

# State of the Urban Forest 2019

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Forestry & Pest Control Operations  
Parks and Open Space Services Branch  
Parks, Recreation & Cultural Services Department  
City Planning & Community Development Division

City of Regina

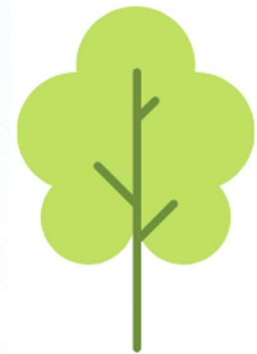


**REGINA**  
Infinite Horizons

## Urban Forest: Benefits to the Community

Value of Regina's Urban Forest as an asset

**\$1.4 Billion**



CO<sub>2</sub> benefits from Regina's Urban Forest

**20 million Kilograms\***

Removal of non-CO<sub>2</sub> pollution

**24,000 Kilograms\***



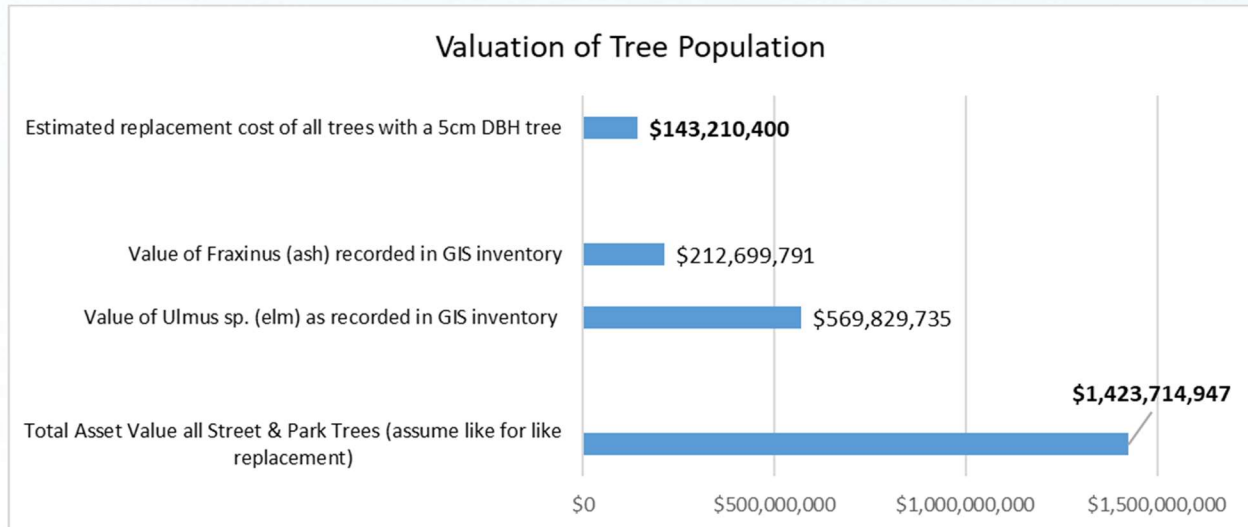
Stormwater benefits

**500 million Litres\***

\*Environmental benefits are derived from the Davey Tree Calculator™. Utilizing species and average size for each species as identified in GIS Inventory trying to account for good condition, full sun exposure and climate zone with a median aged residence. Then applied to the overall population of City of Regina street & park tree inventory.

## Community & Urban Forest Measures

### Valuation Estimates of Regina's Urban Forest



Values are population estimates only - Assessed values are determined by:

- species ratings as determined by the Alberta Tree Ratings Guide (2003);
- assumes 85% site condition rating;
- assumes 85% overall health condition;
- cost per cm<sup>2</sup> DBH (\$12,26/cm<sup>2</sup>).

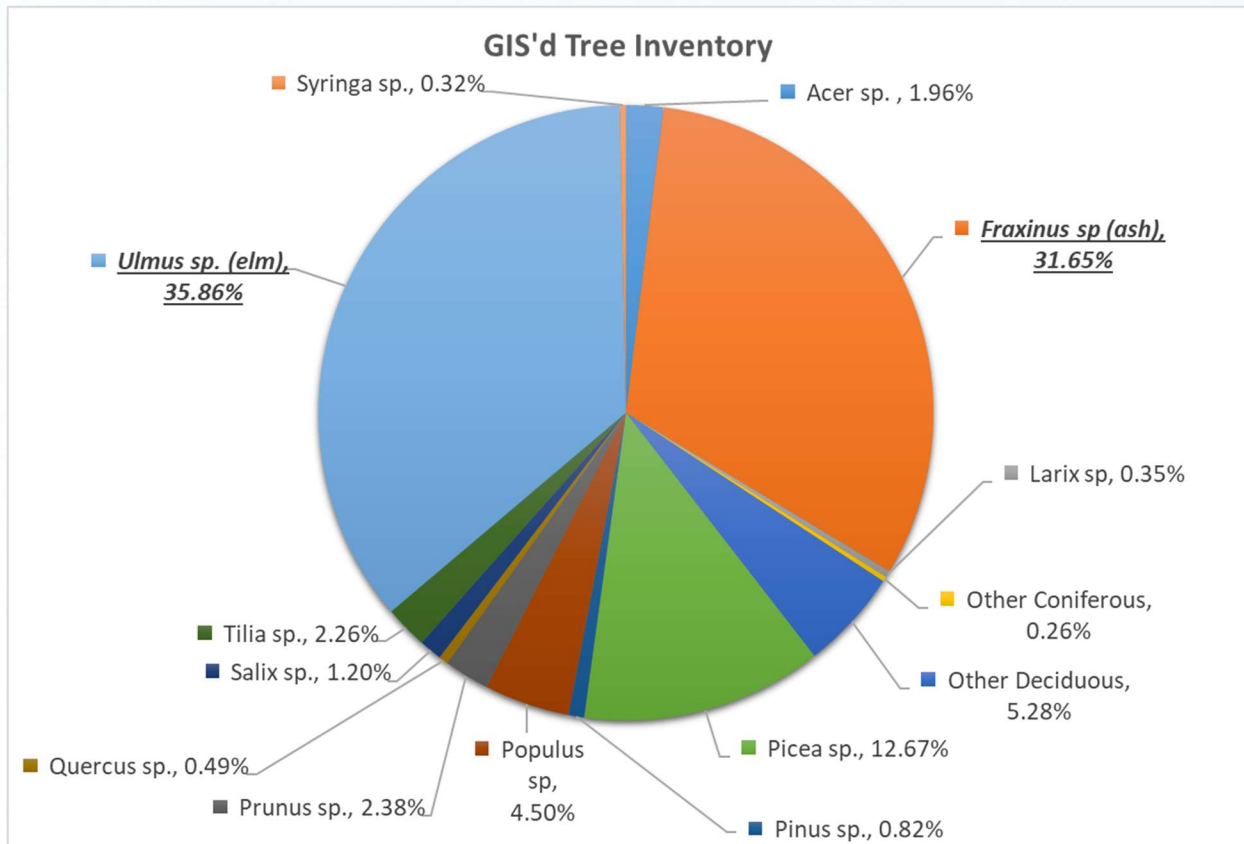
Note: At the time of an assessment of an individual tree, a formal condition and site assessment are made at that time.

*Regina Forestry Bylaw (2008-48)* - Any tree removed for development purposes the requestor is charged 20% of the assessed value or \$500 whichever is greater. This funding is then used to plant a minimum of two replacement trees. (*Regina Urban Forest Management Strategy (July 2000)*)

Estimated replacement cost is \$800 per tree. Breakdown is as follows:

- Average unit cost & install of a 5-10 cm tree = \$500
- Establishment costs for minimum three years = \$300 (primarily watering)

## Tree Species Diversity

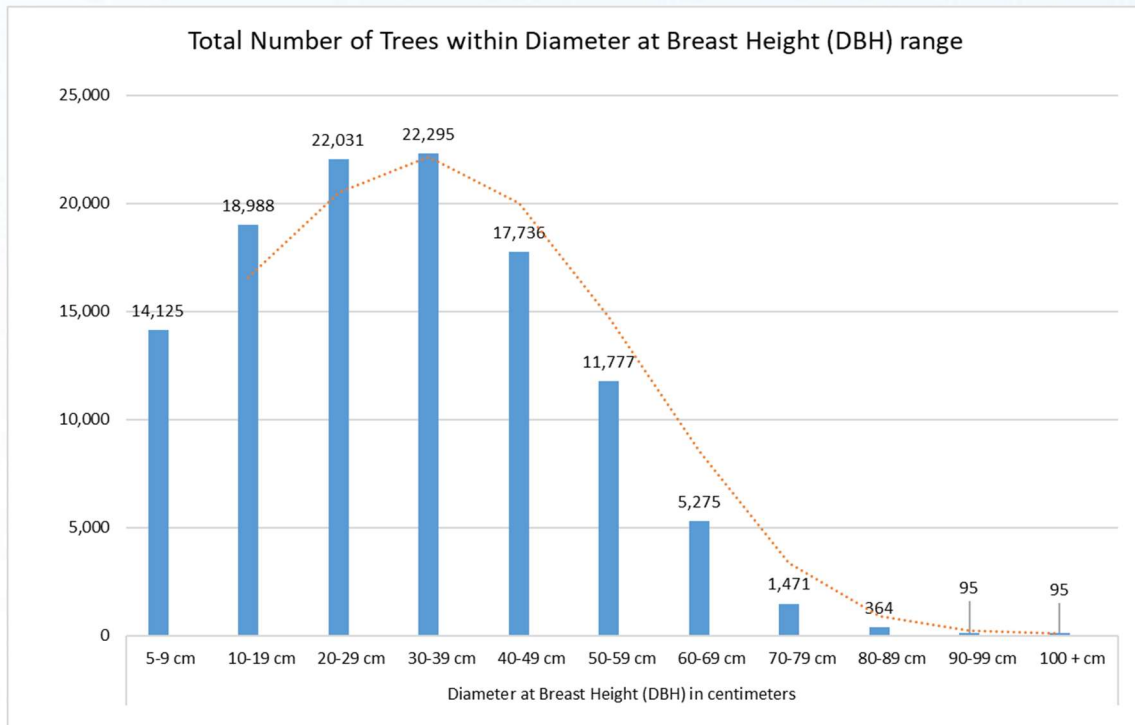


**This is the total species diversity managed by City of Regina - as recorded within the GIS Tree Inventory as of December 18, 2019.**

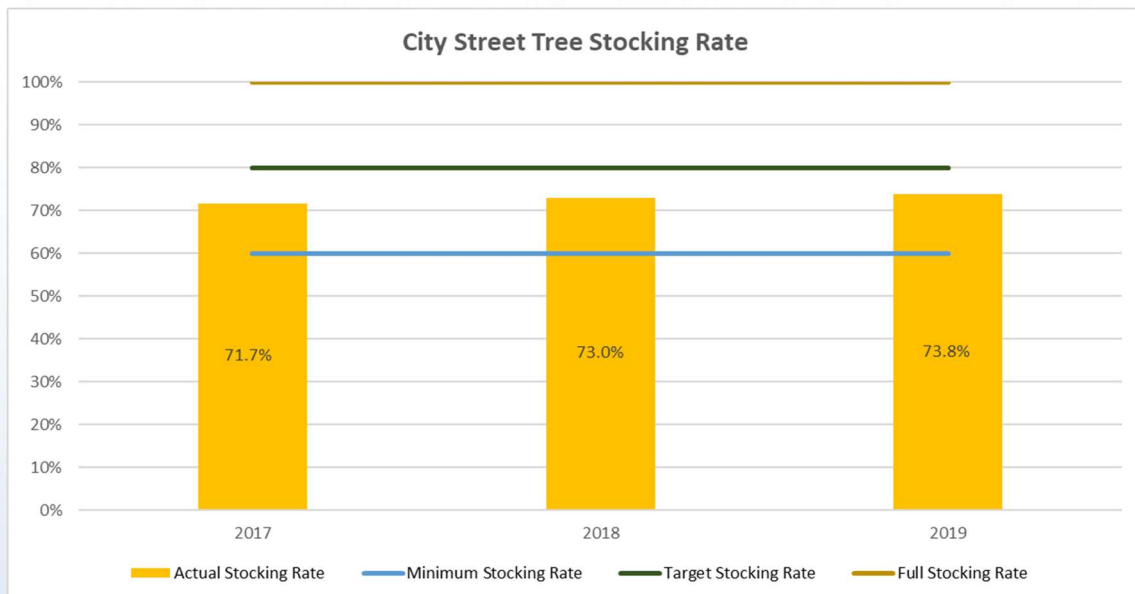
- Inventory primarily based on residential street trees and approximately 85% of “NAMED” park spaces.
- Buffers and open spaces are not yet entered.
- Total trees recorded within GIS inventory = 114,272
- Approximately 64% of the total street tree and park tree inventory is recorded by GIS currently. Additional tree inventory is added in the fall of each calendar year and is dependent on funding available.

*Regina Urban Forest Management Strategy (July 2000)* - Sustainability goal is no more than 25% of any one genus within City (specific area). Prior to 1989, majority of plantings were predominately monocultures of *Ulmus* (elm) or *Fraxinus* (ash).

