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Report No.: 0041/17/ED/0311A

## Quarterly EM&A Report February 2018 - April 2018

Client : Drainage Services Department

Project : Contract No. CM 14/2016  
Environmental Team for Operational  
Environmental Monitoring and Audit for Siu  
Ho Wan Sewage Treatment Works

Report No.: : 0041/17/ED/0311A

Prepared by: Andy K. H. Choi

Reviewed by: Cyrus C. Y. Lai

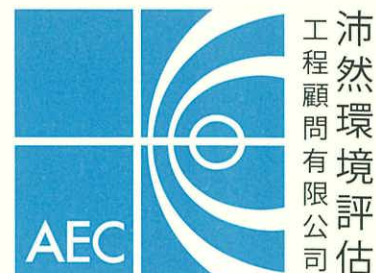
Certified by:

A handwritten signature in black ink, appearing to be "Colin K. L. Yung", written over a horizontal line.

Colin K. L. Yung  
Environmental Team Leader  
Fugro Technical Services Limited

Allied Environmental Consultants Limited  
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Our Ref: 1458/18-0103

21 June 2018

*By Post and E-mail*

**Drainage Service Department**  
Projects and Development Branch  
Consultants Management Division  
42/F, Revenue Tower,  
5 Gloucester Road  
Wan Chai, Hong Kong

**Attn: Mr. CHUNG Ching Hong, Romeo (E/CM9)**

Dear Sir,

**RE: CONTRACT NO. CM 13/2016  
INDEPENDENT ENVIRONMENTAL CHECKER FOR OPERATIONAL ENVIRONMENTAL  
MONITORING AND AUDIT FOR SIU HO WAN SEWAGE TREATMENT WORKS (SHWSTW)  
QUARTERLY ENVIRONMENTAL MONITORING AND AUDIT (EM&A) REPORT  
(FEBRUARY TO APRIL 2018)**

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Reference is made to the submission of Quarterly Environmental Monitoring and Audit (EM&A) Report (February to April 2018) (Report No.: 0041/17/ED/0311A) received from the Environmental Team (ET), Messrs. Fugro Technical Services Ltd., on 15 June 2018 via email.

We would like to inform you that we have no adverse comment on the captioned submission and hereby verify the same in accordance with Condition 4.3 of the Environmental Permit (EP) for the captioned Project (Permit No.: EP-076/2000).

Notwithstanding, please be reminded that the ET shall strictly follow Condition 4.3 of the EP to submit EM&A report within two weeks after the completion of each reporting period and the report shall be certified by the Independent Environmental Checker (IEC) before depositing with the Environmental Protection Department.

Should you have any queries, please feel free to contact the undersigned, or our Mr. Rodney IP at 2815 7028.

Yours faithfully,

For and on behalf of  
**Allied Environmental Consultants Ltd.**



Grace M. H. KWOK  
Independent Environmental Checker

GK/ri/rc

c.c. Fugro Technical Service (ET Leader)  
AECOM

Attn: Mr. Colin YUNG  
Attn: Ms. Joanne TSOI

(By E-mail)  
(By E-mail)

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**EXECUTIVE SUMMARY**

The Drainage Services Department (DSD) of Hong Kong Special Administrative Region has appointed Fugro Technical Services Limited (FTS) to undertake the Environmental Team services for the Project and implement the EM&A works.

This is the third Quarterly EM&A Report presents the environmental monitoring and audit works for the period between 1 February 2018 and 30 April 2018. As informed by the Contractor, major activities in the reporting period included:

**February 2018 - April 2018**

- Perform comprehensive operation and maintenance services for the electrical, mechanical and electronic systems/equipment at Siu Ho Wan Sewage Treatment Works (SHWSTW).
- Alleviate as far as practicable the impact that the facilities and sewage systems imposed on the environment of Hong Kong.

**Breaches of Action and Limit Levels**

No exceedances of Action/Limit levels at Air Sensitive Receiver (ASR) were recorded and no non-compliance of odour monitoring at ASR were recorded in the reporting period.

**Compliant Log**

There was no complaint received in relation to the environmental impact during the report period.

**Notifications of Summons and Successful Prosecutions**

There were no notifications of summons or prosecutions received during the reporting period.

**Summary of the Environmental Mitigations Measures**

Mitigation measures specified in the EP and EIA Report such as aeration, chemical dosing system, covering or enclosing the pressing and sludge thickening facilities and ventilating air to a biological treatment unit prior to stack exhaust was implemented during the reporting period.

## 1. INTRODUCTION

### 1.1 Background

- 1.1.1 The Project “Upgrading of Siu Ho Wan Sewage Treatment Works” is to upgrade Siu Ho Wan Sewage Treatment Works (SHWSTW) from the preliminary treatment level to Chemically Enhanced Primary Treatment (CEPT) level with Ultraviolet (UV) disinfection facilities. The Project is required to comply with the Environmental Permit (EP) in respect of the construction and operation phases of the Plant.
- 1.1.2 Under the Environmental Impact Assessment Ordinance (EIAO), the Project was classified as “Designated Project”. The Environmental Impact Assessment (EIA) study was completed in September 1997 with the EIA Report of Register No. EIAR-124BC, Operational EM&A Plan and the EP of No. EP-076/2000 was issued in August 2000 to Drainage Services Department (DSD).
- 1.1.3 The CEPT part has been completed and was put into operation in March 2005. The UV disinfection works were substantially completed in December 2006. It is considered that the operation of the Project shall be deemed to start when the UV disinfection facilities have been completely installed and tested.
- 1.1.4 This Quarterly EM&A report is required under Section 8.5 of the OEM&A Plan. It is to report the results and findings of the EM&A programme required in the OEM&A Plan.
- 1.1.5 This is the third quarterly OEM&A Report which summaries the impact monitoring results and audit findings for the Project within the period between 1 February 2018 and 30 April 2018.

