

Prince Edward Island's Mussel Monitoring Program and Associated Environmental Data

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ABSTRACT

Poirier, L.A., Ramsay, A., Coffin, M.R.S., Davidson, J.D.P., Comeau, L.A. 2021. Prince Edward Island's Mussel Monitoring Program and associated environmental data. Can. Manuscr. Rep. Fish. Aquat. Sci. 3226: vi + 17 p.

Prince Edward Island (PEI) coastal waters support an important Blue Mussel (*Mytilus edulis*) industry that relies on wild spat, or seed, to supply grow-out operations. While this industry operates within a small geographic area, there may be site-specific environmental characteristics that are driving anecdotal inconsistencies observed in mussel production and quality. The PEI Mussel Monitoring Program (MMP) is a service provided to mussel growers and processors by the Provincial Department of Fisheries and Communities. It supplies a variety of vital information to stakeholders including mussel growth, spat-fall, and meat yield, while also informing on the presence of toxic algae, fouling organisms, and predators. In 2015, environmental monitoring was added to this complement of measurements, which may provide insight on the site-specific differences. We explored datasets from six sites for indicators of observed differences in mussel performance between 2016 and 2018. Overall, mussel aquaculture sites were similar in mussel growth, but some trends were observed. Nine Mile Creek performed better than the other sites with regards to mussel performance, but no clear differences in environmental parameters were noted among the six sites. Tracadie Bay and Murray River both experienced delayed recovery in meat yields after spawning events, and while no environmental stressor could be determined, they were the only sites to experience larger phytoplankton blooms in mid-summer. Food availability in the winter months across all sites was also of note, as several peaks in phytoplankton concentration were observed, potentially impacting growth factors later in the year. These MMP and environmental data from productive bays of PEI will provide a valuable resource of historical data to future stakeholders.

RÉSUMÉ

Poirier, L.A., Ramsay, A., Coffin, M.R.S., Davidson, J.D.P., Comeau, L.A. 2021. Prince Edward Island's Mussel Monitoring Program and associated environmental data. Can. Manuscr. Rep. Fish. Aquat. Sci. 3226: vi + 17 p.

Les eaux côtières de l'Île-du-Prince-Édouard (Î.-P.-É.) soutiennent une importante industrie de la moule bleue (*Mytilus edulis*) qui dépend des naissains sauvages pour l'approvisionnement des activités de grossissement des exploitations mytilicoles. Bien que les activités de cette industrie soient limitées à une petite zone géographique, il est possible que des caractéristiques environnementales propres aux sites soient à l'origine des incohérences anecdotiques observées dans la production et la qualité des moules. Le programme de surveillance des moules de l'Î.-P.-É. est un service offert aux éleveurs et aux transformateurs de moules par le ministère provincial des Pêches et des Communautés. Il fournit une multitude de renseignements vitaux aux intervenants sur des sujets comme la croissance des moules, la fixation des naissains et le rendement en chair, en plus de les informer de la présence d'algues toxiques, d'organismes salissants et de prédateurs. En 2015, la surveillance du milieu a été ajoutée à cet ensemble de paramètres, ce qui pourrait nous aider à comprendre les différences propres aux sites. Nous avons exploré les ensembles de données de six sites afin d'y relever des indicateurs des différences observées dans le rendement des moules entre 2016 et 2018. Globalement, les sites de mytiliculture présentaient des résultats similaires sur le plan de la croissance, mais certaines tendances ont été observées. Le site du ruisseau Nine Mile a obtenu de meilleurs résultats que les autres sites pour ce qui touche le rendement, mais aucune différence marquée n'a été observée entre les six sites en ce qui concerne les paramètres environnementaux. Les sites de la baie Tracadie et de la rivière Murray ont tous les deux connu un rétablissement tardif des rendements en chair après les épisodes de fraie, et bien qu'aucun facteur de stress environnemental n'ait pu être identifié, ils ont été les seuls sites à connaître des proliférations phytoplanctoniques plus importantes au milieu de l'été. La disponibilité des aliments pendant les mois d'hiver dans l'ensemble des sites est également à noter, étant donné que plusieurs pics de concentration du phytoplancton ont été observés, et peuvent avoir eu une incidence sur les facteurs de croissance plus tard au cours de l'année. Ces données du programme de surveillance des moules et données environnementales provenant de baies productives de l'Î.-P.-É. constitueront une source précieuse de données historiques pour les futurs intervenants.

INTRODUCTION

The Blue mussel (*Mytilus edulis*) is an important part of Prince Edward Island's (PEI) economy, with current estimated annual landings from aquaculture being 20 000 tonnes valued at approximately 31 million dollars (Statistics Canada, 2021), accounting for approximately 75% of Canadian mussel production and value. The industry has now exited its "growth phase" and is in a "management phase", with no new aquaculture leases granted since the early 2000's.

Mussel aquaculture in PEI is concentrated in estuaries and bays along the northern and eastern coasts. The industry's success relies on the settlement of wild spat, or seed, on collectors placed in specific seed-producing areas of the estuaries and bays. Collectors are placed in these areas in the spring, when water temperatures approach 12°C, triggering spawning. In the fall, farmers collect and strip the seed from suspended collectors when the seed has reached about 25 mm (Comeau et al. 2017). Most local grow-out production is completed in suspended culture, with the recently collected mussel seed packed in mesh sleeves or "socks" attached to longlines to enhance growth and yield. Production time from stocking to market varies between different bays, however, the typical range is between 18 and 24 months (Drapeau et al., 2006).

Mussel aquaculture in PEI occurs within a small geographic area with relatively homogenous weather and lithology. However, there are site-specific environmental characteristics (e.g. temperature, salinity, phytoplankton concentrations) that may differ due to bathymetry, land use, fresh-water input, and other watershed parameters. Anecdotal inconsistencies in mussel quality (mussel meat yield and time to market), have been observed between sites and one hypothesis for the variability observed in mussel quality among sites has been attributed to seed source. There is some evidence that seed origin influences mussel yield and growth with certain mussel seed performing well in some locations but not in others (A. Ramsay, pers. obs.). This phenomenon could be linked to site-specific differences of environmental parameters such as phytoplankton availability (Tremblay et al. 2011). Even across relatively short geographic distances (~50 km), like those between PEI estuaries, environmental stressors, and artificial selection for certain traits by seed collection procedures may be the most significant factors affecting these differences in growth and yield (Myrand et al. 2002).

The existence of localized environmental pressures is of interest to growers as their collective effect on mussel productivity remains unclear. While multiple studies have highlighted the individual importance of temperature (Mallet et al. 1987), pH (Thomsen and Melzner 2010), and phytoplankton availability (Camancho et al. 1995), these variables are thought to be relatively stable locally (i.e. phytoplankton mean \pm SD: 2.4 \pm 1.4 µg per l, Meeuwig et al. 1998), however, they remain likely to be influential on mussel growth. However, if mussel performance is affected by low levels of variability between local environmental conditions, then the rapidly changing global environment may have substantial influence on mussel performance in the future. Thus, it is critical for growers to understand the influence of both abiotic and biotic factors on farming yield and production.

The PEI Mussel Monitoring Program (MMP) is a service provided to mussel growers and processors by the Provincial Department of Fisheries and Communities. It has operated annually during ice-free seasons since 1982 and supplies a variety of essential information. The primary focus of this program is to inform stakeholders on mussel growth, spat-fall, and meat yield, as well as the potential presence of toxic algae, fouling organisms, and predators. In 2015, environmental variable monitoring was added to the Program, including measurements of chlorophyll concentration, which may provide insight on site-specific environmental growth differences. Herein, we explore the environmental data set for indicators for observed differences in mussel performance on PEI. This was accomplished through exploratory analyses using multi-year environmental and mussel data to visually assess whether there is support for this hypothesis. Important historical data will also be compiled and presented for future use.

METHODS

STUDY AREA

In 2016, six of the 33 MMP sampling sites on PEI were selected for this study and EXO2 multi-parameter probes were deployed (YSI Incorporated, Ohio, USA). These sites were Brudenell River, March Water, Murray River, New London Bay, Nine Mile Creek, and Tracadie Bay (Table 1, Figure 1). Sites were selected based on intense mussel aquaculture and the sites covering a wide geographic area that encompasses estuaries and bays that empty into the Northumberland Strait and the Gulf of St. Lawrence directly (Figure 1). Three years (2016–2018) of environmental data were obtained for each site.

Table 1. Approximate GPS locations for sonde deployment at six Mussel Monitoring Program sites.

Site	Latitude	Longitude
Brudenell River	46.1661	-62.5278
March Water	46.5318	-63.7630
Murray River	46.0297	-62.5323
New London Bay	46.4826	-63.4603
Nine Mile Creek	46.1521	-63.1575
Tracadie Bay	46.4074	-62.9926

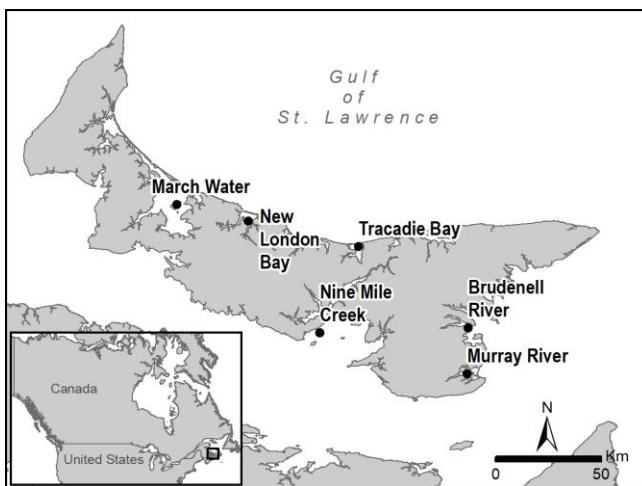


Figure 1. Map of study locations on Prince Edward Island, Canada.

DATA COLLECTION

Environmental Data

Using EXO2 sondes, continuous environmental data were collected every 15 minutes at each of the six study sites. Parameters recorded included pH, temperature, salinity, chlorophyll concentration, fluorescent dissolved organic material, dissolved oxygen, total dissolved solids, and depth of the probe. Herein, only pH, temperature, salinity, and chlorophyll are discussed at length, however, the remaining variables are presented graphically in Appendix 1 and were included in multivariate analyses. The sondes were generally attached to a mussel line near the location of the submerged MMP mussel cage. In New London Bay, the sonde was attached to a specific water quality buoy near the mussel cage during the ice-free season, which brought it slightly closer to the surface (~1 m). Data points recorded during retrieval, on shore calibrations, when the sensor was fouled, or collected in error were eliminated. Consequently, as the literature indicates that local chlorophyll concentrations rarely exceed 50 µg per L (Meeuwig et al. 1998, Waite et al. 2005, Filgueira et al. 2014), all values above this threshold were assumed to be in error and excised from the dataset.

Mussel Data

Each May, mussel spat from the previous year was collected from socks nearby and placed in a partially submerged cage with attached floats at each MMP site. Cages measured 38 x 38 x 53 cm, with a mesh size of 3.8 cm. Initial densities varied, but usually 4 to 5 socks each measuring 2.1 m, with approximate densities of 650 mussels per m. Throughout deployment as fouling became apparent on the cage, it was removed. Weekly monitoring of mussel growth metrics – including condition index, measured by % European meat yield (see below), and shell length in mm – occurred from May to December each year on 30 mussels arbitrarily retrieved from the

cages. For condition index, the mussels were steamed for five minutes and the meat shucked from the shells. The formula for European meat yield, expressed as a percentage is:

$$\% \text{ European Meat Yield} = \frac{\text{Steamed Meat Weight}}{\text{Raw Weight of Sample}} \times 100$$

ANALYSIS

Our analytical approach consisted of visually analysing all data for trends, completing a multivariate analysis for environmental parameters across sites and years, completing ANOVA analyses on the mussel parameters, and most importantly, compiling the historical environmental and mussel data for future analyses.

First, multivariate analysis of the environmental data was completed using a Principal Coordinate Analysis (PCA) in PRIMER 7 software. Data were summarized to daily averages and only complete data rows were used (i.e. if a particular variable was missing for a particular time point, it was excised from the dataset). Variables included in this analysis were chlorophyll (μg per L), depth (m), pH, salinity (ppt), temperature ($^{\circ}\text{C}$), total dissolved solids, dissolved oxygen (mg per L), and fluorescent dissolved organic matter in relative fluorescence units (fDOM-RFU). Environmental data were also tabulated monthly with standard deviations and are included in Appendix 1, Tables 1–8. Daily means with associated maximum and minimum values were plotted in order to visually compare yearly trends across sites and are included in Appendix 1, Figures 1–8.

Second, mussel morphometric data averages with standard deviations on shell length and European Meat Yield were tabulated monthly, where available, and are presented in Appendix 1, Tables 9–10. Loess curve functions were applied to growth averages and meat yield in order to visually compare yearly trends (Appendix 1, Figures 9–10). Loess curves were used as the mussel data collected from week to week may not be on the same cohort, or that cohort may have been altered due to mussel densities within the cages (i.e. mussels may have been removed due to size limits of the cages, or some more mussels added from nearby socks as required). Loess curves are opportunistic and their fit, atheoretical, therefore they should be used for exploratory purposes only.

Mussel data (average shell length and European meat yield) from each year in November were analysed independently of the environmental data using two-way ANOVAs to examine effects of site, year, and their interaction, followed by post-hoc Tukey tests to examine year and site pair-wise differences.

