

Final Report for the Canadian Tree Fund Project Conducted by the Society to Prevent Dutch Elm Disease (STOPDED)

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Project Title: “Targeted enhanced surveillance for early detection for the presence of Dutch elm disease or stockpiles of elm firewood in rural Alberta municipalities reporting higher numbers of DED beetle vectors.”

At present, Alberta has the largest Dutch elm disease (DED)-free stand of American elm (*Ulmus americana*) in the world. The province has 600,000 American elms valued at \$2 billion. In order to keep Alberta DED-free, the Society to Prevent Dutch Elm Disease (STOPDED), a nonprofit organization, leads the development and delivery of Alberta’s *Provincial Dutch Elm Disease Prevention Program*. Alberta American elms are not native, they either have been planted or are naturalized offspring of the planted elms.

Since 1975, STOPDED has been involved with monitoring throughout the province for the smaller European elm bark beetle (SEEBB) *Scolytus multistriatus* (Marsh), the native elm bark beetle (NEBB) *Hylurgopinus rufipes* (Eichhoff) and the banded elm bark beetle (BEBB) *Scolytus schevyrewi* (Semenov-Tian-Shanskij), all vectors of the DED pathogens *Ophiostoma ulmi* (Buisman) Nannf and *Ophiostoma novo-ulmi subs americana* (Brasier). Municipal and industry cooperators place sticky traps with dual component, pheromone/host volatile lures in rural and urban municipalities, tree nurseries, provincial and municipal parks and at Canada/US ports of entry. Monitoring for the beetles has been a key component to the DED prevention program and has been used as an indicator for the possible presence of DED.

The thinking in Alberta has been; in the absence of DED, the presence of DED beetle vectors could indicate a DED infection or elm firewood possibly harbouring the DED fungi. As with many invasive tree pest and disease species, elm firewood is a major threat for distance spread of DED and DED vectors.

The purpose of this project was to conduct targeted enhanced surveillance for early detection of DED, stockpiles of elm firewood and high risk elm trees in rural Alberta municipalities reporting higher numbers of DED beetle vectors over the past few years. Training sessions on how to recognize DED infected trees would be delivered to municipal staff in the targeted locations. The goal was to raise awareness of DED and vigilance in rural Alberta municipalities for DED that were experience higher numbers of elm bark beetles (EBB) on bark beetle traps, and to determine if there were any DED infected elms in these areas.

It should be noted that STOPDED has been re-evaluating the approach to DED prevention in Alberta. Specifically, whether there should be a shift in from the EBB monitoring program to direct surveillance assessments of the health status of the provinces’ elm trees’ and for symptoms of DED infection. Towards this end, STOPDED, in a separate project funded by the Society, contracted Dr. Ken Fry, Olds College to conduct an analysis of elm bark beetle monitoring program and to make recommendations. The analysis was completed in May 2021. The single most important recommendation from this analysis was for municipalities and counties to appoint and train inspectors/officers to survey elm trees health and enforce the statutes listed in the *Agricultural Pests Act* of Alberta. STOPDED and stakeholders are considering if there is still value in monitoring DED beetle vectors in the province of Alberta.

To date, SEEBB’s which are native to western Europe, the Middle East, and northern Africa have been captured in low numbers annually throughout Alberta. The native range of the BEBB is northern China and southern Russia and was first detected in Medicine Hat in 2006 and has become established in the southeastern part of

