



MOUNTAINS OF OPPORTUNITY
CRANBROOK

Water Smart Program

2016 Final Report



Photo: T. Rodgers

August 25, 2016

Thea Rodgers
2016 Water Smart Ambassador
City of Cranbrook

Columbia Basin
Water
Smart

Table of Contents

1 – Overview	2
2 – Background	2
3 – Water Smart Ambassador Program Summary.....	5
I. Community Engagement.....	6
Elementary Education & Kids’ Programs	6
Public Presentations	6
Booths & Information Displays	7
Water Smart Colouring Contest.....	7
II. Irrigation Assessments	8
Residential Irrigation Assessments	8
Incentives.....	10
Public School Irrigation Assessments.....	11
III. Bylaw Monitoring.....	12
Patrolling & Compliance	12
Public Education.....	13
IV. Ambassador Final Project: Outdoor Watering Policy Report	13
4 – Conclusion	13
5 – Feedback for Neal Klassen (CBT).....	14
Inventory.....	14

Cover photo:

View looking north up the valley towards the Phillips Reservoir and the City of Cranbrook, taken from the divide between the Baker Creek and Gold Creek watersheds (Photo: Thea Rodgers, May 2016).



1 – Overview

As part of the Columbia Basin Water Smart Initiative, the City of Cranbrook has participated in the Water Smart Ambassador Program for the past three years. The program aims to reduce summer-season outdoor water use, as it accounts for a large percentage of annual water demand in the Columbia River basin (Columbia Basin Water Smart (CBWS), 2015).

Cranbrook's Ambassador for 2016 was Thea Rodgers, a UBC student with a background in soil and environmental sciences. The Ambassador program ran in Cranbrook from May 2nd to August 26th, 2016.

The Cranbrook Ambassador completed several projects during the summer term, including residential and park irrigation assessments, elementary education programming, bylaw monitoring, information displays, public education, and community presentations about watering restrictions and efficient water conservation practices.

The following report provides a brief background about the City of Cranbrook's Water Smart Program, and summarizes the activities of the Water Smart Ambassador for the 2016 season. Recommendations for future water conservation programming for Cranbrook are included.

2 – Background

The City of Cranbrook lies within the Southern Rocky Mountain Trench, at 920 meters (3,020 ft.) above sea level in the southeast Kootenay region of British Columbia (City of Cranbrook 2016). Cranbrook encompasses an area of approximately 32km² (Statistics Canada 2012) within the transboundary Columbia River drainage basin. Surrounded by two distinct mountain ranges, the local area benefits from sunny valley weather and winter snowpack accumulation.

Cranbrook is the largest municipality within the Regional District of East Kootenay. The city population in 2011 was roughly 19,500; the current population is estimated at closer to 20,000 (BC Stats 2015). The median age of the population is 43 years (Statistics Canada 2012).

Columbia Basin Water Smart Initiative:

As a signatory of the Columbia Basin Trust (CBT) Water Smart Charter in 2010, the City of Cranbrook committed to the basin-wide goal of reducing water consumption by 20% from 2009 reference levels (CBWS 2015). Motivations for water conservation in Cranbrook include reducing stressors on municipal supply and distribution infrastructure, saving capital and operating costs, supporting future grant opportunities, and adapting to future climate scenarios (CBWS 2015).

The City has undertaken several water conservation measures to date. These include numerous water-loss management protocols such as leak detection and low-flow rebate programs, and a student ambassador outreach program which has been seasonally active since 2014 (CBWS 2015). This has resulted in a 5% decrease in gross community water demand since 2009 (Fig. 1).

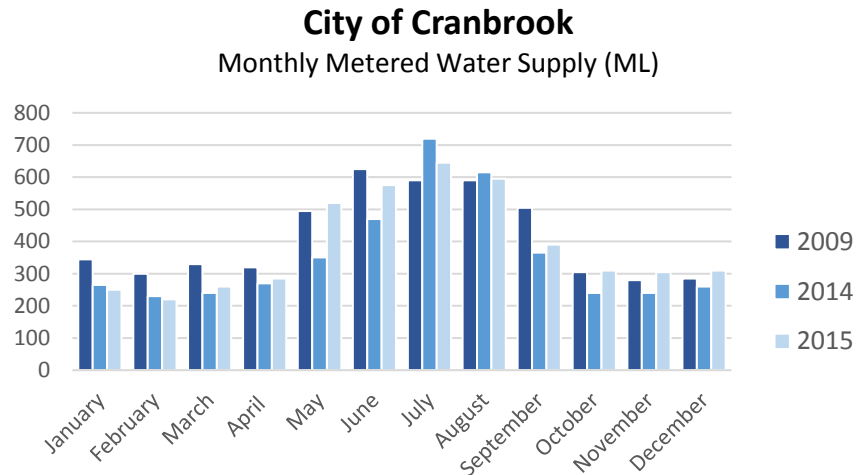


Figure 1: Monthly metered water supply in Cranbrook including 2009 base level and 2014-2015 data (CBWS 2015).