### 1.2 Project Description

- 1.2.1 The project proponent was DSD. AECOM was commissioned by DSD as the Engineer for the Project. Allied Environmental Consultants Limited (AEC) was commissioned by DSD as the Independent Environmental Checker (IEC) in the operation phase of the Project. FTS was appointed as the ET by DSD to implement the EM&A programme for the operation phase of the Project including air quality monitoring, water quality monitoring, sediment quality and benthic survey and Chinese white dolphin (CWD) monitoring.

### 1.3 Project Organization

- 1.3.1 The project organization for environmental works is shown in **Appendix A**. The contact person and telephone numbers of key personnel for the captioned project are shown in **Table 1.1**.

**Table 1.1 Contact Persons and Telephone Numbers of Key Personnel**

Organization	Role	Contact Person	Telephone No.	Fax No.
DSD	Project Proponent Representative	Mr. Romeo Chung	2594 7266	3104 6426
AECOM	Engineer Representative (ER)	Ms. Joanne Tsoi	3922 9423	3922 9797

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AEC	Independent Environmental Checker (IEC)	Ms. Grace Kwok	2815 7028	2815 5399
FTS	ET Leader (ETL)	Mr. Colin Yung	3565 4114	2450 8032

## 1.4 Work Undertaken during the Report Period

1.4.1 During this reporting period, the principal work activities included:

### February 2018 – April 2018

- Perform comprehensive operation and maintenance services for the electrical, mechanical and electronic systems/equipment at SHWSTW.
- Alleviate as far as practicable the impact that the facilities and sewage systems imposed on the environment of Hong Kong.

**2. SUMMARY OF EM&A REQUIREMENTS AND MONITORING RESULTS**

**2.1 Monitoring Requirement**

2.1.1 In accordance with the approved OEM&A Plan, air quality monitoring (odour patrol monitoring, H<sub>2</sub>S measurement and olfactometry analysis), water quality monitoring (onsite measurement and laboratory analysis), sediment quality & benthic survey at the designated monitoring stations are required. Data interpretation for the distribution and abundance of Chinese white dolphin (CWD) from the survey undertaken by the Agriculture, Fisheries and Conservation Department (AFCD) is also required for CWD monitoring. Air quality monitoring (H<sub>2</sub>S concentration monitoring and Odour patrol) should be conducted on a weekly basis for six months while the odour sampling for olfactometry analysis should be conducted on the first week of the odour patrol monitoring. For water quality monitoring, sediment quality & benthic survey and CWD monitoring should be carried out once per two months for a period of five years. The Action and Limit Levels of the air quality monitoring are given in **Appendix B**.

**2.2 Monitoring Locations**

2.2.1 According to the OEM&A Plan, one Air Sensitive Receiver (ASR) was identified and required to conduct air quality monitoring. The location (ASR) for air quality monitoring is shown in **Figure 1**.

2.2.2 In accordance with Section 5 of the EM&A Plan, water quality monitoring should be carried out at 8 designated monitoring locations (2 impact stations and 6 control stations). The monitoring locations shall be the same monitoring locations that were used for the baseline monitoring programme and have been approved by EPD. The coordinates of the monitoring location is shown in **Table 2.1**. The monitoring locations of water quality monitoring, Sediment Quality Monitoring and Benthic Survey are also shown in **Figure 2**.

**Table 2.1 Location of Water Quality Monitoring, Sediment Quality Monitoring and Benthic Survey**

Sampling Location		Easting	Northing
A	The Brothers, Control Station	816 100	822 500
B	The Brothers, Control Station	816 680	822 440
C	Siu Ho Wan Outfall, Impact Station	816 800	820 180
D	Siu Ho Wan Outfall, Impact Station	817 160	820 360
E	Cheung Sok, Control Station	819 817	821 655
F	Cheung Sok, Control Station	820 158	821 922
G	Tai Ching Chau, Control Station	822 214	822 692
H	Tai Ching Chau, Control Station	822 494	822 939

**2.3 Monitoring Parameter**

2.3.1 The durations and frequencies of H<sub>2</sub>S concentration measurement, odour patrolling and odour sampling are summarized in **Table 2.2** below.

**Table 2.2 Durations and Frequencies of Air Quality Monitoring Programme**

	Duration	Frequency
H <sub>2</sub> S concentration monitoring	15 minutes	<sup>1</sup> Weekly basis for 6 months during the initial operation stage
Odour patrol		
Odour sampling for olfactometry analysis	<sup>3</sup> 15 minutes	<sup>2</sup> First week of the odour patrol monitoring

Remark:

- 1) In case excessive odour nuisance was detected during the odour patrol monitoring or the standard of the 5 odour units cannot be complied with during the odour panel monitoring, the odour patrol monitoring and H<sub>2</sub>S concentration monitoring shall be extended for a period of three months to cater for the warm-up period of the functioning of the additional mitigation measures.
- 2) In case the relationship between H<sub>2</sub>S concentration (ppb) with the odour unit (OU/m<sup>3</sup>) cannot conclude from the correlation study carried out at the first week of the odour patrol monitoring due to invalid data, additional odour sampling for olfactometry analysis shall be carried out for the correlation study.
- 3) Sufficient air samples (approximate 60L) may be collected in less than 15 minutes during odour sampling.