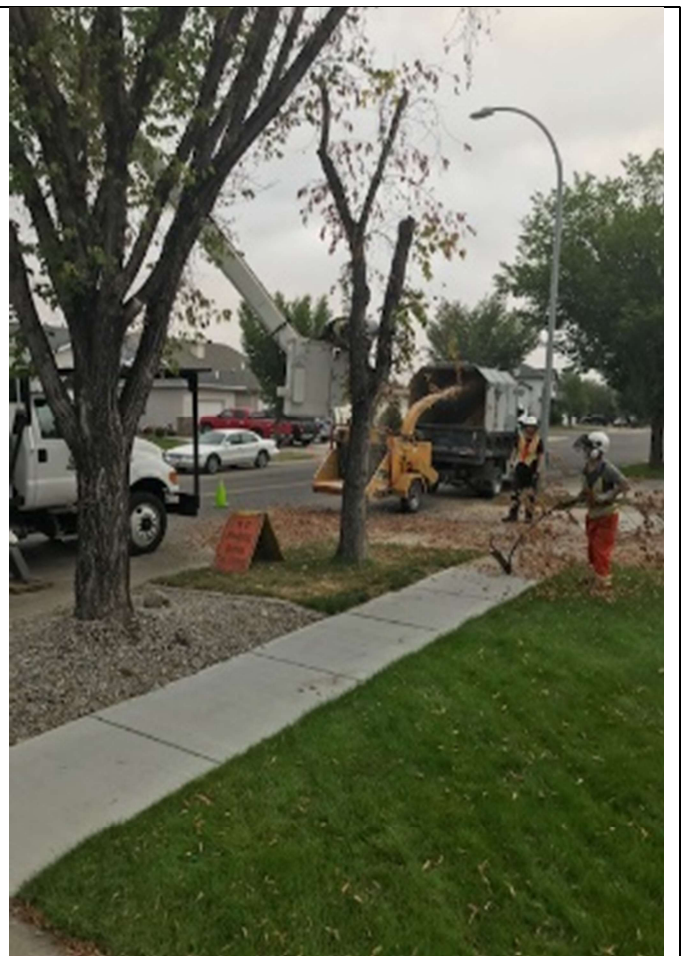
the province. The BEBB are now found in lower numbers in municipalities throughout the province. The NEBB which is indigenous to North America has not been captured in Alberta.

In 1998, Alberta had one isolated elm in a yard in the Town of Wainwright test positive for the DED fungus. The complete town and a two km radius of the town was immediately surveyed for more infections. None were found. Elm firewood brought in from Saskatchewan was implicated as the cooperative home owner admitted to bringing elm firewood into the province the previous year and had used it during the winter to help heat his home. Additional EBB traps were placed throughout the town and surrounding two km radius for five years after this incident and no EBBs were recovered from those traps. No other elm trees show any DED symptoms and it was subsequently determined that DED was eradicated.

In 2020, the City of Lethbridge had two boulevard elm trees test positive for the DED fungus. Surveillance for DED suspect elm trees and elm firewood was immediately conducted in a one km radius of the infected trees. No other infected trees or elm firewood were found. However, elm firewood is still considered to be the likely cause if the infestation. In 2021, this one km area radius was surveyed again along with an inspection of all 55,000 publicly owned elm trees in the City of Lethbridge. It has been determined that these two DED infected trees was again an isolated case for Alberta. In 2021 the city also hired two pest inspectors and is working on updating the city's elm inventory. An updated tree inventory is essential for the management of all tree pests.



Lethbridge elm trees infected with DED in 2020



City of Lethbridge crews removing the infected trees.

Under the *Plant Protection Act* “Plant Protection Regulation” of Canada, the movement of both DED pathogens, *Ophiostoma ulmi* and *Ophiostoma novo-ulmi* are regulated. Elms from a DED infected province cannot be shipped to a disease-free province/territory. Alberta and British Columbia are the only provinces classified as DED-free. Alberta’s DED-free status allows it to ship elm trees across Canada, a \$50 to \$60 million dollar a year business for the province’s tree nursery industry. The ability to ship elm trees Canada-wide is contingent on the province’s DED-free status.

The relationship between the presence of beetles and DED disease introduction, incidence and spread is not completely understood. In jurisdictions such as Manitoba and Saskatchewan, that are actively managing DED, more effort is put towards DED surveillance and less on monitoring for the beetles as a tool to direct DED management efforts. Alberta had not routinely conducted complete DED surveillance. In 1998 Alberta received Federal funding to conduct a province-wide elm tree inventory. It was at this time, that the first DED infected tree in Wainwright was identified. Subsequent to this incidence STOPDED ramped up its DED prevention efforts with the focus being on monitoring for the vectors and working with municipalities to be aware of the status of their elm trees.

In the summer of 2021 STOPDED received funding from Canadian TREE Fund-Jack Kimmel Grant to complete an enhanced DED surveillance survey in municipalities and provincial parks that had captured higher, sustained numbers, of EBBs over the previous 3 years or that were locations close to Lethbridge. The enhanced surveillance was to determine if DED or if elm firewood was present. This was considered to be a valuable exercise because early detection of a new DED infection is important if the disease is to be eradicated, and to signal a shift to put more effort into surveillance of elm tree directly for DED symptoms.

Table 1. Number of DED beetle vectors captured (all were BEBB) over the past three years in locations selected for enhanced surveillance in 2021. Selection was based on higher numbers of beetle vectors captured on dual component lure sticky traps or trapping locations close to the City of Lethbridge.