## Size Distribution of Regina's Urban Forest (GIS)

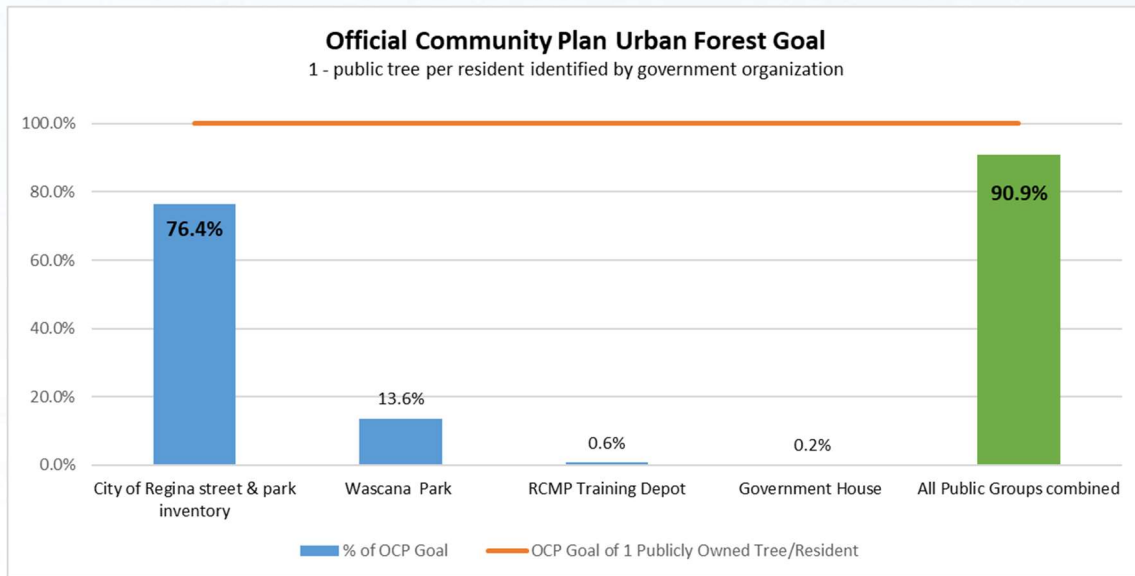


## Stocking Rate of Street Tree Inventory



Stocking Rate - is defined as the number of trees planted vs the total number of possible planting spaces (Journal of Arboriculture, Richards, 1992). Regina's street stocking rate is estimated at 73%. Park plantings do not easily fit this measure as current plantings versus possible locations cannot easily be defined.

## Public Trees to Official Community Plan

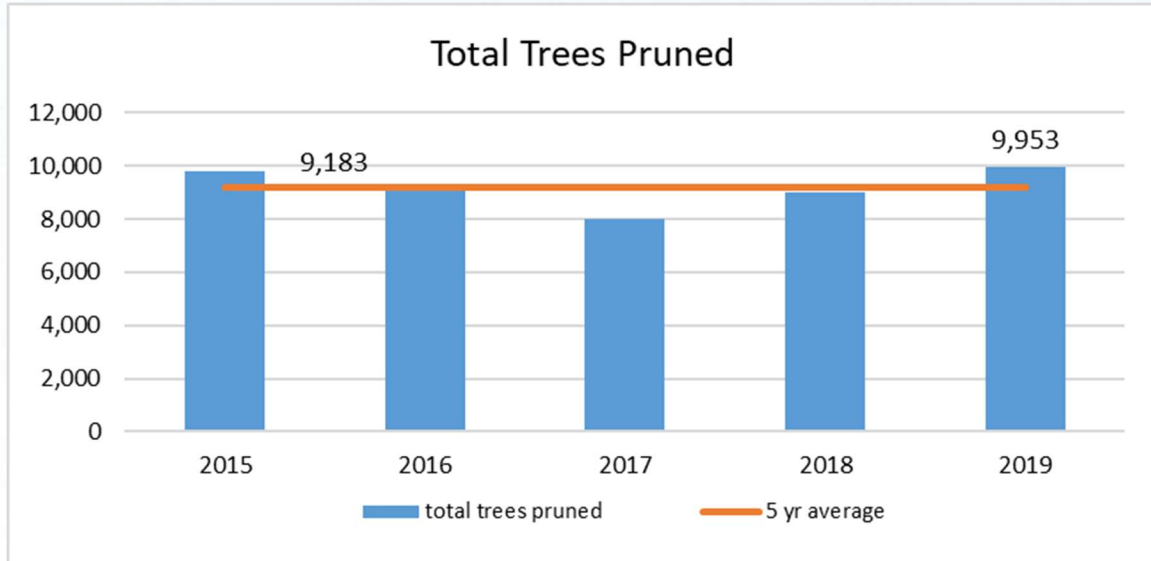


### ***Regina's Official Community Plan (2013) - Environment Goal 4.7.1 - Increase the urban forest to one tree per person in public spaces.***

- **City of Regina street & park inventory = 179,007 trees.**
  - Assumes 2001 MCSII inventory is correct (161,836);
  - plus 2002- 2011 net tree change = +4,407;
  - plus 2012 to present net tree change = +12,764.
  - In future years, the inventory processes will either verify or nullify this assumption.
- **Wascana Park inventory = 31,880 trees.** Source GIS Tree Inventory records as supported by City of Regina. City of Regina provided \$2.72 million in funding during 2019 in support of Wascana Park maintenance operations. (Source: 2019 City of Regina Budget).
- **Government House (Provincial Capital Commission) = 485 trees.** Inventory is held with the Wascana GIS inventory as supported by City of Regina. For comparison to the 2018 report, the two properties are identified separately. Starting in 2020 both Wascana Park and Government House trees will be reported as Provincial Capital Commission.
- **RCMP Depot = 1,500 trees (estimate).** This value is based on visual review of Aerial photography. Will be worked on in 2020.
- Regina's population (start of 2019) = 234,177 - Source MBN Canada.
- The **2020 report** will use satellite geospatial analytics tools for “woodlot” areas managed by the City of Regina. These areas will include the abandoned Dewdney tree nursery site, Torr Hill & Murray Golf Courses and Kings Park areas. The tree count in these areas were once considered “uncountable” but is recognized for its environmental value.

## Urban Forest Maintenance

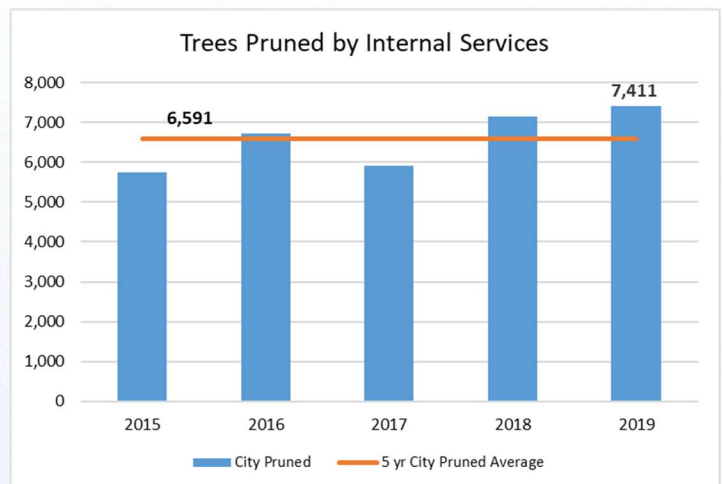
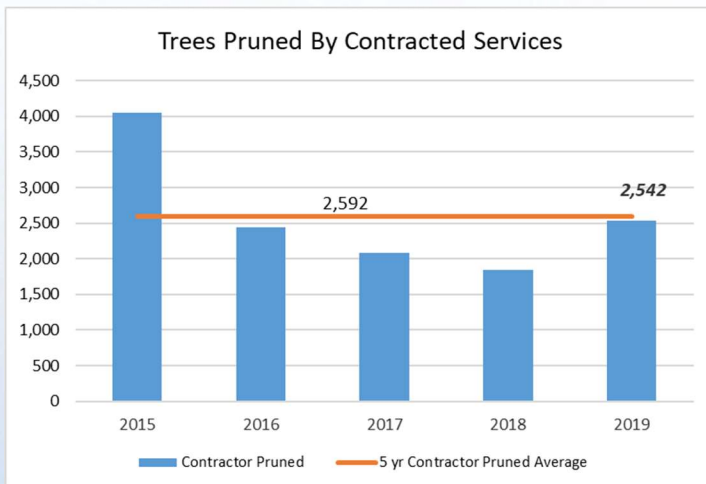
### Tree Pruning



Includes the following work codes - Internal Scheduled Pruning (aerial & ground), Service Requested Pruning (aerial & ground), Broken Branch Pruning, Public Works Pruning and Contracted Pruning.

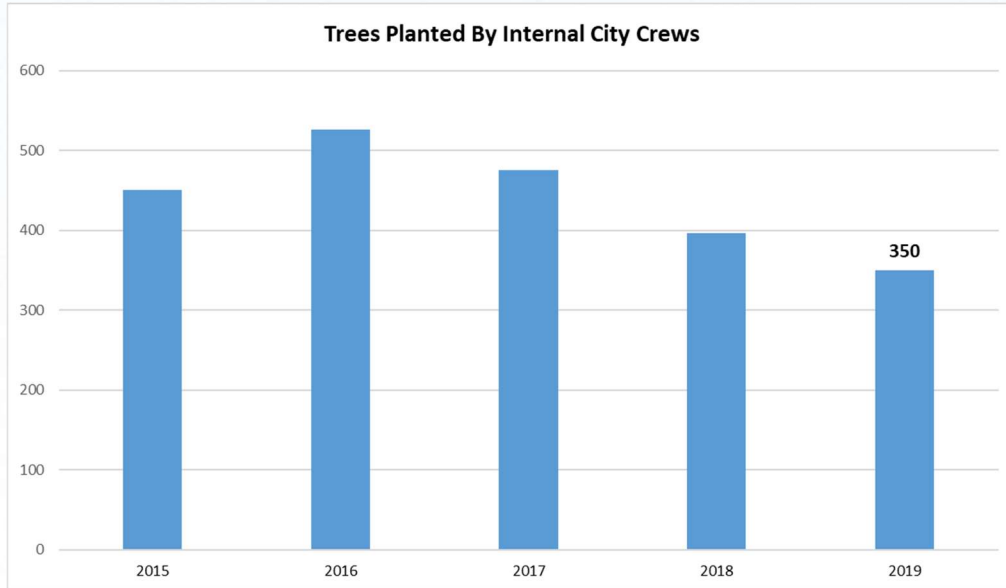
A total of 9,953 trees were pruned during 2019 – the most trees pruned by Forestry Maintenance Operations in a single year on record.

### Contracted Versus Internal Pruning



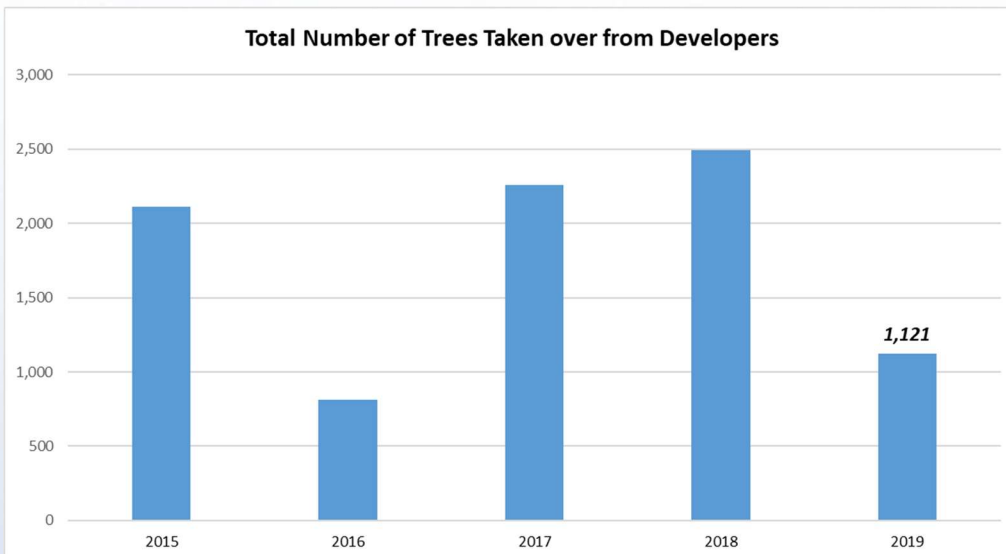
## New Tree Planting & Diversity

### Internal New Trees



For 2019 the annual capital budget allocation was \$62,500. Other unplanned funding sources for 2019 included: Tree Canada (\$79,500), funding derived from assessed tree removal applications for building or development projects during 2018 (\$90,345).

### Developer New Trees



There were 1,121 trees recorded in GIS as Developer Takeover throughout 2019. Any trees under developer or contractor control are not reported until the City of Regina has issued CCC2 takeover to the developer.

