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Mill Creek

Tree Management Plan



Funding:

Okanagan Basin Water Board (OBWB)
Water Conservation and Quality Improvement Grant

City of Kelowna – Park Services



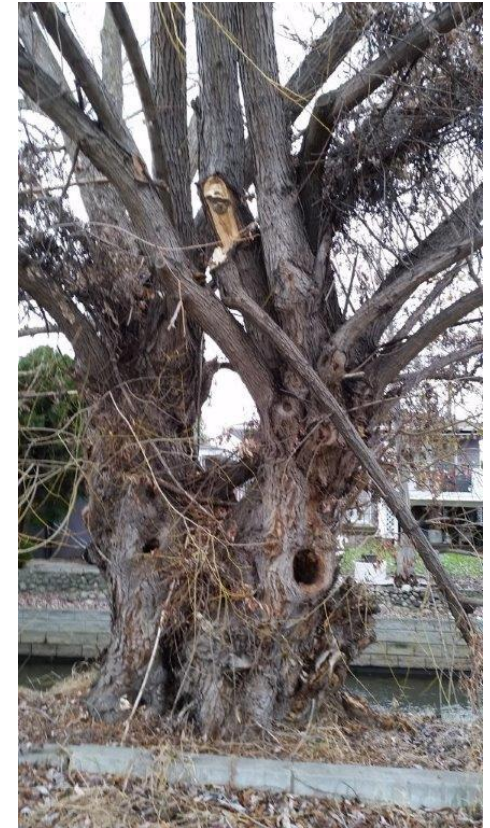
Completed by:

Mumby's Arboriculture Consulting
Diamond Head

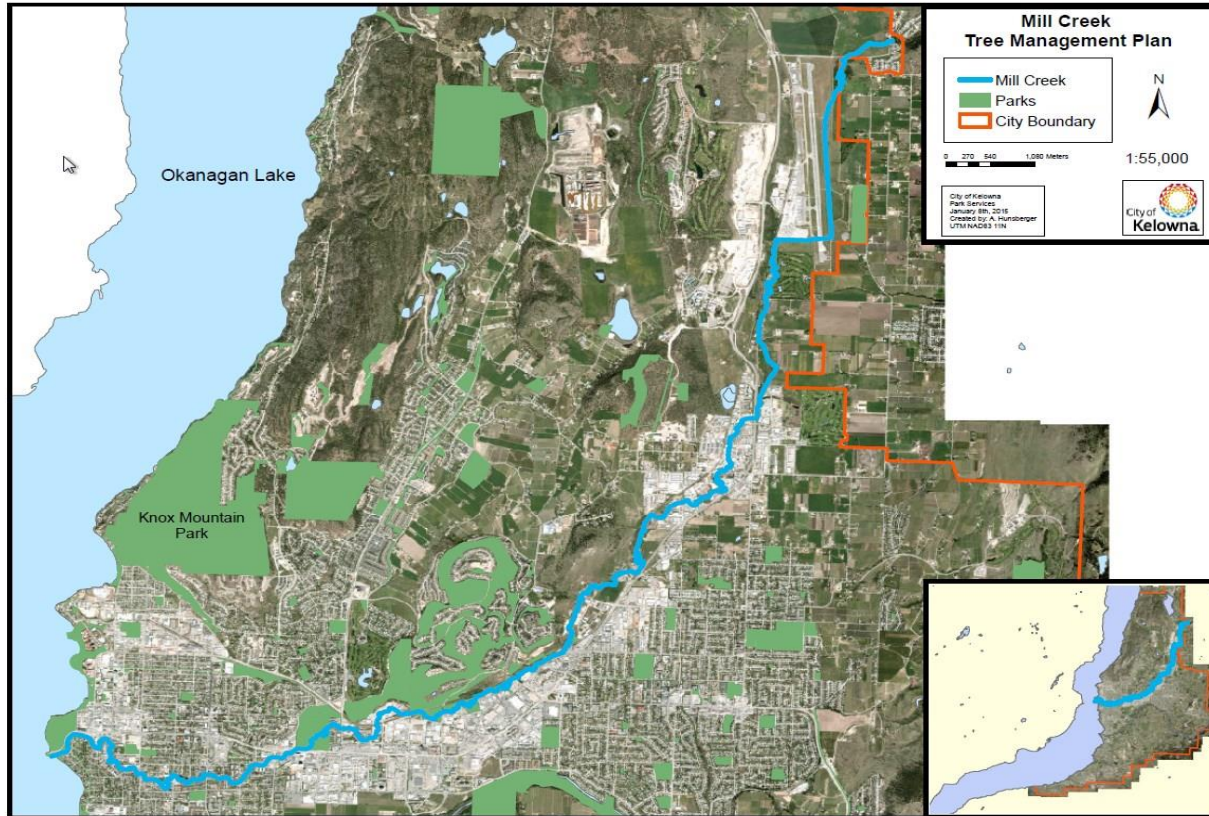


Overview

- Background
- Tree Management Plan
- Tree Inventory & Risk Assessment
- Tree Planting, maintenance and protection
- Impacts
- Future Outlook



Background



- Mill Creek winds for 24 km through the City of Kelowna
- Channelized through the floodplain to Okanagan Lake
- Mill Creek used extensively for irrigation

Background

- *Mill Creek can have an impact on drinking water quality within Okanagan Lake*
 - *High contamination events*
 - *More stormwater storage with permeable surfaces*
- *Only portions are treed with functioning riparian management areas*
 - *Maintain cool water temperatures for fish habitat*
- *Mature and over-mature Willow, Populus sp. and Elm*
 - *Age and structure is an issue for adjacent landowner*



Background



- **Official Community Plan (OCP)**

Kelowna 2030 Plan

- *Goal 6 – Protect and enhance natural areas*
- *Natural Environment Development Permit Guidelines*

- **Riparian Area Regulation (RAR)**

- Riparian Management Areas (15 – 30 meters)

- **Sustainable Urban Forest Strategy - 2011**

- **Urban Forest Effects Analysis (UFORE) - 2007**

- 12 Strategies and Tactics
- diversity, tree canopy, tree health, tree plant etc.)