RESULTS AND DISCUSSION

ENVIRONMENTAL DATA

Multivariate analysis of the environmental data was completed using a Principal Component Analysis (PCA) in PRIMER 7 software. Though slight differences were observed among years and sites, this level of difference could be attributed to logger placement within each site, or to small changes in weather patterns (Figures 2 and 3, respectively). Seasonality largely drove the overlap among years, with data from January–March being on the right side of Figures 2 and 3 and data from July–September on the left, with shoulder seasons in between. Despite the lack of distinct observed effects among sites (Figure 3), there were patterns observed in the environmental parameters such as temperature and DO being inversely correlated, which was expected due to the solubility of oxygen declining with increasing temperature. Additionally, sites with higher daily average chlorophyll concentrations are in the upper portion of Figure 3. For the following description of highlights and trends in collected environmental data, please also refer to Appendix 1; Tables 1–8 and Figures 1–8.

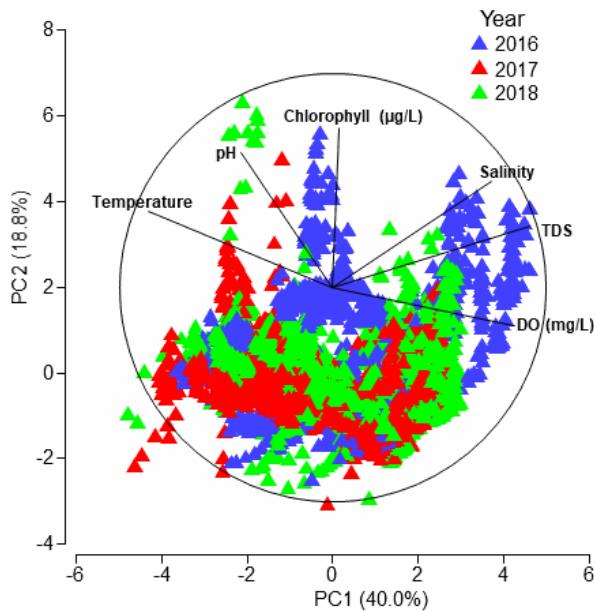


Figure 2. Principal Component Analysis (PCA) using the environmental data collected from the six Mussel Monitoring Program sites, with year as a visual factor. Overall, 58.8% of the total variation is explained by the first two component axes (40.0% and 18.8%, respectively). Eigenvectors with coefficients of less than $|0.01|$ were removed from the figure for ease of interpretation.

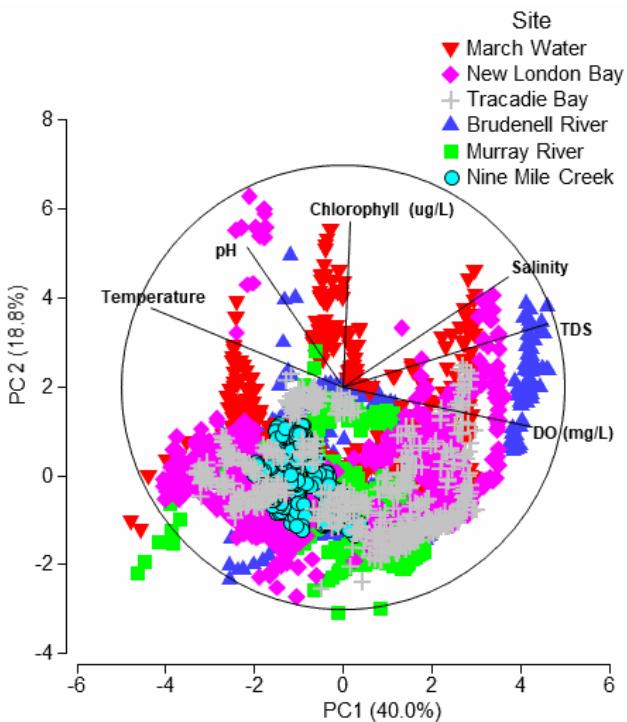


Figure 3. Principal Component Analysis (PCA) using the environmental data collected from the six Mussel Monitoring Program sites, with site as a visual factor. Overall, 58.8% of the total variation is explained by the first two component axes (40.0% and 18.8%, respectively). Eigenvectors with coefficients of less than $|0.01|$ were removed from the figure for ease of interpretation.

Inspection of the chlorophyll concentrations through time revealed that they were stable except for clear indications of phytoplankton blooms in early 2016 (between February and April) in Brudenell River, March Water, and New London Bay. In 2017 and 2018, blooms were observed over the same period, but not at the same magnitude. These early blooms occurred prior to the deployment of the mussels in the monitoring program in each year (May). In 2017, blooms appeared later in the summer in Brudenell River, Murray River, and Tracadie Bay. In 2018, no real trends were observed, but some minor blooms were observed across most sites (New London at the end of summer, Murray River in the middle of summer). It is possible that these blooms were not site-wide, or they possibly were not captured by the sonde due to fouling. While maximum fluctuations up to 50 µg/L were observed at most sites, daily averages were typically lower and well-aligned with acetone-extracted chlorophyll-a values reported in the literature (Meeuwig et al. 1998, Waite et al. 2005, Filgueira et al. 2014).

pH levels in PEI waters could be characterized as being average or high, typically fluctuating around 7.9 or 8.0, and the values noted herein do not seem to be detrimental with regards to mussel growth as they fall within generally accepted values for no inhibition of mussel growth (between 7.5 and 7.9, Clements et al. 2018). New London Bay experienced the most fluctuation, with Murray River and Nine Mile Creek observing relatively tight daily fluctuations. This may be a result of seasonal or tidal variation at these sites.

There was very little observed difference in temperatures among all sites and years, except where the sonde was put at deeper depths (i.e. Brudenell River). Temperatures fluctuated mainly around -1°C during ice cover in the winter to the mid-twenties in the peak of summer. Salinity values experienced daily tidal fluctuations in Murray River and New London Bay, while values in Nine Mile Creek remained relatively stable indicating less tidal influence. There were some drops in salinity that may be related to probe maintenance. The typical average salinity across all sites was around 27 ppt.

Fluorescent dissolved organic matter concentrations were relatively stable, but Murray River experienced some spikes in 2018, as did New London Bay in 2016 and March Water in 2017. Dissolved oxygen levels indicated high levels of saturation (near 100%), and values in mg/L were equally high, both indicating that anoxic conditions near the mussel growing sites were rare to non-existent. New London Bay had the most daily fluctuation in DO levels, possibly related to the sonde's position on the water quality buoy, however, they remained consistently above 75% saturation. Total dissolved solids followed very similar patterns to salinity measurements, as expected. In particular, Nine Mile Creek had a very tight distribution of TDS values.

Depths of the sonde averaged between 2 and 5 m, except Brudenell River for the first 3 months of 2016 where the average depth was around 11 m. Certain sites show more daily fluctuation in terms of depth, which could be an indication of tidal influence, which would be location specific.

MUSSEL DATA

For the following description of trends in collected mussel data, please also refer to Appendix 1; Tables 9–10 and Figures 9–10.

The Loess curves for average shell length indicated that most sites experienced start of season sizes of 30–40 mm and by the end of the growing season 50–60 mm. Average shell length in March Water in 2016 started lower (approximately 20 mm) but eventually reached the same end size of 50–60 mm. Nine Mile seemed, on average, to be the largest by year end. Overall though, no true year to year trend was observed across all sites for average shell growth. Of note, the mussel growth is only captured between May and December, thus missing 5 months of potential growth or the build up of bio-reserves, and susceptibility to varying environmental conditions during this time. This is especially important when considering chlorophyll concentrations are relatively high throughout the winter months and while unknown to what degree, they could potentially contribute to growth or reserve build up.

European meat yield Loess curves demonstrated large drops in meat yield of approximately 20% by August of each year for all sites, likely due to spawning events. While March Water and Nine Mile Creek seem to experience some bounce back in yields, Brudenell River, Murray River, and Tracadie Bay do not seem to recover to the same extent. New London Bay seemed to exhibit some variability year to year, but overall, most sites followed consistent trends over the period of study.

Results from the ANOVA of November growth data indicated significant interactions between Site and Year (Tables 2 and 3), thus requiring post-hoc analysis of the interaction term. With regards to trends observed in the Tukey pair-wise interaction tests (not displayed), mussels were very similar between Brudenell River, March Water, New London Bay, and Tracadie Bay, and any small differences mostly varied from year to year. Only Nine Mile Creek consistently maintained higher meat yield and shell length relative to the other sites potentially due to its proximity to the open water of the Northumberland Strait, with Murray River tending towards lower meat yields.

Table 2. ANOVA results for average shell length in November. Significant effects are indicated in bold.

Factor	SS	MS	F-value	p-value
Site	234.0	46.8	9.079	<0.001
Year	6.2	3.1	0.603	0.551
Site x Year	143.2	15.9	3.086	0.005
Residual	247.4	5.2		

Table 3. ANOVA results for European meat yield in November. Significant effects are indicated in bold.

Factor	SS	MS	F-value	p-value
Site	299.1	59.8	18.887	<0.001
Year	150.6	75.3	23.776	<0.001
Site x Year	168.2	18.7	5.899	<0.001
Residual	152.1	3.2		

CONCLUSIONS

Overall, mussel aquaculture sites were quite similar to each other, both in terms of mussel tissue yield and shell growth, as well as the environmental parameters that were measured. Below we speculate about potential trends that were observed.

In general, Nine Mile Creek performed better than the other sites with regards to mussel growth and recovery from spawning, and while no clear differences in environmental parameters were noted with respect to the other sites, the daily variation and fluctuation (maximum and minimum) seemed to be smaller or more stable. This was observed particularly in measurements of salinity, total dissolved solids, and dissolved oxygen. This is likely an indication that there is less freshwater influence on this particular growing site and that food availability remains stable and high, likely due to growing sites being closer to the open water of the Northumberland Strait.

Food availability in the winter months across all sites was also of note, as there were several instances of large peaks in phytoplankton concentrations often in the late winter. Although mussels have lower filtration rates in the winter (Comeau et al. 2008), increased temperatures due to climate change may influence this growth factor later in the year. Trends in meat yields in Tracadie Bay and Murray River both demonstrated potential delayed recovery from spawning events, and while no causative effect can be determined from the environmental data, they were the only sites to experience larger phytoplankton blooms in August.

The MMP program and its associated environmental data provide useful information that has benefited the mussel industry over the past seven years. With some of the data now catalogued here, other stakeholders will now have access to a valuable resource of historical data in productive bays of PEI.

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Appendix 1. Figures and tables for environmental and mussel data collected from 6 Mussel Monitoring Program sites on Prince Edward Island.

Table 1. Monthly Chlorophyll concentration values ($\mu\text{g per L}$) (mean \pm SD) recorded at 6 MMP sites on PEI between 2016 and 2018. NA denotes no data available for that month.

Site	Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Brudenell River	2016	0.95 \pm 0.23	9.63 \pm 0.23	9.58 \pm 7.30	10.67 \pm 7.46	NA	1.35 \pm 0.75	4.34 \pm 1.74	4.38 \pm 1.81	4.71 \pm 2.10	2.00 \pm 1.21	0.89 \pm 0.47	0.36 \pm 0.24
	2017	0.37 \pm 0.17	0.64 \pm 0.48	4.07 \pm 3.83	4.26 \pm 3.55	NA	1.50 \pm 0.96	5.33 \pm 1.63	4.29 \pm 1.83	5.98 \pm 6.56	10.10 \pm 11.06	1.38 \pm 0.88	0.41 \pm 0.42
	2018	0.07 \pm 0.37	NA	NA	NA	NA	NA	3.85 \pm 1.18	4.02 \pm 1.36	5.21 \pm 1.89	2.88 \pm 1.09	1.70 \pm 0.57	0.82 \pm 0.14
March Water	2016	13.55 \pm 13.60	12.64 \pm 11.90	2.51 \pm 4.29	3.77 \pm 3.88		4.29 \pm 1.44	11.53 \pm 5.36	15.30 \pm 6.40	8.23 \pm 3.38	3.90 \pm 2.31	3.16 \pm 1.33	2.31 \pm 2.00
	2017	1.13 \pm 1.29	3.50 \pm 4.03	3.30 \pm 3.08	1.56 \pm 0.95	2.44 \pm 2.62	3.84 \pm 1.89	12.46 \pm 5.33	11.89 \pm 6.22	4.45 \pm 1.80	2.80 \pm 1.10	3.44 \pm 1.73	3.76 \pm 2.67
	2018	4.42 \pm 4.35	6.77 \pm 7.58	8.21 \pm 8.07	6.96 \pm 8.14	0.52 \pm 0.29	1.80 \pm 0.85	6.81 \pm 1.58	7.11 \pm 2.67	3.67 \pm 1.61	3.37 \pm 1.11	4.98 \pm 1.91	0.75 \pm 0.52
Murray River	2016	NA	NA	NA	NA	NA	0.59 \pm 0.52	1.58 \pm 1.00	1.79 \pm 1.22	1.51 \pm 1.14	0.95 \pm 0.54	0.85 \pm 0.96	0.64 \pm 0.35
	2017	0.62 \pm 0.23	0.86 \pm 0.37	1.67 \pm 1.77	1.30 \pm 0.77	NA	1.35 \pm 1.01	2.74 \pm 1.89	3.56 \pm 4.78	2.48 \pm 1.22	2.33 \pm 1.27	1.64 \pm 1.98	0.22 \pm 0.24
	2018	0.11 \pm 0.82	1.15 \pm 3.69	3.32 \pm 3.01	2.18 \pm 3.56	1.02 \pm 0.32	4.56 \pm 6.78	1.77 \pm 0.94	2.67 \pm 1.42	3.76 \pm 1.34	1.81 \pm 1.37	0.68 \pm 0.45	0.96 \pm 0.99
New London Bay	2016	3.37 \pm 7.57	12.14 \pm 10.30	2.64 \pm 4.86	1.94 \pm 2.50	2.25 \pm 1.59	2.75 \pm 1.78	3.23 \pm 2.42	1.82 \pm 1.99	1.80 \pm 1.47	1.77 \pm 1.39	1.32 \pm 1.01	1.69 \pm 0.97
	2017	1.82 \pm 1.16	2.38 \pm 3.61	3.85 \pm 5.24	2.43 \pm 3.91	3.99 \pm 2.45	3.88 \pm 2.29	5.58 \pm 2.99	2.97 \pm 2.04	1.68 \pm 1.19	1.91 \pm 1.49	4.26 \pm 1.63	2.03 \pm 0.83
	2018	1.05 \pm 0.41	1.67 \pm 1.32	4.31 \pm 5.03	5.66 \pm 6.78	4.10 \pm 1.90	4.46 \pm 1.82	4.35 \pm 1.93	6.86 \pm 3.15	13.10 \pm 17.15	2.78 \pm 4.22	1.91 \pm 1.14	1.50 \pm 0.62
Nine Mile Creek	2016	NA	NA	NA	NA	NA	3.65 \pm 1.21	4.91 \pm 1.20	5.33 \pm 2.05	5.30 \pm 2.01	2.95 \pm 1.15	11.27 \pm 6.21	NA
	2017	NA	NA	NA	NA	NA	0.23 \pm 2.01	2.66 \pm 1.26	2.90 \pm 1.13	4.04 \pm 1.61	6.73 \pm 2.26	5.20 \pm 4.09	NA
	2018	NA	NA	NA	NA	2.43 \pm 0.81	4.68 \pm 2.17	2.78 \pm 1.25	5.11 \pm 2.10	5.40 \pm 2.31	4.13 \pm 3.08	2.71 \pm 0.99	NA
Tracadie Bay	2016	NA	NA	NA	NA	NA	2.04 \pm 1.20	2.35 \pm 0.92	3.66 \pm 1.92	4.96 \pm 4.01	NA	NA	0.75 \pm 0.69
	2017	0.87 \pm 0.52	1.99 \pm 2.77	4.66 \pm 4.84	1.45 \pm 1.02	NA	2.16 \pm 0.69	3.22 \pm 3.31	2.70 \pm 2.70	3.43 \pm 1.32	3.08 \pm 3.31	1.28 \pm 0.73	1.51 \pm 0.47
	2018	1.37 \pm 1.19	5.40 \pm 5.50	11.91 \pm 6.71	6.28 \pm 5.29	1.00 \pm 0.56	NA	2.32 \pm 0.94	4.07 \pm 2.13	3.12 \pm 1.45	2.12 \pm 0.91	1.35 \pm 0.88	0.56 \pm 0.24