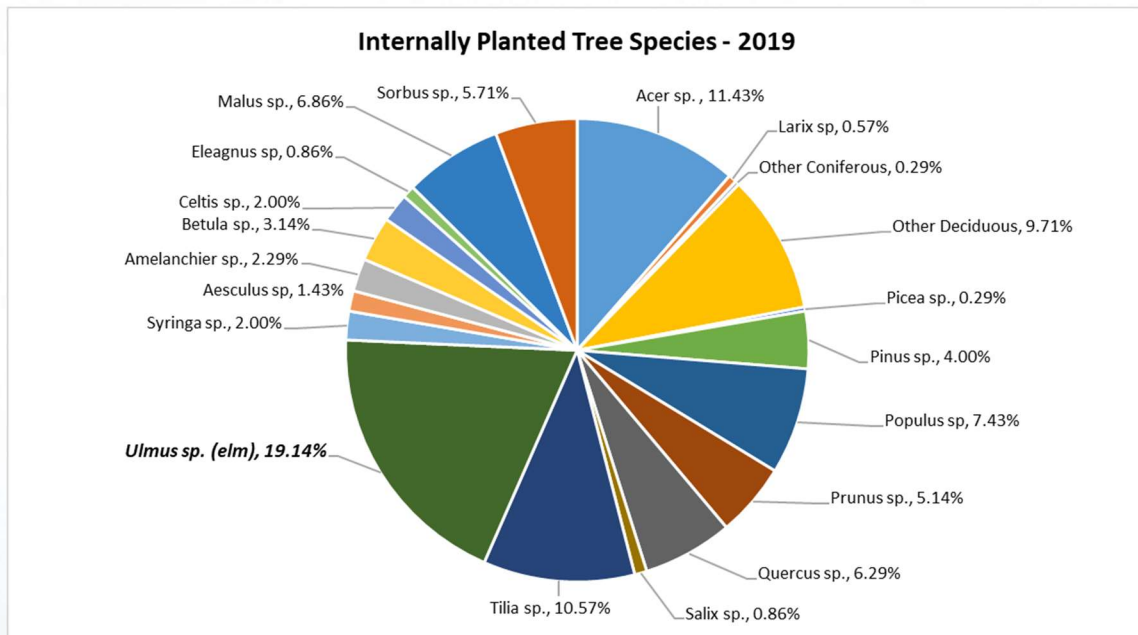


## Current Planting Diversity

*Regina Urban Forest Management Strategy (2001)* - Sustainability goal is no more than 25% of any one genus within City (specific area). The document further specifies that for a park space, no more than 20% of any one genus is permitted. Prior to 1989, majority of plantings were predominately monocultures of *Ulmus* (elm) or *Fraxinus* (ash).

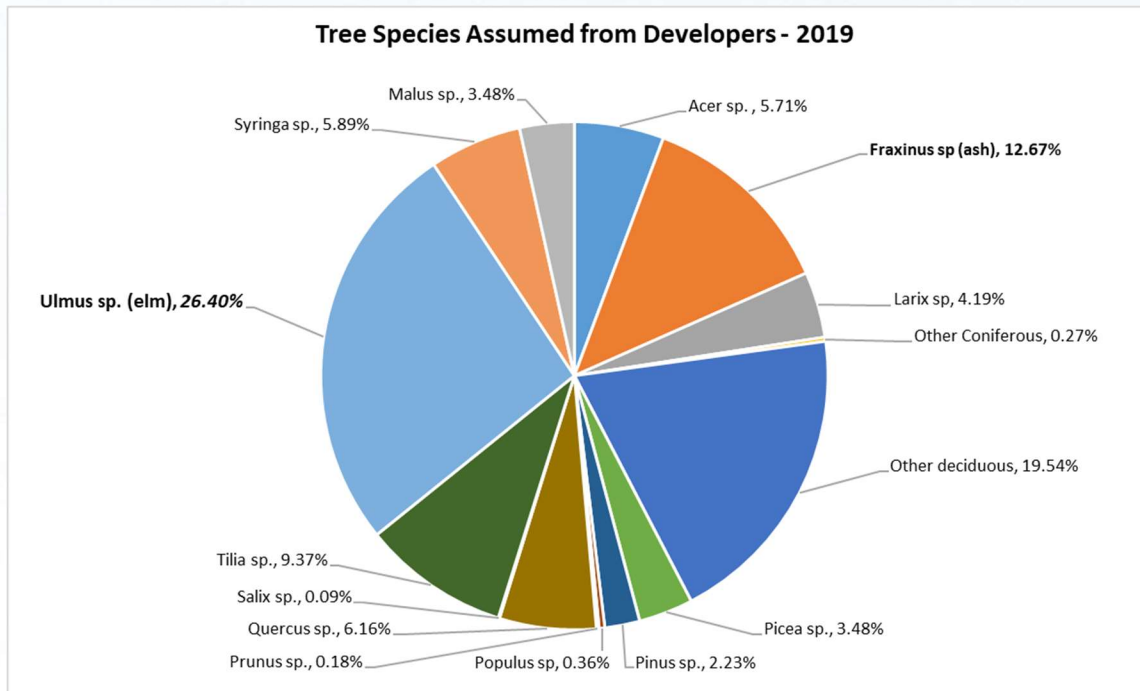
January 2018 – Due to minimizing future risk to Emerald Ash Borer, a decision to stop planting ash was made. As part of this decision, only trees that were previously approved that remained in the cue would be permitted for planting, as to not adversely affect the development community.

## Internal Planting Diversity



There were no *Fraxinus sp.* trees planted by City of Regina crews during 2019.

## Developer Planting Diversity



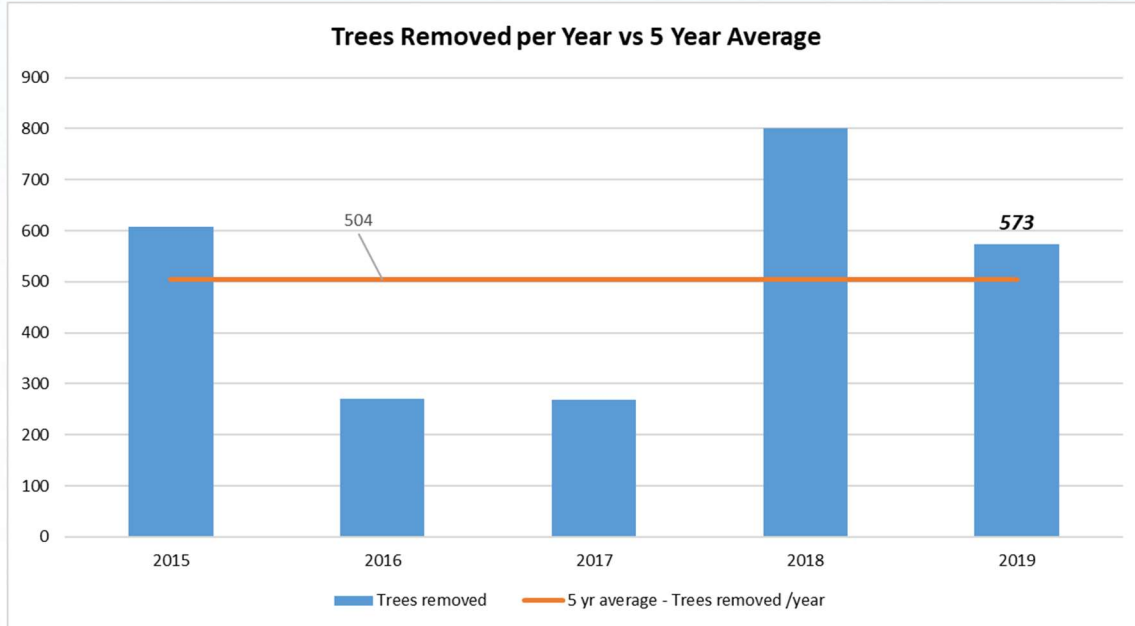
*Fraxinus sp.* (Ash) plantings assumed from developers was 142 trees. (12.67% of new development plantings). Compare to 2017 where ash plantings assumed from developers was 1,320 trees. The 2017 number represented 32.1% of new development plantings for that year. It is expected that ash plantings should continue to be reduced in future years.

With less reliance on ash, both internal and developer plantings continue to rely heavily on *Ulmus sp.* (elm). Both groups continue to plant elm near the upper limit of diversity at a genus level as set within the *Regina Urban Forest Management Strategy*. Traditionally ash and elm have comprised most streetscape plantings due to their ability to withstand harsh environments and salt tolerance.

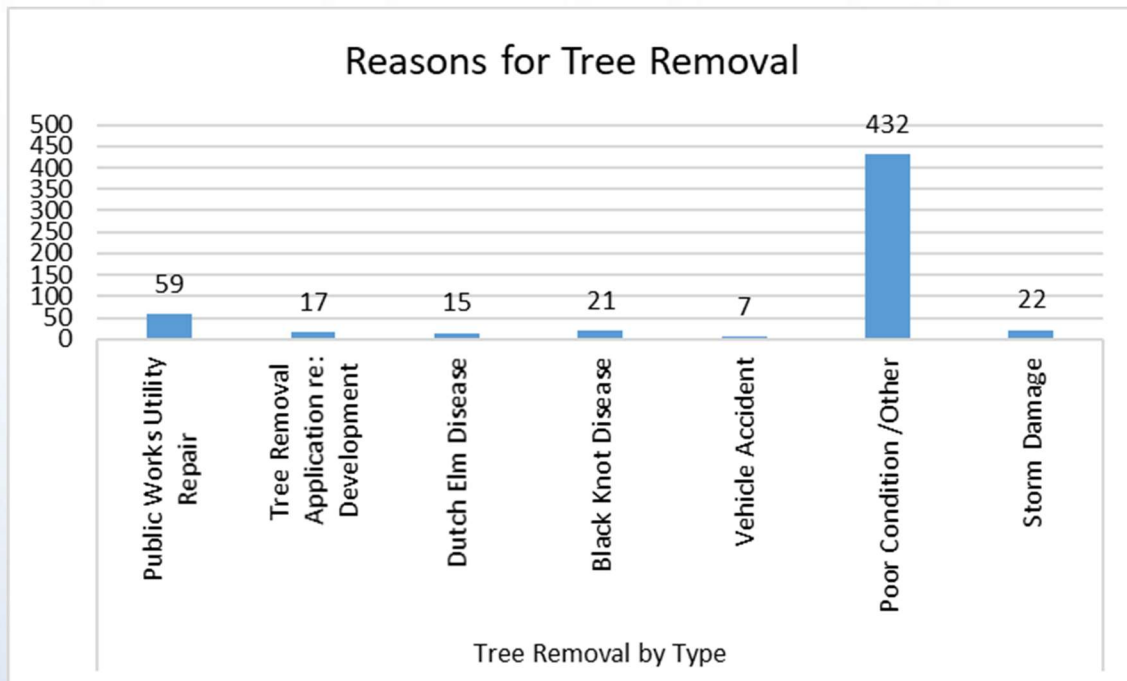
Further streetscape diversity work is required.

## Forestry - Trees Removed

### Overall Removals

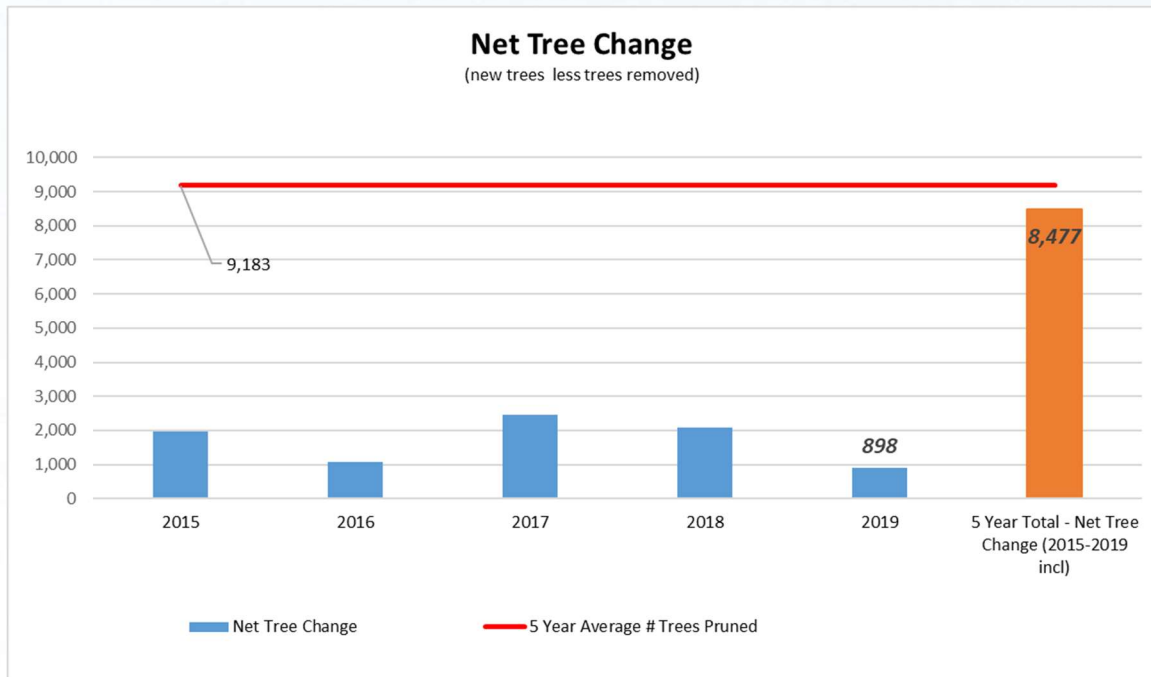


### Tree removals by type



The most recent two years continued to see higher than normal removals, much of it due to drought experienced during 2017 and 2018. This is a significant reason within the poor condition/other category.

