Anoxic Events 2017

Presentation to the EAC

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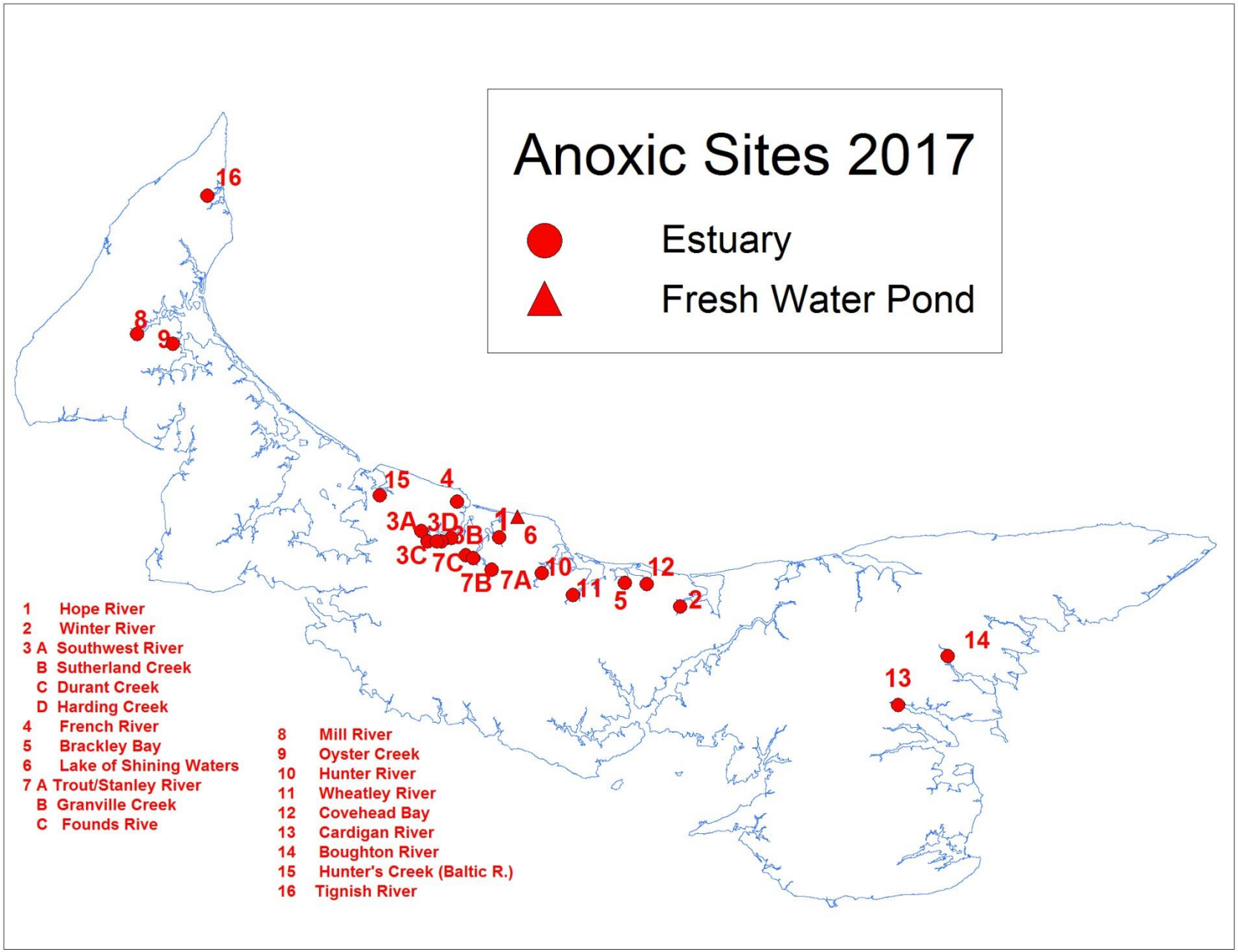
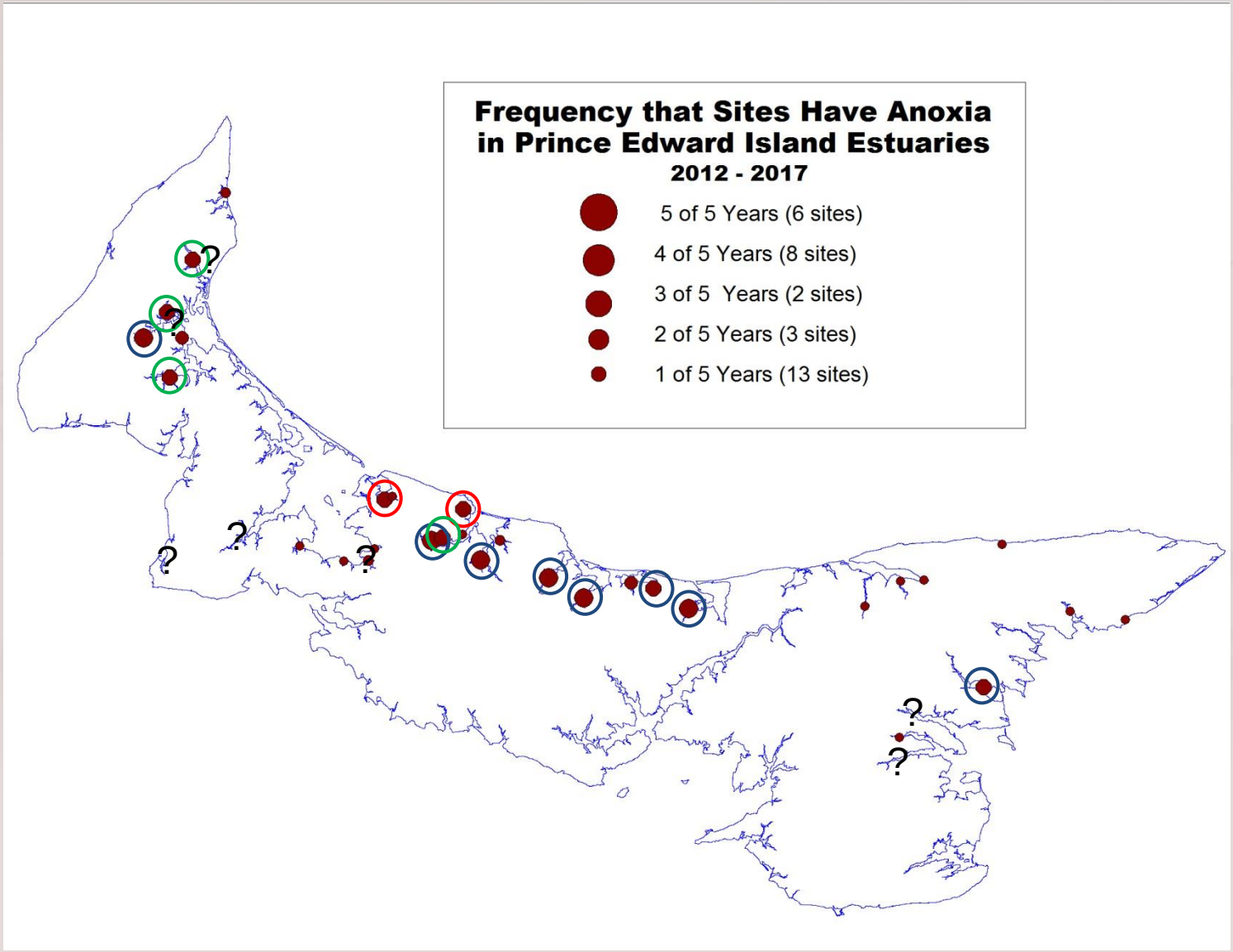
