Presentation to the Environmental Advisory Council Regarding PEI's New Water Act

WINTER RIVER - TRACADIE BAY WATERSHED ASSOCIATION

November 5, 2015

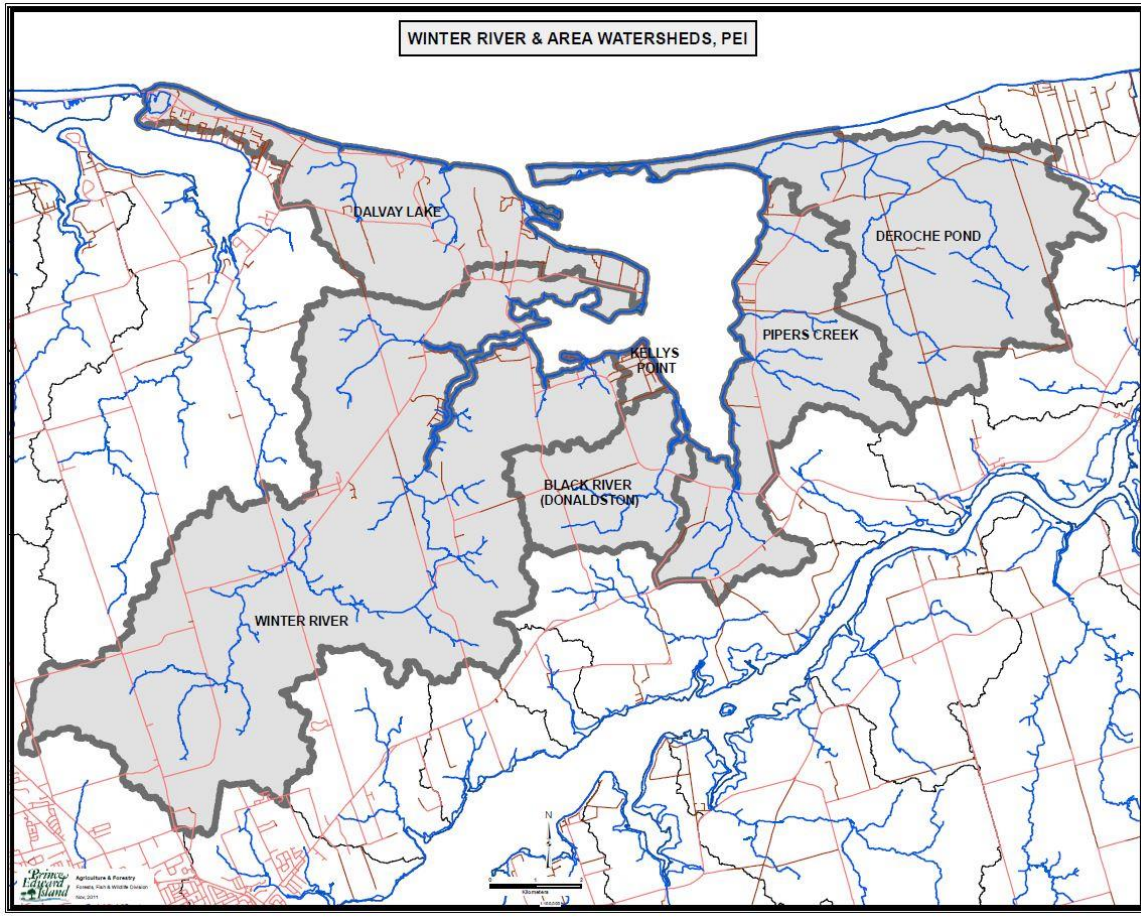
Introduction

What does the Association do?

- Field work
- Advocacy
- Bringing stakeholders together

Why is the watershed important?

- Historically important area for fishing and water powered mills
- Past and present water extraction



- 7272 hectares
- 84% is Agriculture & Forestry
- Extensive aquaculture leasing in bay

Water challenges on PEI

- Water Quality
  - Anoxia
  - High nitrate levels in private wells
- Effects of Land use on Water Quality
  - Siltation & erosion
  - Crop rotation & Buffer zone rules
  - Poor enforcement of rules
  - Ditch infilling in cities
  - Coastal development
- Ponds and Dams
  - Reduced ability for fish to migrate
  - Increased water temperature
- Water quantity concerns

Due to our unique situation and the time limit, we will focus our presentation mainly on water extraction issues.

History of Water Extraction from Winter River

Brackley - 1930

- Initially a series of shallow wells (5 to 10 m deep)
- Then 4 high capacity wells were drilled (1967, 1970, 1972, 1976)
- The series of shallow wells were abandoned in 1983
- Later the high capacity wells were deepened

Union – 1949

- Initially a series of shallow wells (5 to 10 m deep)
- 5 high capacity wells were added (4 in 1970 and 1 in 1977)
- The series of shallow wells were abandoned in 1983

Suffolk – 1994

- 3 high capacity wells were drilled, then 2 more added in 2002

Effects of Unsustainable Water Extraction

2011

2012

The same area of the Brackley branch at different times: early summer in a normal year (2011) and late summer in a dry year (2012).