Climate:

Cranbrook has a semi-arid, temperate continental climate typified by large seasonal temperature differences, with warm to hot summers and cold winters (Fig. 2); average precipitation is roughly 400mm/year (Environment Canada 2016).

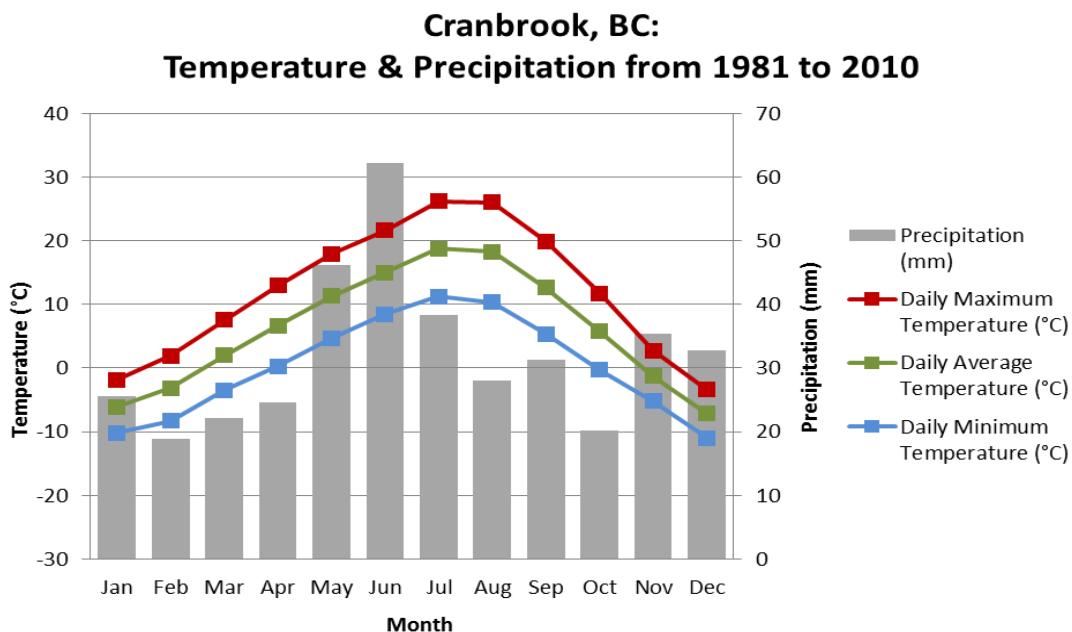


Figure 2: Thirty-year average daily temperatures and monthly precipitation in Cranbrook, BC.

The 2016 summer season was atypical from average climatic conditions of the past thirty years, and very different from the 2015 summer season (Fig. 3a-b). The 2016 season's snowmelt was 3-4 weeks ahead of normal. As of June 1st, 2016, the East Kootenay Snow Basin Indices were at 8 percent of normal for the time of year, with snow conditions being more typical of late June or early July (BC River Forecast Centre 2016).

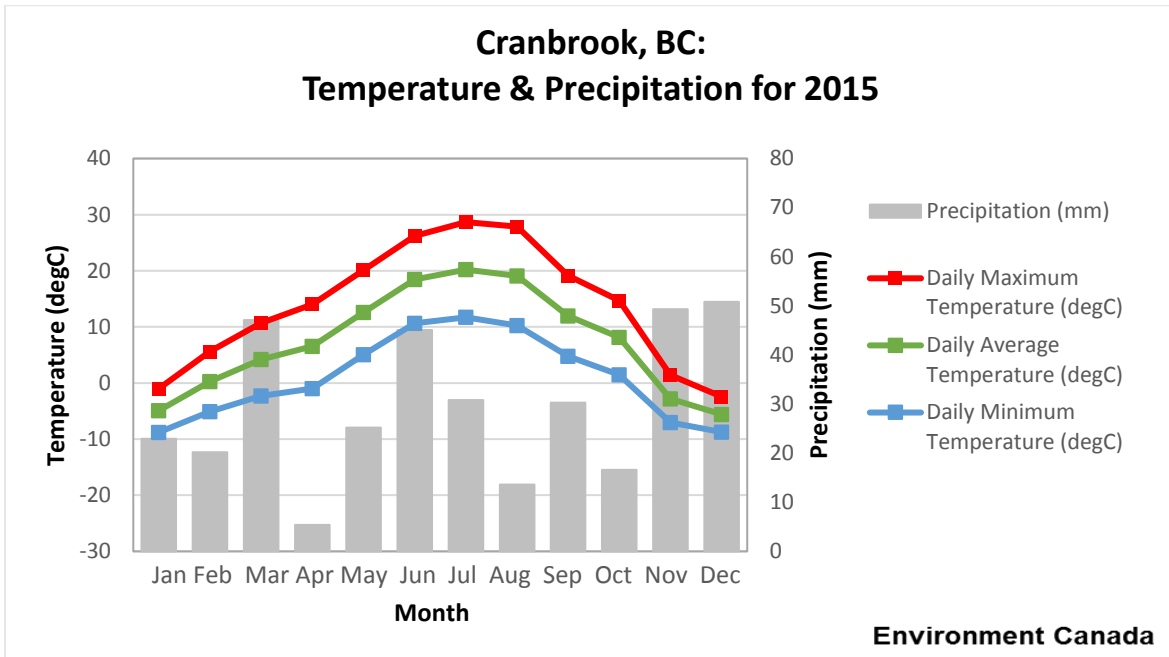


Figure 3a: Average daily temperatures and monthly precipitation in Cranbrook, BC for 2015.