2.3.2 The monitoring parameters for water quality monitoring are summarized in **Table 2.3**.

**Table 2.3 Parameters for Water Quality Monitoring**

Monitoring Parameters	
In-situ Measurement	Laboratory Analysis
Dissolved oxygen (mg/L)	<i>E. coli</i> (cfu/100ml)
Temperature (degree Celsius)	5-day BOD (mg/l)
pH value	Suspended Solids (mg/l)
Water depth (m)	Ammonia as N (mg/l)
Salinity (ppt)	Nitrate as N (mg/l)
Turbidity (NTU)	Nitrite as N (mg/l)
Current Speed (m/s)	Total inorganic nitrogen (mg/l)
Current Direction (degree magnetic)	Total phosphorus (soluble and particulate) (mg/l)

2.3.3 The monitoring parameters for sediment quality monitoring and benthic survey are summarized in **Table 2.4**.

**Table 2.4 Parameters for Sediment Quality Monitoring and Benthic Survey**

Monitoring Parameters	
Sediment Quality Monitoring	Rinsate Blank for Benthic Survey
Grain size profile* (i.e. Particle Size Distribution) (%)	Cadmium (µg/L)
Total organic carbon* (%)	Chromium (µg/L)
pH value	Copper (µg/L)
Ammonia as N (mg-N/kg)	Lead (µg/L)
Total nitrogen (mg-N/kg)	Mercury ((µg/L)
Total phosphorus (mg-N/kg)	Nickel (µg/L)
Cadmium (mg/kg)	Zinc (µg/L)
Chromium (mg/kg)	Arsenic (µg/L)
Copper (mg/kg)	Silver (µg/L)





Monitoring Parameters	
Sediment Quality Monitoring	Rinsate Blank for Benthic Survey
Lead (mg/kg)	
Mercury (mg/kg)	
Nickel (mg/kg)	
Zinc (mg/kg)	
Arsenic (mg/kg)	
Silver (mg/kg)	

\*Grain size profile and total organic carbon is determined from the sediment sampled collected for benthic survey.

2.3.4 Apart from the parameters listed in the **Table 2.3** and **Table 2.4**, other relevant supplementary information such as monitoring location, time, weather conditions and any special phenomena shall be also recorded.

2.3.5 The tidal data will be obtained from the tide gauge installed in Ma Wan Marine Traffic Station, managed by the Hydrographic Office of Marine Department. Location of the tide gauge is shown in **Figure 3**. The tidal data is present in **Appendix E**.

**2.4 Results and Observations**

2.4.1 No Action and Limit Level exceedance for air quality monitoring (odour patrol monitoring, H<sub>2</sub>S measurement and olfactometry analysis) was recorded in the reporting period at ASR since no complaint on odour was received in the reporting period.

2.4.2 The monitoring data was summarized in **Table 2.5**.

**Table 2.5 Summary of Air Quality Monitoring Data in Reporting Period**

Monitoring Location	Reporting Month	Monitoring Parameter				
		H <sub>2</sub> S concentration* (ppb)		Odour Patrol^ (Odour Level)	Olfactometry Analysis of odour (OU/m <sup>3</sup> )	
		Range	Average	Range	Range	Average
ASR	Feb 2018	<1 - 14	4.0	1 - 1	11 - 16	14.0
	Mar 2018	1 - 15	5.0	1 - 1	13 - 47	24.3
	Apr 2018	1 - 20	6.0	1 - 1	15 - 19	17.5

Remark:

\*The value of H<sub>2</sub>S Concentration was taken in average of 15 min for each measurement.

^Odour Level: 0 – Not detected, 1 – Slight, 2 – Moderate, 3 – Strong, 4 – Extreme

2.4.3 Based on record of onsite odour patrol monitoring, other dominant odour or non-ideal wind directions was recorded which indicated the measurements was interfered by other dominant odours (e.g. seawater, vegetation and gasoline) or the wind direction during the measurement was not from SHWSTW towards ASR (e.g. N, SE and SW). Therefore, during this reporting period, H<sub>2</sub>S data collected (total 12 measurements) could not be considered as representative data to reflect the odour impact from SHWSTW and not suitable for correlation establishment with the exceeded results of the olfactometry due to interference by other dominant odour (8 measurements) or record of non-ideal wind directions (4 measurements) during measurements. Although results of olfactometry analysis from the odour sampling during the reporting period exceeded the criterion of 5 odour units (based on averaging time



of 5 seconds at the nearest ASR), the exceedances from the olfactometry analysis were considered as not project-related by the results of onsite odour patrol monitoring and the records of wind direction. Therefore, no non-compliance of odour monitoring at ASR were recorded in the reporting period. As inadequacy of representative data was result in the past 9 months, current H<sub>2</sub>S measurement and olfactometry analysis was considered as unlikely way to establish the relationship of H<sub>2</sub>S concentration (ppb) with the odour unit (OU/m<sup>3</sup>). Alternative methods shall be proposed and submitted for EPD's approval. In order to assess whether SHWSTW is the major H<sub>2</sub>S source to ASR, three additional air quality monitoring events were conducted on February 2018. The data showed that site boundary of SHWSTW and the location of ASR is not appropriate for the correlation study as the change of both odour level and H<sub>2</sub>S concentrations at ASR were not sensitive to that at site boundary of SHWSTW. Since six months air quality monitoring and additional three months air quality monitoring had been conducted according to Section 2.2 of OEM&A Plan without any complaint or non-compliance recorded, temporary suspension of air quality monitoring was proposed and submitted for EPD's approval.

2.4.4 Water quality monitoring, sediment quality monitoring and benthic survey were conducted on 12 April 2018 to collect data for future reference in accordance with Section 5.5 and 6.5 of the Operational EM&A Plan. No special phenomena were observed during the monitoring. The summaries of results collected of the monitoring were presented in the below tables.