This has been observed by WRTBWA in 2011, 2012, 2013, 2014, 2015

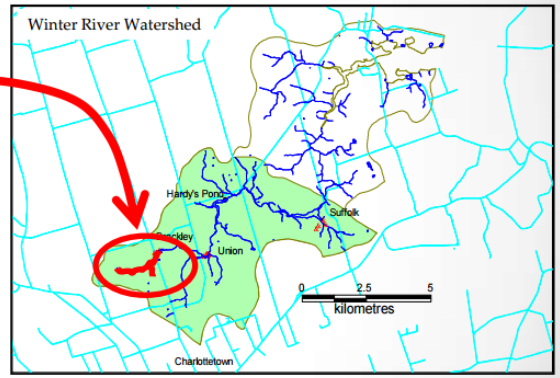
"At both the Brackley Stream and Union Bridge locations the streams go dry during continuous pumping of the well fields in late summer when streamflow is naturally low."
- Rory Francis, 1989 *from Hydrogeology of the Winter River Basin*

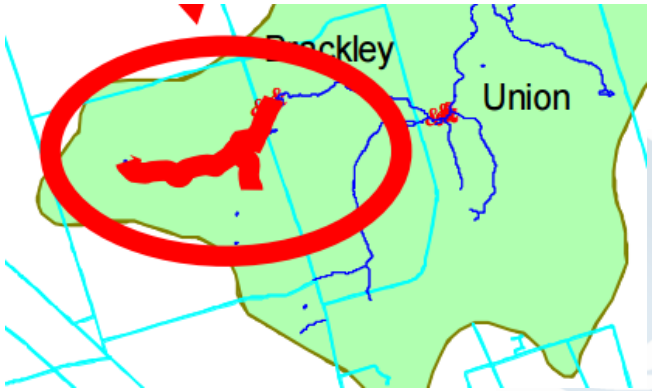
Effects of Unsustainable Water Extraction

- Misleading information in the Water Act Backgrounder file
- Highlighted area is not the whole area that goes dry

Impacted Site – Winter River Headwater

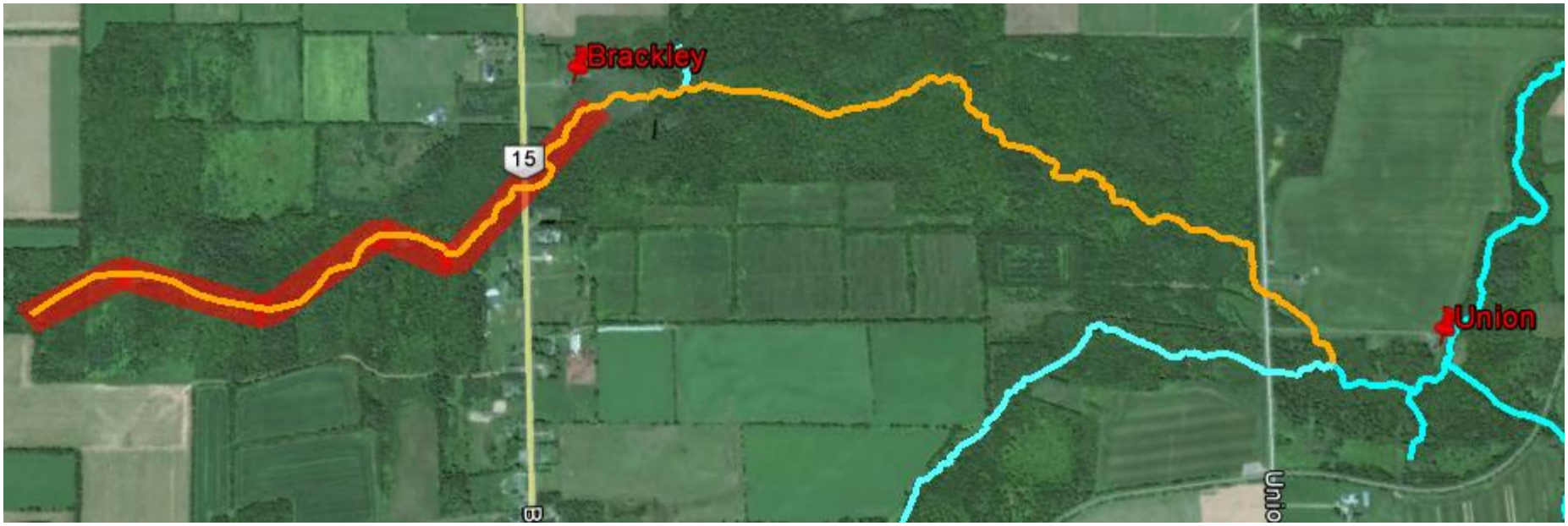
- High extraction rate
- Increases natural drying up of headwater in Brackley area
  - Total length of dry area >2 km
  - Actual distance of additional amount from pumping cannot be easily determined as pumping has been going on since the 1930s
- Well fields established before water was regulated
  - Current extraction at the Brackley and Union well fields is higher than that allowed under the water extraction policy established in 2010
- City of Charlottetown is required to create a new pumping rate plan