Do you have a
**Stream, Lake,
Wetland or Ditch**
on or beside your
property?

You need to know:

Provincial and Federal legislation may apply to you. This brochure is intended to assist land owners & developers who are planning development activities in riparian areas adjacent to streams or other water bodies.

This pamphlet is a guide only. It is not a substitute for the Federal Fisheries Act, the Riparian Areas Regulation or your local government's bylaws.

The block contains three photographs of riparian areas: a lake with trees in the background, a stream flowing through a wooded area, and a ditch with a small bridge. Below the photos is the text 'You need to know:' followed by a paragraph explaining that provincial and federal legislation may apply and that the brochure is intended to assist landowners and developers. A disclaimer states that the pamphlet is a guide only and not a substitute for the Federal Fisheries Act, the Riparian Areas Regulation, or local government bylaws. At the bottom are the logos for British Columbia and the Ministry of Environment.



The Tree Management Plan

“**Retain, maintain** and **increase the tree cover** along the riparian areas of Mill Creek”

“Tree enhancement with the goal of protecting future **drinking water quality**, ensuring **public safety** and improving **wildlife habitat** along the creek

***We need to know what we have and what we are dealing with to properly manage the resource**



Tree Management Plan

Five-Year Plan

1. **Inventory** mature and over-mature trees along the creek.
2. Prioritize **tree hazards** identified in the inventory.
3. Prioritize tree **planting** locations.
4. Remove **invasive tree** species where practical.
5. Develop a **list of native trees** and shrubs for planting.
6. Develop and propose capital and operating **budgets** to complete the work.

Tree Management Plan

Issues with Mill Creek Trees

- Development
- Beavers
- Flooding & erosion
- Homeless camps & Illegal activities
- Tree removal – private land



Tree Inventory & Risk Assessment

- 13 % tree canopy cover – target 20%
- 3.3 million trees in Kelowna (UFORE 2007)
- 24,000 city trees inventoried
- Limited tree risk assessment
 - Level 1 & 2 TRAQ Assessments