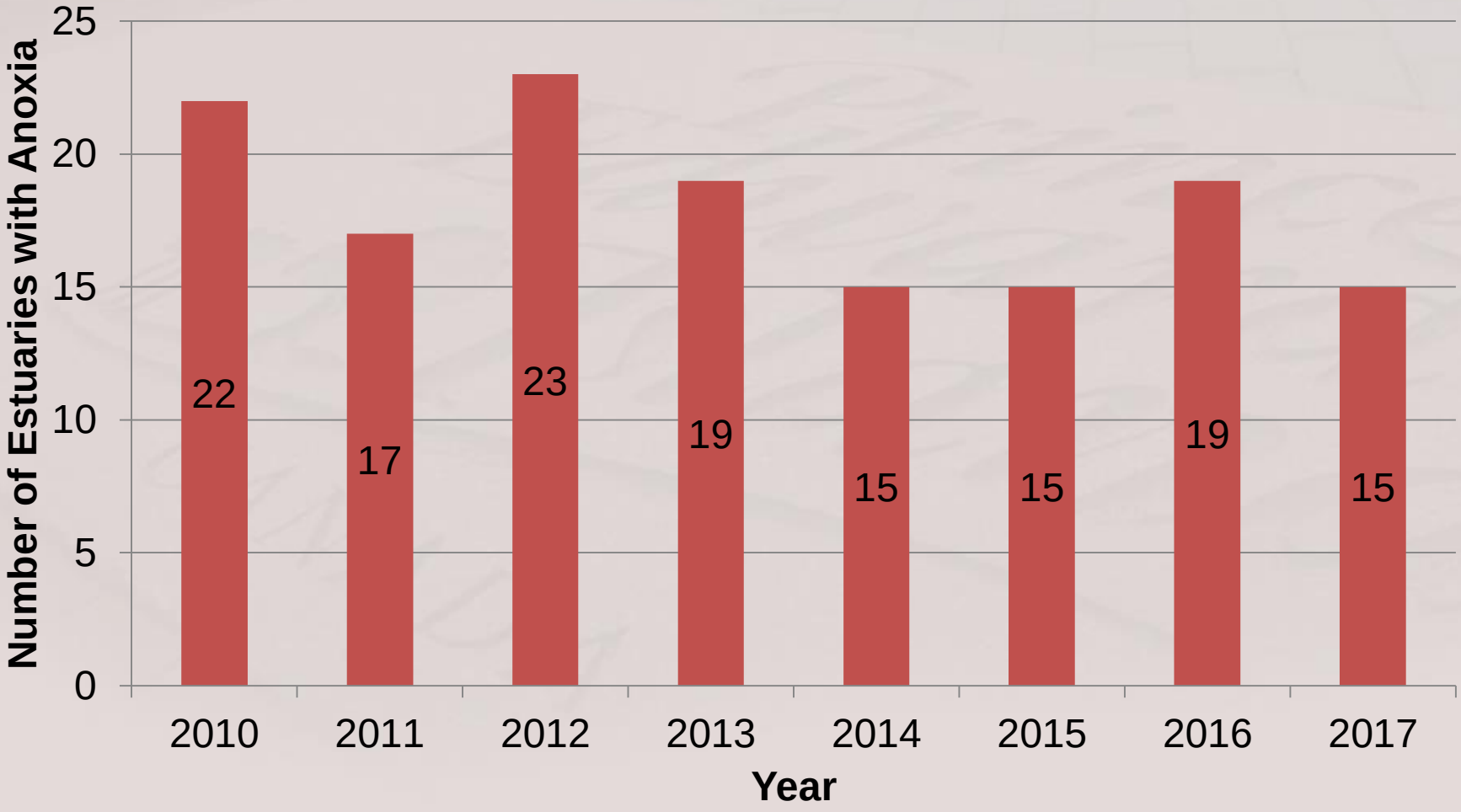
Department of Communities, Land and Environment