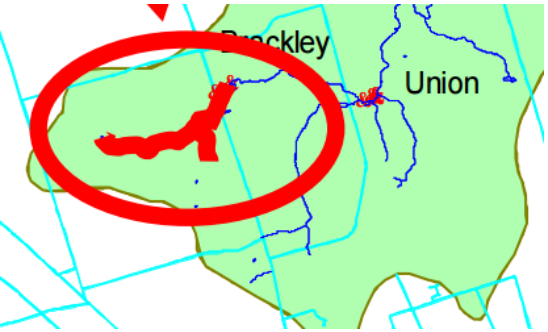




Effects of Unsustainable Water Extraction

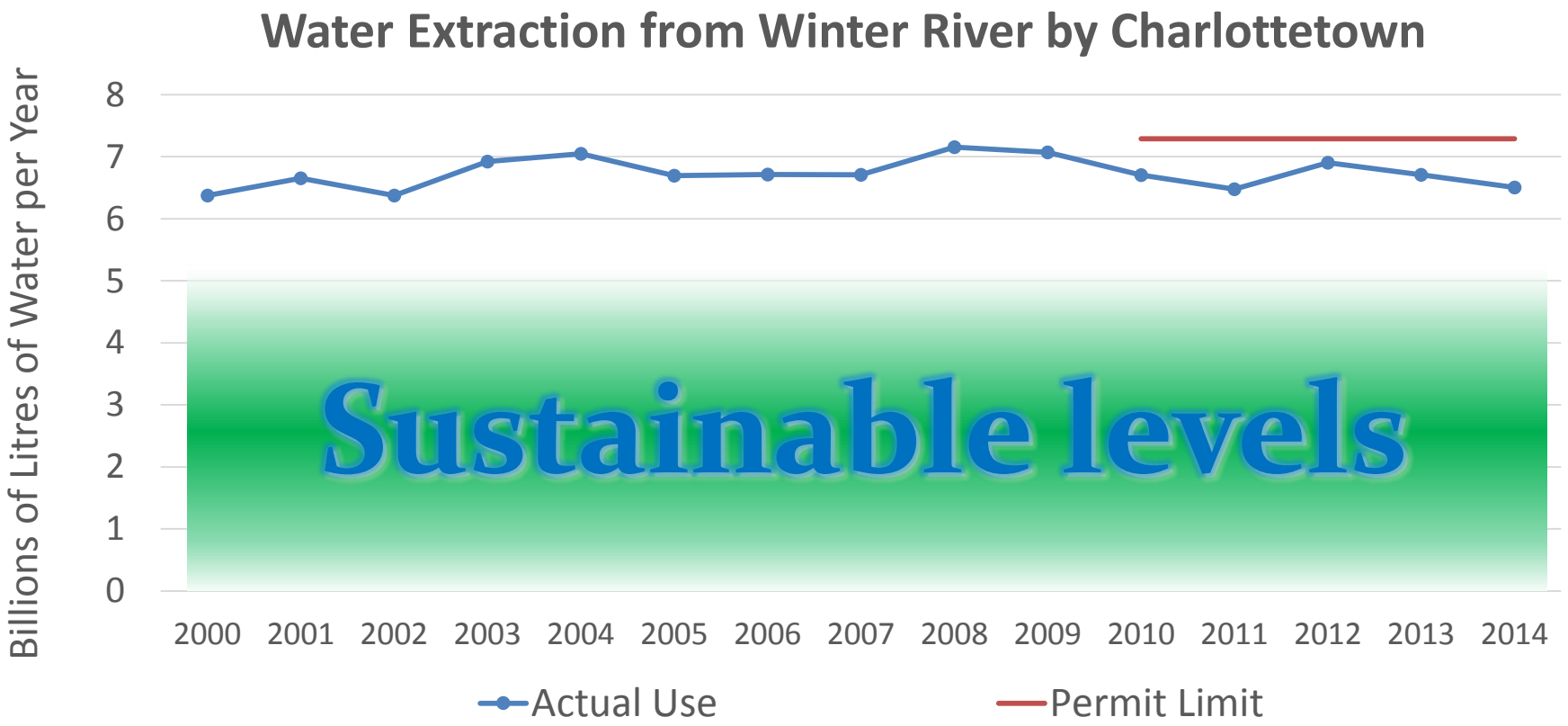
A much larger area goes dry than is indicated in the PEI Water Act Backgrounder





- Entire distance from the head spring to Brackley Point Road to Union Road to the end of the branch is **<u>3.70 km of dry stream, NOT 2 km</u>**.
- There is zero flow from any of the 25 springs located in this area for long periods during the year.

Extraction is not sustainable!



- Current extraction is clearly not sustainable. What amount would be sustainable?
- PEI Dept. of Env. is unable to provide a specific limit that would be sustainable and permitted within the existing policy.
- The permit established in 2010 was based on historical usage, <u>not</u> based on science.

Water monitoring by WRTBWA

- Water flow
- Water depth
- Water temperature
- Nitrate levels
- Fish populations in local ponds

Data logger in dry stream.