## Net Tree Change to Urban Forest

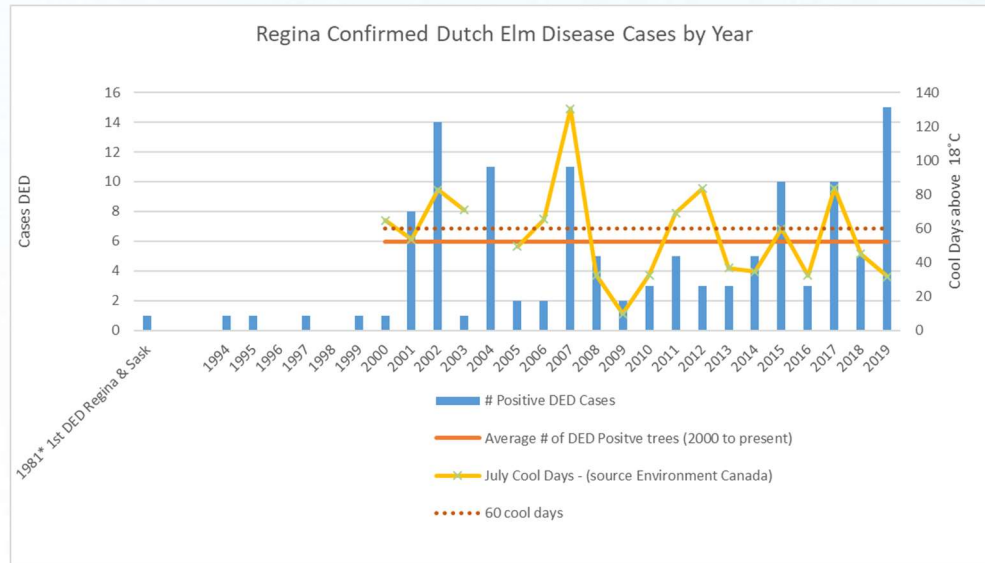


Net tree change is calculated from the total new trees (Internal City and Developer combined) minus total trees removed.

- Total Tree change (8,477 Orange) indicates the significance to inventory change over past 5 years.
- The 5-year average of trees pruned is 9,183 trees/year (Red). This is the first year in the past number years where trees pruned (5 years) pruning has exceeded the net 5-year net tree change. Indicative that the pruning cycle is shortening, if only slightly.
- In a typical year, most tree plantings are trees that have been assumed are from greenfield development. Takeovers have slowed from a peak in 2017 and is likely due to the decrease of the local building economy.

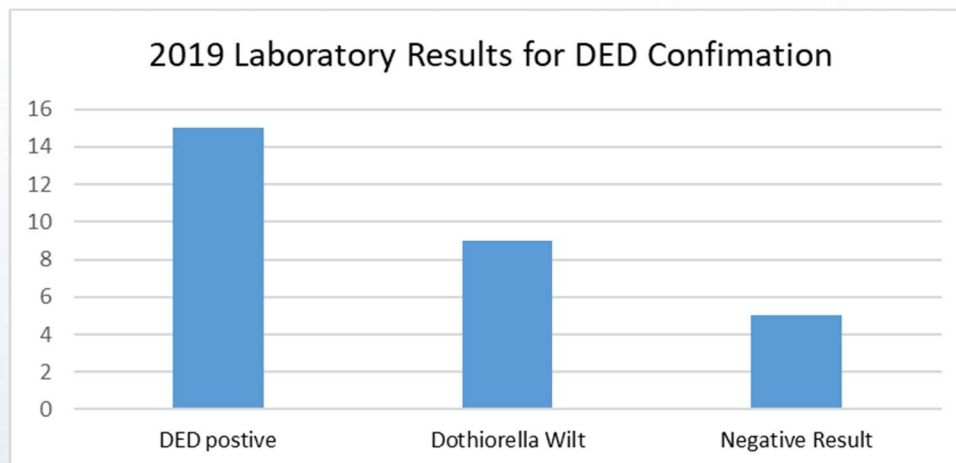
## Pest Control Section

### Dutch Elm Disease (DED) Incidences since 1981



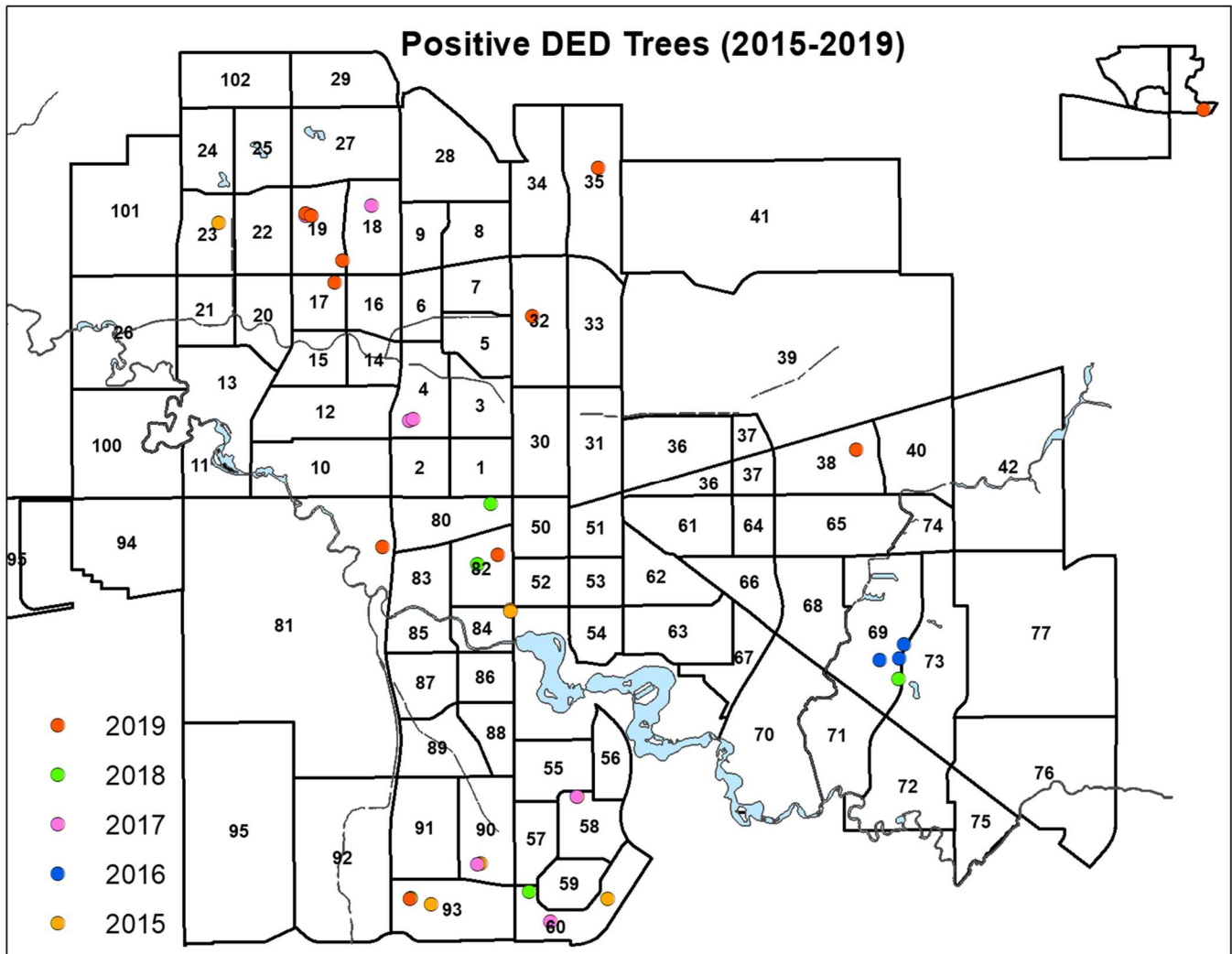
Fifteen (15) trees were lost to Dutch Elm Disease during 2019. The total number of Regina trees lost to DED from 1981 to 2019 inclusive (38 years) is **124**. Except for 2019, there seems to be a correlation with years of higher incidences of DED - with July's exceeding 60 cool degree days above 18°C as defined by Environment Canada.

### 2019 Diseased Tree Samples – Laboratory Results



Provincial Crop Protection Laboratory provides diagnostic services. A total of 29 samples were submitted to the lab for DED confirmation during 2019. *Dothiorella ulmi* fungus appears similar to *Ophiostoma ulmi* (DED) fungus in situ and must be distinguished in a lab setting. It is considered less aggressive than DED and is managed through a pruning and fungicide program.

## DED Diseased Tree Locations



Inside city limits, there was no real pattern to location of DED incidence identified. The seemingly random presence indicates that the *Ophiostoma ulmi* fungus is endemic inside the urban forest. All trees shown on the map were removed within 48 hours of confirmation by the provincial laboratory.

## Provincial DED Buffer for Regina

### Regina Buffer - 2019 DED Removal Locations

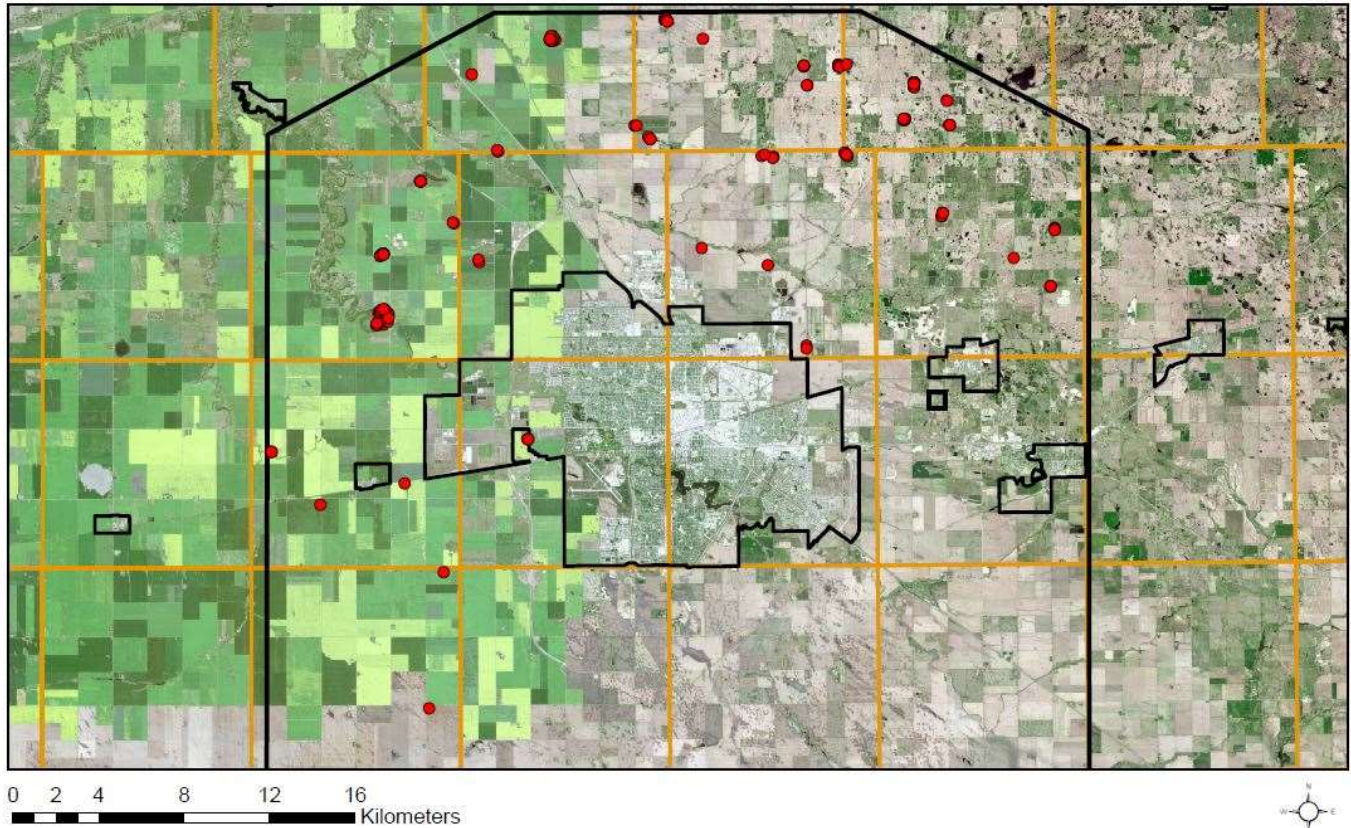
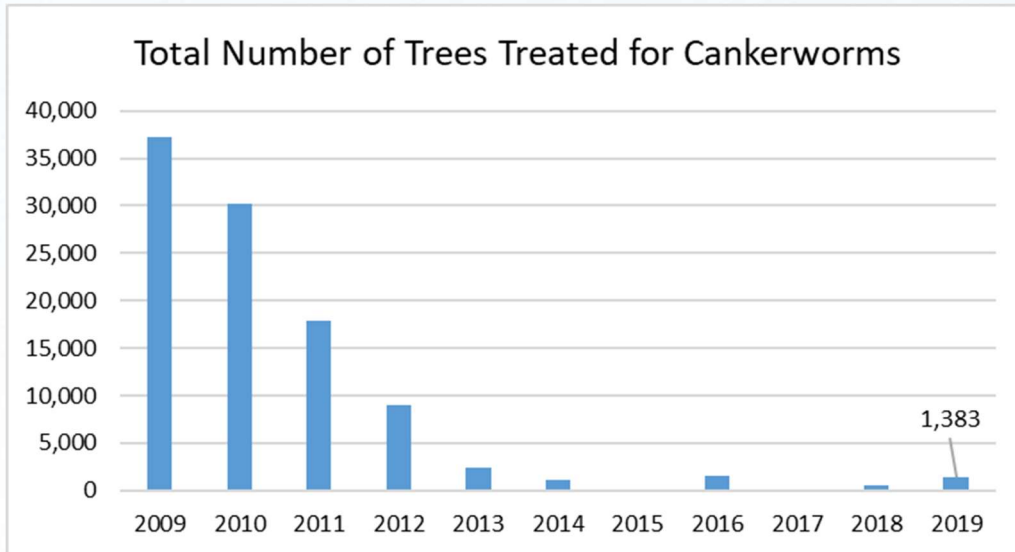