Table 2. Monthly pH values (mean \pm SD) recorded at 6 MMP sites on PEI between 2016 and 2018. NA denotes no data available for that month.

Site	Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Brudenell River	2016	7.90 \pm 0.01	7.95 \pm 0.05	8.01 \pm 0.01	7.99 \pm 0.01	NA	8.05 \pm 0.03	8.12 \pm 0.05	8.18 \pm 0.05	8.08 \pm 0.09	8.01 \pm 0.05	7.99 \pm 0.03	7.94 \pm 0.01
	2017	7.93 \pm 0.01	7.95 \pm 0.02	8.07 \pm 0.10	8.11 \pm 0.06	NA	8.10 \pm 0.03	8.21 \pm 0.04	8.19 \pm 0.09	8.08 \pm 0.04	8.05 \pm 0.10	7.85 \pm 0.06	7.92 \pm 0.01
	2018	7.92 \pm 0.01	NA	NA	NA	NA	8.15 \pm 0.05	8.16 \pm 0.05	8.08 \pm 0.04	8.03 \pm 0.06	8.00 \pm 0.02	8.15 \pm 0.05	8.16 \pm 0.05
March Water	2016	8.03 \pm 0.08	8.22 \pm 0.08	8.31 \pm 0.07	8.10 \pm 0.05	NA	8.10 \pm 0.05	8.21 \pm 0.03	8.19 \pm 0.03	8.27 \pm 0.04	8.30 \pm 0.07	8.04 \pm 0.03	8.05 \pm 0.02
	2017	8.08 \pm 0.04	8.19 \pm 0.02	8.22 \pm 0.04	8.28 \pm 0.05	8.12 \pm 0.03	8.15 \pm 0.04	8.20 \pm 0.06	8.23 \pm 0.07	8.10 \pm 0.03	8.10 \pm 0.04	8.08 \pm 0.02	7.97 \pm 0.02
	2018	7.96 \pm 0.02	8.00 \pm 0.03	8.14 \pm 0.04	8.23 \pm 0.04	8.18 \pm 0.03	8.26 \pm 0.04	8.23 \pm 0.04	8.20 \pm 0.04	8.16 \pm 0.05	8.14 \pm 0.04	8.08 \pm 0.02	7.99 \pm 0.02
Murray River	2016	NA	NA	NA	NA	NA	8.08 \pm 0.02	8.12 \pm 0.04	8.16 \pm 0.04	8.10 \pm 0.07	7.99 \pm 0.04	7.97 \pm 0.03	7.98 \pm 0.02
	2017	8.00 \pm 0.02	7.97 \pm 0.05	8.09 \pm 0.07	8.14 \pm 0.02	NA	8.08 \pm 0.05	8.11 \pm 0.05	8.14 \pm 0.05	8.08 \pm 0.04	8.07 \pm 0.07	8.00 \pm 0.02	7.91 \pm 0.02
	2018	7.90 \pm 0.02	7.95 \pm 0.04	8.05 \pm 0.03	8.06 \pm 0.05	8.03 \pm 0.02	8.09 \pm 0.02	8.16 \pm 0.03	8.11 \pm 0.05	8.11 \pm 0.05	8.05 \pm 0.06	8.00 \pm 0.03	7.98 \pm 0.03
New London Bay	2016	7.95 \pm 0.05	8.12 \pm 0.15	8.38 \pm 0.04	8.29 \pm 0.10	8.22 \pm 0.08	8.27 \pm 0.09	8.33 \pm 0.05	8.24 \pm 0.06	8.17 \pm 0.13	8.11 \pm 0.06	8.14 \pm 0.05	7.99 \pm 0.01
	2017	7.99 \pm 0.01	8.01 \pm 0.06	8.13 \pm 0.12	8.25 \pm 0.04	8.21 \pm 0.06	8.22 \pm 0.05	8.30 \pm 0.05	8.23 \pm 0.07	8.09 \pm 0.07	8.08 \pm 0.05	8.05 \pm 0.03	7.94 \pm 0.02
	2018	7.90 \pm 0.02	7.93 \pm 0.02	8.03 \pm 0.05	8.17 \pm 0.06	8.21 \pm 0.05	8.20 \pm 0.05	8.24 \pm 0.06	8.18 \pm 0.09	8.12 \pm 0.07	8.12 \pm 0.07	8.01 \pm 0.03	7.93 \pm 0.02
Nine Mile Creek	2016	NA	NA	NA	NA	NA	8.04 \pm 0.02	8.09 \pm 0.06	8.18 \pm 0.04	8.12 \pm 0.14	8.01 \pm 0.03	8.04 \pm 0.03	NA
	2017	NA	NA	NA	NA	NA	8.05 \pm 0.05	8.06 \pm 0.04	8.08 \pm 0.04	8.05 \pm 0.05	8.08 \pm 0.06	8.03 \pm 0.03	NA
	2018	NA	NA	NA	NA	8.01 \pm 0.02	8.07 \pm 0.04	8.01 \pm 0.02	8.05 \pm 0.05	8.07 \pm 0.05	8.05 \pm 0.07	8.00 \pm 0.02	NA
Tracadie Bay	2016	NA	NA	NA	NA	NA	8.21 \pm 0.02	8.22 \pm 0.04	8.23 \pm 0.03	8.24 \pm 0.04	NA	NA	7.93 \pm 0.02
	2017	7.93 \pm 0.01	7.97 \pm 0.03	8.10 \pm 0.10	8.15 \pm 0.02	NA	8.12 \pm 0.03	8.18 \pm 0.06	8.15 \pm 0.11	8.01 \pm 0.04	7.99 \pm 0.08	7.94 \pm 0.03	7.93 \pm 0.01
	2018	7.92 \pm 0.02	7.97 \pm 0.05	8.09 \pm 0.05	8.09 \pm 0.05	8.01 \pm 0.02	NA	8.18 \pm 0.04	8.17 \pm 0.03	8.14 \pm 0.05	8.09 \pm 0.06	8.02 \pm 0.02	7.96 \pm 0.01

Table 3. Monthly temperature values ($^{\circ}\text{C}$) (mean \pm SD) recorded at 6 MMP sites on PEI between 2016 and 2018. NA denotes no data available for that month.

Site	Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Brudenell River	2016	-0.10 \pm 0.20	-0.71 \pm 0.42	-0.74 \pm 0.26	-0.11 \pm 0.32	NA	12.81 \pm 1.39	16.80 \pm 2.18	18.69 \pm 1.71	17.23 \pm 1.45	13.39 \pm 1.52	9.48 \pm 0.70	2.43 \pm 1.50
	2017	0.18 \pm 0.68	-1.05 \pm 0.47	-0.93 \pm 0.42	0.44 \pm 0.74	NA	9.33 \pm 1.13	19.14 \pm 1.33	18.69 \pm 2.82	17.39 \pm 0.70	14.64 \pm 1.19	11.22 \pm 2.78	2.90 \pm 2.03
	2018	-0.99 \pm 0.50	NA	NA	NA	NA	NA	17.29 \pm 1.52	20.42 \pm 1.12	16.63 \pm 2.68	10.55 \pm 2.32	6.85 \pm 1.65	1.47 \pm 1.14
March Water	2016	-1.15 \pm 0.24	-0.64 \pm 0.21	-0.31 \pm 0.33	2.37 \pm 1.81	NA	16.84 \pm 1.51	19.48 \pm 1.82	21.37 \pm 0.83	20.06 \pm 0.75	10.84 \pm 1.57	7.16 \pm 0.81	-1.04 \pm 0.59
	2017	-0.93 \pm 0.16	-0.68 \pm 0.10	-0.51 \pm 0.18	2.31 \pm 2.39	10.42 \pm 0.84	14.89 \pm 3.26	20.84 \pm 1.35	21.22 \pm 0.81	17.99 \pm 0.71	13.63 \pm 1.28	7.39 \pm 2.87	-0.21 \pm 1.70
	2018	-1.35 \pm 0.23	-1.31 \pm 0.13	-1.28 \pm 0.17	0.91 \pm 2.00	10.88 \pm 1.02	13.39 \pm 1.37	21.39 \pm 1.39	22.55 \pm 1.04	17.44 \pm 2.25	9.32 \pm 3.56	4.56 \pm 2.57	-0.84 \pm 0.82
Murray River	2016	NA	NA	NA	NA	NA	14.47 \pm 1.67	17.79 \pm 2.31	20.04 \pm 1.00	17.67 \pm 2.07	13.05 \pm 1.83	8.99 \pm 0.72	1.17 \pm 1.25
	2017	-0.25 \pm 0.77	-1.01 \pm 0.38	-0.67 \pm 0.43	1.46 \pm 1.68	NA	13.06 \pm 2.27	19.37 \pm 1.47	19.76 \pm 2.12	18.07 \pm 0.72	14.59 \pm 1.05	9.56 \pm 2.21	2.19 \pm 2.49
	2018	-1.26 \pm 0.27	-1.20 \pm 0.23	-0.67 \pm 0.35	1.13 \pm 1.13	8.72 \pm 1.41	11.82 \pm 1.47	19.77 \pm 1.91	21.73 \pm 1.06	17.99 \pm 2.08	10.53 \pm 2.70	6.20 \pm 2.47	0.25 \pm 1.08
New London Bay	2016	-1.03 \pm 0.40	-0.92 \pm 0.26	-0.62 \pm 0.23	5.44 \pm 1.60	11.50 \pm 2.07	14.61 \pm 2.30	19.93 \pm 2.01	21.04 \pm 0.90	17.84 \pm 2.81	11.90 \pm 1.83	7.23 \pm 0.86	-0.51 \pm 0.88
	2017	-1.11 \pm 0.26	-1.25 \pm 0.26	-0.84 \pm 0.18	0.75 \pm 1.72	10.82 \pm 0.90	13.41 \pm 1.61	21.48 \pm 0.97	20.81 \pm 1.03	18.03 \pm 0.81	13.56 \pm 1.34	6.67 \pm 2.88	0.46 \pm 1.89
	2018	-1.20 \pm 0.46	-1.22 \pm 0.23	-0.96 \pm 0.25	1.21 \pm 2.75	11.81 \pm 1.32	13.86 \pm 1.44	22.09 \pm 1.10	22.76 \pm 0.99	19.00 \pm 1.67	7.71 \pm 1.75	5.61 \pm 2.44	-0.32 \pm 0.75
Nine Mile Creek	2016	NA	NA	NA	NA	NA	16.5 \pm 1.62	18.48 \pm 1.77	20.50 \pm 0.54	18.27 \pm 1.88	13.03 \pm 1.59	8.62 \pm 0.85	NA
	2017	NA	NA	NA	NA	NA	14.21 \pm 2.01	18.93 \pm 0.97	20.32 \pm 0.85	17.90 \pm 0.50	14.56 \pm 1.11	8.95 \pm 2.38	NA
	2018	NA	NA	NA	NA	9.48 \pm 0.77	11.21 \pm 1.57	20.27 \pm 2.10	21.21 \pm 0.64	17.54 \pm 1.45	10.78 \pm 3.04	5.90 \pm 2.23	NA
Tracadie Bay	2016	NA	NA	NA	NA	NA	17.6 \pm 1.23	18.80 \pm 2.17	20.39 \pm 0.84	19.60 \pm 0.94	NA	NA	-0.20 \pm 1.10
	2017	-1.06 \pm 0.52	-1.33 \pm 0.20	-1.04 \pm 0.32	1.03 \pm 2.06	NA	17.35 \pm 1.01	19.98 \pm 1.51	20.45 \pm 1.08	17.72 \pm 0.78	13.65 \pm 1.65	7.05 \pm 2.45	0.81 \pm 2.16
	2018	-1.35 \pm 0.47	-1.45 \pm 0.20	-1.26 \pm 0.32	1.34 \pm 2.48	8.61 \pm 1.32	NA	21.02 \pm 2.11	23.51 \pm 1.03	17.41 \pm 2.58	9.75 \pm 2.81	4.94 \pm 2.95	-0.46 \pm 1.16

Table 4. Monthly salinity values (ppt) (mean \pm SD) recorded at 6 MMP sites on PEI between 2016 and 2018. NA denotes no data available for that month.