Table 2.6 Summary of In-situ Monitoring Results

Monitoring Station		Dissolved oxygen (mg/L)	Temperature (degree Celsius)	pH	Salinity (ppt)	Turbidity (NTU)	Current speed (m/s)	Current velocity (degree magnetic)
A	E	6.45 - 7.03	22.50 - 22.97	8.07 - 8.10	30.42 - 33.31	1.9 - 2.4	0.12 - 0.24	100.5 - 224.6
	F	6.49 - 8.05	22.53 - 23.55	8.11 - 8.20	29.23 - 33.36	3.2 - 8.5	0.05 - 0.29	246.9 - 273.1
B	E	6.48 - 7.12	22.48 - 23.25	8.11 - 8.13	31.23 - 33.52	1.8 - 3.5	0.07 - 0.19	136.6 - 205.9
	F	6.68 - 8.05	22.79 - 23.52	8.13 - 8.21	29.46 - 32.16	1.9 - 3.4	0.04 - 0.26	136.1 - 253.8
C	E	6.52 - 8.05	22.56 - 23.67	8.10 - 8.21	29.99 - 32.75	1.8 - 2.1	0.13 - 0.37	204.9 - 245.4
	F	6.59 - 7.79	22.67 - 23.39	8.12 - 8.25	29.40 - 32.78	3.4 - 7.0	0.08 - 0.23	192.6 - 245.3
D	E	6.46 - 8.02	22.53 - 23.66	8.10 - 8.21	29.72 - 32.90	1.5 - 2.1	0.12 - 0.23	131.8 - 205.9
	F	6.39 - 7.81	22.53 - 23.62	8.12 - 8.22	29.37 - 33.35	3.0 - 5.2	0.10 - 0.42	216.1 - 236.0
E	E	6.39 - 7.70	22.46 - 23.37	8.11 - 8.19	30.21 - 33.28	1.9 - 2.9	0.15 - 0.40	163.1 - 257.7
	F	6.68 - 7.97	22.63 - 23.49	8.13 - 8.21	30.62 - 33.36	2.5 - 4.5	0.17 - 0.46	163.2 - 206.0
F	E	6.39 - 7.70	22.46 - 23.37	8.11 - 8.19	30.21 - 33.28	1.9 - 2.9	0.26 - 0.47	117.5 - 141.5
	F	6.46 - 8.09	22.63 - 23.62	8.14 - 8.26	29.94 - 33.55	2.0 - 4.1	0.20 - 0.50	167.5 - 200.5
G	E	6.45 - 7.10	22.55 - 23.07	8.12 - 8.15	31.95 - 33.31	1.8 - 2.4	0.20 - 0.37	179.5 - 231.6
	F	6.73 - 7.30	22.80 - 23.32	8.15 - 8.18	31.40 - 32.78	2.7 - 3.9	0.15 - 0.40	230.8 - 269.2
H	E	6.83 - 7.42	22.90 - 23.40	8.15 - 8.17	31.15 - 32.56	1.8 - 2.1	0.22 - 0.42	114.3 - 158.4
	F	6.52 - 7.46	22.63 - 23.28	8.14 - 8.19	31.49 - 33.64	1.6 - 3.3	0.22 - 0.40	132.7 - 166.1

Table 2.7 Summary of Laboratory Analysis Results

Monitoring Station		TSS (mg/L)	NH <sub>3</sub> as N (mg/L)	NO <sub>3</sub> <sup>-</sup> as N (mg/L)	NO <sub>2</sub> <sup>-</sup> as N (mg/L)	TIN (mg/L)	E.coli (cfu/100m L)	Total P (mg/L)	BOD <sub>5</sub> (mg/L)
A	E	2.9 - 4.8	0.075 - 0.102	0.016 - 0.036	0.257 - 0.519	0.357 - 0.628	1.0 - 29.0	0.03 - 0.04	<1.0 - <1.0
	F	8.5 - 10.1	0.054 - 0.084	0.040 - 0.055	0.621 - 0.792	0.715 - 0.904	1.0 - 12.0	0.03 - 0.05	<1.0 - 1.7