Image courtesy Forest Service, Ministry of Environment, Province of Saskatchewan – October 2019

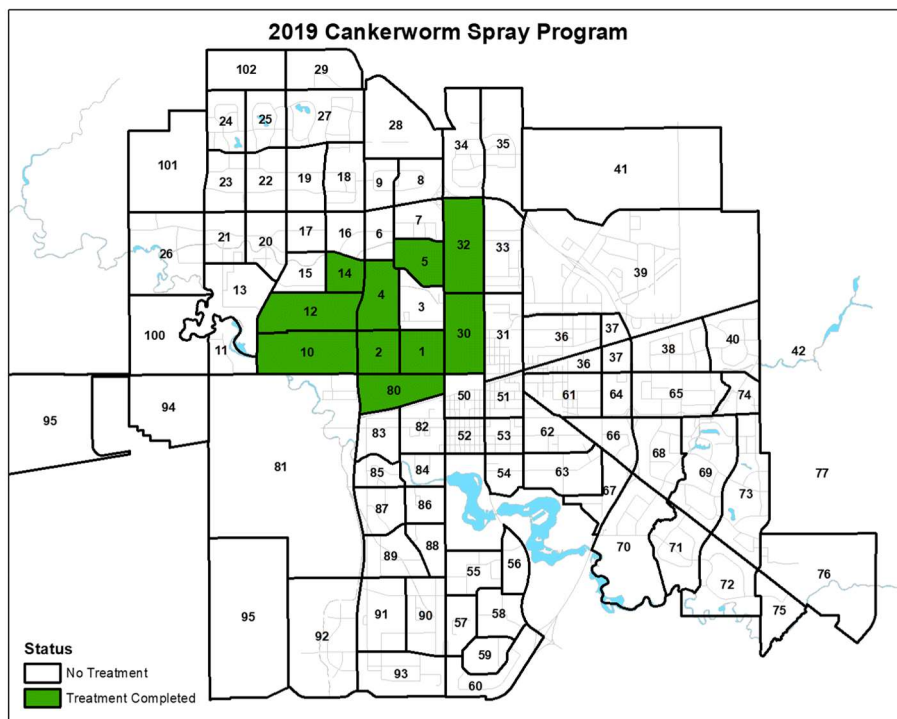
With respect to aiding the City of Regina effort to combat DED, the Province of Saskatchewan maintains a DED buffer immediately surrounding Regina city limits. During 2019, the province identified 36 properties with 195 infected trees. In the fall of each year, the province coordinates a removal program within the buffer to reduce the risk of DED moving into Regina. As of October 30<sup>th</sup>, ninety (90) infected trees remained standing.

As illustrated, most of the infected trees within the buffer occurred in the area north of the city. This directionality is not unexpected as DED is most prevalent throughout the Qu'Appelle Valley located 30 Km north of Regina. In a natural setting, river valleys are a natural corridor for movement of DED.

## Cankerworm Program



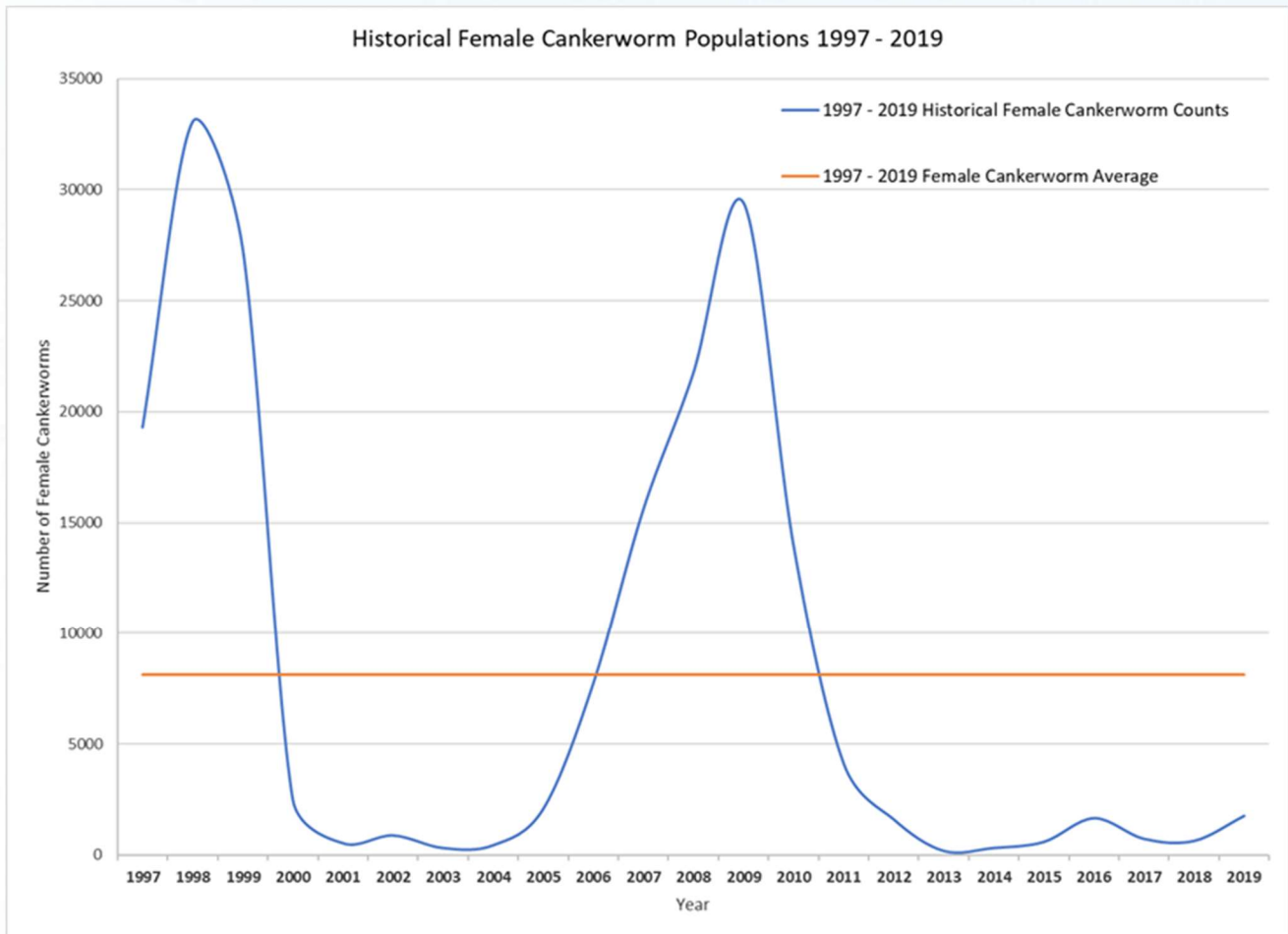
Total number of trees treated for cankerworm during 2019. Treatment was with a *Bacillus thuringiensis var. kurstaki* (BT) based spray. Historically treatments are based on populations exceeding established threshold.



Sectors where treatments for cankerworms geographically occurred during 2019. In some cases, the sector was only partially treated and determined on a block by block basis.



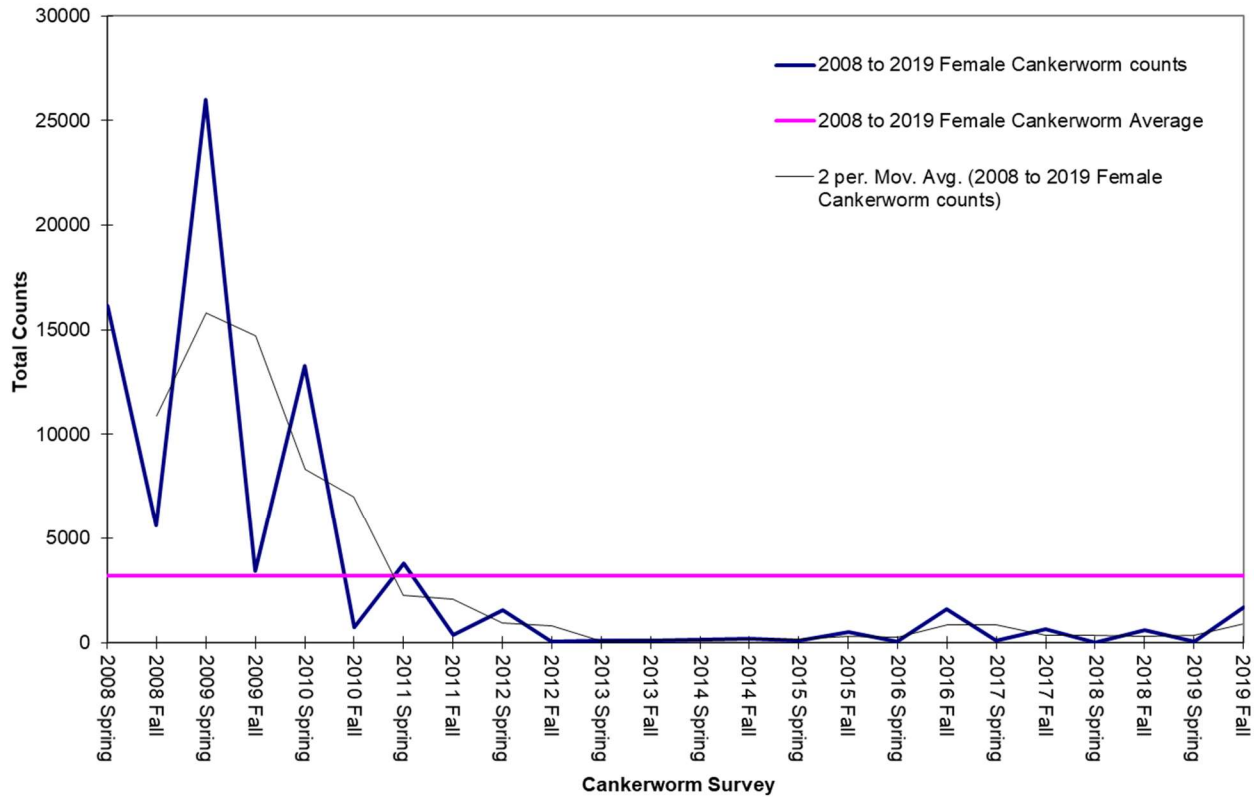
## Cankerworm Trends - Populations Going forward



Cyclical nature of cankerworm populations since 1997. Each year is a total sum of female cankerworms of both spring cankerworm species (*Palecrita vernata*) and fall cankerworm (*Alsophila pometaria*). This does not truly represent defoliation cycle as fall cankerworm larval stage, straddles into the following year. Of interest is that the current low period of cankerworm population experienced in Regina has exceeded the previous by two years.

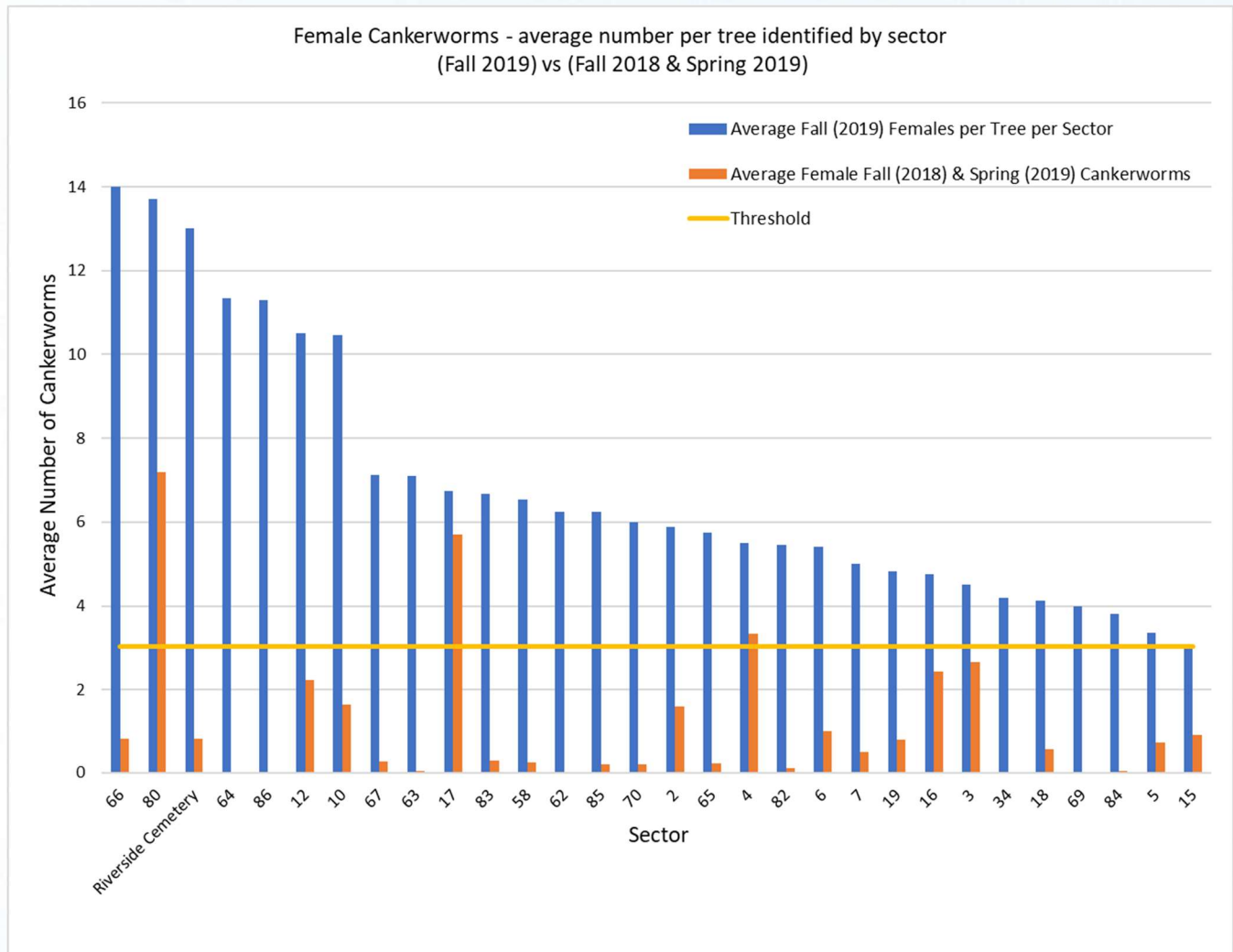
## Cankerworm Trends - Populations Going forward (continued)

### 2008 - 2019 City Wide - Seasonal Female Cankerworm Counts



Historic driving population for defoliation event has been the spring cankerworm. The 2019 fall population is showing an upwards trend. This upswing may be indicating this low period is coming to an end.