Site	Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Brudenell River	2016	30.94 \pm 0.14	30.88 \pm 0.32	31.29 \pm 0.25	31.42 \pm 0.23	NA	31.68 \pm 0.15	31.16 \pm 0.27	30.19 \pm 0.48	28.91 \pm 1.22	27.26 \pm 0.28	26.65 \pm 0.92	27.52 \pm 0.35
	2017	27.54 \pm 0.34	27.96 \pm 0.29	27.66 \pm 0.51	27.25 \pm 0.42	NA	28.66 \pm 0.32	27.37 \pm 0.59	27.21 \pm 0.51	27.55 \pm 0.23	27.62 \pm 0.21	27.87 \pm 0.19	28.05 \pm 0.29
	2018	28.30 \pm 0.26	NA	NA	NA	NA	NA	28.40 \pm 0.21	27.71 \pm 0.62	28.36 \pm 0.40	28.65 \pm 0.19	28.43 \pm 0.23	28.31 \pm 0.31
March Water	2016	29.53 \pm 0.83	30.58 \pm 0.20	29.71 \pm 0.40	28.48 \pm 0.81	NA	NA	30.90 \pm 0.11	30.88 \pm 0.13	30.64 \pm 0.12	30.25 \pm 0.36	28.50 \pm 0.23	29.48 \pm 0.50
	2017	30.18 \pm 0.26	30.14 \pm 0.04	28.37 \pm 0.23	26.81 \pm 1.08	27.27 \pm 0.24	27.04 \pm 0.24	26.99 \pm 0.14	26.93 \pm 0.17	27.27 \pm 0.11	27.52 \pm 0.20	27.80 \pm 0.24	28.19 \pm 0.64
	2018	29.64 \pm 0.23	29.52 \pm 0.18	29.24 \pm 0.26	28.14 \pm 0.66	28.29 \pm 0.24	28.30 \pm 0.16	27.61 \pm 0.09	26.09 \pm 1.64	27.86 \pm 0.16	27.84 \pm 0.20	27.19 \pm 0.65	28.47 \pm 0.47
Murray River	2016	NA	NA	NA	NA	NA	31.35 \pm 0.23	30.94 \pm 0.38	30.10 \pm 0.35	28.85 \pm 1.34	27.14 \pm 0.42	27.30 \pm 0.40	27.48 \pm 0.36
	2017	27.70 \pm 0.35	28.08 \pm 0.26	27.91 \pm 0.33	27.04 \pm 0.39	NA	28.51 \pm 0.40	27.37 \pm 0.58	24.61 \pm 1.56	27.47 \pm 0.37	27.56 \pm 0.50	28.45 \pm 0.35	27.76 \pm 0.62
	2018	28.04 \pm 0.33	28.12 \pm 0.27	27.68 \pm 0.39	27.95 \pm 0.51	28.69 \pm 0.38	28.69 \pm 0.37	28.18 \pm 0.35	27.79 \pm 0.37	27.83 \pm 0.31	28.22 \pm 0.37	28.07 \pm 0.37	27.21 \pm 0.46
New London Bay	2016	30.48 \pm 1.14	31.74 \pm 0.11	31.57 \pm 0.20	25.81 \pm 1.31	27.08 \pm 0.77	27.63 \pm 0.38	27.38 \pm 0.43	26.77 \pm 0.35	26.58 \pm 0.22	26.58 \pm 0.22	26.58 \pm 0.35	28.72 \pm 0.71
	2017	29.49 \pm 0.51	30.32 \pm 0.34	30.22 \pm 0.17	29.51 \pm 0.88	26.72 \pm 0.89	26.74 \pm 0.52	25.35 \pm 0.24	25.57 \pm 0.76	27.14 \pm 0.24	27.34 \pm 0.24	27.85 \pm 0.24	28.37 \pm 0.53
	2018	29.82 \pm 0.19	29.94 \pm 0.16	29.38 \pm 0.41	28.82 \pm 0.88	27.15 \pm 0.42	26.91 \pm 0.37	26.40 \pm 0.30	26.54 \pm 0.30	27.19 \pm 0.20	27.18 \pm 0.41	26.06 \pm 0.69	28.65 \pm 0.71
Nine Mile Creek	2016	NA	NA	NA	NA	NA	30.41 \pm 0.09	30.43 \pm 0.11	30.62 \pm 0.16	29.40 \pm 1.22	27.80 \pm 0.13	27.49 \pm 0.12	NA
	2017	NA	NA	NA	NA	NA	27.35 \pm 0.10	27.57 \pm 0.16	27.78 \pm 0.20	28.16 \pm 0.11	28.16 \pm 0.16	28.14 \pm 0.08	NA
	2018	NA	NA	NA	NA	27.93 \pm 0.08	28.08 \pm 0.10	28.17 \pm 0.07	28.21 \pm 0.14	28.49 \pm 0.11	28.14 \pm 0.21	27.38 \pm 0.20	NA
Tracadie Bay	2016	NA	NA	NA	NA	NA	30.80 \pm 0.19	30.45 \pm 0.35	29.92 \pm 0.32	29.49 \pm 0.25	NA	NA	27.96 \pm 0.68
	2017	28.22 \pm 0.61	28.94 \pm 0.42	28.77 \pm 0.28	28.32 \pm 0.71	NA	26.69 \pm 0.38	26.07 \pm 0.21	26.00 \pm 0.28	26.89 \pm 0.30	27.62 \pm 0.50	28.38 \pm 0.17	28.60 \pm 0.48
	2018	29.80 \pm 0.40	30.11 \pm 0.28	30.06 \pm 0.32	29.54 \pm 0.55	29.17 \pm 0.27	NA	27.41 \pm 0.12	27.22 \pm 0.18	28.30 \pm 0.31	28.37 \pm 0.41	28.07 \pm 0.59	28.65 \pm 0.51

Table 5. Monthly Fluorescent Dissolved Organic Matter values (RFU) (mean \pm SD) recorded at 6 MMP sites on PEI between 2016 and 2018. NA denotes no data available for that month.

Site	Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Brudenell River	2016	0.78 \pm 0.11	0.59 \pm 0.10	0.39 \pm 0.06	0.36 \pm 0.08	NA	0.40 \pm 0.06	0.40 \pm 0.27	0.62 \pm 0.25	0.60 \pm 0.56	0.06 \pm 0.28	-0.18 \pm 0.14	1.20 \pm 0.17
	2017	1.24 \pm 0.17	0.78 \pm 0.25	0.55 \pm 0.12	0.68 \pm 0.16	NA	0.35 \pm 0.13	1.84 \pm 0.20	2.01 \pm 0.45	2.22 \pm 0.20	1.98 \pm 0.23	1.81 \pm 0.43	0.31 \pm 0.13
	2018	0.23 \pm 0.06	NA	NA	NA	NA	NA	1.96 \pm 0.20	2.51 \pm 0.63	2.12 \pm 0.24	0.72 \pm 0.77	0.48 \pm 0.18	2.19 \pm 0.17
March Water	2016	2.81 \pm 0.52	2.26 \pm 0.19	2.00 \pm 0.36	1.56 \pm 0.29	NA	1.40 \pm 0.13	3.52 \pm 2.05	2.81 \pm 0.66	2.57 \pm 0.81	0.58 \pm 0.43	0.51 \pm 0.33	2.69 \pm 0.29
	2017	2.12 \pm 0.14	2.25 \pm 0.04	1.79 \pm 0.38	1.34 \pm 0.22	1.11 \pm 0.21	1.12 \pm 0.31	2.84 \pm 1.11	2.86 \pm 1.42	1.82 \pm 0.71	1.94 \pm 0.68	2.45 \pm 0.27	4.65 \pm 0.63
	2018	5.04 \pm 0.53	4.98 \pm 0.57	4.07 \pm 0.57	3.40 \pm 0.55	2.25 \pm 0.13	2.22 \pm 0.17	0.94 \pm 0.39	1.45 \pm 0.64	1.63 \pm 0.58	1.48 \pm 0.43	2.10 \pm 0.70	2.55 \pm 0.41
Murray River	2016	NA	NA	NA	NA	NA	0.64 \pm 0.16	0.39 \pm 0.24	0.82 \pm 0.35	0.54 \pm 0.30	0.47 \pm 0.40	0.72 \pm 0.69	1.08 \pm 0.42
	2017	0.68 \pm 0.12	0.56 \pm 0.08	0.54 \pm 0.08	0.53 \pm 0.11	NA	-0.46 \pm 0.40	-0.46 \pm 0.25	0.42 \pm 1.05	1.98 \pm 0.38	1.36 \pm 0.77	0.53 \pm 0.36	7.21 \pm 0.65
	2018	6.41 \pm 0.56	6.26 \pm 0.38	5.80 \pm 0.45	5.31 \pm 0.38	2.95 \pm 0.43	2.29 \pm 1.89	-0.03 \pm 0.19	0.06 \pm 0.27	-0.01 \pm 0.20	0.04 \pm 0.90	0.61 \pm 0.46	2.84 \pm 0.45
New London Bay	2016	0.09 \pm 0.23	-0.41 \pm 0.12	-0.60 \pm 0.05	0.13 \pm 0.20	0.09 \pm 0.12	0.07 \pm 0.10	0.25 \pm 1.26	0.69 \pm 0.29	0.98 \pm 0.28	0.88 \pm 0.23	0.74 \pm 0.18	0.51 \pm 0.20
	2017	0.29 \pm 0.06	0.35 \pm 0.10	0.19 \pm 0.08	0.08 \pm 0.09	0.21 \pm 0.24	0.17 \pm 0.17	0.73 \pm 0.21	1.36 \pm 0.91	2.64 \pm 0.34	1.89 \pm 0.52	0.76 \pm 0.12	1.95 \pm 0.13
	2018	1.72 \pm 0.09	-11.89 \pm 9.09	-18.38 \pm 0.33	-18.75 \pm 0.27	2.04 \pm 1.60	2.12 \pm 0.18	0.16 \pm 0.16	0.94 \pm 0.54	3.10 \pm 0.24	2.75 \pm 0.22	2.76 \pm 0.52	0.71 \pm 0.09
Nine Mile Creek	2016	NA	NA	NA	NA	NA	0.36 \pm 0.05	1.46 \pm 1.29	0.35 \pm 0.50	0.34 \pm 0.18	0.15 \pm 0.09	0.98 \pm 0.60	NA
	2017	NA	NA	NA	NA	NA	-0.27 \pm 0.07	0.90 \pm 1.38	1.46 \pm 0.59	2.00 \pm 0.17	1.83 \pm 0.32	1.76 \pm 0.13	NA
	2018	NA	NA	NA	NA	2.17 \pm 0.26	1.33 \pm 0.31	2.43 \pm 0.31	2.26 \pm 0.27	2.07 \pm 0.20	2.13 \pm 0.15	2.27 \pm 0.30	NA
Tracadie Bay	2016	NA	NA	NA	NA	NA	0.49 \pm 0.12	0.52 \pm 0.50	0.70 \pm 0.39	1.33 \pm 0.49	NA	NA	1.61 \pm 1.04
	2017	1.15 \pm 0.45	1.01 \pm 0.21	0.77 \pm 0.28	0.68 \pm 0.38	NA	1.09 \pm 0.23	0.74 \pm 0.42	0.61 \pm 0.39	0.40 \pm 0.48	0.45 \pm 0.51	0.73 \pm 0.63	6.38 \pm 0.77
	2018	5.60 \pm 0.43	5.81 \pm 0.69	5.60 \pm 0.63	5.92 \pm 1.05	6.88 \pm 1.09	NA	-0.13 \pm 0.45	0.08 \pm 0.33	0.32 \pm 0.34	0.46 \pm 0.40	1.32 \pm 0.98	0.78 \pm 0.37

Table 6. Monthly dissolved oxygen values (mg per L) (mean \pm SD) recorded at 6 MMP sites on PEI between 2016 and 2018. NA denotes no data available for that month.

