

# Bowness Responsible Flood Mitigation Society

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## Revision History

Rev	Author	Date	Description
0.1	JLW	2019-04-19	First Draft
0.2	JLW	2019-04-19	Added Animal Catalog
0.3	JLW	2019-05-01	Incorporated feedback from internal review
1.0	JLW	2019-05-01	Send to the City of Calgary Bowness Barrier Team

## Glossary

Term	Description

## BRFM Environmental Inquiries

Bowness Responsible Flood Mitigation Society  
BRFM-200-EIR-2019

May 1, 2019  
Revision 1.0

Term	Description

## References

Guide to the Common Native Trees and Shrubs in Alberta	Alberta Environment & Parks
<a href="http://calgaryrivervalleys.org">http://calgaryrivervalleys.org</a>	Calgary River Valleys
<a href="https://naturecalgary.b-cdn.net/wp-content/uploads/2012/06/CalgaryRegionChecklist.pdf">https://naturecalgary.b-cdn.net/wp-content/uploads/2012/06/CalgaryRegionChecklist.pdf</a>	Nature Calgary

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## 1. Introduction

The Bowness Responsible Flood Mitigation Society (“BRFM”, “we”) is a society of residents from the community of Bowness in Calgary, Alberta. Bowness is a community of ten thousand and is adjacent to the Bow River.

This document organizes points of discussion between the City of Calgary Bowness Barrier Project Team (“City Project Team”) and the Bowness Responsible Flood Mitigation Society (“BRFM”). This document will be updated as new information becomes available.

BRFM Board Members and members of the BRFM technical committee have had meetings with the City Project Team with respect to more technical aspects of the project. A similar inquiries style document was created for this purpose.

BRFM’s environment committee has not yet had the same opportunity to begin a dialog with respect to the impacts to the environment that the project may have and the City’s plans to mitigate these impacts.

This document will be shared with the City of Calgary employees and consultants, residents of Bowness and members of BRFM.

This document is not all encompassing of residents or BRFM’s concerns. Other issues such as inquiries to the City’s Bowness Barrier email and questions during any City Information sessions are of no lessor value.

## 2. BRFM Wildlife Inventory & Tree Census

Residents who live along the Bow River in Bowness believe that we are stewards of the river environment. As a result, when BRFM asked neighbours to assist with our wildlife inventory and tree census, the response was overwhelmingly supportive.

Since May of 2018, BRFM has been compiling a wildlife inventory. Details of the methods and the catalog can be found in the appendix. In summary, residents reported sighting **52** species of birds and **12** species of animals.

The natural association of birds to this environment is that they use this habitat for security, feeding on insects, berries and plants and for nesting to raise their young in a safe, protected environment.

Habitat loss would be a severe detriment to the continued presence of birds and other animals.

To objectively assess the potential environmental impact of the City's proposed flood barrier in Bowness, BRFM conducted a tree census. From May to November 2018, BRFM volunteers walked the conceptual alignment of the Bowness flood barrier to record the number of trees that occupy a 30-foot wide footprint (this is the stated average from the City) from Shouldice Bridge in the east to the CP tracks in the west (3-4 km in length). The results were staggering.

In summary, the BRFM tree census:

- Counted, measured and mapped **5,713** individual trees, shrubs and shrub groupings.
- Identified **65** different varieties of trees and **68** different varieties of shrubs; an indication of the incredible diversity within the proposed project area.



Figure 1 - Sawet Owl

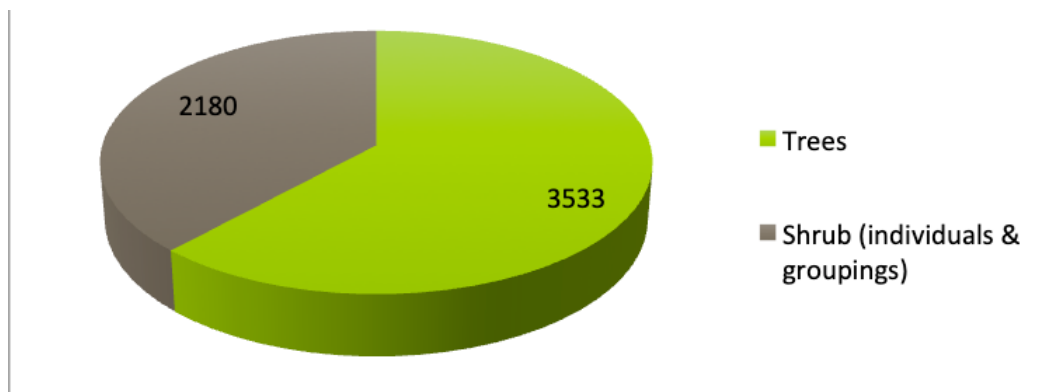


Figure 2 - Tree Census Summary Count

One could project a greater loss, as a result of disturbed roots of nearby vegetation during construction.