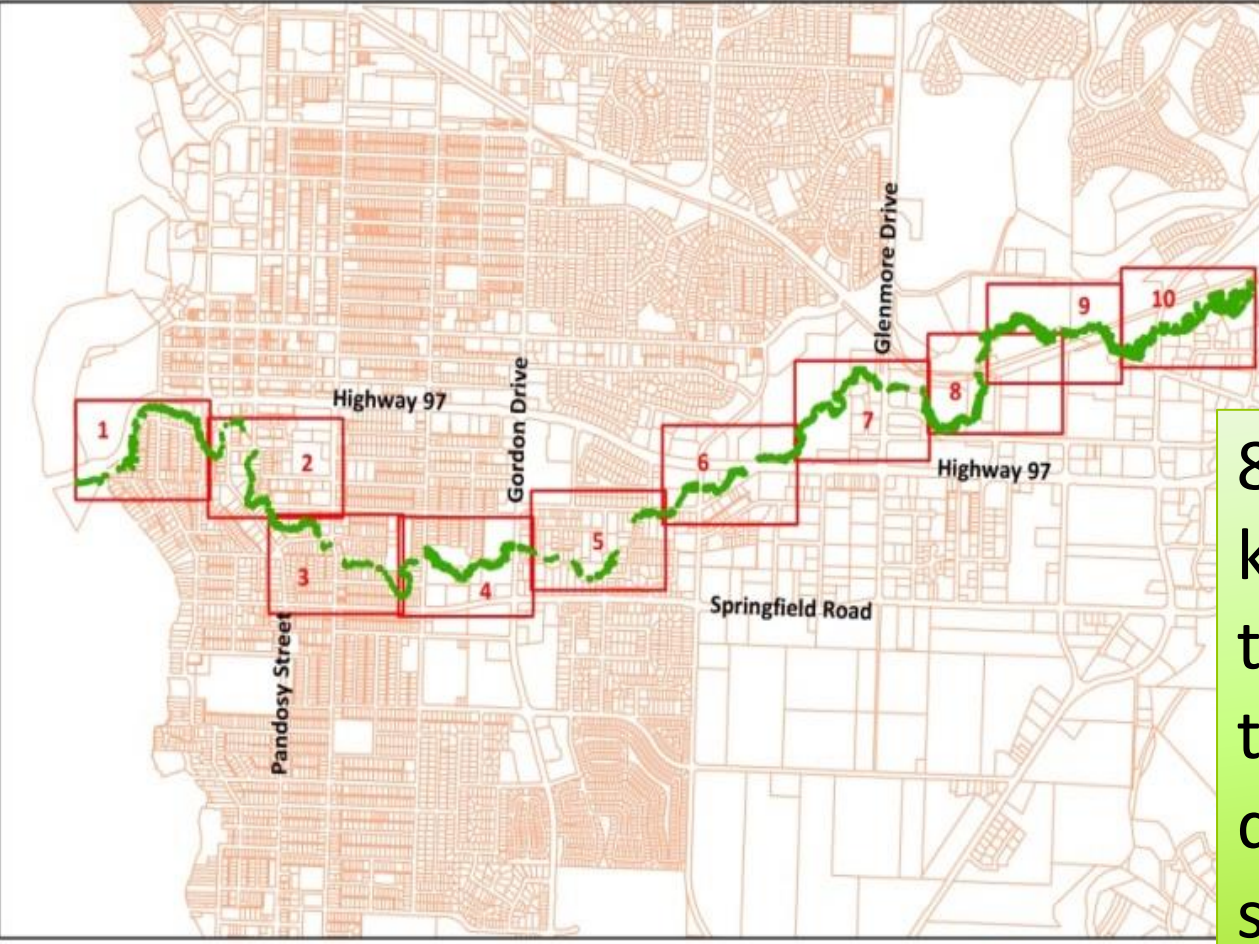


Mill Creek Tree Management Plan

City of Kelowna

Mill Creek Tree Management Plan

Map Key



Legend

- Trees That Were Inventoried
- Property Lot Lines

8.1 linear kilometers of trees, including twenty-three deciduous species and four coniferous species.

0 0.5 1 Kilometers

25 February 2016

This map is for general information only. The City of Kelowna does not guarantee its accuracy, currency or completeness. All information should be verified.



- Inventoried, tagged and itemized **2,243 trees** in a detailed Access database.
- Identified **three trees** that appear to be shared on private and public property.
- Identified a total of **fourteen** sites along Mill Creek ranging from 55 to over 2,600 square meters for their **planting potential**.
- Inventoried **289 invasive trees** growing in the MCTMP area, most of which are Siberian Elms.
- Assessed **179 at-risk trees**.

Mill Creek Tree Management Plan

Access data presented in a number of tables, this example is of a tree over **100** cm DBH with a High risk rating.

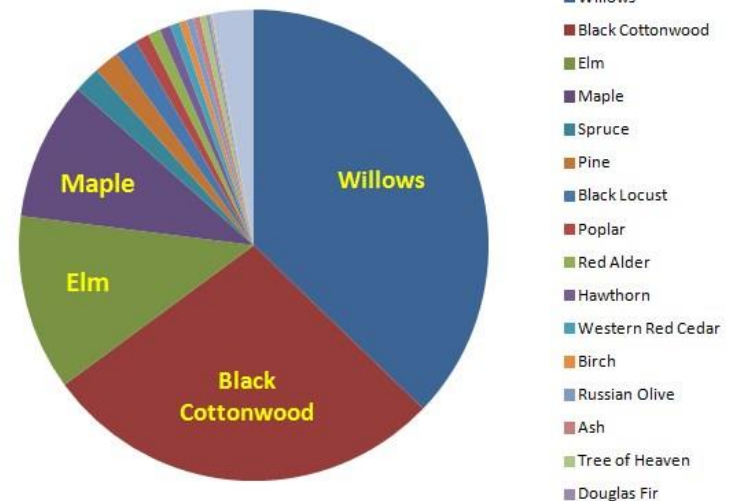
Tree Number	Map Number	Easting	Northing	Tree Species	Diameter	Multi Stem	Height	Canopy Spread	Condition
1	1	320186.095	5528344.06	Willow	107	Yes	12	17	70

Previously Maintain	RISK	GPS Date	GPS Time	Horz Prec	Remarks
Yes	HIGH	7/Dec/2015	10:21	0.780469601213019	prune out dead wood stem a 107 b 79

Tree Inventory & Risk Assessment

Species diversity and size

Species	Number of Trees	Average Diameter (cm)	Range of diameter (cm)
Willows	744	57	13 - 177
Black Cottonwood	554	38	13 - 200
Elm	242	30	13 - 93
Maple	191	30	13 - 186
Spruce	36	34	13 - 97
Pine	35	46	22 - 81
Black Locust	31	27	13 - 51
Poplar	19	24	14 - 52
Red Alder	17	19	13 - 34
Hawthorn	15	17	
Western Red Cedar	13	23	
Birch	10	25	
Russian Olive	10	23	
Ash	9	31	
Tree of Heaven	9	34	
Douglas Fir	4	37	
Oak	3	18	
Mountain Ash	2	28	
Other trees	56		
Total Trees Phase 1	2,000		