V-notch weir to measure water flow.

Trout found in fish trap.

Water monitoring by WRTBWA

Groundwater Spring Monitoring 2013																												
Spring Location	Wellfield Distance (m)	11/06/2013	21/06/2013	25/06/2013	02/07/2013	18/07/2013	25/07/2013	01/08/2013	08/08/2013	15/08/2013	22/08/2013	28/08/2013	05/09/2013	12/09/2013	19/09/2013	26/09/2013	04/10/2013	09/10/2013	17/10/2013	23/10/2013	30/10/2013	08/11/2013	14/11/2013	21/11/2013	28/11/2013	05/12/2013	11/12/2013
Brackley #3	698	W	W	W	W	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	W
Brackley #4	736	W	W	W	W	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	W
Brackley #5	753	W	W	W	W	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	W
Brackley #6	764	W	W	W	W	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	W
Brackley #7	871	W	X	W	W	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	X
Brackley #8	932	W	W	W	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	X
Vanco	1386	X	W	W	X	W	W	W	W	X	W	X	D	D	W	X	W	W	W	W	X	X	X	X	X	X	W
Cudmore #6	1572	X	W	X	X	W	W	W	W	W	W	W	W	W	W	X	W	W	W	W	X	W	X	W	X	W	X
Cudmore #3	1710	X	W	W	W	W	W	W	W	W	W	W	W	W	W	X	W	W	W	W	X	W	X	W	X	W	X
Pater Lower	1862	W	W	W	W	W	D	X	X	W	X	D	W	W	W	X	W	W	W	W	X	W	W	W	W	W	W
Pater Upper	1923	W	X	W	W	X	D	X	X	X	X	D	X	D	X	X	X	X	X	X	X	X	X	X	X	W	W
Affleck's Upper	2472	X	W	W	W	X	W	W	W	X	W	W	W	W	W	W	W	W	W	W	X	W	W	W	X	W	W
Affleck's Lower	2483	X	X	X	X	X	W	W	W	W	W	W	W	W	W	W	W	W	W	W	X	W	W	X	X	W	W
Tim's Creek Lower	2692	X	X	X	X	X	W	X	W	W	W	W	W	W	W	X	W	W	X	W	W	W	W	X	X	W	X
Tim's Creek Upper	2696	X	X	X	X	X	W	X	W	W	W	W	W	W	W	X	W	W	X	X	W	W	W	X	X	W	X
Pleasant Grove #2	2926	X	W	W	W	W	W	X	W	W	W	W	W	W	W	W	W	W	W	X	W	W	W	X	X	W	X
Pleasant Grove Combined	2927	X	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	X	W	W	X	X	X	W	X