## 2019 Fall Cankerworm Survey

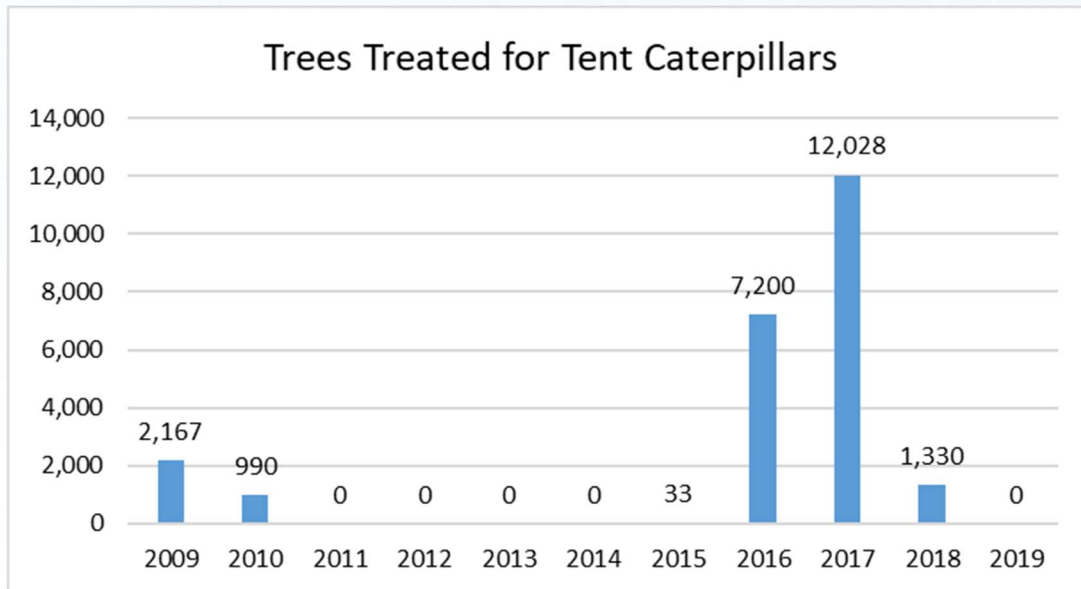


Of the 66 sectors surveyed in the fall, only the 30 sectors exceeding threshold are shown on chart.

The 2019 fall cankerworm (*A. pomataria*) is increasing (Blue) as compared to previous generation. This chart compares fall cankerworm numbers for 2019 to the average of both the fall 2018 and spring 2019 cankerworm counts (Orange). Treatment operations are always based on the average of the fall count of the preceding year along with the spring count of the year treated - this based on the biology of the two species of insect.

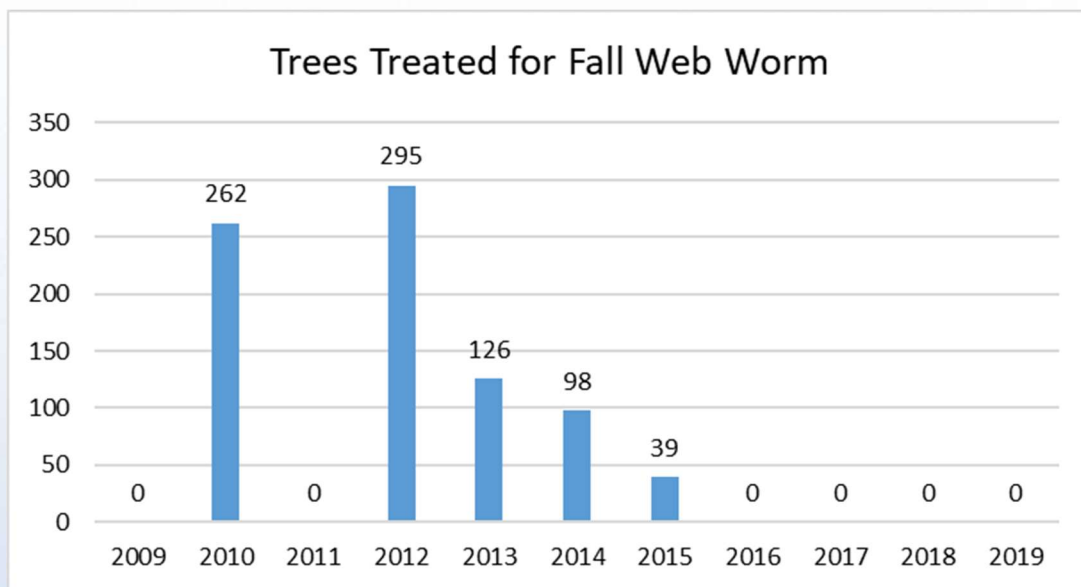
The threshold for determining when treatment should occur is also shown. Initial counts are indicating that up to 30 sectors may need to be treated in the 2020 season. Comparatively, the fall 2018 count indicated that only 9 sectors required consideration of treatment for 2019. This threshold indication may be moderated by the spring cankerworm (*P. vernata*) counts during April and May of 2020.

### Tent Caterpillar Program



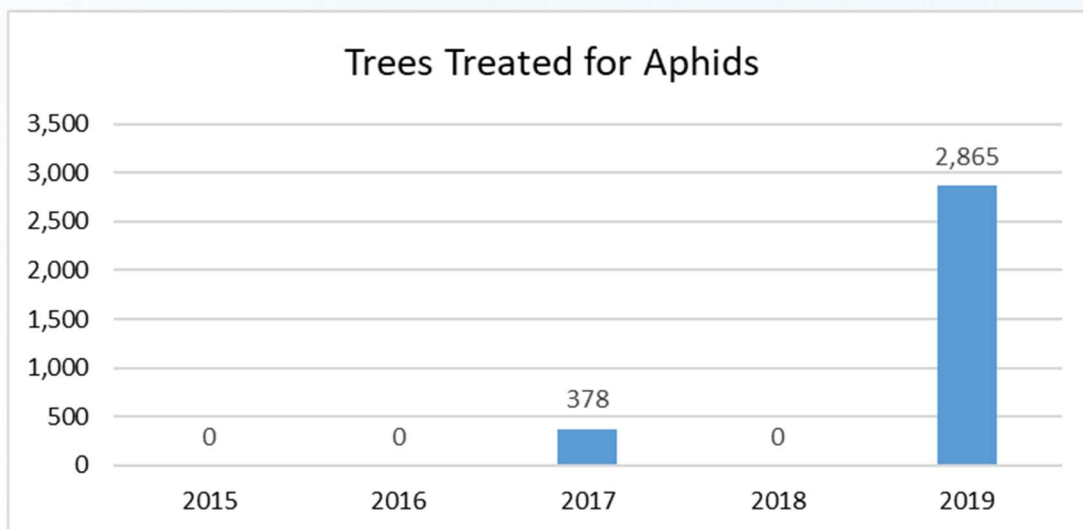
Fall monitoring during 2018, indicated tent caterpillar (*Malacosoma sp.*) would be below threshold. During 2019, no trees were required to be treated and no calls were received from residents regarding this insect. Branch sampling was not undertaken in the fall of 2019 for prediction of 2020 larval population. Based on historical trend, it's thought populations will remain low for the next two to three seasons.

### Fall Webworm Program



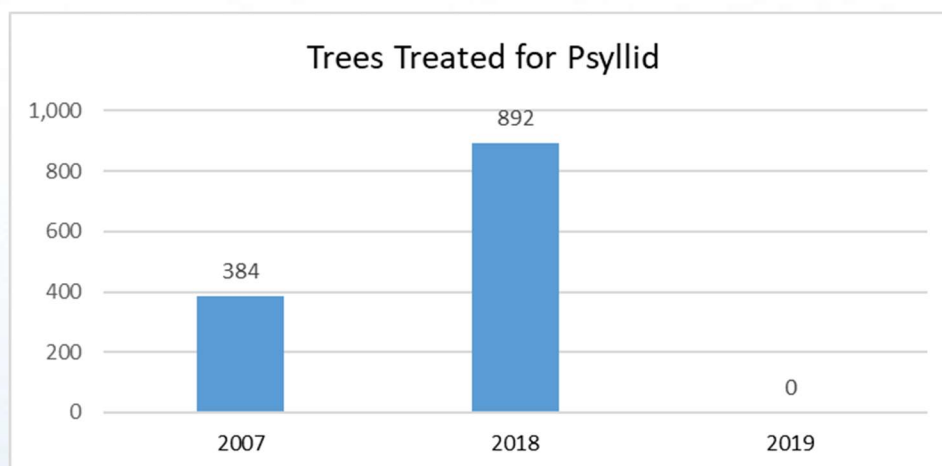
No treatments were undertaken for fall webworm (*Hyphantria sp.*) during 2019. Populations were noticed in August but did not warrant treatment at a commercial scale. This population may increase to threshold levels in 2020.

## 2019 Aphid Program



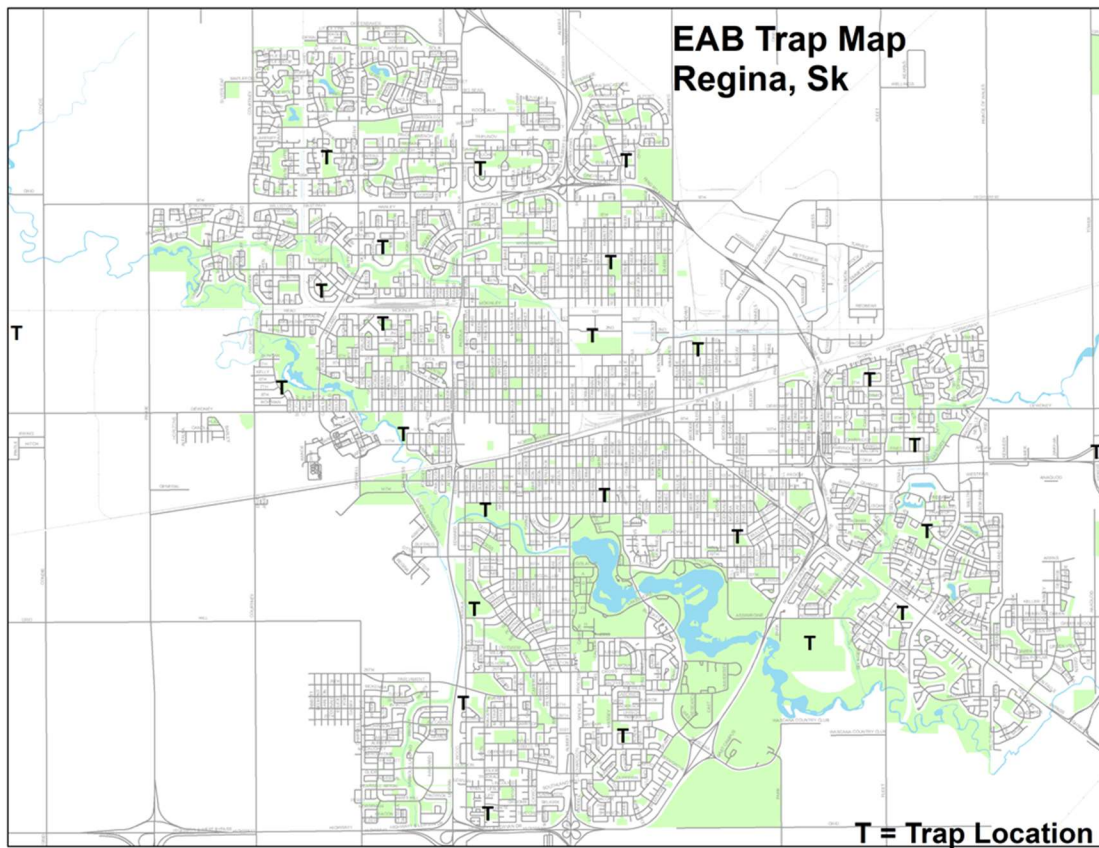
Aphids (*Eriosoma sp.*) were of concern with residents during 2019. Elm trees were treated with insecticidal soap with a residential spot spray program throughout the city. Typically, this program is determined by volume of service requests received (383). When a call is received indicating a problem, the entire block is inspected and treated if required.