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Monitoring Station		TSS (mg/L)	NH <sub>3</sub> as N (mg/L)	NO <sub>3</sub> <sup>-</sup> as N (mg/L)	NO <sub>2</sub> <sup>-</sup> as N (mg/L)	TIN (mg/L)	E.coli (cfu/100m L)	Total P (mg/L)	BOD <sub>5</sub> (mg/L)
B	E	3.5 - 4.2	0.086 - 0.128	0.012 - 0.027	0.257 - 0.432	0.401 - 0.553	5.0 - 76.0	0.03 - 0.04	<1.0 - 1.1
	F	6.2 - 7.6	0.049 - 0.108	0.044 - 0.063	0.656 - 0.769	0.769 - 0.885	25.0 - 49.0	0.04 - 0.06	<1.0 - 1.8
C	E	3.0 - 4.8	0.040 - 0.081	0.027 - 0.041	0.433 - 0.584	0.544 - 0.670	1.0 - 3.0	0.03 - 0.03	1.0 - 1.3
	F	8.4 - 9.5	0.005 - 0.051	0.038 - 0.050	0.607 - 0.670	0.700 - 0.724	18.0 - 26.0	0.03 - 0.03	1.2 - 2.0
D	E	3.1 - 6.6	0.039 - 0.052	0.033 - 0.047	0.522 - 0.650	0.600 - 0.736	1.0 - 4.0	0.03 - 0.05	1.0 - 1.5
	F	6.6 - 7.8	0.019 - 0.074	0.037 - 0.051	0.596 - 0.672	0.680 - 0.770	15.0 - 23.0	0.03 - 0.04	1.2 - 1.7
E	E	4.0 - 5.6	0.038 - 0.108	0.030 - 0.041	0.436 - 0.588	0.574 - 0.666	3.0 - 11.0	0.03 - 0.04	<1.0 - 1.2
	F	4.4 - 10.8	0.043 - 0.088	0.021 - 0.045	0.443 - 0.651	0.546 - 0.784	78.0 - 120.0	0.03 - 0.05	1.2 - 1.6
F	E	3.4 - 5.0	0.052 - 0.084	0.035 - 0.041	0.532 - 0.569	0.627 - 0.693	1.0 - 6.0	0.03 - 0.05	<1.0 - 1.5
	F	4.8 - 7.3	0.042 - 0.075	0.032 - 0.044	0.474 - 0.598	0.564 - 0.685	80.0 - 150.0	0.03 - 0.04	1.2 - 1.9
G	E	3.1 - 5.4	0.075 - 0.118	0.019 - 0.028	0.353 - 0.462	0.455 - 0.567	17.0 - 36.0	0.04 - 0.04	<1.0 - 1.1
	F	5.0 - 6.9	0.060 - 0.066	0.027 - 0.035	0.440 - 0.461	0.530 - 0.557	35.0 - 67.0	0.03 - 0.05	<1.0 - 1.7
H	E	3.4 - 5.1	0.051 - 0.080	0.026 - 0.039	0.449 - 0.488	0.556 - 0.580	2.0 - 8.0	0.03 - 0.04	<1.0 - 1.4
	F	4.2 - 5.0	0.056 - 0.062	0.025 - 0.036	0.447 - 0.469	0.534 - 0.552	57.0 - 70.0	0.04 - 0.05	<1.0 - 1.1

Table 2.8 Summary of laboratory analysis results for sediment monitoring

Monitoring Station	pH value	NH <sub>3</sub> as N (mg/L)	Total N (mg-N/kg)	Total P (mg-P/kg)	Cd (mg/kg)	Cr (mg/kg)	Cu (mg/kg)	Pb (mg/kg)	Hg (mg/kg)	Ni (mg/kg)	Zn (mg/kg)	As (mg/kg)	Ag (mg/kg)
A	8.8	4	500	374	<0.1	25.0	23.2	25.7	0.07	15.7	75.3	18.6	0.20
B	8.7	8	1170	498	<0.1	40.0	39.1	36.2	0.12	25.5	115	12.9	0.40
C	8.5	10	1120	559	<0.1	42.8	37.5	39.2	0.12	27.0	119	13.1	0.30
D	8.8	3	550	272	<0.1	22.4	19.3	24.5	0.07	14.2	66.5	7.5	0.17
E	8.5	12	1330	584	<0.1	45.8	43.3	41.2	0.16	29.4	132	12.5	0.42
F	8.3	22	1190	571	<0.1	43.0	41.8	39.5	0.11	27.8	125	12.8	0.36
G	8.6	4	860	450	<0.1	32.9	41.8	33.5	0.11	20.6	104	9.7	0.30
H	8.3	13	1260	528	<0.1	38.3	43.9	34.2	0.12	24.7	119	10.9	0.46

Table 2.9 Summary of laboratory analysis results for benthic survey

Monitoring Station	Total organic carbon (%)	Grain size profile (%)				Description
		Gravel	Sand	Silt	Clay	
A	0.80	7	47	28	18	Dark grey, slightly gravelly, sandy SILT/CLAY with shell fragments



Monitoring Station	Total organic carbon (%)	Grain size profile (%)				Description
		Gravel	Sand	Silt	Clay	
B	1.12	0	15	49	36	Dark grey, slightly sandy SILT/CLAY with shell fragments
C	1.00	0	4	58	38	Dark grey, slightly sandy SILT/CLAY with shell fragments
D	1.13	0	9	58	33	Dark grey, slightly sandy SILT/CLAY with shell fragments
E	1.27	0	6	57	37	Dark grey, slightly sandy SILT/CLAY with shell fragments
F	1.21	0	3	59	38	Dark grey, slightly sandy SILT/CLAY
G	1.26	7	15	50	28	Dark grey, slightly gravelly, slightly sandy SILT/CLAY with shell fragments
H	1.00	6	20	47	27	Dark grey, slightly gravelly, slightly sandy SILT/CLAY with shell fragments

2.4.5 The benthic survey results are analyzed and presented as below:

i) Abundance

A total of 331 macrobenthic organisms were collected from the eight monitoring stations. The lowest abundance was 14 individuals (ind.) recorded in Station C and the highest was 143 ind. in Station A. Abundance distribution showed that the impact stations, Stations C and D, have relatively lower abundances compared to the reference stations. Noticeable also is that abundances generally increase as the distance from the impact stations increases.

ii) Biomass

The total wet biomass for all the eight monitoring stations was 231.17g. The highest total biomass was observed in Station A (97.76g), while Station C (2.18g) exhibited the lowest biomass. The relatively higher biomass observed in Station A were due to the increased number of the bivalve species, *Ruditapes variegatus*. Similar to abundance distribution, biomass at the impact stations were generally lower compared to those of the reference stations.

iii) Taxonomic Composition

Specimens were identified to family, genus and species level or to the lowest practicable taxon as possible. A total of eight phyla comprising of 35 families and 41 genera were identified. The benthic fauna composition is dominated by Mollusca (50.45%), Annelida (31.12%), and Arthropoda (13.60%). The most dominant species (abundance >10) was the bivalve, *R. variegatus*, with the abundance of 90 ind. and 12 ind. in Stations A and H, respectively. *Talonostrea talonata*, another species of bivalve also showed dominance in Station A with 12 ind. recorded.

iv) Diversity

Benthic diversity index (H') ranged from 1.72 – 1.95 in impact stations and 1.56 – 2.54 among the reference stations, which suggest that benthic faunal diversity is relatively higher at reference stations than those at impact stations. However, overall diversity in the eight monitoring stations was within the range of typical values. The

diversity indices (0.62 – 1.1) during the baseline study (August 2004) was lower than that of the present study for all stations.