Anoxic Sites 2017
Estuary
Fresh Water Pond
16
8
9
15
4
3A
3D
3B
1
6
3C
7C
7B
7A
10
11
12
5
2
14
13
1 Hope River
2 Winter River
3 A Southwest River
B Sutherland Creek
C Durant Creek
D Harding Creek
4 French River
5 Brackley Bay
6 Lake of Shining Waters
7 A Trout/Stanley River
B Granville Creek
C Founds Rive
8 Mill River
9 Oyster Creek
10 Hunter River
11 Wheatley River
12 Covehead Bay
13 Cardigan River
14 Boughton River
15 Hunter's Creek (Baltic R.)
16 Tignish River

Frequency of Anoxic Events



Comparison to Previous Years



Status of Anoxic Events

- 2017 a relatively “good” year but still 15 systems with anoxic events.
  - One report of better conditions during the summer but also had an anoxic event reported in the fall (mid-October -Long River).
- Long period of warm weather into the fall led to continuing sea lettuce growth and the latest ever reported occurrences of anoxic events (late October- Cass’s/Tignish River, mid-November- Harding Creek).

Dissolved Oxygen Monitoring

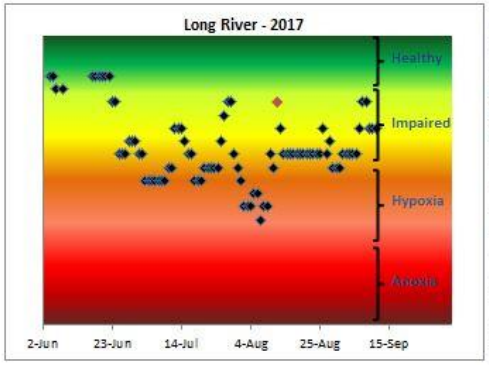
- Recommended by NorSt-EMP (2012-2016).
  - 2 sites/3 instruments per estuary (1 at 10% and 2 at 50%).
  - Continuous measurement of DO May – Nov (June – Sept. critical period).
  - 6-8 estuaries/year (2 each year and 18 on a rotating basis (6 estuaries a year – once every 3 years).

Dissolved Oxygen Monitoring

- One site in 2016 (Mill River) and 2 in 2017 (Wheatley River and Southwest River) as a trial
  - Identified workload and resources required to do the work.
- For 2018 equipment purchase is planned to allow us to monitor at least six sites.
- DFO interested in this work as well as part of their Marine Environmental Quality (MEQ) initiative.
  - Will be exploring how to pool resources/share effort prior to the spring deployment

Estuary Watch Program

Long River (Tributary of Southwest River – New London Bay) – 2017



This graph shows estuary conditions in Long River during the summer of 2017. Observations were made almost daily between June 4th and Sept. 11th. The estuary was in an impaired state for most of the period of record. Hypoxia was present during both early July and early August. There were no observations of anoxic conditions. The result shown in red on the graph indicates a record where an incomplete record was present (water clarity was not noted). The table below summarizes the 2017 data and makes comparison to previous years' results during the July 1 to August 31 time frame. 2017 had better water quality than any of the previous three years.

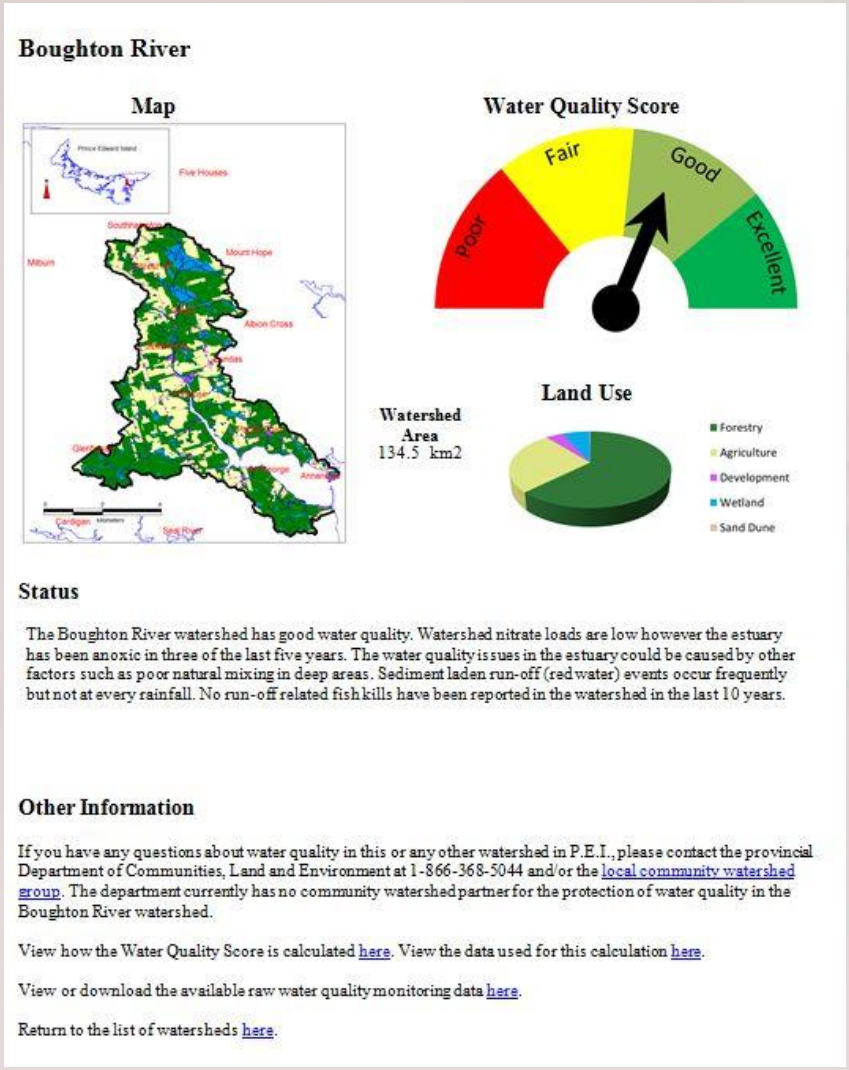
Period	# Days Recorded	Days Healthy	Days Impaired	Days Hypoxic	Days Anoxic
June 4- Sept. 11, 2017	91 of 100	10	62	19	0
July 1 - Aug. 31, 2017	62 of 62	0	43	19	0
July 1 - Aug. 31, 2016	62 of 62	0	23	35	4
July 1 - Aug. 31, 2015	62 of 62	0	25	35	2
July 1 - Aug. 31, 2014	61 of 62	1	32	27	1