Site	Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Brudenell River	2016	11.43 \pm 0.15	12.30 \pm 0.51	12.56 \pm 0.25	12.12 \pm 0.06	NA	9.77 \pm 0.24	8.67 \pm 0.54	7.90 \pm 0.50	7.64 \pm 0.44	8.35 \pm 0.34	9.02 \pm 0.37	10.28 \pm 0.50
	2017	11.10 \pm 0.25	11.61 \pm 0.19	12.53 \pm 0.59	12.26 \pm 0.28	NA	NA	8.27 \pm 0.50	7.88 \pm 0.59	7.80 \pm 0.41	7.69 \pm 1.62	7.58 \pm 2.65	10.96 \pm 0.57
	2018	12.29 \pm 0.18	NA	NA	NA	NA	NA	8.43 \pm 0.53	7.94 \pm 0.66	7.89 \pm 0.47	8.91 \pm 0.52	9.83 \pm 0.46	11.19 \pm 0.41
March Water	2016	13.00 \pm 0.79	14.81 \pm 0.92	13.56 \pm 1.31	11.67 \pm 0.37	NA	NA	8.60 \pm 0.45	7.70 \pm 0.44	7.35 \pm 0.44	7.78 \pm 0.37	8.97 \pm 0.38	9.77 \pm 0.22
	2017	11.72 \pm 0.37	12.81 \pm 0.19	NA	NA	9.80 \pm 0.30	8.88 \pm 0.73	7.66 \pm 0.40	7.47 \pm 0.41	7.89 \pm 0.37	8.60 \pm 0.33	9.86 \pm 0.67	12.07 \pm 0.60
	2018	12.66 \pm 0.31	13.03 \pm 0.24	13.32 \pm 0.38	12.84 \pm 0.77	9.60 \pm 0.21	9.19 \pm 0.38	7.71 \pm 0.35	7.31 \pm 0.48	8.07 \pm 0.45	9.62 \pm 0.75	10.87 \pm 0.72	12.22 \pm 0.35
Murray River	2016	NA	NA	NA	NA	NA	9.45 \pm 0.34	8.66 \pm 0.46	7.82 \pm 0.45	7.90 \pm 0.44	8.54 \pm 0.33	9.19 \pm 0.27	10.63 \pm 0.45
	2017	11.32 \pm 0.31	11.19 \pm 0.45	12.24 \pm 0.50	11.75 \pm 0.36	NA	9.73 \pm 0.60	8.41 \pm 0.34	8.08 \pm 0.45	7.91 \pm 0.32	8.39 \pm 0.28	9.08 \pm 0.51	11.19 \pm 0.75
	2018	12.27 \pm 0.33	12.89 \pm 0.38	13.04 \pm 0.34	12.50 \pm 0.50	10.48 \pm 0.38	9.63 \pm 0.48	8.62 \pm 0.33	7.88 \pm 0.52	7.97 \pm 0.39	9.14 \pm 0.52	10.04 \pm 0.63	11.79 \pm 0.40
New London Bay	2016	12.41 \pm 0.59	13.16 \pm 0.99	13.78 \pm 1.04	12.38 \pm 0.64	10.53 \pm 1.04	9.46 \pm 0.47	8.37 \pm 0.67	6.96 \pm 0.86	7.34 \pm 0.92	8.76 \pm 0.55	9.76 \pm 0.43	11.27 \pm 0.32
	2017	11.68 \pm 0.22	11.41 \pm 0.70	12.28 \pm 1.03	12.65 \pm 0.60	10.50 \pm 0.48	9.81 \pm 0.62	8.40 \pm 0.62	7.71 \pm 0.75	6.99 \pm 0.70	8.36 \pm 0.81	10.18 \pm 0.63	11.85 \pm 0.58
	2018	12.32 \pm 0.20	12.11 \pm 0.37	12.30 \pm 0.26	12.44 \pm 0.89	9.89 \pm 0.38	9.37 \pm 0.51	7.96 \pm 0.60	7.58 \pm 0.83	7.51 \pm 0.54	10.00 \pm 0.48	10.50 \pm 0.66	11.88 \pm 0.27
Nine Mile Creek	2016	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	2017	NA	NA	NA	NA	NA	9.44 \pm 0.77	8.21 \pm 0.40	7.82 \pm 0.40	7.99 \pm 0.34	8.60 \pm 0.39	9.42 \pm 0.40	NA
	2018	NA	NA	NA	NA	10.05 \pm 0.20	9.96 \pm 0.35	7.95 \pm 0.50	7.68 \pm 0.46	8.11 \pm 0.35	9.22 \pm 0.52	10.30 \pm 0.58	NA
Tracadie Bay	2016	NA	NA	NA	NA	NA	8.67 \pm 0.26	8.31 \pm 0.36	7.82 \pm 0.37	7.88 \pm 0.38	NA	NA	11.46 \pm 0.43
	2017	11.87 \pm 0.28	11.97 \pm 0.37	12.59 \pm 0.59	12.09 \pm 0.57	NA	8.47 \pm 0.37	7.91 \pm 0.50	7.51 \pm 0.63	7.87 \pm 0.42	8.51 \pm 0.36	10.00 \pm 0.63	11.67 \pm 0.75
	2018	12.42 \pm 0.22	12.83 \pm 0.37	13.43 \pm 0.49	12.31 \pm 0.91	10.08 \pm 0.38	NA	8.11 \pm 0.56	7.24 \pm 0.42	8.05 \pm 0.55	9.54 \pm 0.74	10.72 \pm 0.84	12.80 \pm 0.50

Table 7. Monthly total dissolved solids values (g per L) (mean \pm SD) recorded at 6 MMP sites on PEI between 2016 and 2018. NA denotes no data available for that month.

Site	Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Brudenell River	2016	32.33 \pm 0.13	32.41 \pm 0.33	32.81 \pm 0.28	32.78 \pm 0.28	NA	31.60 \pm 0.17	31.06 \pm 0.26	30.17 \pm 0.43	29.02 \pm 1.09	27.58 \pm 0.25	27.16 \pm 0.83	28.64 \pm 0.30
	2017	29.02 \pm 0.38	29.67 \pm 0.33	29.35 \pm 0.54	28.69 \pm 0.52	NA	29.03 \pm 0.32	27.62 \pm 0.54	27.49 \pm 0.48	27.79 \pm 0.21	27.88 \pm 0.19	28.23 \pm 0.24	29.10 \pm 0.52
	2018	30.00 \pm 0.30	NA	NA	NA	NA	NA	28.57 \pm 0.20	27.93 \pm 0.57	28.54 \pm 0.41	28.97 \pm 0.23	28.99 \pm 0.26	29.53 \pm 0.29
March Water	2016	31.21 \pm 0.78	32.10 \pm 0.22	31.20 \pm 0.37	29.57 \pm 0.74	NA	NA	30.81 \pm 0.11	30.79 \pm 0.11	30.58 \pm 0.11	30.23 \pm 0.31	28.74 \pm 0.16	29.02 \pm 0.20
	2017	31.79 \pm 0.27	31.69 \pm 0.04	29.95 \pm 0.24	28.02 \pm 1.30	27.69 \pm 0.24	27.38 \pm 0.27	27.29 \pm 0.13	27.23 \pm 0.16	27.53 \pm 0.10	27.82 \pm 0.20	28.40 \pm 0.34	29.76 \pm 0.84
	2018	31.37 \pm 0.25	31.25 \pm 0.21	30.97 \pm 0.28	29.49 \pm 0.88	28.61 \pm 0.23	28.54 \pm 0.17	27.86 \pm 0.08	26.48 \pm 1.52	28.08 \pm 0.16	28.32 \pm 0.23	28.09 \pm 0.69	30.13 \pm 0.54
Murray River	2016	NA	NA	NA	NA	NA	31.26 \pm 0.24	30.85 \pm 0.36	30.09 \pm 0.32	28.96 \pm 1.20	27.49 \pm 0.39	27.79 \pm 0.36	28.80 \pm 0.44
	2017	29.26 \pm 0.41	29.78 \pm 0.33	29.54 \pm 0.38	28.34 \pm 0.60	NA	28.74 \pm 0.39	27.65 \pm 0.53	25.08 \pm 1.49	27.71 \pm 0.33	27.83 \pm 0.47	28.84 \pm 0.37	28.94 \pm 0.73
	2018	29.80 \pm 0.34	29.86 \pm 0.30	29.32 \pm 0.41	29.25 \pm 0.58	29.09 \pm 0.42	28.93 \pm 0.37	28.37 \pm 0.31	28.02 \pm 0.33	28.04 \pm 0.29	28.59 \pm 0.39	28.74 \pm 0.37	28.70 \pm 0.58
New London Bay	2016	32.09 \pm 1.11	33.28 \pm 0.14	33.04 \pm 0.21	26.68 \pm 1.36	27.48 \pm 0.66	27.90 \pm 0.37	27.64 \pm 0.38	27.08 \pm 0.32	26.92 \pm 0.21	27.00 \pm 0.23	27.24 \pm 0.33	30.30 \pm 0.73
	2017	31.16 \pm 0.52	32.00 \pm 0.37	31.80 \pm 0.18	30.83 \pm 1.06	27.16 \pm 0.84	27.11 \pm 0.49	25.79 \pm 0.22	25.99 \pm 0.70	27.41 \pm 0.22	27.65 \pm 0.22	28.50 \pm 0.35	29.81 \pm 0.82
	2018	31.51 \pm 0.22	31.62 \pm 0.16	31.03 \pm 0.39	30.13 \pm 1.19	27.53 \pm 0.41	27.25 \pm 0.34	26.76 \pm 0.28	26.89 \pm 0.28	27.45 \pm 0.18	27.77 \pm 0.37	26.92 \pm 0.67	30.19 \pm 0.79
Nine Mile Creek	2016	NA	NA	NA	NA	NA	30.38 \pm 0.10	30.39 \pm 0.09	30.56 \pm 0.14	29.46 \pm 1.10	28.09 \pm 0.10	27.99 \pm 0.14	NA
	2017	NA	NA	NA	NA	NA	27.66 \pm 0.11	27.81 \pm 0.15	28.00 \pm 0.18	28.34 \pm 0.10	28.38 \pm 0.14	28.59 \pm 0.19	NA
	2018	NA	NA	NA	NA	28.34 \pm 0.07	28.41 \pm 0.14	28.36 \pm 0.06	28.40 \pm 0.12	28.64 \pm 0.10	28.50 \pm 0.14	28.12 \pm 0.25	NA
Tracadie Bay	2016	NA	NA	NA	NA	NA	30.72 \pm 0.17	30.41 \pm 0.32	29.93 \pm 0.29	29.54 \pm 0.22	NA	NA	29.51 \pm 0.72
	2017	29.92 \pm 0.62	30.69 \pm 0.43	30.45 \pm 0.29	29.65 \pm 0.98	NA	27.00 \pm 0.35	26.44 \pm 0.18	26.38 \pm 0.25	27.18 \pm 0.28	27.90 \pm 0.49	28.95 \pm 0.19	29.97 \pm 0.78
	2018	31.52 \pm 0.44	31.85 \pm 0.27	31.75 \pm 0.29	30.78 \pm 0.79	29.54 \pm 0.34	NA	27.68 \pm 0.10	27.52 \pm 0.17	28.48 \pm 0.30	28.76 \pm 0.32	28.89 \pm 0.60	30.22 \pm 0.59

Table 8. Monthly depth of sonde measurement (m) (mean \pm SD) recorded at 6 MMP sites on PEI between 2016 and 2018. NA denotes no data available for that month.