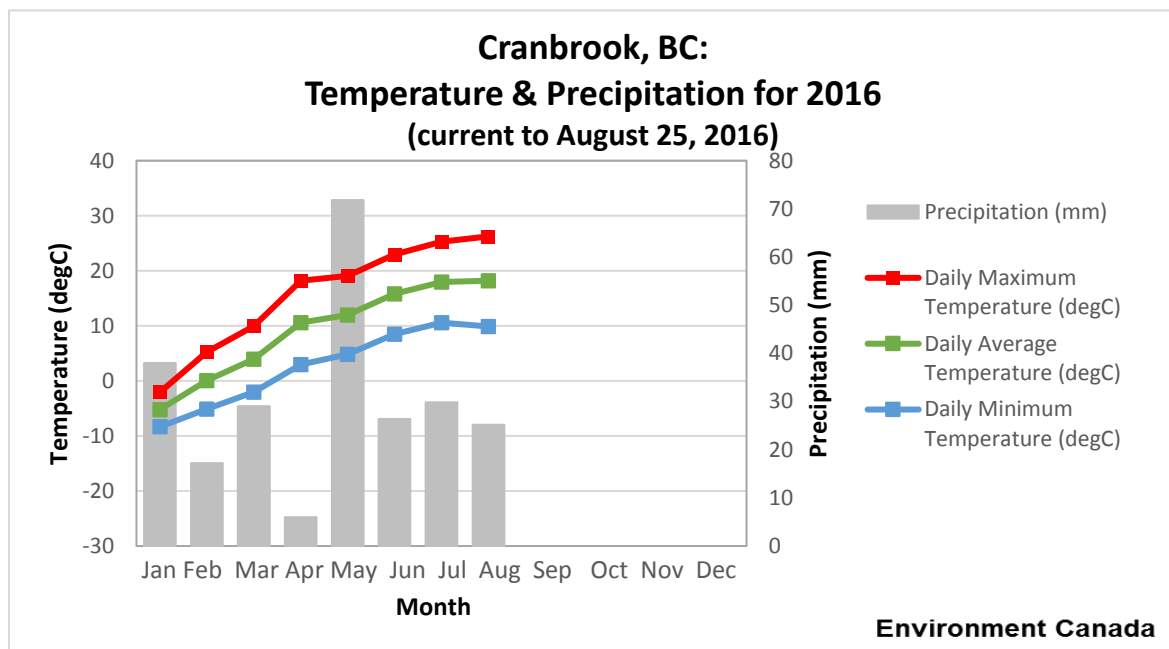


Figure 3b: Average daily temperatures and monthly precipitation in Cranbrook, BC to date in 2016.

This year's spring melt was followed, however, by unseasonably cool and wet weather from early May through to mid-August (Fig. 3b). This is in stark contrast to 2015, when Phase 2 watering restrictions were implemented due to hot and dry weather in mid-August (Fig. 3a).

3 – Water Smart Ambassador Program Summary

The Water Smart Ambassador in Cranbrook works to spread awareness and education of water conservation within the community, to target outdoor water consumption through assessments of irrigation systems, and to encourage compliance with City bylaws through monitoring and public education (Fig. 4).