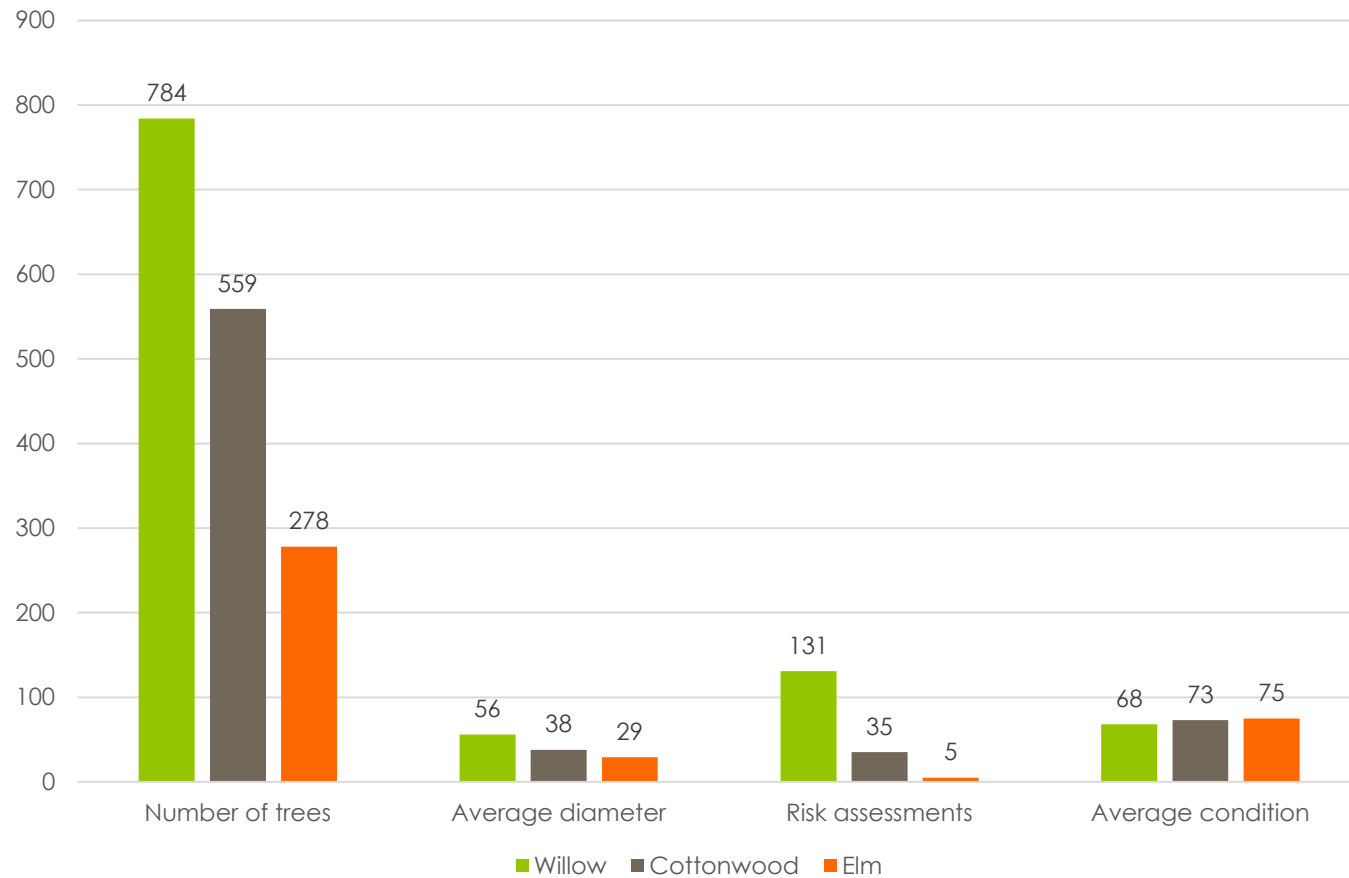
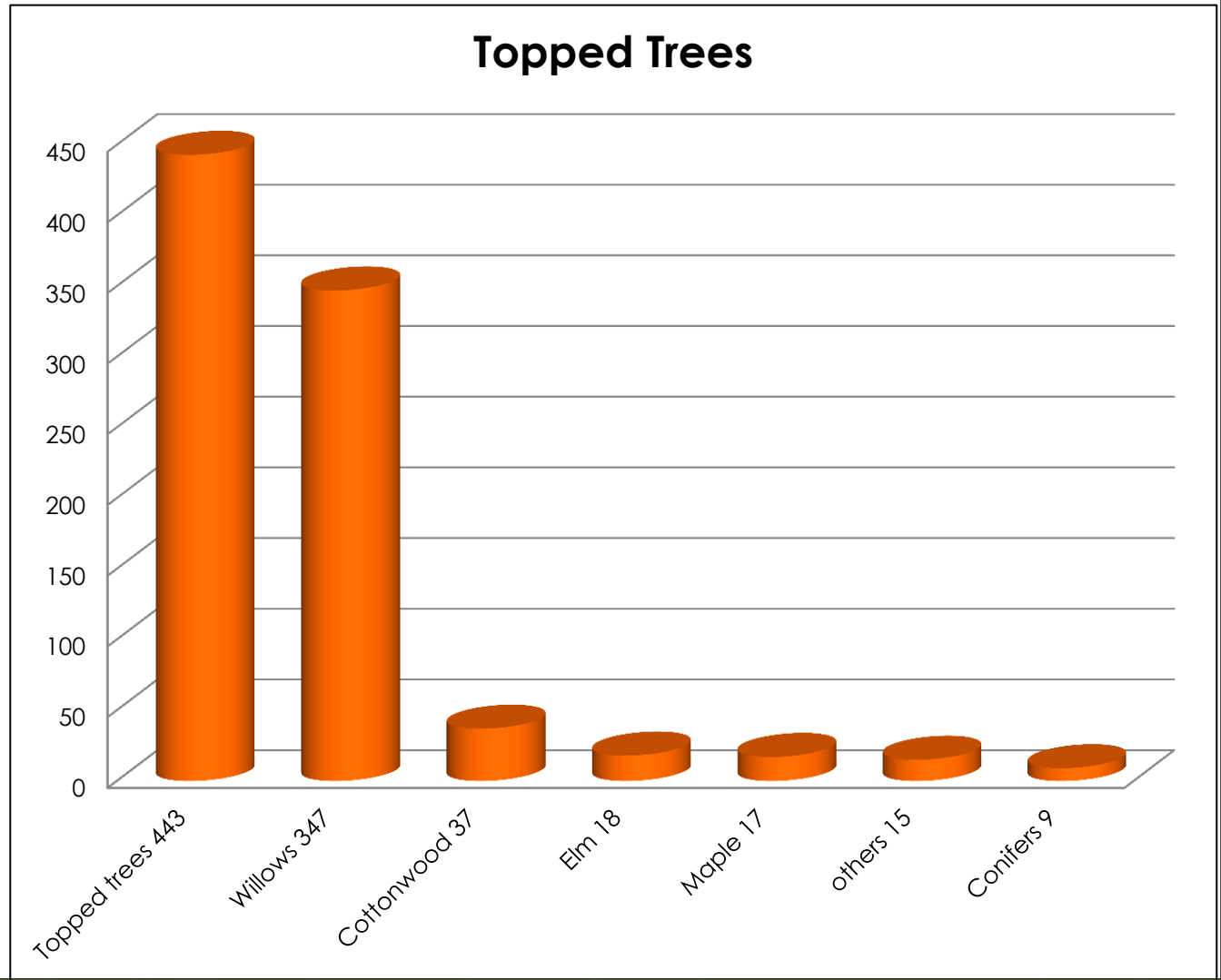