W Water D Dry X Not monitored

Water monitoring by WRTBWA

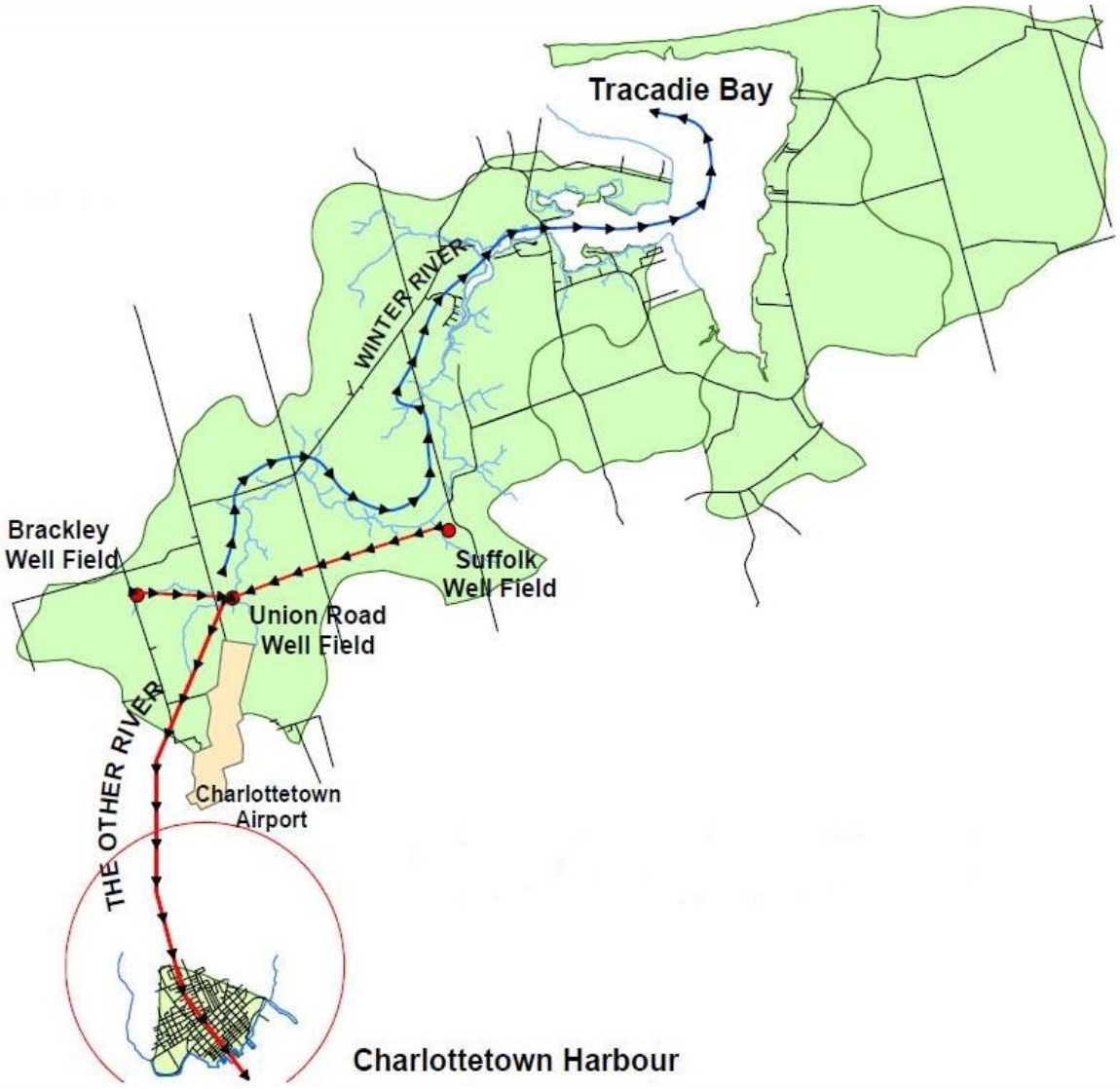
Groundwater Spring Monitoring 2014													
Spring Location	Wellfield Distance (m)	27/06/2014	04/07/2014	10/07/2014	23/07/2014	31/07/2014	08/08/2014	21/08/2014	02/09/2014	12/09/2014	24/09/2014	15/10/2014	06/11/2014
Brackley #3	698	X	W	X	W	D	X	D	D	D	D	D	D
Brackley #4	736	X	W	X	W	D	X	D	D	D	D	D	D
Brackley #5	753	X	W	X	W	D	X	D	D	D	D	D	D
Brackley #6	764	X	W	X	W	D	X	D	D	D	D	D	D
Brackley #7	871	X	W	X	W	D	X	D	D	D	D	D	D
Brackley #8	932	X	W	X	W	D	X	D	D	D	D	D	D
Vanco	1386	X	W	X	W	X	X	W	W	X	X	W	X
Cudmore #6	1572	W	W	X	W	X	W	W	W	X	D	W	X
Cudmore #3	1710	W	W	X	W	X	W	W	W	X	W	W	X
Pater Lower	1862	W	W	X	W	X	W	W	W	X	W	W	X
Pater Upper	1923	W	W	X	W	X	W	W	W	X	D	D	X
Affleck's Upper	2472	W	W	W	W	X	W	X	W	X	W	W	W
Affleck's Lower	2483	X	X	W	W	X	W	X	W	X	W	W	W
Tim's Creek Lower	2692	W	X	W	W	W	W	W	W	X	X	W	W
Tim's Creek Upper	2696	X	X	W	W	W	W	W	W	X	X	W	W
Pleasant Grove #2	2926	W	W	X	W	W	W	W	W	X	W	W	W
Pleasant Grove Combined	2927	X	X	X	W	W	W	W	W	X	W	W	W