The risk posed for water quality by sea lettuce was low for most of 2017 at this site with coverage exceeding 25% on only a few occasions. This sea lettuce had at least some die-off for much of the summer. Phytoplankton blooms can also contribute to elevated oxygen and/or hypoxia and anoxia in some estuaries; however the discolorations, observed in this estuary in 2017, were more consistent with the presence of hypoxic or anoxic conditions than a phytoplankton bloom.

The observations presented here were made by a voluntary estuary watcher. The data was categorized following the **Estuary Watch Index** developed by the PEI Dept. of Communities, Land and Environment. Please see the following pages for the site location, a description of the index calculation, the water quality categories represented by the index and the categorized data collected by the estuary watcher. Please contact Cindy Crane, PEI Department of Communities Land and Environment at cscrane@gov.pe.ca if you would like more information about Estuary Watch or if you are interested in becoming an Estuary Watch volunteer.

- Volunteer "citizen science" program
- 14 Estuary Watchers in 2017
  - Several have been in the program since 2014.
  - Starting to see some useful metrics in the data.
  - Adds to our knowledge about where events are happening, for how long etc.
- Have UPEI students investigating a web app for this program that could potentially help us in our tracking.

Watershed Water QualityReport Cards



Boughton River

Map

Water Quality Score

Watershed Area
134.5 km2

Land Use

Status

The Boughton River watershed has good water quality. Watershed nitrate loads are low however the estuary has been anoxic in three of the last five years. The water quality issues in the estuary could be caused by other factors such as poor natural mixing in deep areas. Sediment laden run-off (red water) events occur frequently but not at every rainfall. No run-off related fish kills have been reported in the watershed in the last 10 years.

Other Information

If you have any questions about water quality in this or any other watershed in P.E.I., please contact the provincial Department of Communities, Land and Environment at 1-866-368-5044 and/or the local community watershed group. The department currently has no community watershed partner for the protection of water quality in the Boughton River watershed.

View how the Water Quality Score is calculated here. View the data used for this calculation here.

View or download the available raw water quality monitoring data here.

Return to the list of watersheds here.

New in 2017!

- Assessment of water quality on a watershed basis.
- Occurrence of anoxic events one of five metrics used to determine a water quality score and category:
  - nitrate levels
  - Anoxic events
  - fish kills related to run-off
  - siltation events
  - other concerns (e.g. elevated water temperature)

https://www.princeedwardisland.ca/en/information/communities-land-and-environment/water-quality-report-cards-watershed

What Can be Done to Stop Anoxic Events?

- The solution to anoxic events is to reduce nutrient loading (in particular nitrate).
- Watershed nitrate targets have been developed.
  - Some estuaries require reductions of 50% - 60% to meet these targets.
  - In PEI most of the nitrate loading to our estuaries originate in the agricultural sector.

Trout River (Millvale) 07/26/2017
Picture Courtesy of Justice and Public Safety

Questions?

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