Figure B. Number of trees, average diameter, risk assessment and conditions for the most common species inventoried: Willow, Cottonwood, and Elm.

The largest *Salix alba* is 177 cm, *Populus trichocarpa* 200 cm and 116 cm for *Ulmus pumula*.

19.75% of the population were topped. Of the 347 willows identified as topped, 126 required a risk assessment (36%).



Tree Inventory & Risk Assessment

City of Kelowna

Mill Creek Tree Management Plan

Map 1



Legend

	Alder	Symbol size for tree diameter DBH		
	Ash		* < 21 cm	
	Birch		* 21 to 50 cm	
	Black Locust		* 51 to 100 cm	
	Western Red Cedar		* >100 cm	
	Cottonwood			
	Douglas Fir			
	Elm			
	Hawthorn			
	Maple			
	Mountain Ash			Mill Creek Linear Park
	Oak			Other Parks
	Pine			Property Lot Lines
	Poplar			
	Russian Olive			
	Spruce			
	Tree of Heaven			
	Willow			
	Other			

Notes

0 50 100 Meters

16 February 2016

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Tree Inventory & Risk Assessment

City of Kelowna

Mill Creek Risk Trees and Planting Areas

Map 1



Legend

Tree Risk Assessment

- High
- Moderate
- ▲ Low



Planting Area



Mill Creek Linear Park

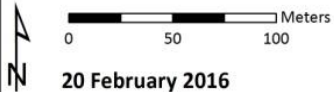


Other Parks



Property Lot Lines

Notes



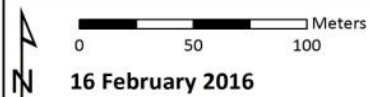
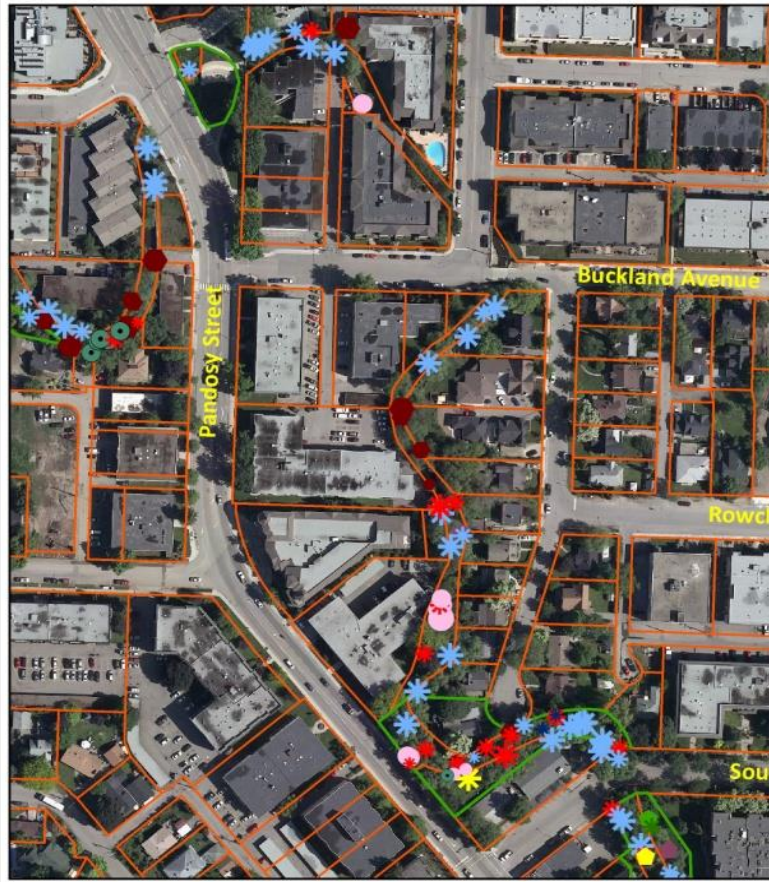
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Mill Creek Tree Management Plan