Water monitoring by WRTBWA

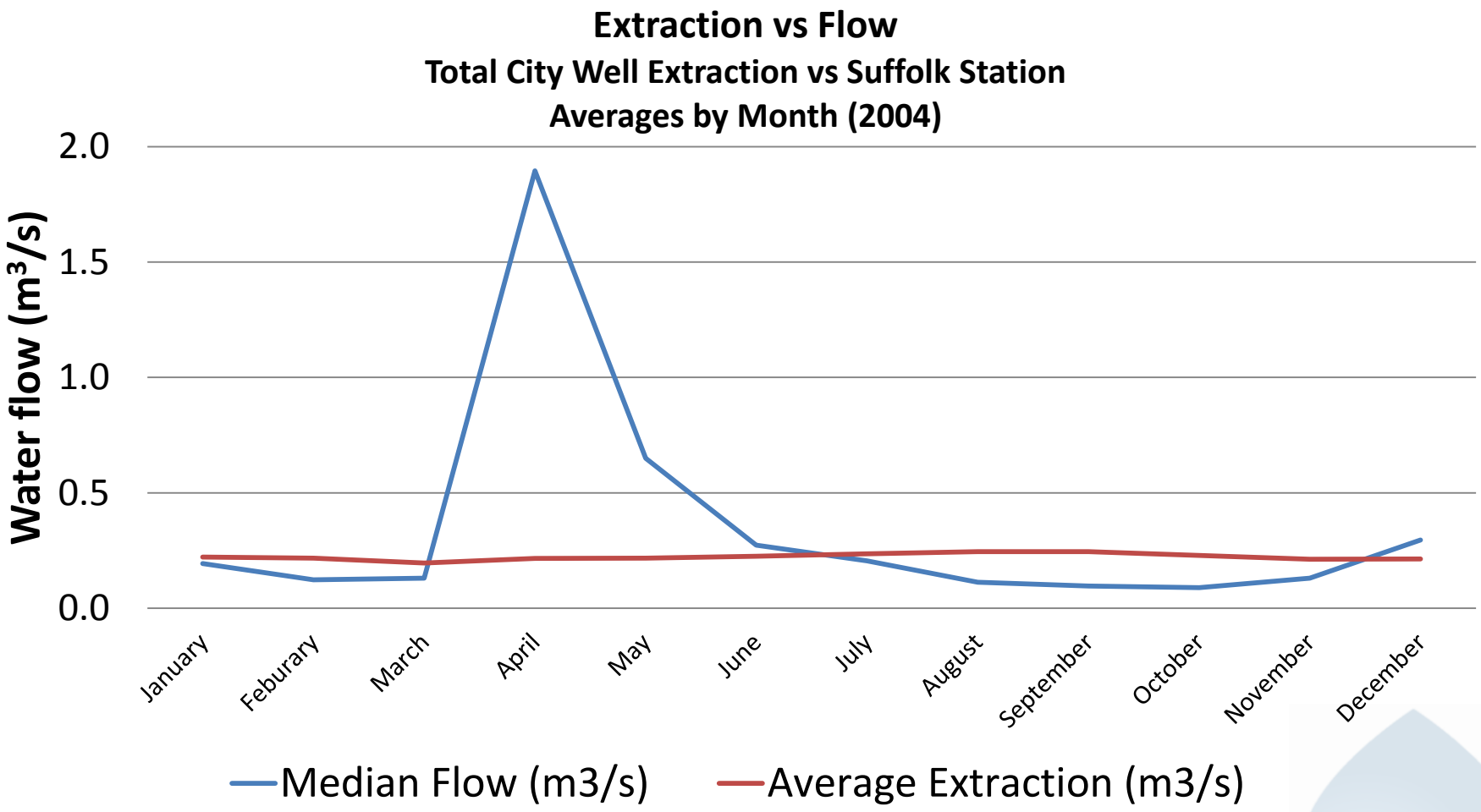
Groundwater Spring Monitoring 2015															
Spring Location	Wellfield Distance (m)	29/07/2015	13/08/2015	20/08/2015	28/08/2015	03/09/2015	17/09/2015	24/09/2015	08/10/2015	15/10/2015	16/10/2015	19/10/2015	22/10/2015	30/10/2015	02/11/2015
Brackley #3	698	W	D	D	D	D	D	D	D	D	X	X	D	X	D
Brackley #4	736	W	D	D	D	D	D	D	D	D	X	X	D	X	D
Brackley #5	753	W	D	D	D	D	D	D	D	D	X	X	D	X	D
Brackley #6	764	W	D	D	D	D	D	D	D	D	X	X	D	X	D
Brackley #7	871	W	D	D	D	D	D	D	D	D	X	X	D	X	D
Brackley #8	932	W	D	D	D	D	D	D	D	D	X	X	D	X	D
Vanco	1386	X	X	W	W	W	W	W	W	W	X	X	W	W	X
Cudmore #6	1572	W	W	W	W	W	W	W	W	X	X	W	W	W	X
Cudmore #3	1710	W	W	W	W	W	W	W	W	X	W	X	W	W	X
Pater Lower	1862	X	W	W	W	W	W	W	W	X	X	W	W	W	X
Pater Upper	1923	X	D	D	D	D	D	D	D	X	X	D	D	D	X
Affleck's Upper	2472	W	W	W	W	W	W	W	W	X	X	W	W	W	X
Affleck's Lower	2483	W	W	W	W	W	W	W	W	X	X	W	W	W	X
Tim's Creek Lower	2692	W	W	W	W	W	W	W	W	X	X	W	W	W	X
Tim's Creek Upper	2696	W	W	W	W	W	W	W	W	X	X	W	W	W	X
Pleasant Grove #2	2926	W	W	W	W	W	W	W	W	X	W	X	W	W	X
Pleasant Grove Combined	2927	W	W	W	W	W	W	W	W	X	W	X	W	W	X

Where did the water go? The “Other River”.