Additional details can be found in the appendix.

The area planned for construction along the Bow River between Shouldice Bridge and the CP Rail tracks is a corridor for animal movement along the Bow River. In the winter, one can see animal tracks along the shore and crossing the ice to the other side of the river, into Bowmont Park. The area is rich with flora and fauna that makes the river their home.

City Parks and Recreation acknowledges the importance of trees for river health, as demonstrated by the interpretative signs they have posted in Bowmont park: *“The roots of a healthy river: Balsam Poplar forests along the river help support wildlife and maintain water quality. Think of the river, forest and wildlife as part of a triangle. If one side disappears then the whole thing collapses.”*

According to Alberta Environment and Parks publication, “Guide to the Common Native Trees and Shrubs in Alberta”, shrubs are important to wildlife. AEP rated their importance by species in the chart below. Most of the species found in this chart were also identified in BRFM’s tree census.

### The Importance of Shrubs to Wildlife

Shrub	Big Game	Birds
Willows .....	1	2
Beaked Hazelnut .....	1	1
Swamp Birch .....	2	2
Alders .....	3	2
Gooseberries & Currants. ....	2	1
Saskatoon Berry .....	1	1
Shrubby Cinquefoil .....	2	2
Pin Cherry .....	2	1
Choke Cherry .....	2	1
Rose .....	2	1
Raspberry .....	2	1
Wolf Willow .....	2	2
Canadian Buffalo-Berry.....	3	1
Red-Osier Dogwood .....	1	1
Labrador Tea .....	3	3
Blueberry .....	2	1
Honeysuckle .....	2	2
Buckbrush .....	2	1
Cranberry .....	1	1

SCALE: 1 = very important  
2 = moderately important  
3 = not important

Table supplied by  
B. Stubbs, Alberta Fish & Wildlife

Figure 3

We understand that some of the benefits of trees and other vegetation along our river, include:

- Trees help to slow the flow of the river during high water events, thereby reducing the effects of flooding both for people and buildings;
- A buffer area of woods, shrubs and grasses intercept contaminated runoff before it reaches the river;
- Vegetation provides organic debris for the river’s food chain;
- Our urban forest sustains important wildlife by providing opportunities for food and shelter; trees are a terrestrial source of food (i.e. bugs) for fish; and
- Trees provide shade for fish and people while absorbing CO<sub>2</sub>

### 3. Areas of Concern

BRFM questions to the City have been categorized by area of concern.

#### 3.1 City of Calgary Biophysical Impact Assessment

BRFM understands that the City is planning to conduct a BIA and not an Environmental Impact Assessment (EIA).

- A-1. Is the City not required to complete an EIA?
- A-2. If an EIA is not required, please explain why it is not required?
- A-3. Can BRFM or any resident of Bowness influence the requirement to conduct an EIA?

BRFM expects that the City's Biophysical Impact Assessment or a provincially or federally mandated EIA will identify areas of environmental importance and/or potential archeological significance.

- A-4. If these areas of importance can be avoided, can the City reasonably conduct the BIA / EIA at the same time as the alignment is being figured out?
- A-5. Please describe what exactly is assessed as part of the BIA. For example will you be identifying all birds and animals that use the area?
- A-6. Will you be identifying, quantifying the number of birds' nests as part of the BIA?
- A-7. What is the extent of the study area for the BIA? Where does it start and stop?
- A-8. Will the BIA evaluate upstream and downstream effects of the barrier?
- A-9. Has the City assessed the social impacts of the residents' loss of the aesthetic and enjoyment loss of this natural environment?
- A-10. Will the City reassess the social impact as part of the preliminary design and later study phases?
- A-11. What data will the City rely on for their BIA?
- A-12. What organization has been engaged by the City to complete the BIA?
  - a. How can we be sure of that the study is conducted without bias from the City?
- A-13. Will the City require access to private property to conduct the BIA?
  - a. If so when (daytime, night time, weekends, holidays, etc.)?
- A-14. When will the BIA begin?
- A-15. Will the City engage BRFM to review the scope of work for the BIA before it begins?
- A-16. When does the City expect to complete the BIA?
- A-17. How does the City determine the appropriate duration of the BIA, given some species are transient?
- A-18. What is the duration of the BIA?
- A-19. Will the City engage BRFM to review the final BIA report(s) before it is published?