## Cottony Psyllid affecting Ash trees



Cottony psyllid (*Psyllopsis discrepans*) primarily affects Black Ash trees (*Fraxinus nigra*). The insect made its first appearance in 2007. It then remained at an undetectable level until spring 2018. Following detection, Pest Control began treatments for the insect. During 2019, psyllid was almost undetectable, and no treatments were required. It is thought that the population crashed due to below normal winter temperatures experienced in February 2019. During that month, eleven nights were well below  $-30^{\circ}\text{C}$  with the coldest reaching  $-42^{\circ}\text{C}$ .

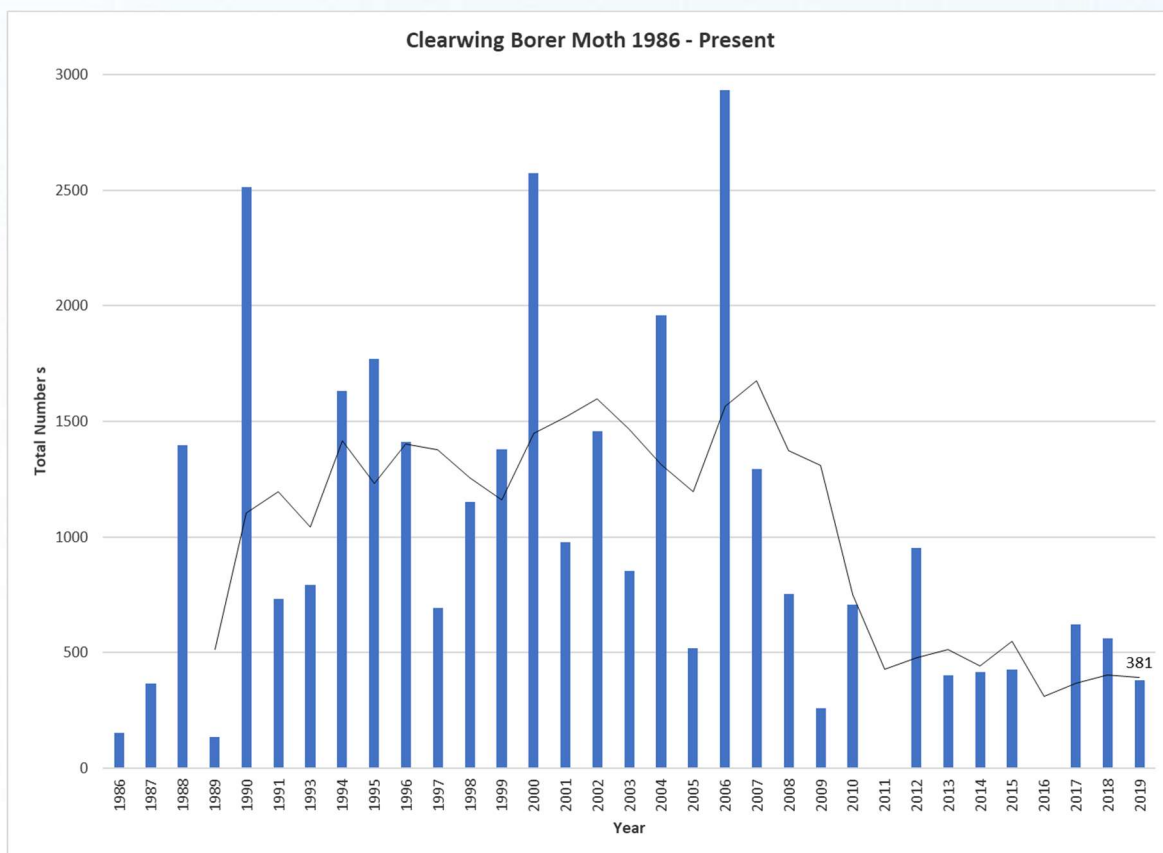
## Emerald Ash Borer Program



City of Regina operates 25 traps Emerald Ash Borer (EAB) traps within City limits. EAB has the potential to destroy 100% of all ash (*Fraxinus sp.*) within City of Regina. Trapping locations for early detection of Emerald Ash Borer during 2019 are highlighted. Trap locations were not altered from the previous year.

- No EAB was detected during 2019.
- Closest known location for EAB: Winnipeg MB - first detected in 2017.

## 2018 Clearwing Borer Moth affecting Ash Trees



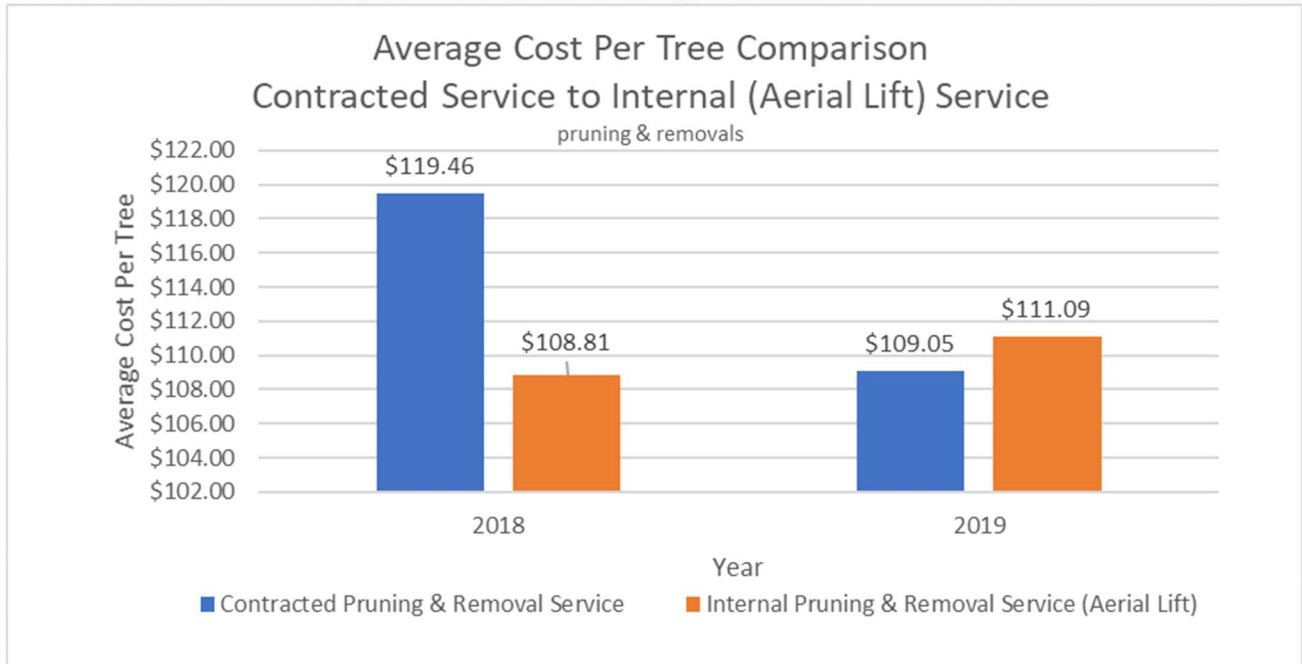
Clearwing borers (*Podosesia sp.*) affecting ash trees: 4-year trendline indicates population remains at a low level. Clearwing borers affect the structural health of ash trees.

Current strategy for control is intensive pheromone trapping. Three hundred six (306) trapping locations were operated inside city limits - with two trap runs per location.

Outliers in data set include:

- 2011 – No trapping occurred
- 2016 – Incomplete dataset

**City of Regina Strategic Plan**  
**Community – Improve Service Financial Sustainability**  
**Contractor vs Internal Service Delivery Comparison**



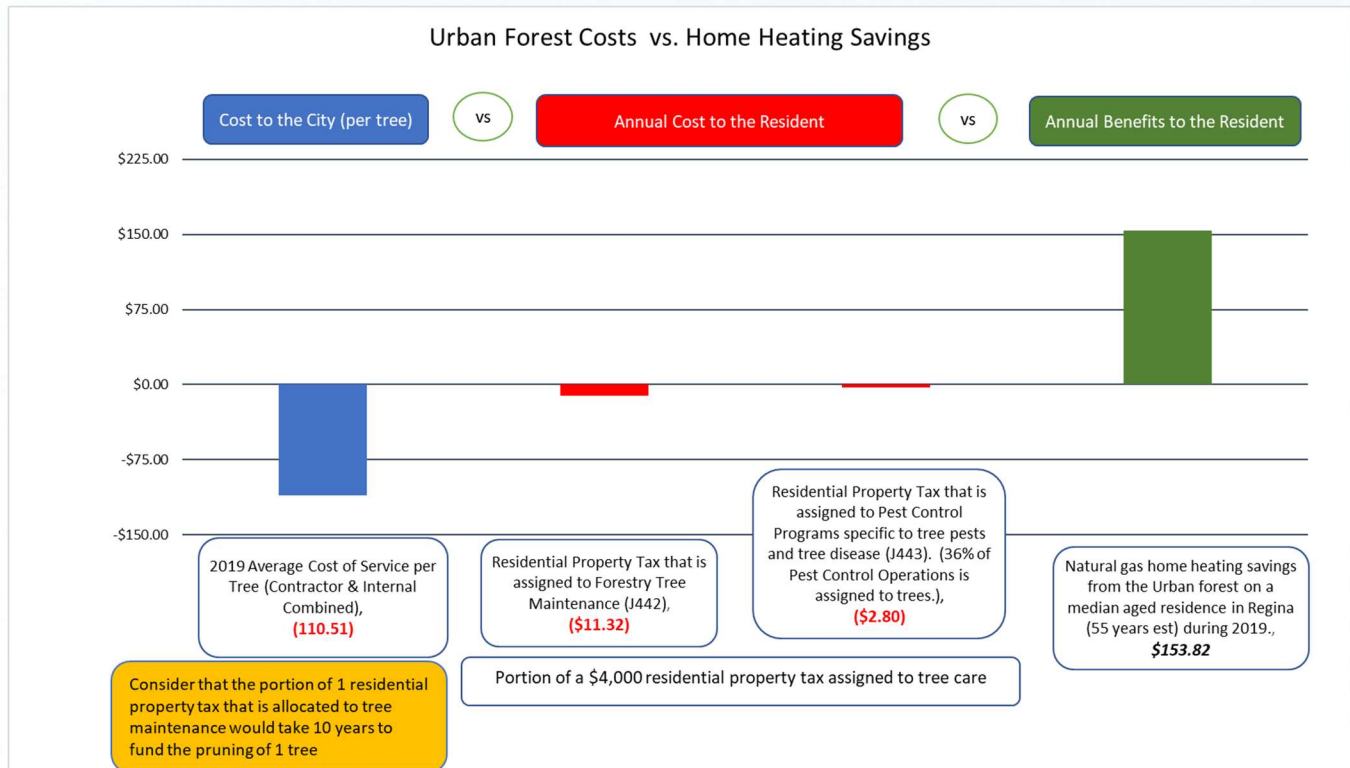
Contracted and internal services comparison for 2018 & 2019. Contracted and internal services are shown comparatively. Internal services are only for costs reflective of trees requiring the use of aerial lifts.

Ground pruning costs are not included and are typically considered less expensive as trees are substantially smaller. Contracted services have not been utilized for any ground pruning during the past two years.

Factors affecting cost of pruning for any individual tree include overall size of tree, any obstructions/hazards encountered onsite or even the ease of access to the site.



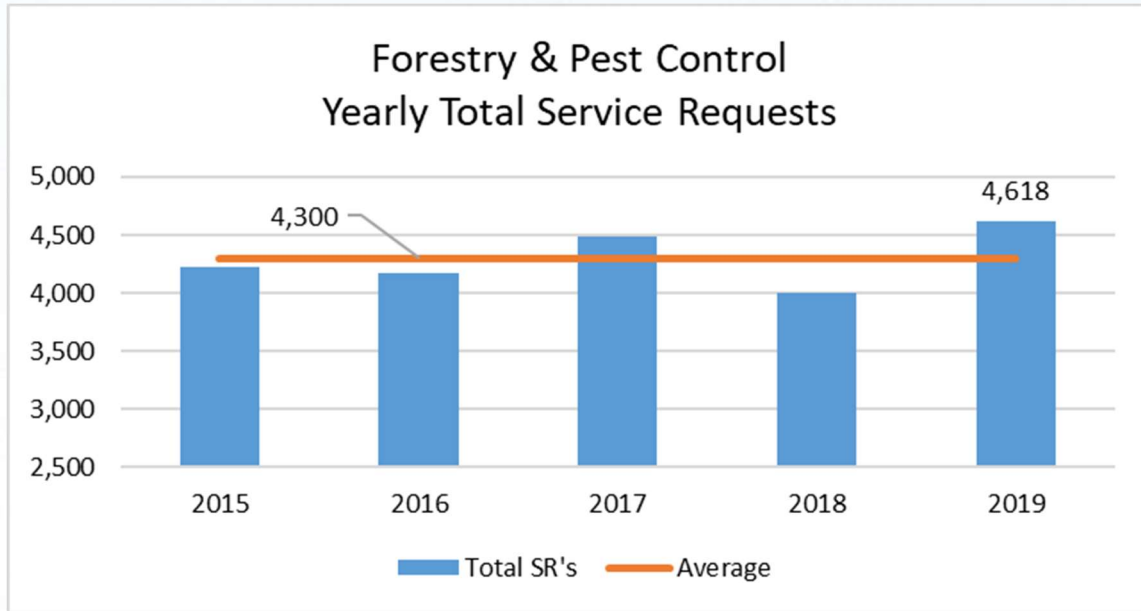
## Community – Increasing Understanding of Cost of Service Urban Forest Cost Benefit Comparisons



Average cost to prune one residential tree as compared to the amount that is allocated to the Forestry Maintenance (J442) budget. Pest Control (J443) budget that is specific to tree pests and diseases is shown as a comparison to Forestry Maintenance funding. The funding amounts illustrated are derived from a residence that paid \$4,000 property tax during 2019.