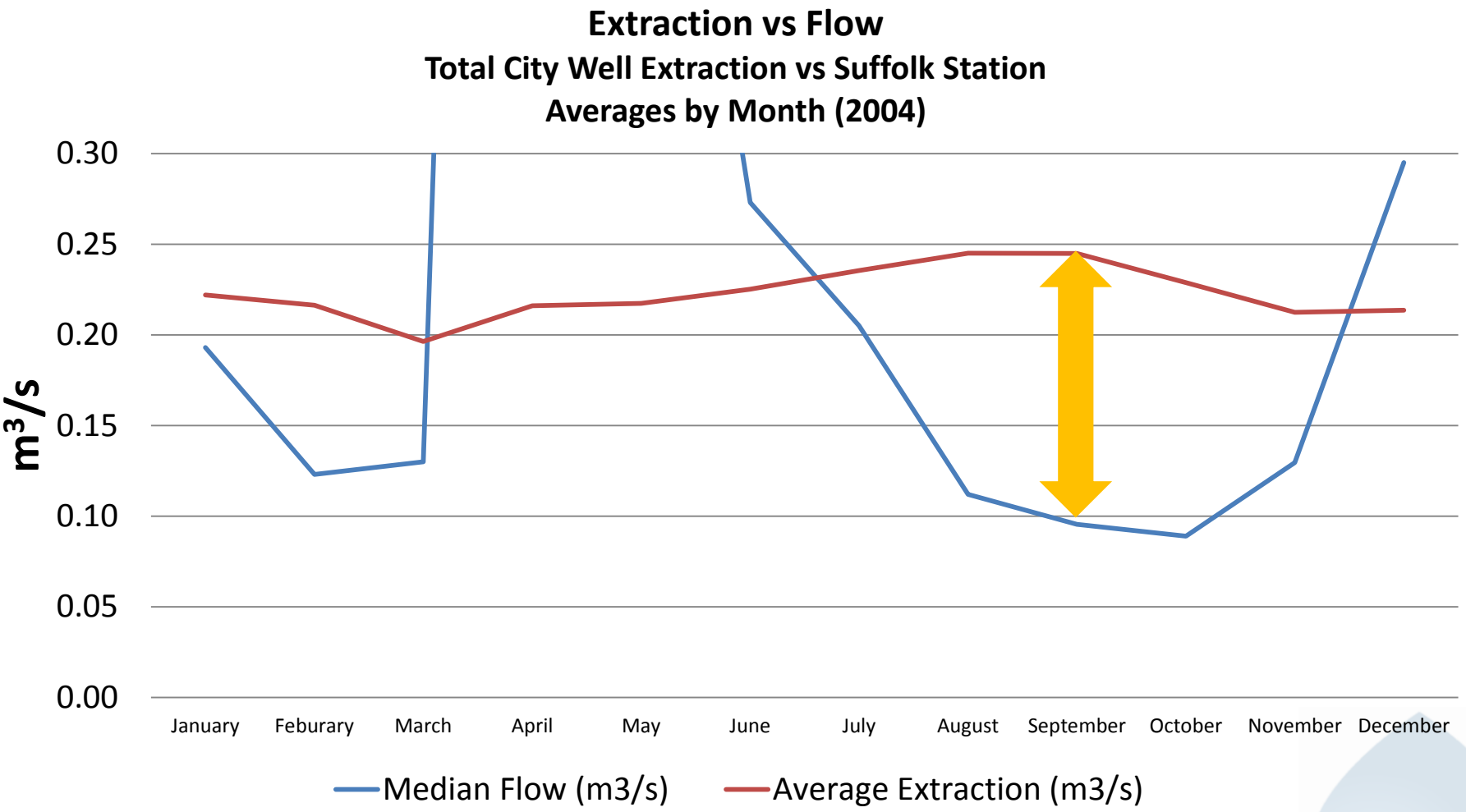
- Water extraction by the City of Charlottetown has a greater impact because the City is not within our watershed.
- The city takes water from our watershed, then discharges waste water into the Hillsborough River.
- Instead of a natural water cycle, water flows in a one way direction.



The Other River: Bad timing



The Other River: Bad timing



City extraction exceeds summer river flow during dry years.

The Other River

- In Ontario and BC it is illegal to transfer large quantities of water from one watershed area to another.

- The PEI Water Act and/or associated regulations should consider transfers of water between watersheds much differently than applications for high capacity wells which will be using and discharging water within a single watershed.

Concerns: Priorities for water use

- The City of Charlottetown was quoted in the Guardian as saying that “The City must be considered a priority user of groundwater on PEI.”
- The existing Water Extraction policy lists the following priorities for water use:
  - **Fire protection**
  - **Drinking water**
  - **Environment**
  - **Industrial** (including agricultural irrigation).
- We agree with this prioritization… with some clarification.
  - Drinking water and domestic water use are not synonymous. The amount of water that individuals actually “drink” is very, very low.




Concerns: Priorities for water use

How much water does a person really need? Only 20-50L/day

50 L per person per day	×	42,500 people	=	775,625,000 L per year
Selected from guidelines by the United Nations as a "needed amount"		34,000 residents + 25% extra for visitors, hospitals, etc.		**11.9%** of actual 2014 usage

- We could easily supply "drinking water" to the City of Charlottetown and recommending that this is indeed a priority water use.
- However, amounts beyond 50L/person/day cannot be called "drinking water"

Concerns: Water Metering and Pricing

<u>Poor system</u>: Flat fee per household

→ NO financial incentive to conserve water.

<u>Better system</u>: Base fee + Usage fee

→ Some incentive to conserve.

However, if base fees are high and usage fees are low, then there is little financial incentive to reduce water use. That is currently the case for Charlottetown households with water meters.