Table 2.10 Summary of Benthic Survey Data

Station	Abundance (ind.)	Total Biomass (g)	Number of Taxa	Diversity (H')	Evenness (J)
A	143	97.76	16	1.56	0.56
B	19	7.36	10	2.16	0.94
C*	14	2.18	8	1.95	0.94
D*	18	3.65	7	1.73	0.89
E	18	3.31	9	2.11	0.96
F	31	20.90	13	2.16	0.84
G	41	20.36	17	2.47	0.87
H	47	75.66	18	2.54	0.88
TOTAL	331	231.17	41 **		

\*Impact Sites, \*\*Total count of different identified Taxa

2.4.6 The latest AFCD's report, "Monitoring of Marine Mammals in Hong Kong Waters (2016-17)", in terms of the distribution and abundance of CWDs, was reviewed in the Monthly EM&A report in August 2017. According to the advice from AFCD, the data of distribution and abundance of CWDs would only be available in the annual reports for Monitoring of Marine Mammals In Hong Kong Waters which cover monitoring data from 1 April to 31 March (next year). The next annual report (2017-18) shall be published around June 2018. The updated status of the distribution and abundance of CWDs will be provided once the annual report (2017-18) is uploaded to AFCD's webpage.

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### 3. ADVICE ON IMPLEMENTATION STATUS OF ENVIRONMENTAL MITIGATION MEASURES

#### 3.1 Implementation Status

- 3.1.1 Although no site inspection is prescribed during the operation of the Plant in accordance with the approved EM&A Plan, SHWSTW is reminded to fully and properly implement mitigation measures specified in the EP and EIA Report. Mitigation measures such as aeration, chemical dosing system, covering or enclosing the pressing and sludge thickening facilities and ventilating air to a biological treatment prior to stack exhaust was implemented in the reporting period. A summary of mitigation measures implementation schedule is provided in **Appendix G**.



#### **4. ADVICE ON THE SOLID AND LIQUID WASTE MANAGEMENT STATUS**

4.1.1 SHWSTW is reminded to fully comply with EP conditions. All measures and recommendations in the EP, EIA Report and approved waste management plan shall be fully and properly implemented. During the reporting period, following measures in related to solid and liquid waste management was implemented:

- The influent of waste water shall be treated by CEPT with UV disinfection;
- Trip-ticket system shall be implemented for sludge and sediment;
- The acceptance criteria for Landfill disposal should be followed;
- Chemical waste should be properly handled and stored temporarily in designated chemical waste storage area on site in accordance with the Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes.

4.1.2 A summary of mitigation measures implementation schedule is provided in **Appendix G**.



## **5. SUMMARY OF EXCEEDANCE OF THE ENVIRONMENTAL QUALITY PERFORMANCE LIMITS**

- 5.1.1 Air quality monitoring i.e. H<sub>2</sub>S concentration monitoring, odour patrol monitoring and olfactometry analysis was carried out in the reporting period. No exceedances of Action/Limit levels at ASR were recorded.
- 5.1.2 During this reporting period, H<sub>2</sub>S data collected (total 12 measurements) could not be considered as representative data to reflect the odour impact from SHWSTW and unsuitable for correlation establishment with the exceeded results of the olfactometry due to interference by other dominant odour (8 measurements) or record of non-ideal wind directions (4 measurements). Although results of olfactometry analysis from the odour sampling during the reporting period exceeded the criterion of 5 odour units (based on averaging time of 5 seconds at the nearest ASR), based on the onsite odour patrol monitoring and the records of wind direction, the exceedances from the olfactometry analysis were not project-related. Therefore, no non-compliance of odour monitoring at ASR were recorded in the reporting period.





**6. SUMMARY OF ENVIRONMENTAL COMPLAINTS**

6.1.1 No complaint (written or verbal), inspection notice, notification of summons or prosecution was received in relation to the environmental impact during the report period. Summaries of complaints, notification of summons and successful prosecutions are presented in **Table 9.1** and **Table 9.2**.

**Table 9.1 Cumulative Statistics on Complaints**

Environmental Parameters	Cumulative No. Brought Forward	No. of Complaints This Month	Cumulative Project-to-Date
Air	0	0	0
Noise	0	0	0
Water	0	0	0
Waste	0	0	0
Others	0	0	0
Total	0	0	0

**Table 9.2 Cumulative Statistics on Notification of Summons and Successful Prosecutions**

Environmental Parameters	Cumulative No. Brought Forward	No. of Notification of Summons and Prosecutions This Month	Cumulative Project-to-Date
Air	0	0	0
Noise	0	0	0
Water	0	0	0
Waste	0	0	0
Others	0	0	0
Total	0	0	0