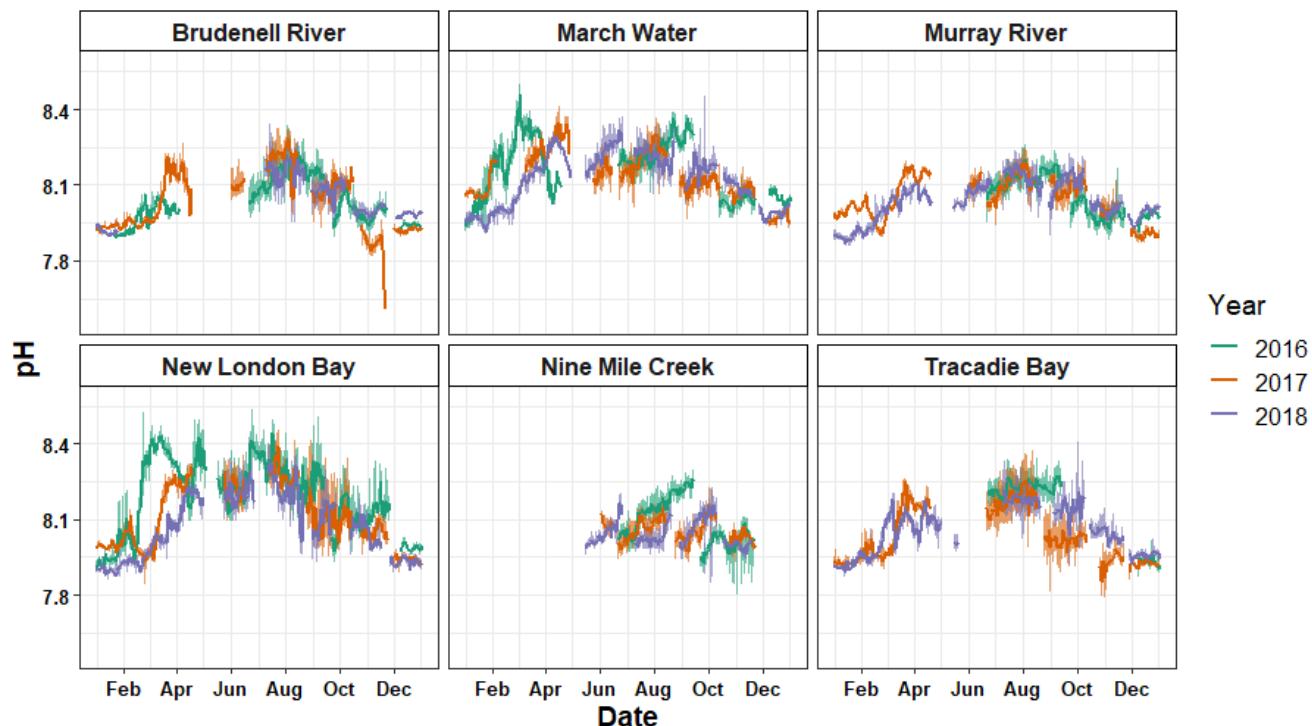
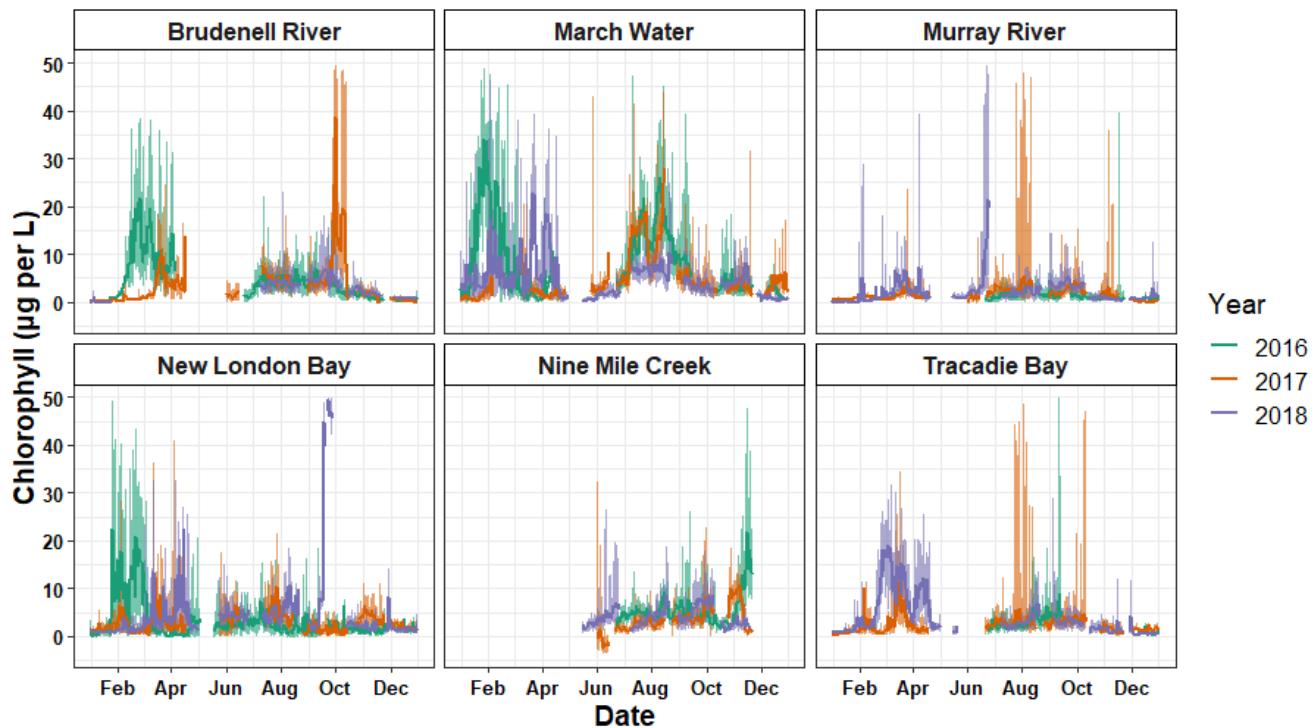
Site	Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Brudenell River	2016	11.34 \pm 0.39	11.45 \pm 0.47	11.18 \pm 0.37	10.75 \pm 0.31	NA	3.60 \pm 0.35	3.80 \pm 0.37	3.81 \pm 0.36	3.93 \pm 0.32	4.08 \pm 0.38	4.23 \pm 0.28	4.13 \pm 0.42
	2017	4.15 \pm 0.38	4.59 \pm 0.38	4.11 \pm 0.46	4.35 \pm 0.89	NA	3.47 \pm 0.35	4.74 \pm 0.39	4.50 \pm 0.36	4.05 \pm 0.33	3.35 \pm 1.29	3.25 \pm 1.45	3.97 \pm 0.40
	2018	4.09 \pm 0.38	NA	NA	NA	NA	NA	3.88 \pm 0.38	4.00 \pm 0.39	4.49 \pm 0.43	4.63 \pm 0.39	4.76 \pm 0.37	4.63 \pm 0.40
March Water	2016	2.69 \pm 0.29	2.60 \pm 0.28	2.56 \pm 0.26	2.64 \pm 0.24	NA	4.47 \pm 0.20	4.64 \pm 0.25	4.59 \pm 0.24	4.65 \pm 0.23	4.81 \pm 0.26	4.65 \pm 0.28	2.65 \pm 0.33
	2017	2.57 \pm 0.31	2.56 \pm 0.20	2.74 \pm 0.25	2.78 \pm 0.21	4.14 \pm 0.36	4.47 \pm 0.37	4.84 \pm 0.24	4.81 \pm 0.21	4.81 \pm 0.22	5.01 \pm 0.24	4.78 \pm 0.45	4.38 \pm 0.31
	2018	4.38 \pm 0.28	4.33 \pm 0.26	4.42 \pm 0.23	4.40 \pm 0.24	4.65 \pm 0.27	4.72 \pm 0.26	4.34 \pm 0.24	4.44 \pm 0.25	4.47 \pm 0.27	4.34 \pm 0.28	4.36 \pm 0.37	5.65 \pm 0.26
Murray River	2016	NA	NA	NA	NA	NA	3.72 \pm 0.35	3.85 \pm 0.45	4.40 \pm 0.42	3.94 \pm 0.57	3.48 \pm 0.45	3.23 \pm 0.51	3.70 \pm 0.43
	2017	3.66 \pm 0.41	3.70 \pm 0.39	3.69 \pm 0.39	3.70 \pm 0.36	NA	3.44 \pm 0.40	3.75 \pm 0.37	4.11 \pm 0.33	3.81 \pm 0.89	3.53 \pm 0.69	4.36 \pm 0.43	3.54 \pm 0.40
	2018	3.56 \pm 0.39	3.57 \pm 0.39	3.64 \pm 0.37	2.93 \pm 1.19	2.90 \pm 0.39	3.09 \pm 0.38	3.03 \pm 0.58	3.02 \pm 0.47	2.95 \pm 0.52	3.66 \pm 0.83	4.39 \pm 0.54	1.39 \pm 0.25
New London Bay	2016	3.05 \pm 0.26	2.99 \pm 0.24	3.24 \pm 0.23	0.84 \pm 0.68	0.66 \pm 0.05	0.60 \pm 0.09	0.61 \pm 0.04	0.65 \pm 0.05	0.69 \pm 0.07	0.69 \pm 0.10	0.64 \pm 0.10	2.81 \pm 0.32
	2017	2.73 \pm 0.28	2.95 \pm 0.27	2.99 \pm 0.23	3.02 \pm 0.19	0.85 \pm 0.06	0.77 \pm 0.06	1.49 \pm 0.05	1.33 \pm 0.28	0.92 \pm 0.07	0.96 \pm 0.09	0.94 \pm 0.12	2.81 \pm 0.28
	2018	2.83 \pm 0.24	2.56 \pm 0.27	2.51 \pm 0.20	2.48 \pm 0.22	0.65 \pm 0.16	0.60 \pm 0.06	0.65 \pm 0.05	0.58 \pm 0.05	0.64 \pm 0.07	0.65 \pm 0.08	0.78 \pm 0.37	2.78 \pm 0.24
Nine Mile Creek	2016	NA	NA	NA	NA	NA	2.49 \pm 0.47	2.79 \pm 0.62	2.94 \pm 0.61	2.90 \pm 0.51	2.97 \pm 0.70	3.16 \pm 0.72	NA
	2017	NA	NA	NA	NA	NA	3.05 \pm 0.70	3.31 \pm 0.71	3.35 \pm 0.65	3.24 \pm 0.69	2.58 \pm 0.84	1.82 \pm 0.46	NA
	2018	NA	NA	NA	NA	2.91 \pm 0.45	3.54 \pm 0.68	3.43 \pm 0.71	3.62 \pm 0.71	3.57 \pm 0.68	3.27 \pm 0.62	3.72 \pm 0.62	NA
Tracadie Bay	2016	NA	NA	NA	NA	NA	2.33 \pm 0.21	2.71 \pm 0.36	2.43 \pm 0.65	2.30 \pm 0.25	NA	NA	1.98 \pm 0.34
	2017	1.88 \pm 0.28	1.94 \pm 0.18	2.03 \pm 0.22	1.96 \pm 0.19	NA	3.16 \pm 0.27	3.28 \pm 0.23	3.45 \pm 0.19	3.51 \pm 0.21	3.59 \pm 0.21	2.62 \pm 0.74	3.13 \pm 0.28
	2018	3.10 \pm 0.24	3.07 \pm 0.23	3.12 \pm 0.22	3.11 \pm 0.24	2.40 \pm 0.29	NA	2.31 \pm 0.22	2.40 \pm 0.21	3.29 \pm 0.21	3.31 \pm 0.23	3.42 \pm 0.27	3.66 \pm 0.25

Table 9. Monthly mussel shell length values (mm) (mean \pm SD) recorded at 6 MMP sites on PEI between May and December of 2016 to 2018. NA denotes no data available for that month. Instances of only one measurement per month are presented without SD.

Site	Year	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Brudenell River	2016	31.90 \pm 1.01	37.66 \pm 4.77	41.30 \pm 0.65	43.44 \pm 1.22	46.48 \pm 1.46	48.10 \pm 1.82	54.90 \pm 2.38	NA
	2017	37.80 \pm 0.36	37.55 \pm 0.25	39.05 \pm 1.16	41.50 \pm 1.56	44.35 \pm 2.40	51.43 \pm 1.59	53.68 \pm 0.70	53.50
	2018	38.93 \pm 0.84	39.83 \pm 1.20	40.36 \pm 1.08	41.65 \pm 1.66	46.53 \pm 1.44	49.38 \pm 0.56	50.30 \pm 2.08	NA
March Water	2016	23.70 \pm 3.11	29.58 \pm 1.54	33.23 \pm 0.96	36.43 \pm 2.42	45.45 \pm 6.05	49.45 \pm 1.38	52.90 \pm 4.44	53.00
	2017	40.70 \pm 1.05	43.70 \pm 1.70	45.20 \pm 2.54	47.85 \pm 1.36	48.83 \pm 0.39	50.93 \pm 2.17	53.00 \pm 1.65	52.30
	2018	40.85 \pm 1.20	40.50 \pm 0.72	43.32 \pm 1.08	45.23 \pm 1.18	52.65 \pm 3.88	51.73 \pm 1.02	55.10 \pm 0.35	NA
Murray River	2016	32.40 \pm 0.75	35.65 \pm 1.35	38.53 \pm 0.98	42.48 \pm 1.20	45.94 \pm 2.08	48.35 \pm 2.02	49.18 \pm 1.94	50.00
	2017	34.77 \pm 0.06	36.45 \pm 0.64	37.70 \pm 1.60	40.68 \pm 2.39	43.95 \pm 1.04	46.63 \pm 1.91	50.82 \pm 1.53	53.80
	2018	38.03 \pm 0.89	38.50 \pm 0.55	39.68 \pm 1.63	41.27 \pm 1.70	49.10 \pm 0.52	51.05 \pm 0.79	54.23 \pm 1.85	NA
New London Bay	2016	36.93 \pm 2.46	43.46 \pm 1.86	47.48 \pm 1.52	47.35 \pm 1.06	51.03 \pm 6.36	57.25 \pm 4.12	58.30 \pm 2.29	56.40
	2017	43.08 \pm 0.63	44.68 \pm 1.12	45.30 \pm 0.95	48.13 \pm 3.70	53.68 \pm 1.13	55.28 \pm 1.36	NA	NA
	2018	37.63 \pm 2.15	40.40 \pm 1.52	41.78 \pm 2.33	43.70 \pm 1.32	47.95 \pm 0.83	49.14 \pm 0.77	56.50 \pm 0.85	NA
Nine Mile Creek	2016	35.43 \pm 0.75	37.50 \pm 1.12	39.20 \pm 0.85	41.43 \pm 1.46	44.24 \pm 3.45	52.08 \pm 1.52	54.68 \pm 4.59	NA
	2017	39.78 \pm 1.23	41.88 \pm 0.95	43.38 \pm 0.17	45.60 \pm 1.08	47.85 \pm 0.54	52.95 \pm 3.44	57.28 \pm 1.48	57.30
	2018	32.40 \pm 0.99	35.40 \pm 0.34	37.60 \pm 1.39	38.75 \pm 0.93	43.70 \pm 2.92	52.26 \pm 1.23	53.95 \pm 0.97	NA
Tracadie Bay	2016	37.53 \pm 2.53	40.73 \pm 2.28	40.80 \pm 0.77	50.40 \pm 0.71	51.45 \pm 1.63	54.54 \pm 1.54	54.43 \pm 1.16	53.70
	2017	35.57 \pm 1.42	38.15 \pm 0.07	39.50 \pm 0.84	41.94 \pm 2.02	46.60 \pm 4.49	49.05 \pm 2.83	51.93 \pm 2.95	53.40
	2018	35.75 \pm 1.77	39.68 \pm 0.95	40.78 \pm 0.96	42.44 \pm 0.82	48.00 \pm 1.97	51.30 \pm 1.32	52.03 \pm 1.42	NA

Table 10. Monthly European meat yield percentages (%) (mean \pm SD) recorded at 6 MMP sites on PEI between May and December of 2016 to 2018. NA denotes no data available for that month. Instances of only one measurement per month are presented without SD.