Example scenario:

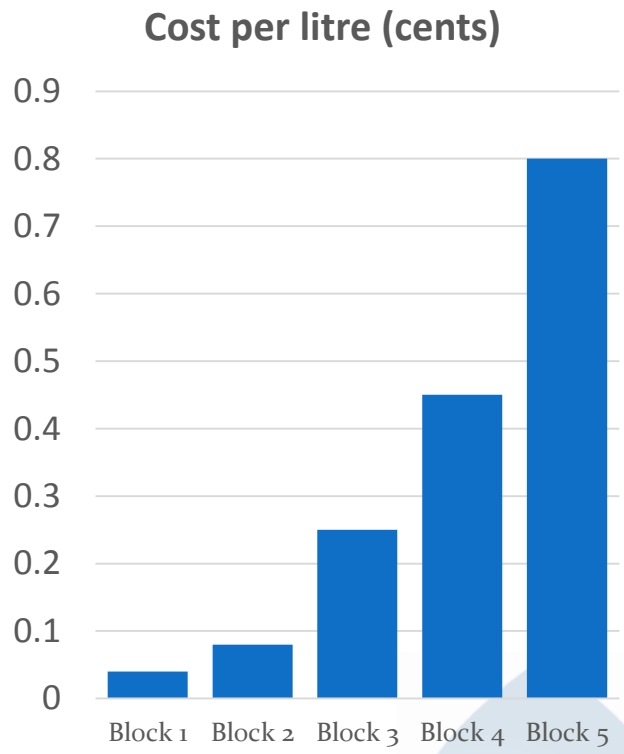
	Before	After	Change
Water use	130 L/day	65 L/day	- 50%
Water bill	$28.13/month	$26.49/month	-6%

Concerns: Water metering and pricing

<u>Great system</u>: Increasing Block Rate System (without base fees)

→ BIG financial incentive to conserve

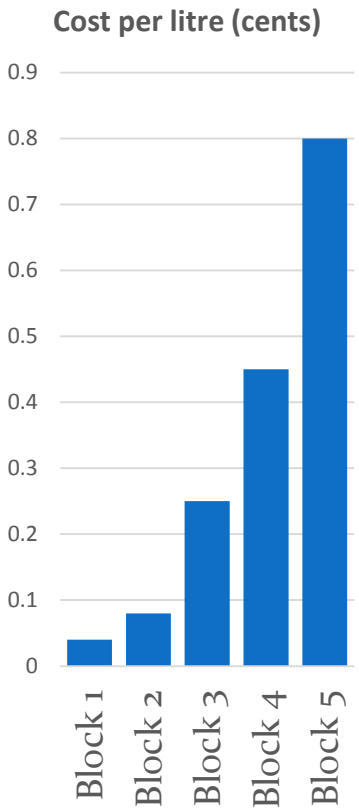
- Cost per litre increases the more water is used.
  - Conserving water would lead to more noticeable decreases in water bills.
  - Users with very high water use would pay significantly more per month than using the current system.
  - Industries & Businesses with high water use would pay their fair share.



Prices for each block were chosen for demonstration purposes only.

Concerns: Water metering and pricing

- With appropriate block sizing and pricing, the total annual revenue for the utility could be the same as under the current system.
  - Recommend setting the first block around 50 L per day per person for residential users



- We congratulate the City on working to implement universal water metering, which is a big investment.
- With small changes, metering and pricing could work together <u>much</u> better, leading to more water conservation.

Concerns: Permitting process

- Extraction permits should be maximum allowable limits, with conditions that require usage to be cut in certain seasons and/or years.
- Many cities set conservation guidelines based on the level within their water supply reservoir. We need a method based upon groundwater as a source, which curbs usage during times of drought.
- Permits should be for a defined period of time, not indefinite.
- Permits must be enforced, with strict penalties for exceeding limits.

Low reservoir in California

Concerns: Volunteer burnout

- Increasing reliance on watershed groups to carry out tasks that were once the responsibility of government.
- Watershed groups need to hire more people if more work is required.

Some of our volunteers, from the young to young at heart!

Short-term recommendations

1. Reduce the City of Charlottetown's water extraction to a more sustainable level at Brackley and Union pumping stations as soon as new wellfield is online.
2. Restore sufficient environmental flow rates (as defined by independent experts) in all streams of the Winter River, including Brackley branch

3. Involve watershed groups in the permitting process for high capacity wells within their boundaries and be provided sufficient and stable funding.
4. Enforce existing permits and regulations and give heavy fines for infractions.
5. Set criteria for declaring a significant dry period.
6. Implement regulations for water extraction during very dry periods.
7. Share data more often and more freely, including more public availability of information.

Long term recommendations

1. Analyze the connectivity of groundwater reservoirs in adjacent watersheds when considering placements of high capacity wells.
2. When large quantities of water are needed, utilize groundwater resources from a number of different watersheds that are not connected.
    - Ex. Any new wells for Charlottetown should not be in Winter River or an aquifer that is significantly connected to Winter River's groundwater.
3. Do not allow high capacity wells near river headwaters.
4. Mandatory third party long term monitoring programs to analyze the impacts of large scale water extraction.
5. Investigate methods to return some water to the Winter River to reduce the amount of "one way flow" of water to Charlottetown, or at least do this during dry periods. This will help recharge the aquifer.

Questions or Comments?