Location Surveyed in 2021	2018	2019	2020
City of Brooks	86 BEBB	12 BEBB	15 BEBB
City of Drumheller	24 BEBB	15 BEBB	7 BEBB
Town of Oyen	6 BEBB	32 BEBB	25 BEBB
Town of Taber	192 BEBB	57 BEBB	172 BEBB
Village of Barons	1 BEBB	0	1 BEBB
Village Consort	141 BEBB	58 BEBB	10 BEBB
Hamlet of Cereal	65 BEBB	11 BEBB	29 BEBB
Hamlet of Diamond City	0	0	22 BEBB
Taber District Park	0	1 BEBB	1 BEBB
Park Lake Provincial Park	1 BEBB	0	1 BEBB
Tillebrook Provincial Park	10 BEBB	1 BEBB	101 BEBB

STOPDED contracted Living Tree Environmental, an Alberta based company that has conducted DED surveillance surveys for the Province of Saskatchewan over the past few years, to conduct the DED surveys in Alberta. Locations surveyed were the Towns of Brooks, Taber, Oyen and Drumheller, Village of Diamond City, Consort, Cereal and Barons, Taber Municipal Park and Park Lake and Tillebrook Provincial Parks.

Each survey included DED surveillance of all private and public elms by an experienced crew. This crew collected samples from symptomatic elm trees which were sent to the provincial lab for diagnosis. Data was collected on stored elm firewood and on standing elms that were considered high risk. These are violations under the Alberta *Agricultural Pests Act*. This Act gives municipalities the responsibility and ability to enforce the DED Prevention/Control Measures found at <https://open.alberta.ca/publications/dutch-elm-disease-prevention-control-measures-responsibilities-authority-apa> to the land owner. A report was supplied to STOPDED and to each municipality surveyed.

Table 2. Numbers of high risk elm trees, elm wood violations under the APA* and suspect DED samples identified by the survey.

Location Surveyed in 2021	High Risk elm trees	Elm Wood Stored	Suspect DED samples sent to lab
City of Brooks	2	5	0
City of Drumheller	0	2	0
Town of Oyen	0	0	0
Town of Taber	3	3	1
Village of Barons	1	0	0
Village Consort	0	0	0
Hamlet of Cereal	0	0	0
Hamlet of Diamond City	1	0	0
Taber District Park	0	0	0
Park Lake Provincial Park	0	0	0
Tillebrook Provincial Park	0	0	0

***Enforceable DED Prevention Measures/Control Measures**

Section 5.b. Elm Wood Storage - prohibited at any time of year

Section 6. High risk tree is defined as a stressed tree that has deteriorated to the point of making it capable of supporting elm bark beetle habitation and breeding. There are many reasons why a tree may become a high risk such as environmental causes or improper pruning such as topping. If an inspector has declared an elm tree to be a high risk, the tree must be removed and properly disposed of.



A high risk elm tree found during by the survey.



One of the elm firewood piles discovered during the survey.

To support municipalities with their DED prevention program, Living Tree Environmental conducted two workshops, in Taber and Brooks. Due to Covid regulations there was limited attendance. These workshops covered biology of DED and its vectors, DED symptoms, elm identification, how to take a suspect DED sample, review of Alberta Agricultural Pests Act (APA) and “Pest and Nuisance Control Regulation (PNCR)”, DED Prevention/Control Measures and the roles of local enforcement officials. A total of 30 people attended the workshops which included Agriculture Fieldmen from 7 counties and parks employees from 3 municipalities.

All surveyed locations were sent an article which included the Canadian Tree Fund and STOPDED logos that explained the project for inclusion in their local papers and social media outreach.

With DED on the rise in Saskatchewan and the high risk of infected/infested elm wood being transported into Alberta this project indicated that more emphasis needs to be placed on DED symptoms and elm firewood surveillance. Monitoring for beetle vectors does not seem to be a good indicator of DED problem areas in this small study, nor has it alerted Alberta to incursions of DED into the province. Both incursions of DED into Alberta was identified by symptoms on the infected trees and elm firewood was suspected as the mechanism into the province. Movement of the disease from the firewood into adjacent elm trees still requires a vector and

we can speculate that the EBB that was involved may have been destroyed with the removal and disposal of the infected trees or did not survive the winter to spread the infection further.

Monitoring for beetles requires a rethink. Surveillance of the health status of elms and elm firewood are arguably better uses of resources in the prevention and management of DED.

STOPDED is appreciative of, and acknowledges, funding received by the Canadian TREE Fund - Jack Kimmel Grant, the Canadian Agricultural Partnership, and Alberta Agriculture and Forestry, that made this project possible.