Site	Year	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Brudenell River	2016	41.67 \pm 1.53	34.75 \pm 2.75	25.25 \pm 2.63	20.60 \pm 2.61	18.00 \pm 2.58	15.75 \pm 2.75	15.80 \pm 0.84	NA
	2017	31.33 \pm 0.58	26.75 \pm 4.65	20.75 \pm 1.26	18.80 \pm 0.84	19.25 \pm 3.20	20.50 \pm 1.73	18.80 \pm 0.84	18.00
	2018	33.25 \pm 3.69	27.00 \pm 1.15	19.20 \pm 0.84	17.50 \pm 1.91	21.25 \pm 1.71	19.25 \pm 1.26	17.50 \pm 0.58	NA
March Water	2016	29.50 \pm 2.12	22.80 \pm 5.97	17.00 \pm 1.83	13.67 \pm 1.15	15.50 \pm 3.11	14.50 \pm 1.29	13.33 \pm 1.15	16.00
	2017	26.67 \pm 0.58	17.75 \pm 0.50	12.00 \pm 0.71	10.25 \pm 0.50	11.50 \pm 1.00	14.50 \pm 1.91	16.67 \pm 2.31	17.00
	2018	27.00 \pm 0.00	24.00 \pm 1.73	14.80 \pm 0.84	12.25 \pm 1.26	13.75 \pm 1.89	17.00 \pm 1.15	21.33 \pm 2.52	NA
Murray River	2016	31.33 \pm 1.53	22.75 \pm 1.89	15.50 \pm 1.91	15.00 \pm 1.63	13.20 \pm 0.84	13.67 \pm 2.08	12.75 \pm 0.50	11.00
	2017	27.67 \pm 3.79	18.00 \pm 2.16	13.75 \pm 0.96	14.00 \pm 1.00	12.25 \pm 1.71	13.00 \pm 1.83	13.00 \pm 1.00	15.00
	2018	28.00 \pm 2.94	18.00 \pm 0.82	14.40 \pm 1.67	13.33 \pm 0.58	14.25 \pm 1.26	15.25 \pm 0.50	17.00 \pm 1.73	NA
New London Bay	2016	30.67 \pm 0.58	22.20 \pm 6.14	17.75 \pm 2.06	16.00 \pm 1.41	18.50 \pm 5.07	11.25 \pm 3.20	12.25 \pm 2.22	16.00
	2017	30.50 \pm 6.95	22.00 \pm 3.56	17.75 \pm 0.50	19.00 \pm 2.00	17.75 \pm 0.96	18.50 \pm 1.91	NA	NA
	2018	29.33 \pm 1.15	22.40 \pm 2.07	20.50 \pm 3.11	17.60 \pm 1.82	20.25 \pm 1.50	22.60 \pm 1.34	21.33 \pm 0.58	NA
Nine Mile Creek	2016	37.00 \pm 7.55	22.80 \pm 4.66	14.75 \pm 0.50	14.33 \pm 0.58	14.20 \pm 0.84	15.75 \pm 0.50	19.40 \pm 3.85	NA
	2017	35.75 \pm 3.40	26.00 \pm 4.76	17.25 \pm 1.89	16.25 \pm 1.50	16.25 \pm 2.22	20.00 \pm 2.16	22.00 \pm 2.12	20.00
	2018	38.00 \pm 2.35	24.75 \pm 8.54	19.00 \pm 2.45	15.60 \pm 2.79	16.25 \pm 0.96	20.40 \pm 1.14	19.75 \pm 1.50	NA
Tracadie Bay	2016	29.67 \pm 1.15	19.33 \pm 4.04	16.25 \pm 3.30	13.50 \pm 2.12	14.25 \pm 1.26	14.80 \pm 1.30	15.67 \pm 1.53	15.00
	2017	28.00 \pm 5.00	21.50 \pm 0.71	14.25 \pm 2.22	13.20 \pm 0.84	14.00 \pm 2.65	13.20 \pm 1.64	16.00 \pm 1.00	19.00
	2018	32.50 \pm 1.00	21.00 \pm 2.45	15.00 \pm 2.16	12.80 \pm 0.84	14.75 \pm 0.50	16.25 \pm 1.71	15.67 \pm 1.15	NA



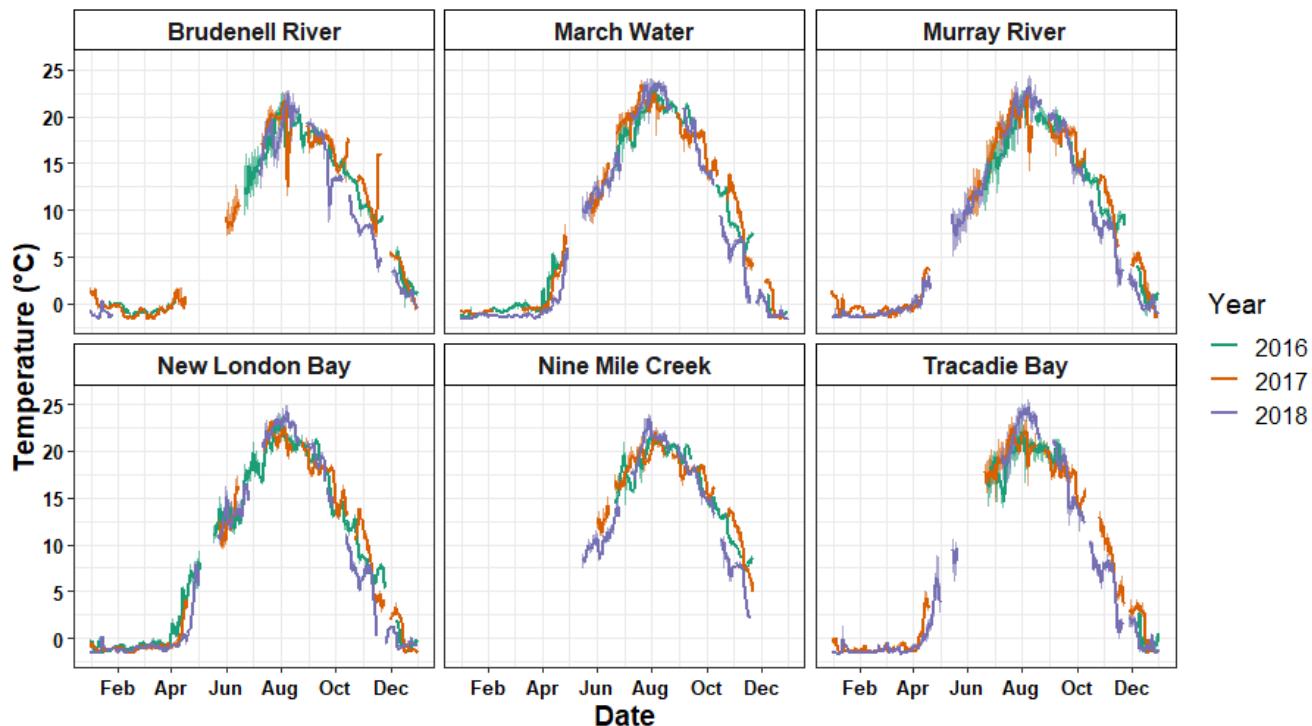


Figure 3. Daily mean temperature ($^{\circ}\text{C}$) recorded at 6 MMP sites on PEI between 2016 and 2018. Shaded ribbon indicates daily maximum and minimum.

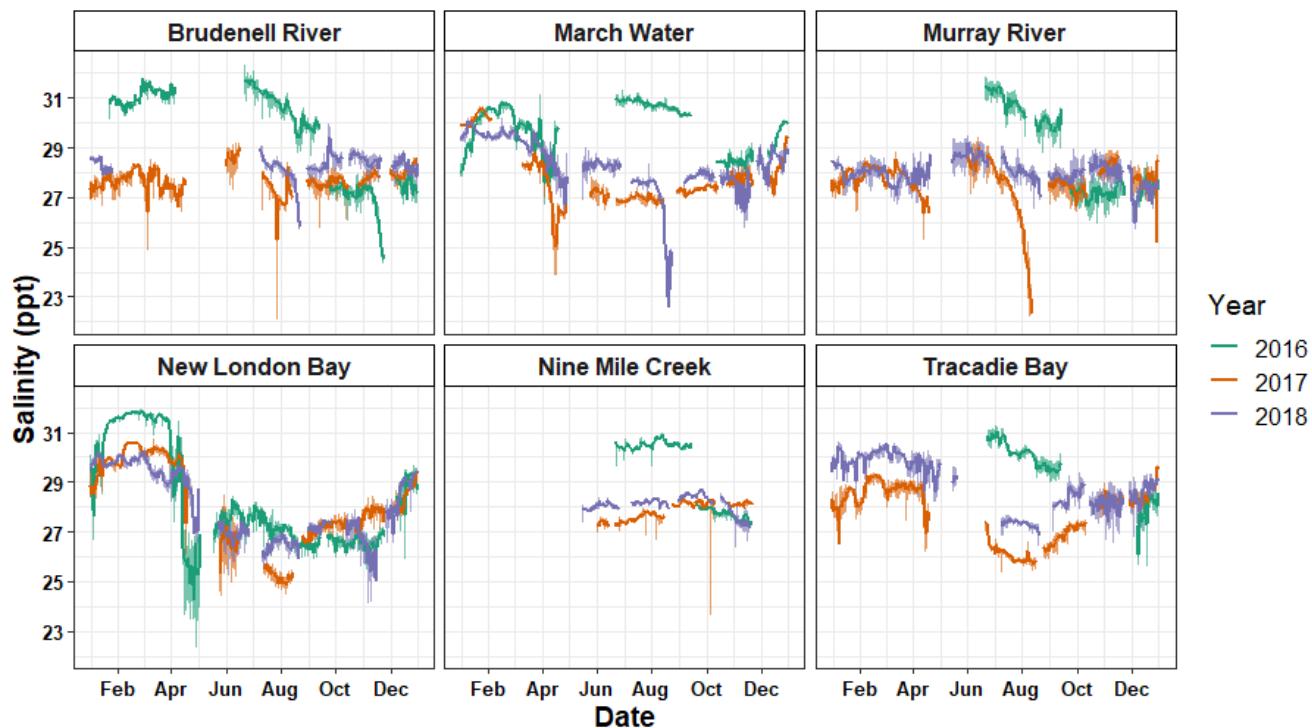


Figure 4. Daily mean Salinity (ppt) recorded at 6 MMP sites on PEI between 2016 and 2018. Shaded ribbon indicates daily maximum and minimum.

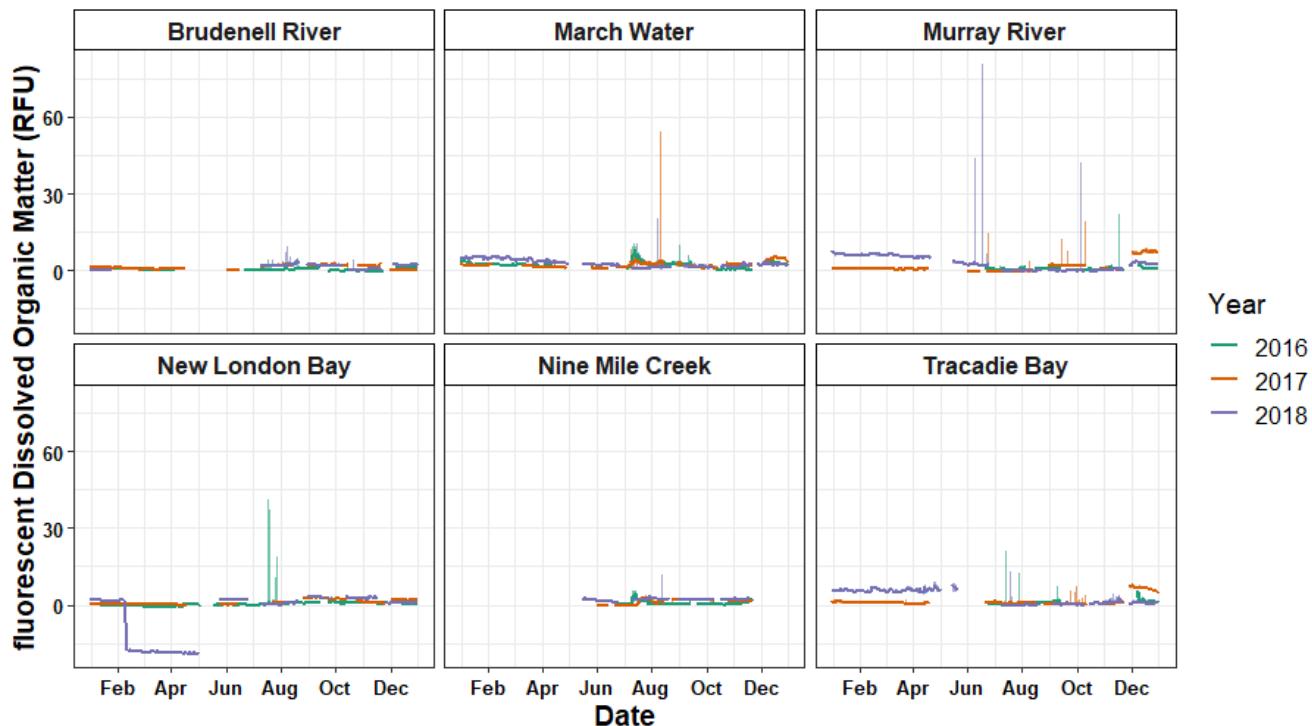


Figure 5. Daily mean Fluorescent Dissolved Organic Matter (RFU) recorded at 6 MMP sites on PEI between 2016 and 2018. Shaded ribbon indicates daily maximum and minimum.

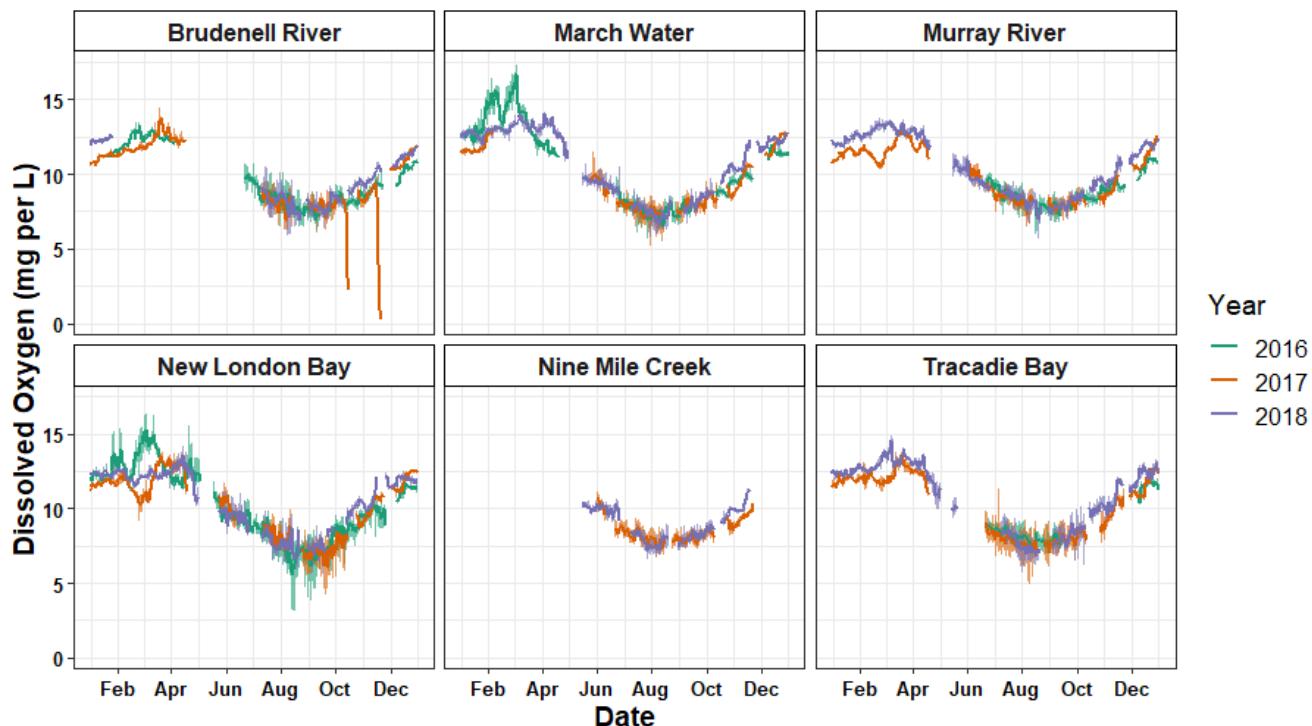


Figure 6. Daily mean dissolved oxygen values (mg/L) recorded at 6 MMP sites on PEI between 2016 and 2018. Shaded ribbon indicates daily maximum and minimum.