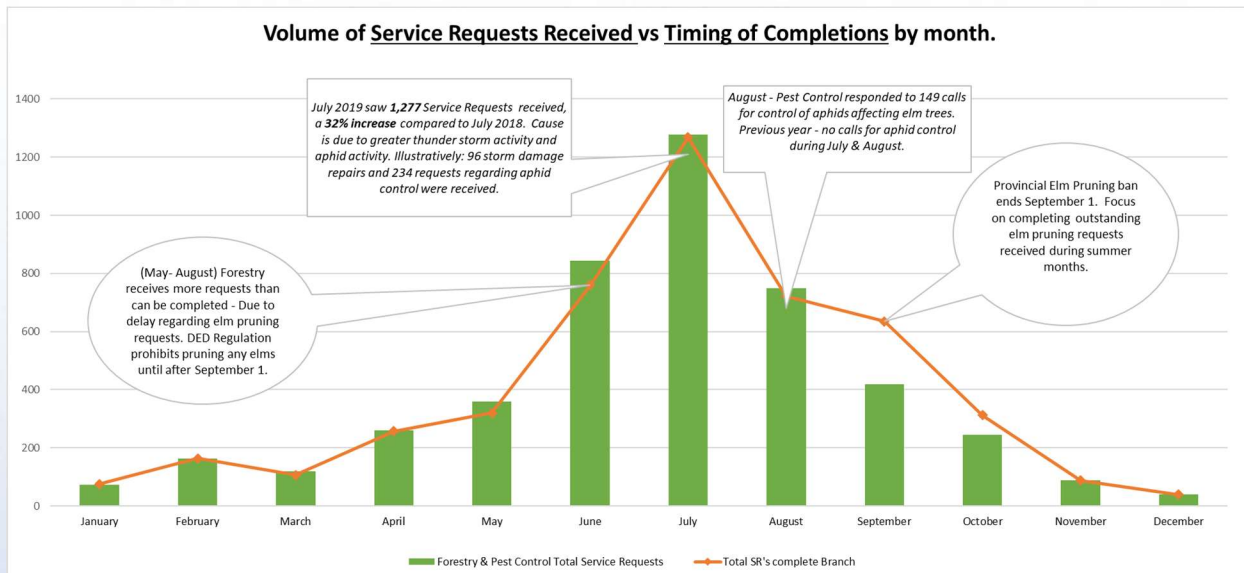
Costs are then compared to the benefits of an urban forest for a residential single dwelling home of approximately 55 years of age. For comparison purposes, costs are illustrated in the negative as compared to benefits. Information for home change of energy consumption savings in Regina is derived from National Research Council data provided to City of Regina during 2014 (~22.5 GJ). The energy saved is then applied to 2019 SaskEnergy residential rates for natural gas consumption and delivery in cubic meters (\$117.76). Municipal delivery surcharge (\$5.89), federal carbon tax (\$23.13) and GST (\$7.04) are included within the total savings.

**Community – Deliver Reliable Service**  
**Forestry and Pest Control Customer Service Measures**

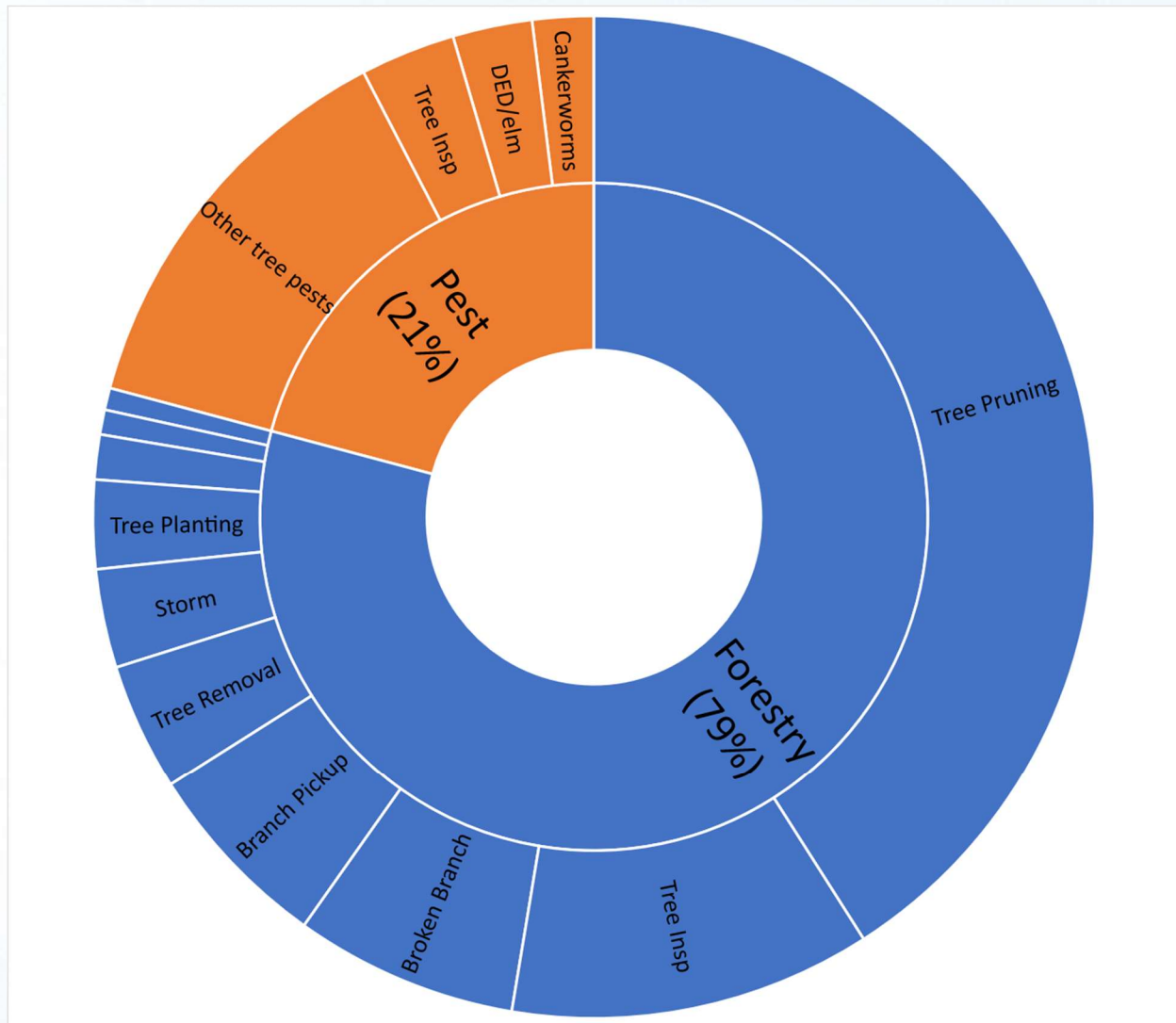


For 2019: Forestry & Pest Control received 4,618 combined service requests (SR's).

**Completing requests throughout 2019**



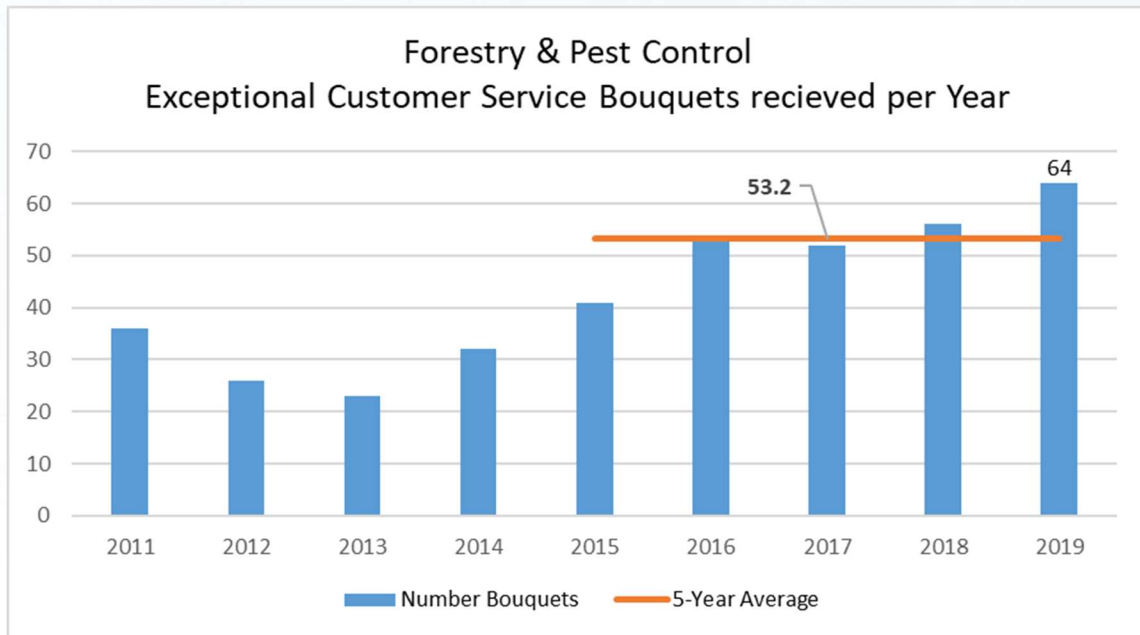
## Urban Forest Service Requests by type



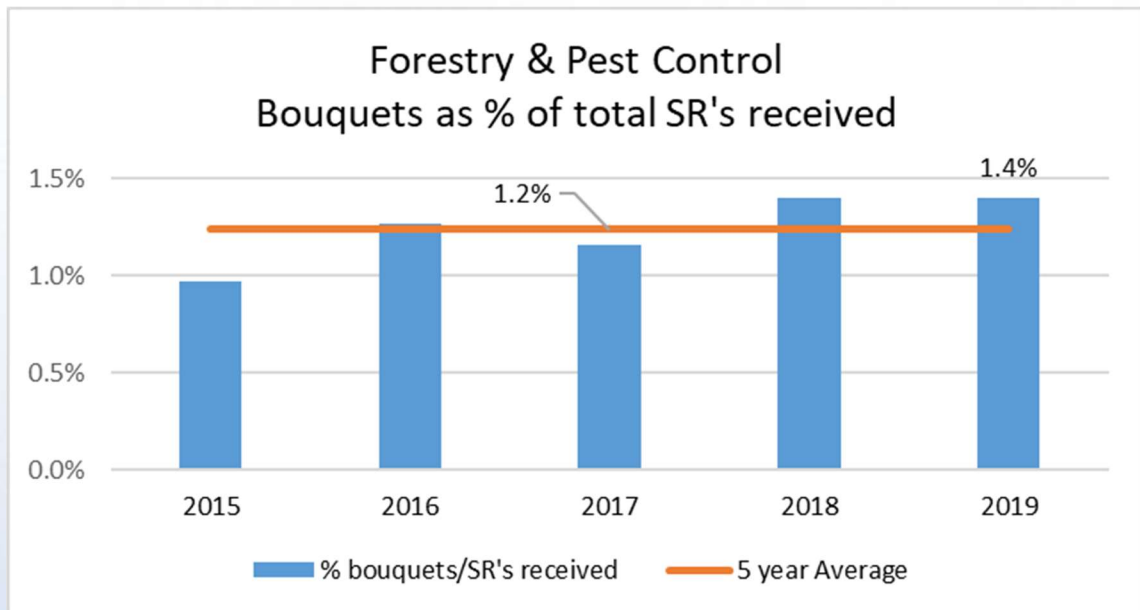
Pie distribution representing the percentage of tree related service requests for 2019.

*Other tree pests* - primarily comprised calls from residents regarding aphids affecting elm trees (383 calls) during July & August.

## Exceptional Customer Service Bouquets



Exceptional Customer Service Bouquets received are considered indicative of customer service delivered to the community. Since 2013, bouquets received from residents has increased by 2.8 times. For 2019, bouquets received were the highest on record.



For every 100 Service Requests received, Forestry and Pest Control receives 1.4 Exceptional Customer Service Bouquets. For the past five years this has been an increasing trend and indicates that residents are becoming more satisfied with service delivery from Forestry & Pest Control Operations.