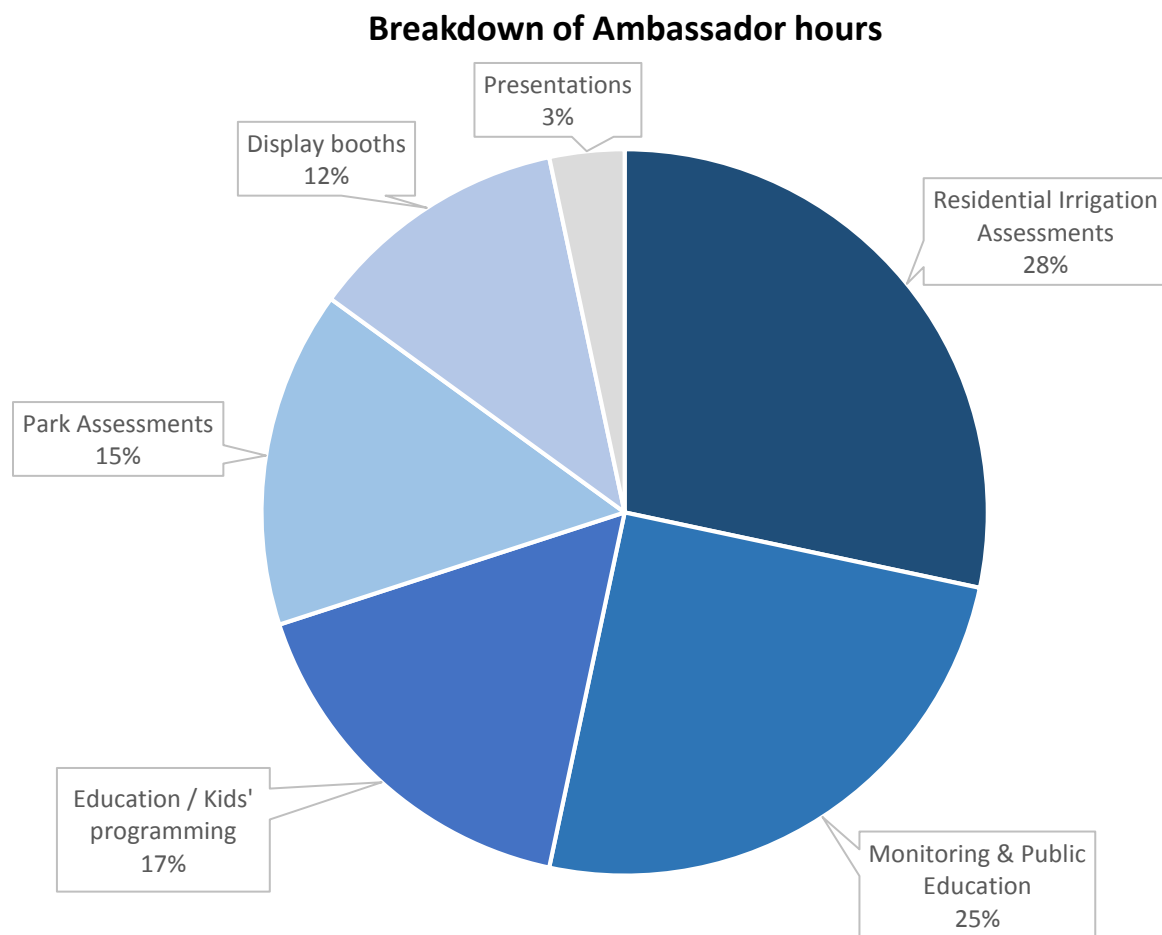


Figure 4: Representation of time allotted by the Water Smart Ambassador during the 2016 season.

The following was completed during the four-month term that the Ambassador was hired in Cranbrook:

I. Community Engagement

Elementary Education & Kids' Programs

The elementary school education program ran from May 16th through June 16th. A total of 15 classrooms, or roughly 350 students, in grades K-6 participated in both English and French language programming.



An additional 4 kids' programs, with roughly 75 participants in grades K-7, were run in collaboration with the Cranbrook Public Library and the City of Cranbrook Summer PLAY Program, between June 4th and July 28th.

The main message of the education programming was the importance of using water wisely. The one-hour sessions involved a science demo, a hands-on discussion or craft project, and a physically active water-saving game to be played outdoors. Feedback about the program was very positive, and it would be great to see this type of educational outreach program continue in future years.

Public Presentations

Two public speaking presentations about the Ambassador program were given to local Rotary and public speaking clubs. Attendance for both presentations totaled roughly 35 and 5 people, respectively. Presentations encouraged audience to sign up for a home assessment; however, uptake of the assessments was low and only generated one confirmed booking.

In future, booking presentations earlier in the season and with a wider range of local clubs and organizations to garner more assessment signups is suggested.

Booths & Information Displays

The Water Smart booth was set up at seven local businesses and public events for a total of roughly 35 hours throughout the summer (Table 1). The booth consisted of a display, brochures and handouts relating to water conservation, signup sheets for home irrigation assessments, watering restriction magnets and stickers, example hose timers and other materials. For the latter half of the summer, the Rain Barrel incentive was included in the display (Table 1).

Table 1: Events attended with the Cranbrook Water Smart booth display.

Date	Rain Barrel	Event	Interested signups	Confirmed Bookings
7/5/2016	N	East Kootenay Children's Festival	0	0
28/5/2016	N	Casey's Greenhouses	0	0
17/6/2016	N	Top Crop Garden Farm & Pet	1	1
19/6/2016	N	Sam Steele Days at Rotary Park	1	0
1/7/2016	Y	Canada Day at Rotary Park	8	3
9/7/2016	Y	July Farmer's Market	5	3
10/7/2016	Y	Open Garden Day	7	3

Having the Rain Barrel on display was a great incentive to encourage people to investigate the booth, and was an excellent way to initiate conversation about water conservation and signing up for a home assessment. The three events with the highest number of interested signups and confirmed bookings were events with the Rain Barrel (Table 1).

Booths were a great opportunity for public education and many residents left with information about wise water use. In future, a banner with some current facts and figures about water consumption in Cranbrook would be an interesting addition that could help spark wider interest in the booth display.

Water Smart Colouring Contest

The Ambassador developed a kids' water conservation themed colouring contest open to submissions from early May through June 30th.

The contest generated over 70 submissions, and for participating each artist received a sticker and had their name entered in a grand prize draw. Prizes included soaker gun water toys and a free family swim pass.