- A-20. What methods will the BIA use to identify nocturnal wildlife that is not normally seen during daylight hours?

### 3.2 Impact of Lost Trees and Other Vegetation

- B-1. Will the City be identifying the trees and shrubs that must be removed and report this back to the community and council before proceeding with their removal?

We understand from the budget document that was published this winter that one of the City's benchmarks is to measure tree canopy. The removal of trees behind Bow Village Crescent as part of the barrier project will have a negative impact to the City's own benchmark.

- B-2. Will the City be reporting this planned loss of canopy to the Urban Forestry department at the City of Calgary?
- B-3. How will the City value the trees and other vegetation that will be removed and is part of our urban forest?
- a. Will snags that offer important nesting and burrowing sites for birds and small wildlife be given a value?
- B-4. Will this value be included in the cost benefit analysis?

The Forestry industry has decimated many Alberta streams by clear-cutting, allowing for severe erosion and the subsequent silting up of the streams and rivers in the west and northwest Forest Reserves of Alberta.

- B-5. If the City removes the trees and shrubbery with their inherent root systems that hold soil in place, how will they prevent erosion from rains and spring runoff?

BRFM believes that removal of trees for the barrier will isolate trees near the riverbank and that high river flow events will increase the probability of causing these trees to fall, resulting in increasing the rate of erosion and riverbank loss.

- B-6. How will the City mitigate this loss?

### 3.3 Fish and Fish Habitat

Residents are proud that the Bow River is considered a world-class fishery. We believe that upstream mitigation on the Bow is important for the fishery to prosper. Upstream storage can help to maintain a steady flow of the river throughout the year thereby reducing the likelihood of the river running very low late in the summer. The late summer drought that we witness most years is perceived to be detrimental to fish populations due to increases in water temperature and reduced oxygen levels in the water.

From a presentation by Anne Naumann with Calgary River Valleys (<http://calgaryrivervalleys.org>) to the Bow River Basin Council:

A project, counting Brown Trout Reds (Spawning area) on the Elbow River found that following the flooding event of 2013, the high flow rates on the Elbow caused the finer gravel to be flushed down the river and the number of suitable spawning



Figure 4 - Fly Fishing

areas were significantly decreased. Since the flood stable flows have restored more areas where there is finer gravel for the Brown Trout to spawn.

BRFM understands that the City believes that with community barriers in place, the river can be run at higher flow rates in the future.

- C-1. As we look at the context for the Bow River here in Bowness, what's the effect of more frequent high flow events, and river containment causing higher velocity? Will this cause finer gravel to be flushed down stream and destruction of fish spawning areas?
  - a. What will be done to mitigate the risk?

Along the Bow between Shouldice Bridge and the CP Railway tracks there are several large gravel bar islands. These gravel bars and the unarmored banks along the river provide excellent habitat and spawning areas for fish. Avid fishermen live along Bow Crescent and anecdotally have already noticed declines in fish population even before construction of the Berm has begun.

We understand that choking the riverbed with clays can lead to algae growth and oxygen depletion, both of which are harmful to fish, other aquatic species and their spawning grounds.

- C-2. Will the construction of the berm, especially where it is close to the riverbank impact fish habitat?
  - a. What will be done to mitigate the risk?
- C-3. What will be done to mitigate the risk of fine silts that erode and run into the river during and after construction?

### 3.4 Pre Construction

- D-1. Will the City be performing bird and animal sweeps prior to, and during construction to ensure that nesting sites, dens or other spaces are identified and not disturbed?
  - a. What other mitigation methods will the City employ?
- D-2. Bats are frequently seen in our yards. Will they be protected?
  - b. If yes, please explain how?

### 3.5 Construction

- E-1. If any of the barrier is constructed in the floodway, how will the City avoid negative impacts to the river ecosystem? (At some of the site visits, neighbours were told that part of the barrier may be constructed in the floodway.)
- E-2. How will the City ensure that the machinery used does not leak oil or other hazardous substances into the river or contaminate soils in the area (e.g. gardens for food)?
  - a. Will the City use low toxic hydraulic oil, mineral oil or some equivalent instead of toxic oil and fuels for any machinery used for the project?
  - b. How do residents notify the City of a spill?
  - c. How will the City respond to spills?

Fine silts could erode and run into the river, damaging fish habitat and spawning grounds. These fine silks can also, choke the riverbed with clays and organics that will lead to algae growth and oxygen depletion.

E-3. What material will be used for berm construction? What is the composition of clay, earth, silica, and organics?

Property owners are concerned about the spread of invasive weeds on their property as witnessed across the river during the construction of the new Dale Hodges Park and development of the storm water settlement ponds.

