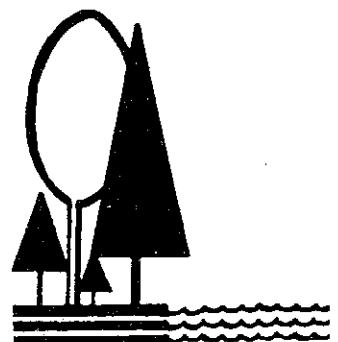
SILVICULTURE

UTILIZATION

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TREE
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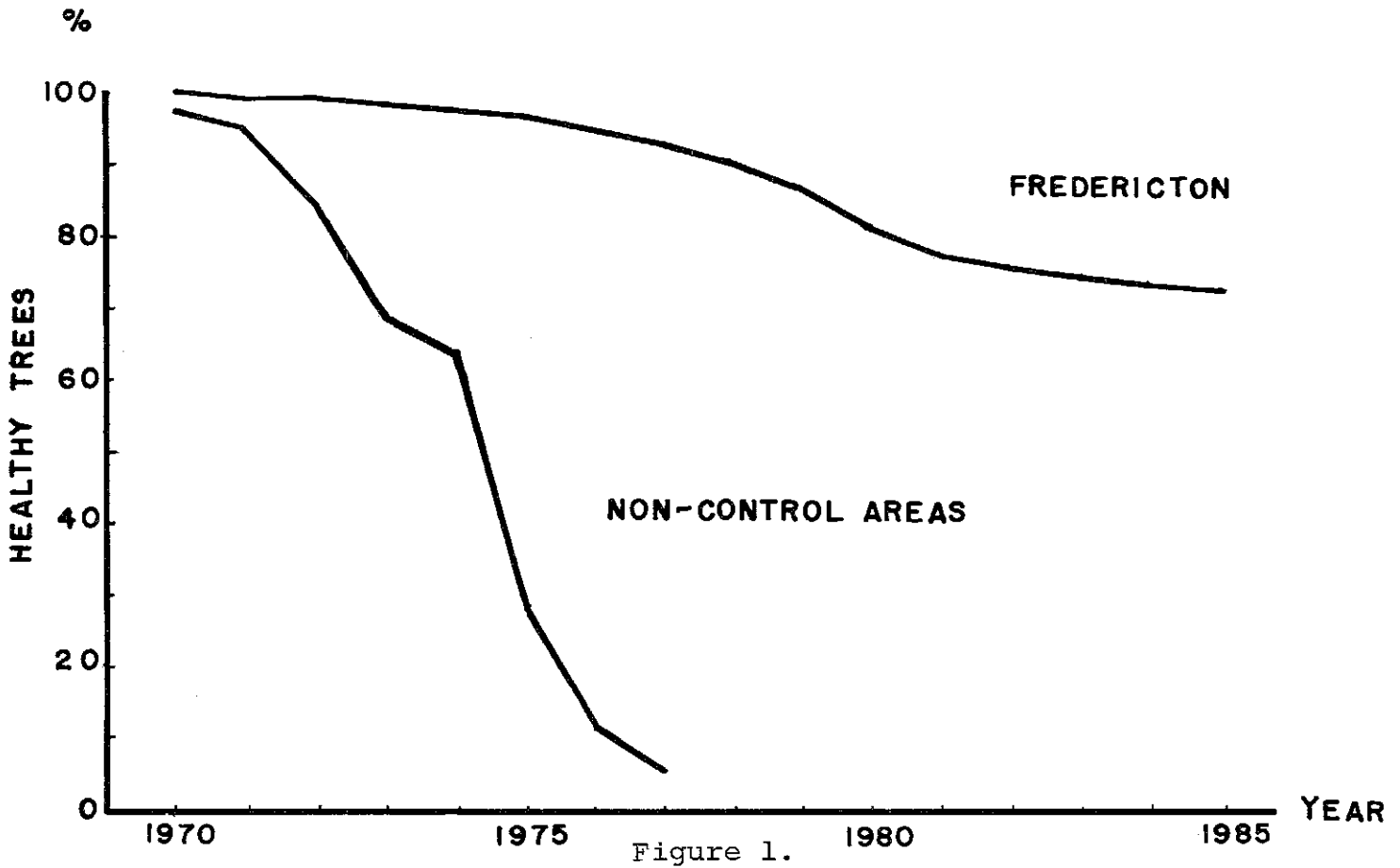


Figure 1.
Percentage of healthy elm trees in Fredericton and in non-control areas in terms of the elm population in the spring of 1970.