Roughly 40 contest submissions were displayed in City Hall through the end of August.

II. Irrigation Assessments

Residential Irrigation Assessments

A total of 44 home irrigation assessments were completed (Fig. 5). This is a reduction of 40 percent from last year's total number (Fig. 6). This is suspected to be due to the cooler and wetter weather this year, as compared to last year (as shown in Figure 3).

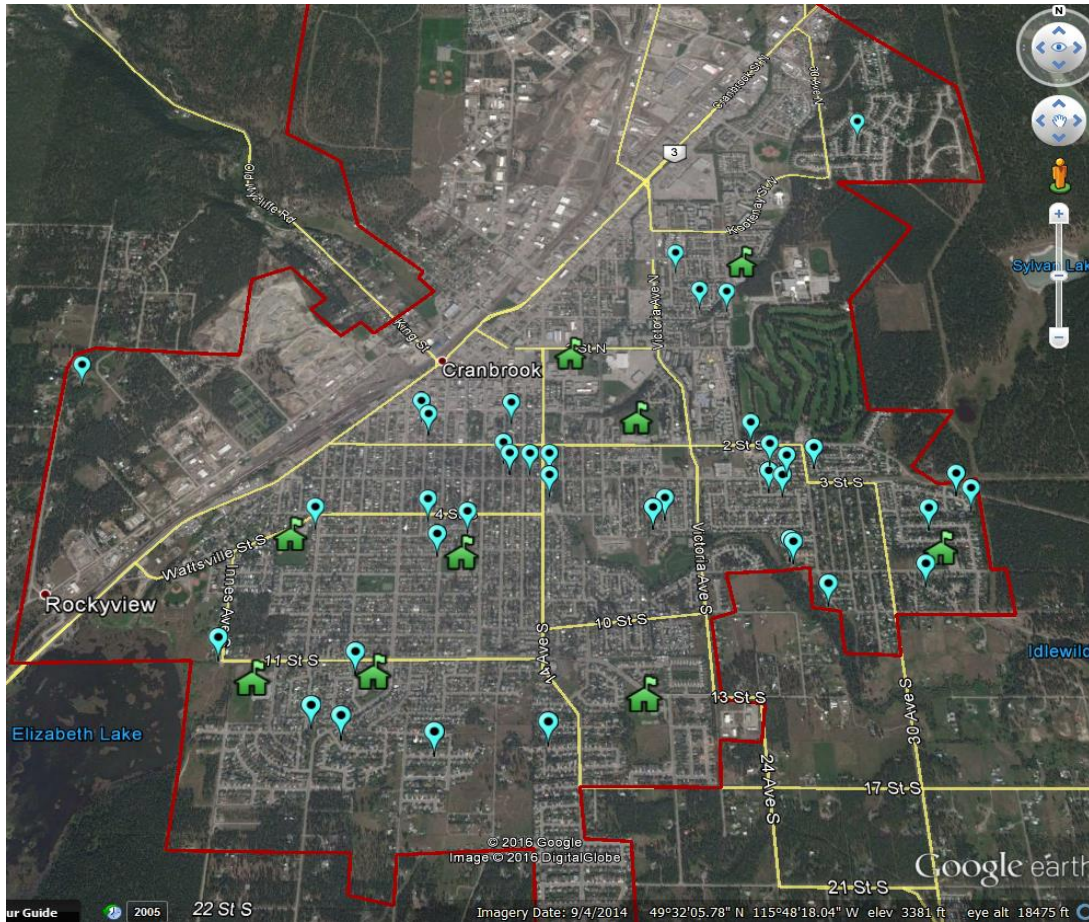


Figure 5: Residential irrigation assessments (blue) and public school assessments (green) performed in 2016.

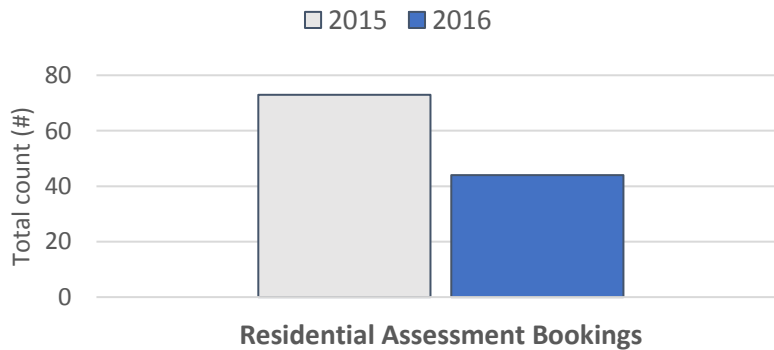


Figure 6: Residential irrigation assessments performed in 2015 and 2016.

The assessment program was advertised thoroughly in newsprint, online, and radio with the help of the Corporate Communications Officer, and via posters and doorknockers distributed by the Ambassador. The most effective source of bookings were online advertisements, E-newsletters and social media; booths were also a significant source of signups (Fig. 7a).