City of Kelowna

Mill Creek Tree



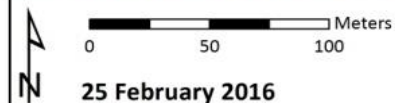
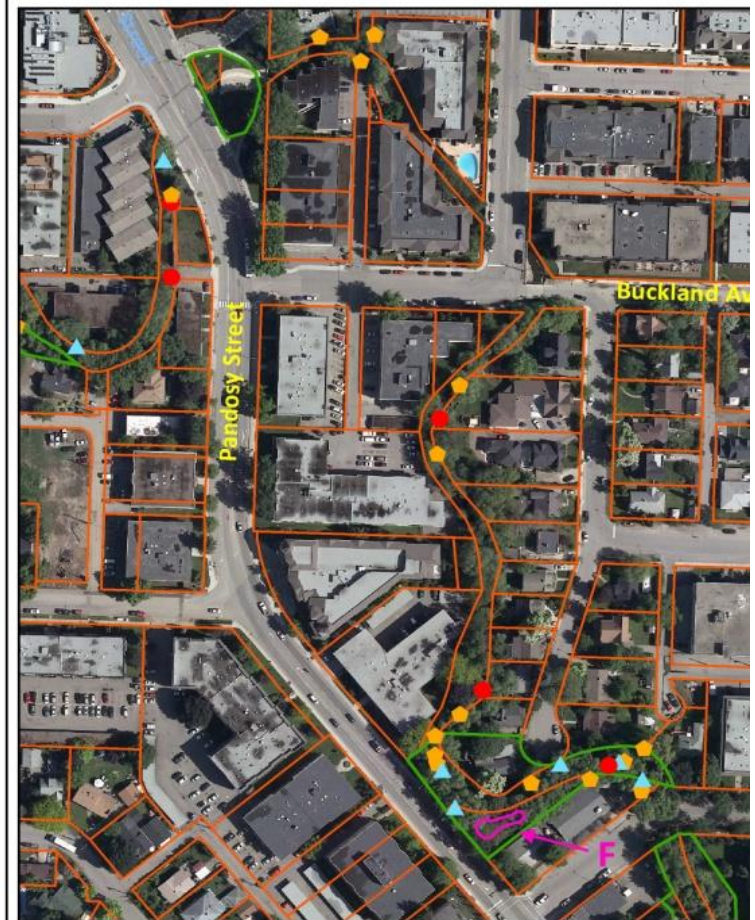
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Example of how development impacts
tree management /risk potential

City of Kelowna

Mill Creek Risk



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Mill Creek Tree Management Plan

Development is further away from the creek in this section, resulting in no risk trees. More natural understory is present.

City of Kelowna

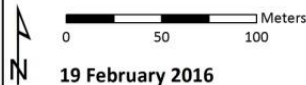
Mill Creek Tree Management Plan

Map 8



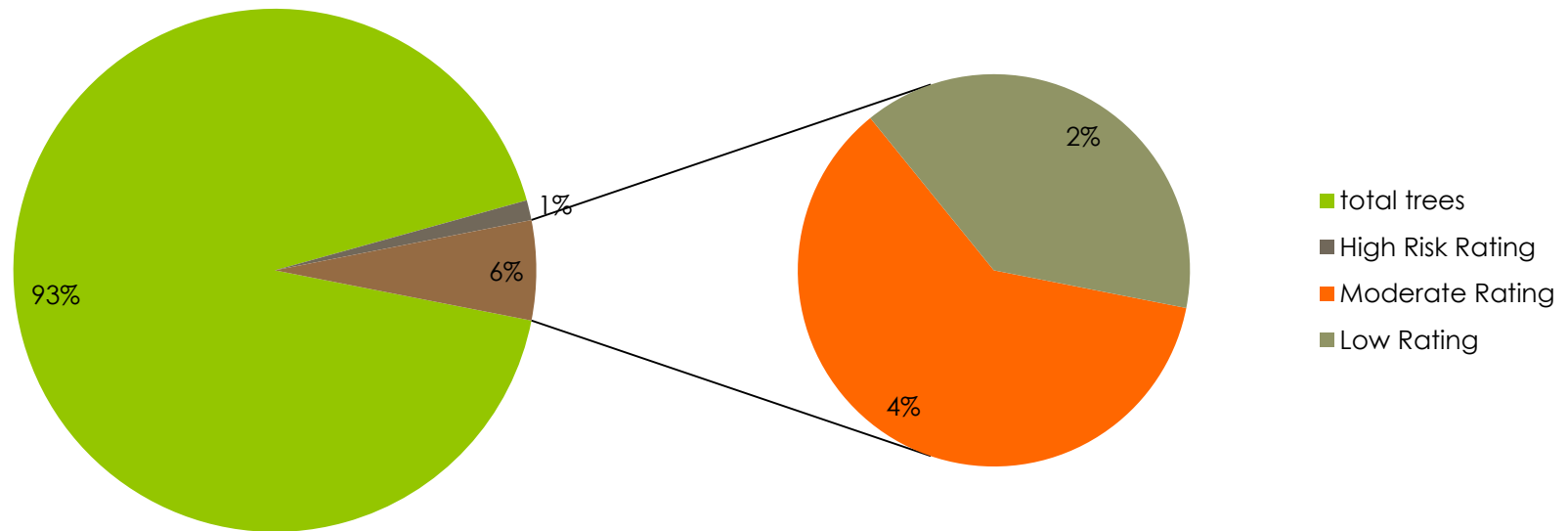
Legend	
	Alder
	Ash
	Birch
	Black Locust
	Western Red Cedar
	Cottonwood
	Douglas Fir
	Elm
	Hawthorn
	Maple
	Mountain Ash
	Oak
	Pine
	Poplar
	Russian Olive
	Spruce
	Tree of Heaven
	Willow
	Other
	Mill Creek Linear Park
	Other Parks
	Property Lot Lines

Notes



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Risk Ratings



179 tree risk assessments required as part of the inventory, or 7% of the tree population. There are no Extreme risk ratings. Thirty high risk trees were identified, as well as 91 moderate risk and 58 low risk ratings.