E-4. From where will the City source its berm material?

E-5. Will a soil composition analysis be done prior to delivery to the construction site?

E-6. What will cover the berm? Grass, shrubs, non-native species?

a. Will the new cover inhibit erosion?

b. Will the new cover and growth spoil the view and become an unsightly mess if not maintained on a frequent basis?

BRFM estimates that approximately 3500 trees stand in the way of the proposed flood barrier.

E-7. How long will it take to remove the trees that stand in the way of barrier construction?

E-8. The community will have to listen to the sound of chainsaws over an estimated 4 year construction period (estimated by the City). How will the City mitigate against the social impact of this disturbance?

E-9. Will the trees be taken off site or ground into mulch onsite then removed?

We understand that the riverside of the berm will be armoured to protect the integrity of the berm. We also understand that this armouring may create greater velocity of river flow during high water events causing greater erosion, loss of trees and other vegetation between the armoured side and the river.

E-10. Why would the City choose to armour the berm given the negative consequences during high water events?

a. Will the City mitigate against this potential loss, and if so, how?

### 3.6 Monitoring Programs – During Construction

F-1. Will the City commit to construction a monitoring program?

a. Please provide details of the monitoring program - what specifically is monitored, how often and how? (e.g. monitoring for weed control, air quality, dust, noise, etc.)

F-2. Will the City ensure that equipment is not stored on private property overnight and on weekends?

### 3.7 Monitoring Programs – Post Construction

G-1. What kind of budget increase to the Parks Department will there be (if any) for yearly maintenance of the Berm?

G-2. Who inspects and maintains the berm and access points post construction?

a. How will access be requested during and after construction?

b. For how long after berm construction will the berm be Inspected and maintained?

c. How often will it be inspected?

G-3. Will the City commit to post-construction monitoring?

a. If yes, for how long will the monitoring continue after construction?

b. Please provide details of the monitoring program - what specifically is monitored, how often and how? (e.g. monitoring for weed control, tree loss, etc.)

G-4. How will the City avoid the outbreak of invasive weeds, like what occurred in Bowmont Park and the Dale Hodges Park that is still closed to the public?

G-5. Has the City assessed the possibility that during and after construction that the wildlife will disappear?

d. If significant habitat is lost, the wildlife may not return, and we will lose this enjoyment of nature. What social cost will the City assign for this loss?

G-6. We expect there to be a certain loss of trees and other vegetation after construction due to root disturbance. Will the City address this loss by replanting?

c. How long after construction will the City monitor and replace trees and shrubs that die as a result of construction?

G-7. When poplars are removed they continue to sucker. How will the City stop this suckering so that the integrity of the barrier can be maintained?

d. How long after construction will the City manage suckering poplars?

Bank armouring impacts migration routes for wildlife and can cause harm to wildlife trying to navigate the armoured bank (e.g. deer can break legs crossing rip rap shore lines).

G-8. How will the City mitigate this risk to wildlife?

Bank armoring may impede the movement of wildlife from the river closer to our homes, where we are able to view and enjoy their comings and goings.

G-9. Will the City consider our lost enjoyment as a social cost in their cost benefit assessment? If so, how?

## 4. Appendix – Tree Census

### 4.1 Methods:

- We used the alignment of the barrier as depicted in the December 2017 City of Calgary Water Services info brochure & imported to Google Earth
- Volunteers visited about 140 properties on Bow Crescent, Bowbank Crescent & behind Bow Village Crescent, logging > 250 hrs in the field (from May to November 2018)
- Trees & bushes along the alignment, 30 feet wide, were GPS located
- Tree trunk circumference was measured about at breast height
- Shrubs / bushes and groups of same were measured for height and width
- Species were identified in the field where possible or from pictures linked to waypoint



### 4.2 Summary Stats – a devastating loss

**5,713** individual trees, shrubs and shrub groupings were counted, measured and mapped

The count demonstrated the diversity of our urban forest: we identified 65 different variety of tree and 68 different variety of shrubs

One could project a greater loss, as a result of disturbed roots of nearby vegetation during construction

## 4.2.1 Top 10 Species by Count:

Tree Species	Count	Shrub Species *	Count
Saskatoon	854	Dogwood	367
Poplar	636	Saskatoon	345
Chokecherry	477	Wolf Willow	220
Wolf Willow	245	Snowberry	189
Spruce	153	Wild Rose	182
Multi-stem River Birch	131	Cotoneaster	118
Willow	99	Buffaloberry	108
Green Ash	77	Chokecherry	91
Manitoba Maple	61	Potentilla	67