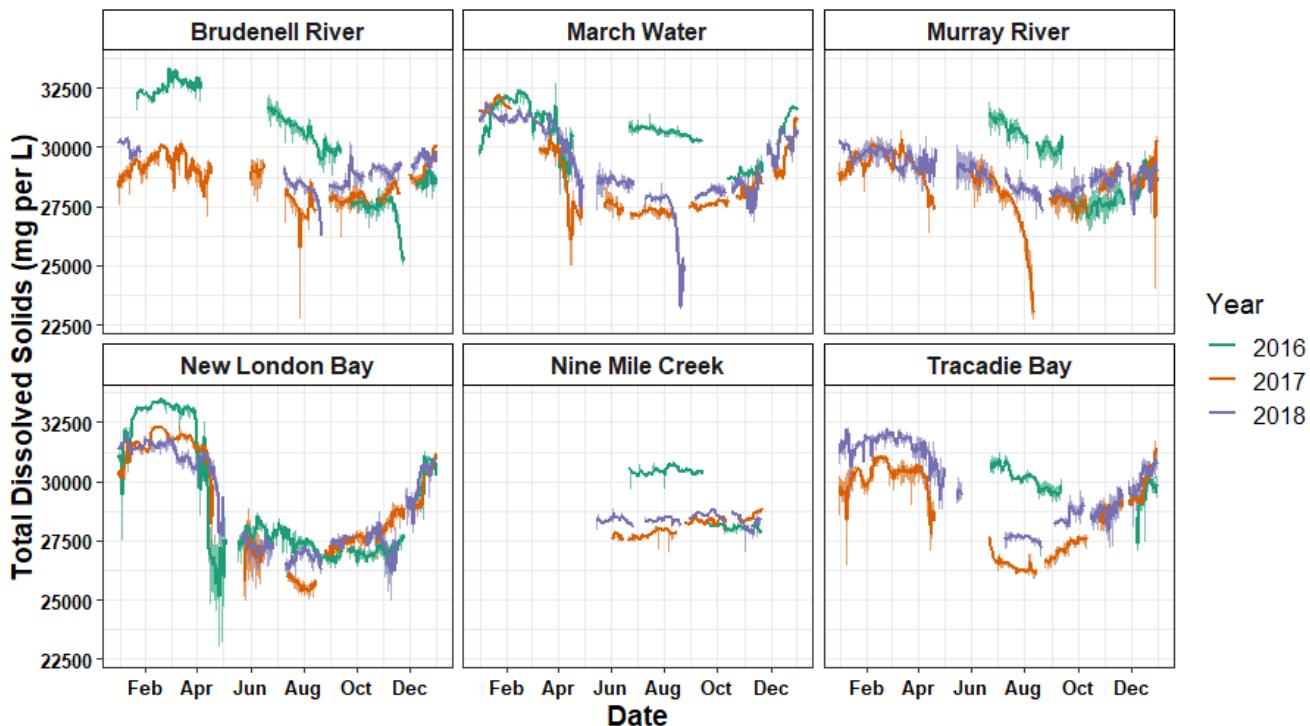


Figure 7. Daily mean Total dissolved solids (mg per L) recorded at 6 MMP sites on PEI between 2016 and 2018. Shaded ribbon indicates daily maximum and minimum.

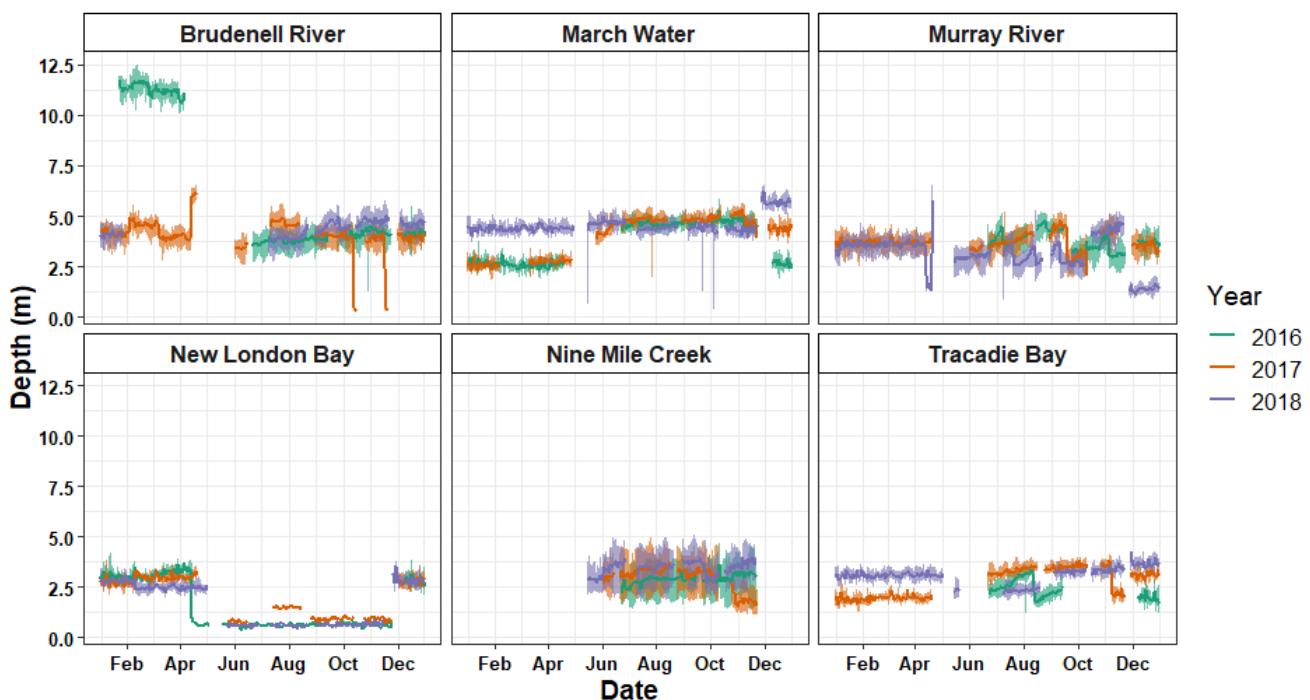


Figure 8. Daily mean depth of probes (m) recorded at 6 MMP sites on PEI between 2016 and 2018. Shaded ribbon indicates daily maximum and minimum

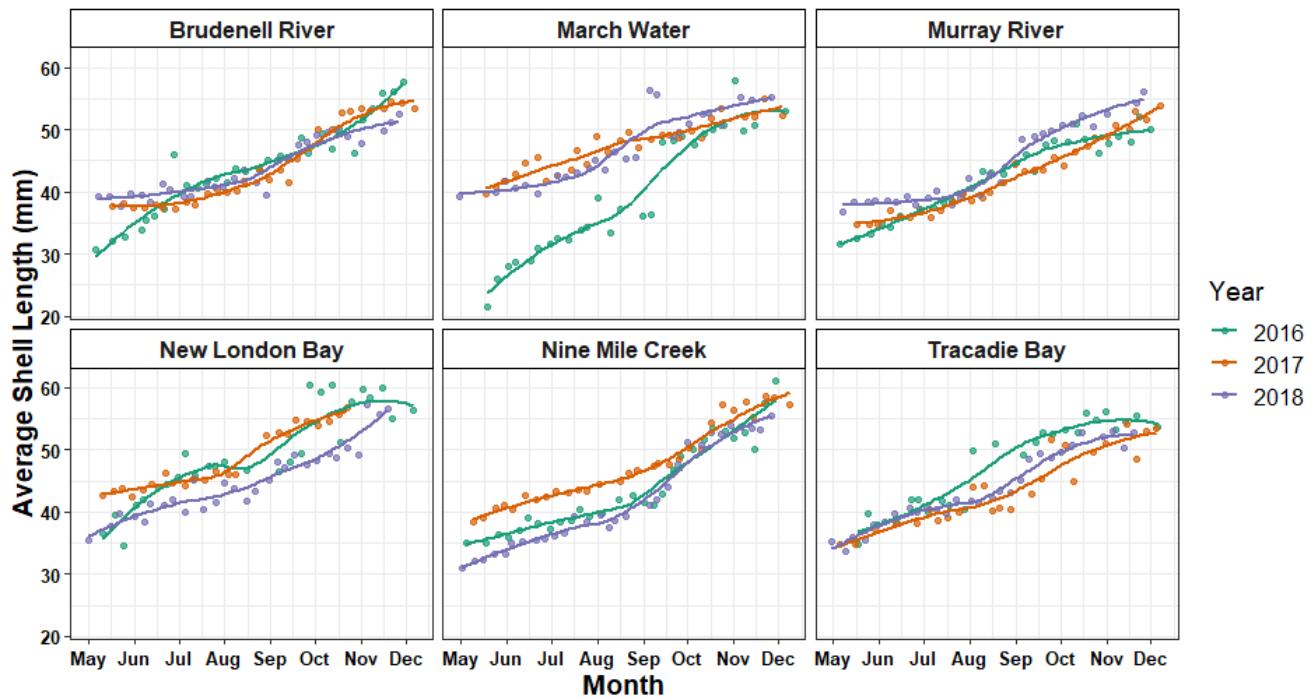


Figure 9. Average shell length (mm) of mussels measured from the PEI MMP. Loess curves have been applied to the data in order to demonstrate independent trend lines.

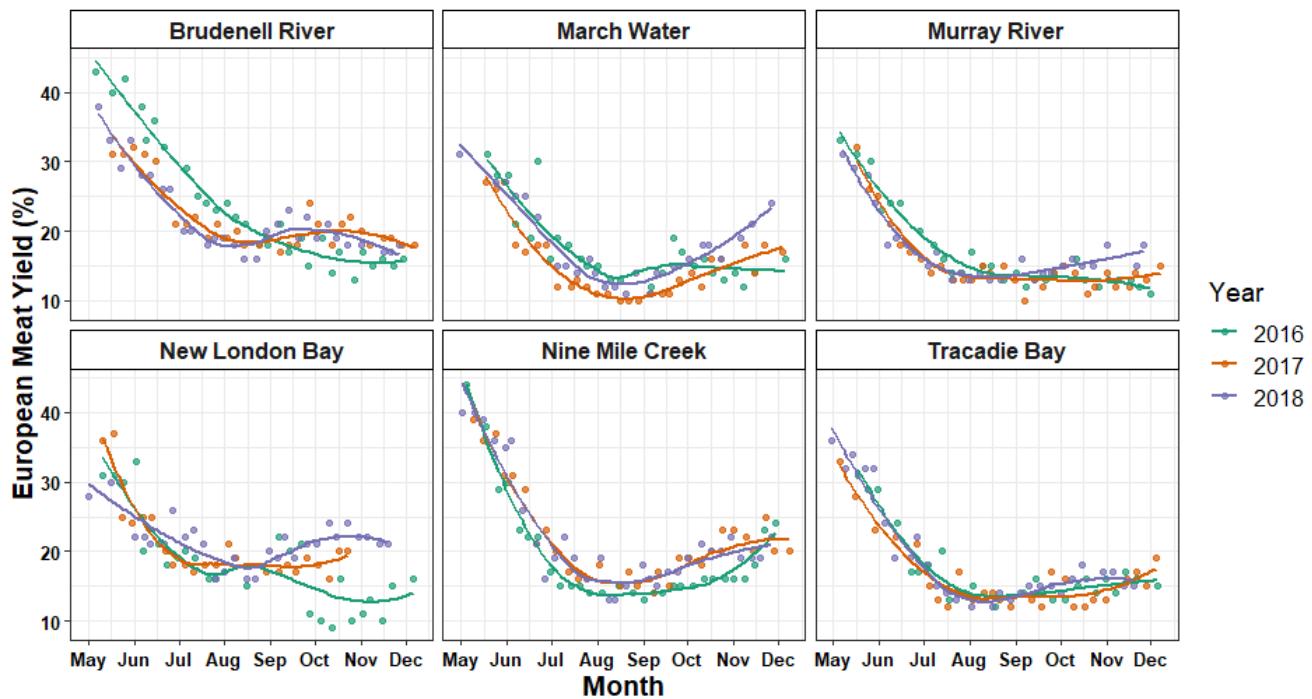


Figure 10. Average European meat yields (%) calculated from mussels collected from the PEI MMP. Loess curves have been applied to the data in order to demonstrate independent trend lines.