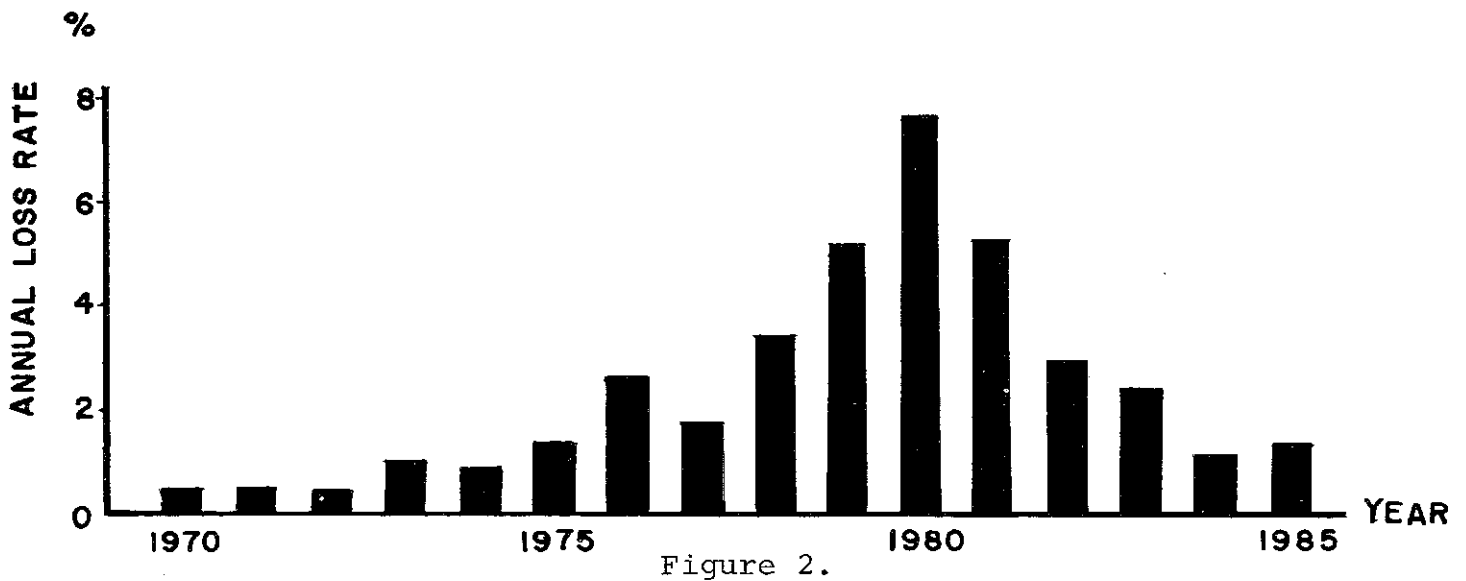


Figure 2.
The annual loss rate of Dutch elm disease in Fredericton based each year on the current elm tree population.

The 1985 situation, to be clearly understood, must be put in perspective of the history of Dutch elm disease in Fredericton. All of the information to 1980, the figures, the methods of control, the principles and the rationale are included in an earlier report (Magasi *et al* 1981), which can be consulted for detail. We deal with those as they relate here. The "story" is divided into sections.

FREDERICTON'S DUTCH ELM DISEASE STORY

Preparation 1952 - 1961

The Fredericton Tree Commission was formed in 1952, partly in response to concern regarding the spread of Dutch elm disease towards the east and in recognition of the fact that the city's thousands of century old elm trees were facing an approaching threat. A by-law was enacted to authorize the City to enter private property and cut diseased trees at the expense of the City. This by-law ensured the prompt removal of diseased trees in later years when the reluctance or financial inability of the owner could have caused delays. Sanitation pruning was carried out on all trees requiring attention. The disease was first found in the Province in 1957 and by 1961 was common and well established in central New Brunswick around Fredericton.