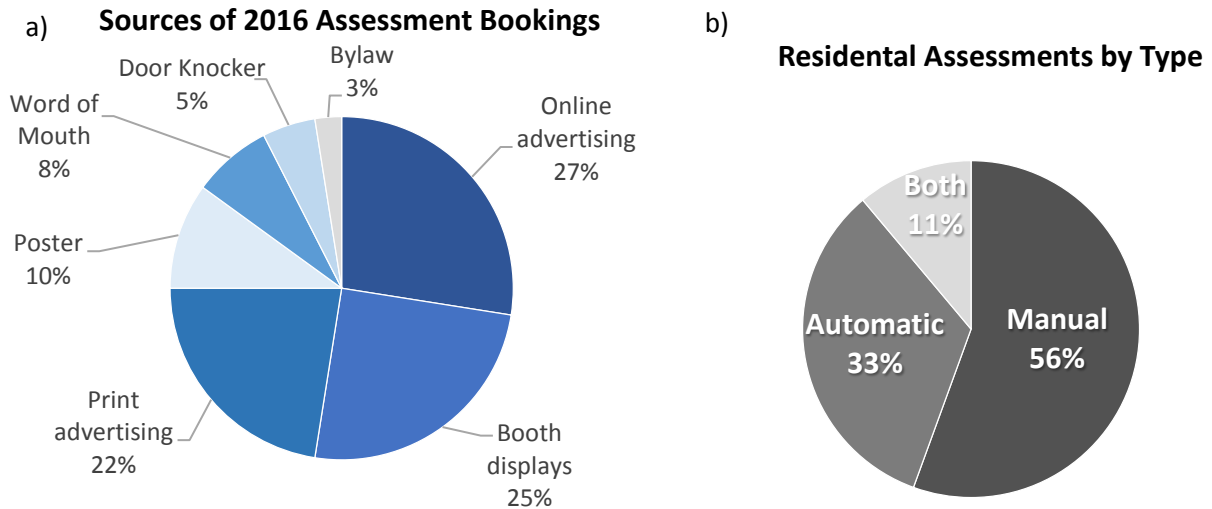


Figure 7: Representation of (a) sources of bookings generated, and (b) type of irrigation system used for bookings.

Most residents who received irrigation assessments used a manual system, via a sprinkler and hose or by hand-watering (Fig. 7b); fewer residents with automatic systems signed up for the assessments. A few households had an automatic system and also supplemented this with a manual system (Fig. 7b). These data suggest that residents who water with manual systems may be more concerned to know whether they are applying the right amount of water (hence more signups for the assessments), whereas residents who have automatic systems may be more inclined to trust that they are already watering the right amount.

However, from data collected during assessments, residents using manual systems had lower average water savings (21%) based on a new, recommended watering schedule than houses with automatic systems (25%) (Fig. 8). Perhaps targeting more houses with automatic irrigation systems could result in greater water savings for Cranbrook in future years.

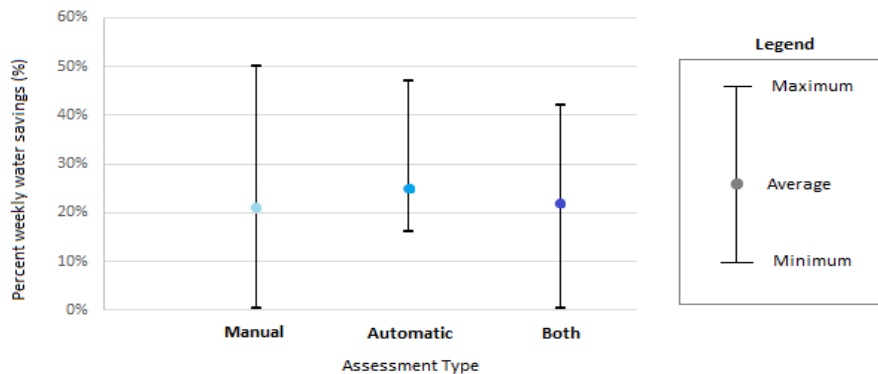


Figure 8: Max., mean, and min. water savings by assessment type (% of weekly total), based on new schedule.

Since manual irrigation can use up to 40% less water on average than automatic systems (Neal Klassen, personal communication, May 2016), it is recommended for future ambassadors to focus efforts on reaching residents with automatic systems.

A free, 1-2 hour workshop run by the Ambassador early in the summer, designed specifically for homes with automatic irrigation timers, could be a great way to educate residents about topics such as evapotranspiration (ET) rate, output of fixed vs. rotary heads, using rain delay or seasonal adjust features, etc. Developing and running this type of workshop in future years, with incentives for public attendance, is recommended.

Incentives

This year, CBT provided up to \$400 towards incentives to encourage signups for home assessments. The incentives are intended to promote wise water use. For Cranbrook, this included a rain barrel and two drip irrigation systems (Table 2).

Table 2: Incentives used for the Water Smart program in Cranbrook for 2016.