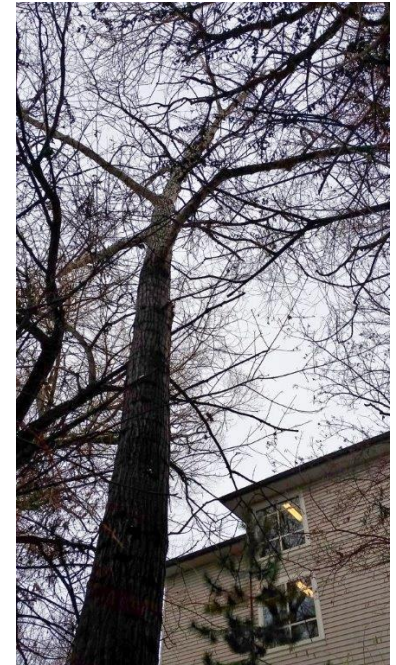
Tree Inventory & Risk Assessment

Tree Hazards

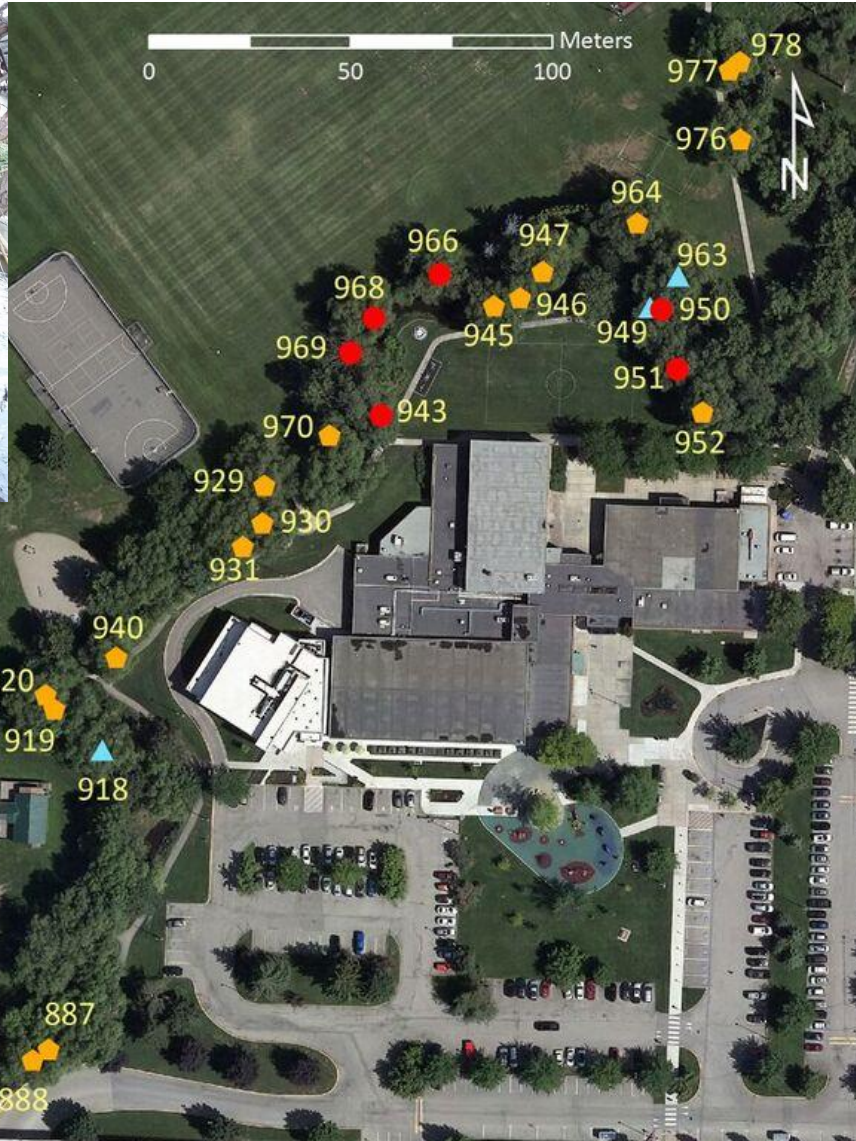
Species	Number of Trees	Average Condition Score	Range of Condition	Number for Tree Risk Assessment	Maps
Willows	744	68	0 - 90	131	1, 2, 3, 4, 5, 6, 7, 9, 10
Black Cottonwood	554	73	0 - 95	35	1, 2, 3, 4, 6
Elm	242	75	5 - 90	5	1, 2, 9
Maple	191	81	30 - 95	5	1, 2
Spruce	36	74	0 - 90	0	
Pine	35	84	60 - 90	0	
Black Locust	31	78	60 - 90	0	
Poplar	19	86	70 - 95	0	
Red Alder	17	81	60 - 90	0	
Hawthorn	15	91	80 - 95	0	
Western Red Cedar	13	54	0 - 90	0	
Birch	10	72	10 - 90	1	2, 10
Russian Olive	10	86	80 - 90	0	
Ash	9	82	75 - 90	0	
Tree of Heaven	9	79	50 - 90	0	
Douglas Fir	4	70	50 - 80	0	
Oak	3	70	50 - 85	0	
Mountain Ash	2	85	85 - 85	0	
Other trees	56			0	
Total Trees Phase 1	2,000				