The early years 1961 - 1969

The first infected tree was found in Fredericton in 1961 and was promptly removed. A total of 15 diseased trees were found during this period, 11 of them in the last two years. Although the disease was present in the City the numbers were low and the annual loss rate was 0.1%. (It may be of interest that 301 other elm trees were also cut during this period, mostly to allow for construction and street widening and only a few because of decadence).

The holding-off years 1970 - 1975

The disease was running rampant in central New Brunswick and trees were dying by the thousands each year. Disease carrying elm bark beetle populations were very high and the number of healthy trees was declining at an alarming rate.

In Fredericton, the number of diseased trees cut each year has also increased, the annual loss rate, a calculation always based on current population, has progressed slowly but steadily upward and surpassed the one percent mark for the first time in 1975. Still, compared to areas where the disease was allowed to run its course unimpeded, the effects of the City's control program became clearly evident. As illustrated in Figure 1, where the lines represent the percentage of healthy elms in terms of the tree population in 1970, Fredericton was saving its trees. While an average of 72.0% of the trees were killed by Dutch elm disease in four outside check areas only 4.2% of Fredericton's trees succumbed to the disease by the end of 1975 - a 67.8% difference. The City lost 225 trees to Dutch elm disease between 1970 and 1975. Assuming the same rate of loss observed in areas without control that difference means a saving of 3767 trees in Fredericton

that remained healthy and green, required no costly removal expense and did not become the source of further infection. (The assumption is valid because, while there were no more than four infected trees in any of the four outside areas at the start of the study, there could have been, without a sanitation program, a minimum of 15 infected trees widely distributed in the City, and the density of elm population was at least as great in Fredericton as in the outside areas.)

In 1973, amalgamation with several surrounding communities has increased the size of Fredericton and considerable effort was expended in the ensuing years to bring tree care to the standards of the 'old' city.

The high pressure years 1976 - 1980

While Fredericton was clearly much better off than other areas - and was often cited as an example of successful Dutch elm disease control - it was becoming a green island in a sea of destruction. Most trees were dead in the outside areas (95% by the end of 1977) and there was an influx of disease carrying beetles, in search of living elm, into the City, as evidenced by an increase in the beetle index and in the pattern of infected trees within the management area.

Sanitation was supplemented by the application of various chemicals during these years, aimed at lowering the elm bark beetle populations.

The losses mounted during this period. The accumulated loss from Dutch elm disease has more than quadrupled from 4.2% in 1975 to 19.7% by the end of 1980. The annual loss rate has increased dramatically and in 1980 alone the City cut 315 diseased trees within the management area, 7.8% of the trees green in the spring were gone by the end of the year (Figure 2).

However, the City, in spite of growing losses, still had over 80% of its elm trees healthy in 1980 after 20 years of battling Dutch elm disease, a remarkable achievement and a credit, mainly, to the sanitation program consistently carried out, especially when compared to losses in communities and other areas without the persistence exhibited by the City.

The turn-around years 1981 - 1985

The report on the first 20 years ended on a note of achievement - 80% of trees saved - but carried with it an uncertainty regarding the future. What if the loss rates keep climbing as they have, in most years, during the past decade? What if the cynics, referring to the 'city of stately stumps' will have the last laugh and we, the citizens of Fredericton, lose after all?

It did not happen that way. In 1981 the annual loss rate, still calculated based on current tree population, dropped two and a half points to 5.3% - then kept on dropping, each year, consistently and the loss rate was reduced to just slightly above 1.0% in both 1984 and 1985. There were occasions before - in 1972, 1974 and 1977 - when the annual loss rate was lower than the previous years but those "pauses" were temporary, probably a combined effect of biology

and calculations, after which the upward cycle was restored. This time the change in direction must be considered real. With the drastic reduction of elm from the surrounding areas the elm bark beetle populations, the carrier of the disease, have declined dramatically as indicated by the declining beetle index. The pressure appears to be off.

Fredericton is still losing trees. In 1985 41 diseased elm trees were removed in the management area, however the losses are much smaller than they used to be. While the City lost 15.5% of its trees between 1975 and 1980 the loss was only slightly more than half of that, 8.1%, between 1981 and 1985, most of this in the first part of the period.