Item	Cost	Draw date	Recipient
Gift voucher towards a custom drip system installation from Top Crop Garden Farm & Pet (local garden store)	\$150	July 29 2016	Rosemarie Selinger [REDACTED]
RAINBIRD drip irrigation spot watering kit	~\$50	August 15 2016	Bill Goss [REDACTED]
MADISON 49 Gal Rain Barrel	~\$150	August 24 2016	Darcy Russel [REDACTED]

The rain barrel was particularly effective at generating interest at the public booths. The prizes were very appropriate and definitely helped to book assessments (see Table 1).

The prize draws were completed by assigning a number to each booking, then using an online random result generator (<http://www.randomresult.com/pick.php>) to choose a winner and eliminate bias. Prize draws were set to be staggered throughout the last two months of the program.

The incentives are a great idea, and it is recommended that this method of generating assessments continues in the future. Getting the incentives sooner in the season, so that advertising can be implemented earlier, is also recommended. Advertising focused on winning prizes for participating, rather than simply saving water, appears to be more effective for Cranbrook based on residents' responses.

Public School Irrigation Assessments

The Ambassador was approached by the Manager of Operations of School District No. 5 in late May, and asked to perform irrigation assessments for the local public schools. These assessments ran from June 27 – July 14 and followed the 2016 Water Smart Ambassador Training Manual for a Park Irrigation Assessment (Columbia Basin Water Smart (CBWS) 2016, pg. 52).

Nine public schools in total were assessed (see Fig. 5), and all broken or problem sprinkler heads were noted. A comprehensive final report was prepared and forwarded to all supervisors.

It was found that SD5 had set a base run time of 30 minutes per zone for each school. This meant that they were currently underwatering many of their large sports fields, though this was offset by other, smaller zones receiving up to twice as much water as required.

It was also noted that grounds maintenance are not in control of the irrigation timers. The grounds staff requested more watering time for the fields, in order to keep grass healthy and keep down weeds. Thus, the final recommendations included attempting to offset an increase in watering times in the large fields, by reducing run times in zones receiving too much water.



After all recommendations for all schools were accounted for, a potential net decrease of 27 minutes watering time per week was calculated. The recommendations to fix and repair inefficient or broken heads would also reduce water losses at eight out of the nine schools.

Overall, only a small savings in terms of water consumption could be achieved, but much more efficient use could be expected if report recommendations are followed.

III. Bylaw Monitoring

Patrolling & Compliance

A total of 270 kilometres were cycled/walked around the City by the Ambassador, between June and late August. The purpose of neighborhood monitoring is to ensure residents are complying with outdoor watering restrictions, and to use the opportunity for engaging residents in conversation about water conservation.

The monitoring distances and areas were mapped using a free mobile GPS tracker (MapMyRide 3.7.0) which allowed a visual overview (Fig. 9), and summary of distance and time spent monitoring.

28 noncompliances were observed and recorded throughout June and August, with zero repeat offenders. This was significantly lower than last year, as 2015 saw 88 total noncompliances recorded by the Ambassador (Fig. 10). Additionally, unlike 2015, Cranbrook did not have to enact Phase 2 watering restrictions this year. The low number of noncompliances is thought to be due to the cooler and wetter weather of the 2016 summer season (see Figure 3), since the times of day and total distance monitored in both cases were approximately equal.

All noncompliant residents were found to be responsive to requests to turn off water. Most cases appeared to be because of forgetting to turn a sprinkler off, or being unaware of the restrictions in place. More evening and weekend monitoring is suggested for future years, as these times are when Bylaw is not on shift, and when most infractions were noted.



Figure 9: Example of a typical neighborhood monitoring session (MapMyRide / Google Maps).

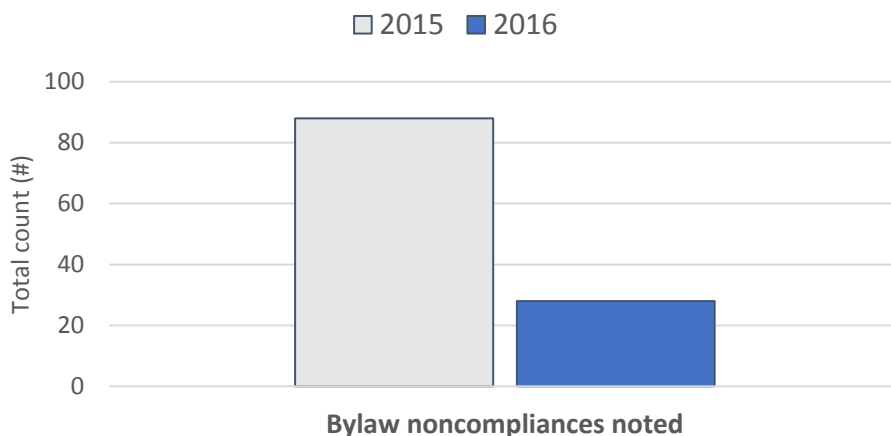


Figure 10: Comparison of number of noncompliances noted between 2015 and 2016.