\* Due to constraints in resources, large groupings of bushes/shrubs (e.g. some dogwoods, caraganas, etc.) were counted as one way point and measured by height of the largest in the grouping and the length of the grouping

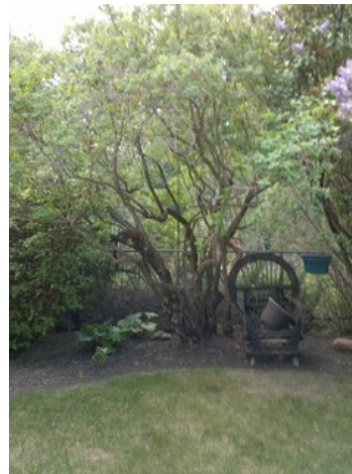


Figure 8 - Lilac

### 4.3 Top 10 by Max Trunk Size (measured as circumference in inches)

Tree Species	Max	Min	Average	Count
Poplar	195	1	38.7	636
Manitoba Maple	128	2	19.3	61
Willow	125	1	9.4	99
River Birch Multi-stem	93	1	8.4	131
Green Ash	85	2	21.2	77
Spruce	70	1	28.2	125
River Birch	63	3	10.6	27
Blue Spruce	62	2	32.5	38
Aspen	61	4	34	4

### 4.4 Top 10 Shrubs by Height (measured in feet)

Shrub or Bush	Height (ft)
Lilac	30
Saskatoon	25
Chokecherry	20
Honeysuckle	20
Willow	20
Lilac Hedge	20
Caragana Hedge	20
Buffalo Berry	18
Mock Orange	15
Dogwood	14





## 5. Appendix – Wildlife Inventory

### 5.1 Bird & Animal Cataloging Method:

Residents of Bow Crescent were invited to submit their wildlife observations to BRFM Environment Committee

All bird species and sightings were confirmed with the Bird Watchers of Calgary ([www.naturecalgary.com](http://www.naturecalgary.com)) by comparing to their area 9 and 10 sighting charts (Bow River Valley through Bowness).

### 5.2 Bird Catalog

<b>Species</b>	<b>Common (C)</b>	<b>Seasonal (S) or Occasional (O)</b>	<b>Nesting (N) Young (Y) seen</b>
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Species	Common (C)	Seasonal (S) or Occasional (O)	Nesting (N) Young Seen (Y)
Blue Jay		S	
Bufflehead		S	
Canada Goose	C	S	N Y
Chickadee, Black Cap	C		N Y
Crow	C		N Y
Eagle, Bald		S	N Y
Falcon, Peregrine		O	
Finch, House		S	N
Flicker		S	N Y
Golden Eye		S	
Grebe, Red Necked		S	N Y
Gull, Franklin		S	
Gull, Common		S	
Hawk, Cooper's		S O	N ?
Hawk, Ferruginous		O	
Hawk, Red-Tail		O	

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Hawk, Swainson's		S O	
House Wren		S	
Hummingbird		S	N
Junco, Dark-eyed		S O	
Kestrel		O	
Killdeer		S	
Kingfisher, Belted		S	
Kinglet, Ruby Crowned		S	
Magpie	C		N Y
Mallard		S	N Y
Merganser, Common		S	N Y
Merlin		S O	
Nuthatch, Red Breast	C		N Y
Nuthatch, White Breast	C		N Y
Oriole, Baltimore		S	
Osprey		S	N Y
Owl, Great Horned		O	N ?
Owl, Saw Whet		O	
Pheasant		O	
Pine Grosbeak		S	
Pine Siskin		S	N Y
Raven	C	O	
Robin	C		N Y
Sparrow, House	C		N Y

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Sparrow, White Throat	C		N Y
Sandpiper, Black Stilted		S	
Sandpiper, Spotted		S	
Swallow, Tree		S	N Y
Swallow, Cliff		S	
Warbler, Yellow		S	N Y
Waxwing, Bohemian		S	
Waxwing, Cedar		S	
Woodpecker, Downy		S	N
Woodpecker, Hairy		S	N



Figure 8 - Black Stilted Sandpiper



Figure 9 - Hummingbird Nest in Wild Rose Bush

### 5.3 Animal Catalog

Species	Common (C)	Occasional (O)	Burrow (B) Young (Y) seen
Bat		O	
Beaver	C	O	B Y
Bobcat		O	
Coyote	C		Y
Deer		O	? Y
Fox, Red		O	
Porcupine		O	
Rabbit	C		
Raccoon		O	
Skunk	C	O	?
Squirrel, Black	C		B Y
Squirrel, Gray	C		B Y
Squirrel, Red	C		? Y



Figure 10- Litter of Fox



Figure 11 - Bobcat