It is true that 27.8% of the original elm tree population of 5692 trees was lost to Dutch elm disease in the 25-year period since 1961, but this also means that 72.2% of the trees were saved, a figure higher than that of the outside areas without control in 1973 - 13 years ago.

The fate of Fredericton's tree program has not been left to blind optimism alone. The pruning program on city trees continued unabated and more than 2000 trees were pruned each year in spite of increased work load due both to increasing tree removal and amalgamation related work. Although still proud of its elms and working hard to save them, the city realized early that it cannot rely forever for beauty and shade on the aging elm trees alone. Consequently, a vigorous tree planting program with a variety of different species to provide diversity has always been high on the list of priorities and over 700 new trees have been planted each year since 1977, partly to replace trees lost, partly to establish them in newly developed areas.

Since 1981 historical and other high value elm trees have been selected for extra attention and, to increase their chances of survival, they have been injected with chemicals to prevent infection. The number of trees injected is small and the method is restricted to the high value trees.

The future years 1986 -

With over 70% of the original elm population still healthy after 25 years of Dutch elm disease and with the loss rates down to around one percent annually, the future looks much brighter than it did five years ago. The planting program will ensure a mixed urban forest with a diversified species composition. The sanitation program, aided by new methodologies such as tree injection, should ensure the continued presence of the magnificent old elms for a long time to come.

The catastrophe befallen surrounding areas helped to eventually relieve the pressure on Fredericton's trees. The virtual disappearance of elm fortunately did not mean the extinction of elm in the countryside. A few elms remained and seed from these took hold. A new generation of elm is growing. Unfortunately, the disease did not disappear altogether either. There are still some old surviving trees around, many of them diseased or dying and there are signs of flare-up of the disease in some areas on the young trees. It is unlikely that Dutch elm disease will again sweep through the land as it did during the first wave but it is also unlikely that it will disappear.

Therefore, while Fredericton may rejoice and enjoy the green canopy of beautiful old elm trees, it must be remembered that these are the remnants of a great stand which not that long ago covered the entire area. It must be remembered that they are still here because the City cared and worked hard to keep them. Fredericton must not become complacent. The greatest pressure is gone but the danger remains. Any relaxation of the persistent adherence to the sanitation program could, in short order, undo all the efforts of all those years.

Fredericton, after 25 years of Dutch elm disease is still the City of Stately Elms and there is no reason why it should not remain so.

Technical points

Throughout this report it was emphasized that loss rates are based on current elm population. The number of elms lost each year, expressed in terms of trees present in the spring of that year gives an annual loss rate higher than if expressed in terms of the starting tree population, which in Fredericton was 5692 in 1981. Trees removed for any reason during the previous year are deducted from the inventory annually to arrive at the current population. Our method gives a realistic estimate of losses for any given year because it is based on what is actually there to become infected.

Fredericton's elm inventory included only trees with a minimum of 10 cm in diameter. The inventory is updated at infrequent intervals. In intervening years the most recent figure is used and it does not take in-growth into consideration. Losses, however, include all trees regardless of size. This system exaggerates calculated losses and in the long term underestimates the number of trees present in the city. In 1978, the date of the latest inventory, it was found that although 1600 elm trees were removed between 1957 and 1978 for various reasons, Fredericton's elm tree population decreased by only 575 trees (Magasi, 1979). We believe that the same situation exists now. There have been 106 elms removed since 1978, classified as "trees of little value", many of these along brooks or property lines and most of them small and unlikely to have been part of the latest inventory. Yet, these are used as trees lost in calculations (four of the 5 trees which accounted for the loss rate increase of 0.2% between 1984 and 1985 were in this category).

Because of these points it is likely that the figures given in the body of the two reports present a worse case scenario.

References:

- Magasi, L.P. 1979. Forest pest conditions in the Maritimes in 1978 with an outlook for 1979. MFRC Info. Rept. M-X-98.
Magasi, L.P., R.E. Balch, S.E. Pond, C.C. Smith, D.A. Urquhart. 1981. Twenty years of Dutch elm disease in Fredericton, N.B. (1961-1980). MFRC Info. Rept. M-X-127.

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This communication is a joint contribution of the Canadian Forestry Service - Maritimes and the Fredericton Tree Commission to commemorate the Bicentennial Celebrations in the City of Fredericton (1785 - 1985).

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