## 7. CONCLUSION

- 7.1.1 No Action and Limit Level exceedance for air quality monitoring (odour patrol monitoring, H<sub>2</sub>S measurement and olfactometry analysis) was recorded in the reporting period at ASR. Although results of olfactometry analysis from the odour sampling during the reporting period exceeded the criterion of 5 odour units (based on averaging time of 5 seconds at the nearest ASR), the exceedances from the olfactometry analysis were considered as not project-related by the results of onsite odour patrol monitoring and the records of wind direction. Therefore, no non-compliance of odour monitoring at ASR were recorded in the reporting period.
- 7.1.2 Due to non-ideal wind direction (e.g. N, SE and SW) or domination of non-target smell (e.g. seawater, vegetation and gasoline) during the measurements conducted in past nine months, inadequacy of representative data was result in the past nine months. Current H<sub>2</sub>S measurement and olfactometry analysis was considered as unlikely way to establish the relationship of H<sub>2</sub>S concentration (ppb) with the odour unit (OU/m<sup>3</sup>). Alternative methods shall be proposed and submitted for EPD's approval. In order to assess whether SHWSTW is the major H<sub>2</sub>S source to ASR, three additional air quality monitoring events were conducted on February 2018. The data showed that site boundary of SHWSTW and the location of ASR is not appropriate for the correlation study as the change of both odour level and H<sub>2</sub>S concentrations at ASR were not sensitive to that at site boundary of SHWSTW. Since six months air quality monitoring and additional three months air quality monitoring had been conducted according to Section 2.2 of OEM&A Plan without any complaint or non-compliance recorded, temporary suspension of air quality monitoring was proposed and submitted for EPD's approval.
- 7.1.3 Water quality monitoring, sediment quality monitoring and benthic survey were conducted on 12 April 2018 to collect data for future reference in accordance with Section 5.5 and 6.5 of the Operational EM&A Plan. The details of methodology and results collected of the monitoring were presented in Section 2. No special phenomena were observed during the monitoring.
- 7.1.4 The latest AFCD's report, "*Monitoring of Marine Mammals in Hong Kong Waters (2016-17)*", in terms of the distribution and abundance of CWDs, was reviewed in the Monthly EM&A report in August 2017. According to the advice from AFCD, the data of distribution and abundance of CWDs would only be available in the annual reports for Monitoring of Marine Mammals In Hong Kong Waters which cover monitoring data from 1 April to 31 March (next year). The next annual report (2017-18) shall be published around June 2018. The updated status of the distribution and abundance of CWDs will be provided once the annual report (2017-18) is uploaded to AFCD's webpage. The updated status of the distribution and abundance of CWDs will be provided once the annual report (2017-18) is uploaded to AFCD's webpage.
- 7.1.5 SHWSTW is reminded to fully *comply with EP conditions*. All *environmental mitigation measures* and recommendations in the EP, EIA Report and approved waste management plan shall be fully and properly implemented.
- 7.1.6 No complaint (written or verbal), inspection notice, notification of summons or prosecution was received in relation to the environmental impact during the report period.

## 7.2 Comment and Recommendations

7.2.1 The recommended environmental mitigation measures, as proposed in the EIA reports and OEM&A Plan were effectively and efficiently minimize the potential environmental impacts from the Project. Therefore, no complaint or non-compliance of monitoring were recorded during the reporting period. As inadequacy of representative data was result in the past 9 months, current H<sub>2</sub>S measurement and olfactometry analysis was considered as unlikely way to establish the relationship of H<sub>2</sub>S concentration (ppb) with the odour unit (OU/m<sup>3</sup>). Alternative methods shall be proposed and submitted for EPD's approval to ensure that EM&A programme could effectively monitor the environmental impacts generated from the site and ensure the proper implementation of mitigation measure.

7.2.2 According to the environmental monitoring performed in the reporting period, the following recommendations were made:

#### Air Quality Monitoring

- As inadequacy of representative data was result in the past 9 months, current H<sub>2</sub>S measurement and olfactometry analysis was considered as unlikely way to establish the relationship of H<sub>2</sub>S concentration (ppb) with the odour unit (OU/m<sup>3</sup>). In order to assess whether SHWSTW is the major H<sub>2</sub>S source to ASR, three additional air quality monitoring events were conducted on February 2018. The data showed that site boundary of SHWSTW and the location of ASR is not appropriate for the correlation study as the change of both odour level and H<sub>2</sub>S concentrations at ASR were not sensitive to that at site boundary of SHWSTW. Alternative methods shall be proposed and submitted for EPD's approval. Since six months air quality monitoring and additional three months air quality monitoring had been conducted according to Section 2.2 of OEM&A Plan without any complaint or non-compliance recorded, temporary suspension of air quality monitoring was proposed and submitted for EPD's approval.

#### Water Quality Monitoring

- No specific observation was identified in the reporting period.

#### Sediment Quality Monitoring and Benthic Survey

- No specific observation was identified in the reporting period.

#### Chinese White Dolphin Monitoring

- No specific observation was identified in the reporting period.