Public Education

Monitoring was a great opportunity to undertake public education about water conservation and the City's watering restrictions. Noncompliant residents were spoken to if possible, given a water conservation handout and restrictions information, and asked to turn off water until next permissible time. In cases where residents were not at home, information was left on the door or in the mailbox, and whenever possible the water was turned off manually by the Ambassador.

Lawn flags were not used, and it was felt they were not necessary; the face-to-face interaction was much more beneficial in terms of educating residents and answering their concerns in person. Monitoring was also an opportunity to advertise the free irrigation assessments. Leaving water conservation information, a magnet with restrictions, and answering questions in person helped to clear up much confusion on behalf of residents.

IV. Ambassador Final Project: Outdoor Watering Policy Report

As part of the 2016 Ambassador's seasonal final project, a review of Cranbrook's current outdoor watering policy was completed. A draft for an updated water management policy was prepared, along with visuals and media resources, and submitted to supervisors for review.

An updated outdoor water management policy will contribute to making Cranbrook a more resilient community in response to climate change and provide a good reference for action in times of drought. It is hoped that City staff and Council will make considerations to update the current policy, as it currently does not account for different types of outdoor water usage, nor does it specify stricter restrictions to be taken in cases of extended drought and reservoir depletion.

4 – Conclusion

The presence of the Water Smart program in Cranbrook is very positive. Uptake of the residential assessment program and number of bylaw noncompliances were lower than in past years, though this is suspected to be due to the cooler and wetter weather of the 2016 season. However, residents were pleased with the service and many comments were received at public booths that residents were happy to see the effort and information out there about conserving water. In addition, much positive feedback was received regarding the kids' education programming.

In future, the Ambassador should aim to get a head start on getting into schools, doing community presentations, automatic irrigation workshop sessions, and heavy advertising regarding incentives for participation. This could go a long way towards generating greater interest in the program in future years.

5 – Feedback for Neal Klassen (CBT)

1. What did you like the most about the Water Smart Program?

The elementary education programming. I think this is a great opportunity as a summer student to learn presentation/speaking skills, and have some fun on the job as well. I feel that the education component helps impart a positive message about water conservation within the younger generation. Targeting kids can be an effective means for getting information to parents as well.

2. What did you learn from the program?

I learned many things, including skills for project management, advertising, and strategic planning. I also improved on my soft skills such as communication, observation, adaptability, and self-confidence while working with residents, homeowners and children. Of course I also learned the hard skills involved with performing irrigation assessments and writing technical reports. Overall, I learned a great deal and this has been a fantastic opportunity for personal and professional growth.

3. What would you change about the program in your area?

If a budget allows, I would suggest one or even two Ambassadors be hired, beginning in April. Since Cranbrook is such a large community, having two students would be better for booth displays, widespread monitoring, and reaching more people. I would also suggest incorporating a free workshop for homeowners about how to use and program their automatic timers, with incentives for attendance (described pg. 10).

❖ Water Smart Program Inventory

Item	Location	Approx. number
Hose Timers	Public Works building	65
Rain Gauges	Public Works building	350
Lawn flags	Public Works building	850
CHMC Guide to Household Water Efficiency	Public Works building	40
Irrigation assessment toolkit	City Hall	1 kit; PSI gauge is broken and should be replaced; Soil auger requires sharpening
Xeriscape Pamphlets	City Hall	60
Doorknockers	City Hall	300
Ambassador materials	City Hall	4 Boxes of supplies / resources

6 – References

BC River Forecast Centre. 2016. Snow Survey and Water Supply Bulletin – June 1st, 2016. Ministry of Forests, Lands, and Natural Resources. Retrieved 20 June 2016 from http://bcrcfbc.env.gov.bc.ca/bulletins/watersupply/2016_Jun1.pdf

BC Stats. 2015. “2015 Sub-Provincial Population Estimates.” *Municipalities, Regional Districts and Development Regions*. Retrieved 15 Jun 2016 from <http://bcstats.gov.bc.ca/StatisticsBySubject/Demography/PopulationEstimates.aspx>

- City of Cranbrook. 2016. "Location and Geology". Retrieved 15 Jul 2016 from <http://cranbrook.ca/our-city/information-and-statistics/location-and-geology/>
- Columbia Basin Water Smart (CBWS). 2015. *Water Smart Cranbrook*. Retrieved 20 Jul 2016 from <http://cbtwatersmart.org/cm-cranbrook.asp>
- Columbia Basin Water Smart (CBWS). 2016. *2016 Water Smart Ambassador Training Manual*. 71pp.
- Environment Canada. 2016. *Canadian Climate Normals 1981 – 2010 Station Data*. Retrieved 15 Jun 2016, from http://climate.weather.gc.ca/climate_normals/results_1981_2010_e.html?searchType=stnProv&stProvince=BC&txtCentralLatMin=0&txtCentralLatSec=0&txtCentralLongMin=0&txtCentralLongSec=0&stnID=1171&dispBack=0
- Statistics Canada. 2012. *Focus on Geography Series, 2011 Census*. Statistics Canada Catalogue no. 98-310-XWE2011004. Ottawa, Ontario. Analytical products, 2011 Census. Last updated October 24, 2012.