Tree Inventory & Risk Assessment

- o **177 hazard trees** require mitigation or further assessment
- o **Habitat trees** – owls, heron, ducks etc.
- o Large willows over-mature - “*mortality spiral*”
- o **Invasive trees** providing riparian function
- o Stem decay due to **topping**



Mill Creek Tree Management Plan



Invasive Tree Species

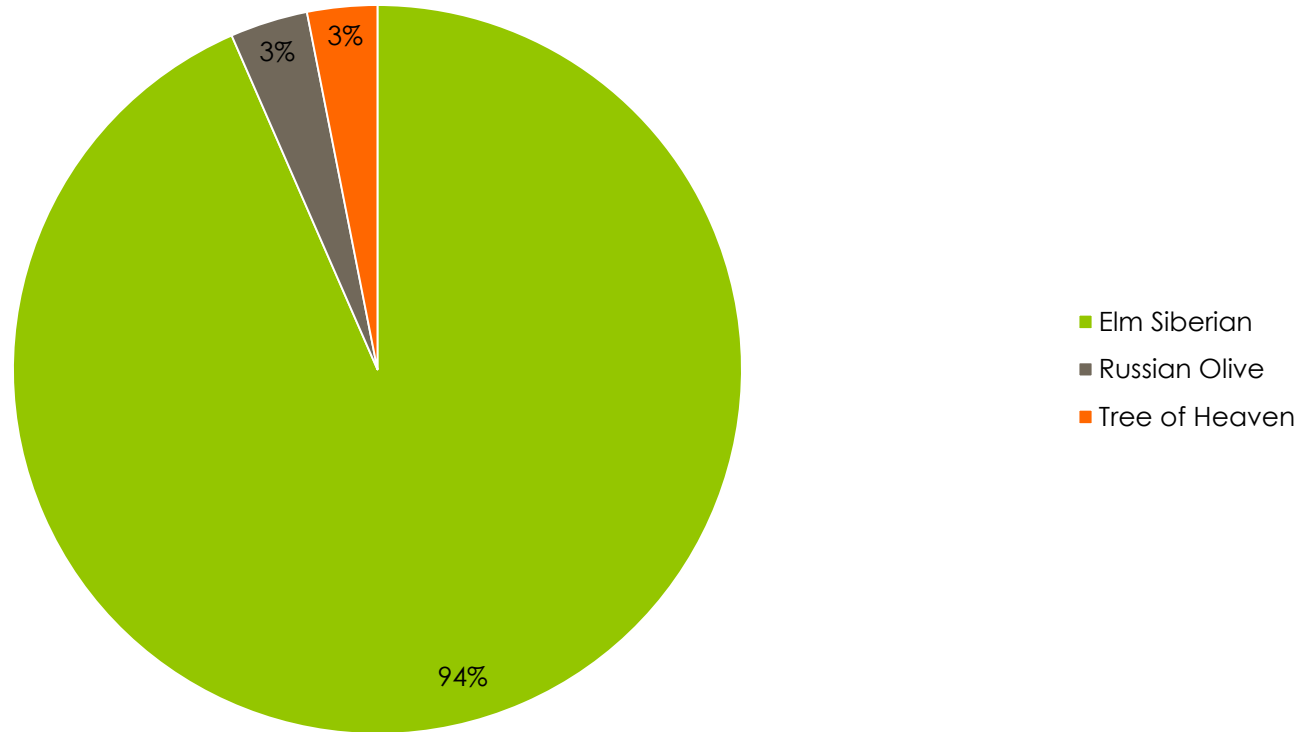


Figure E, a total of 289 invasive tree species were inventoried, or 13% of the tree population. Of those, 270 are Siberian Elms (*Ulmus pumila*), 9 are Trees of Heaven (*Ailanthus*) and 10 are Russian Olive (*Elaeagnus*).

Tree Planting, Maintenance & Protection

- **TRAQ Level III Assessments**
- **Mitigate hazards** – tree removal, pruning and/or support systems
- **Tree pruning** to reduce failures potential
- **Planting** native trees
 - Populus sp., Western Redcedar, Douglas-fir, Black Hawthorn, Salix sp.
 - Identified 11 areas for planting
 - Total 6,900 m²
 - Range from 90 to 2,577 m² in size
- **Succession** planting
- **Beaver** wrapping



Impacts

- Poor access
- Costly to remove or maintain
- Over-mature trees, spiral mortality
- Narrow riparian parcels, limited plantable spots
- Public perception



Future Outlook

Long-term

- Mitigate tree hazards
- Increased species diversity
- Increased tree canopy cover
- Utilize tree inventory
- Greater awareness of our urban forest





Thank you from Mumby's and Diamond Head Consulting to be part of Parks Fall Field Day.



Barred Owl



Questions and Discussion