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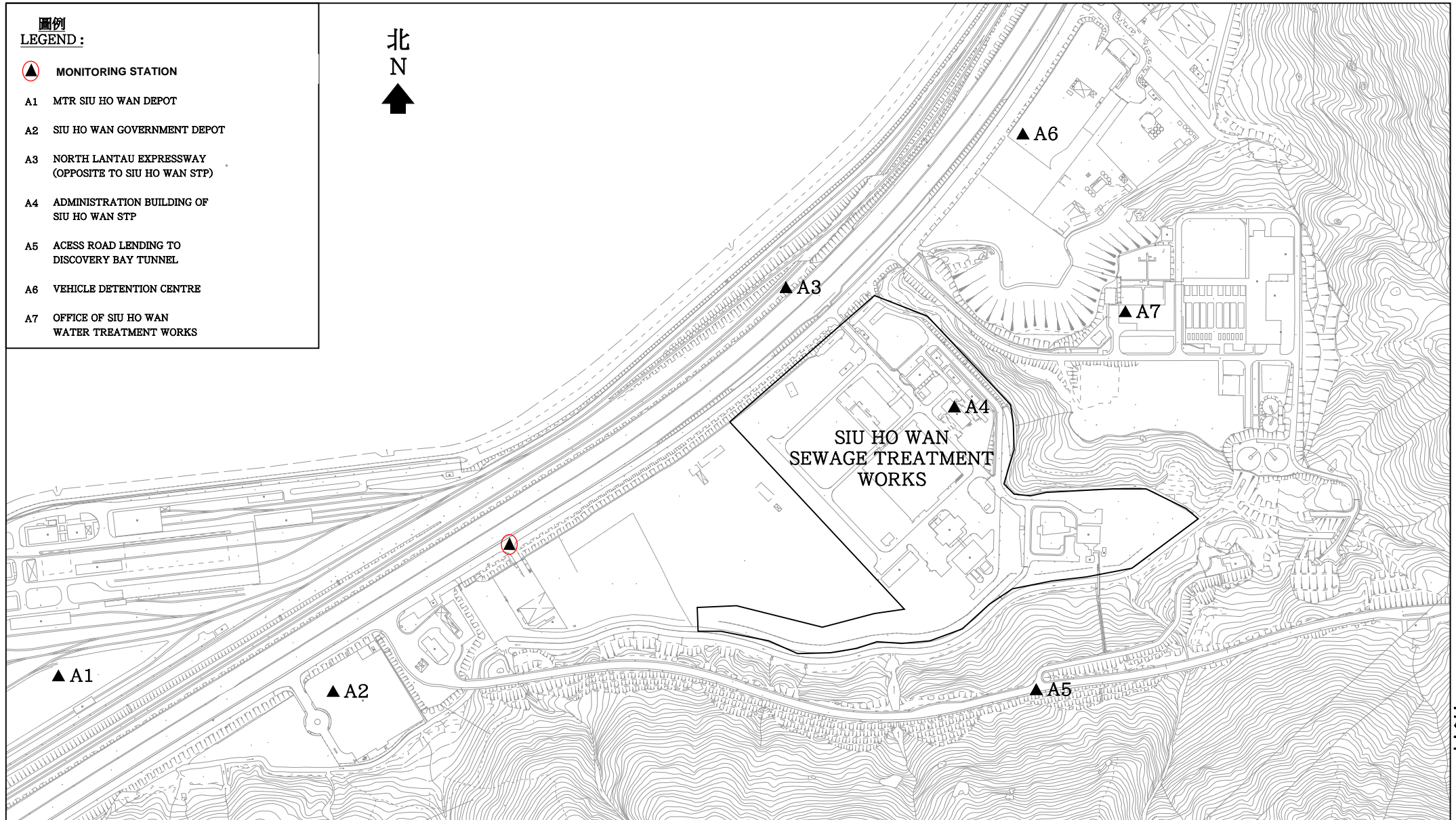
Report No.: 0041/17/ED/0311A

## Figure 1

### Monitoring Location of Air Sensitive Receiver

圖例  
LEGEND :

- ▲ MONITORING STATION
- A1 MTR SIU HO WAN DEPOT
- A2 SIU HO WAN GOVERNMENT DEPOT
- A3 NORTH LANTAU EXPRESSWAY  
(OPPOSITE TO SIU HO WAN STP)
- A4 ADMINISTRATION BUILDING OF  
SIU HO WAN STP
- A5 ACCESS ROAD LENDING TO  
DISCOVERY BAY TUNNEL
- A6 VEHICLE DETENTION CENTRE
- A7 OFFICE OF SIU HO WAN  
WATER TREATMENT WORKS



圖則名稱 drawing title

UPGRADING OF SIU HO WAN SEWAGE TREATMENT PLANT  
OPTIONAL ENVIRONMENTAL MONITORING AND AUDIT PLAN  
ODOUR PATROL MONITORING STATIONS

繪畫 drawn

C.W. CHAN

日期 date

16-08-2006

核對 checked

C.K. LAM

日期 date

16-08-2006

批核 approved

S.K. WONG

日期 date

16-08-2006

部門 office

顧問工程管理部  
CONSULTANTS MANAGEMENT DIVISION

圖則編號 drawing no.

DCM/2006/063

比例 scale

N.T.S.

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## Figure 2

Monitoring Location of Water Quality Monitoring, Sediment Quality Monitoring and Benthic Survey



816000E

818000E

820000E

822000E

822000N

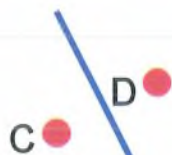
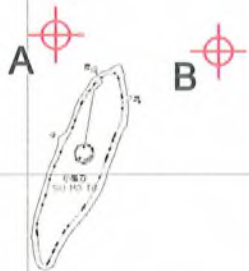
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CO-ORDINATES OF CONTROL STATIONS :




CONTROL STATION No.	CO-ORDINATES	
	NORTHING	EASTING
A	822500	816100
B	822440	816680
E	821655	819817
F	821922	820158
G	822692	822214
H	822939	822494

CO-ORDINATES OF IMPACT STATIONS :

IMPACT STATION No.	CO-ORDINATES	
	NORTHING	EASTING
C	820180	816800
D	820360	817160



圖例  
LEGEND :

-  IMPACT STATION
-  CONTROL STATION
-  SUBMARINE OUTFALL

圖則名稱 drawing title

UPGRADING OF SIU HO WAN SEWAGE TREATMENT PLANT  
BASELINE MONITORING - LOCATION OF MONITORING STATIONS

繪畫 drawn	H.K. LAI	日期 date	06-02-2004
核對 checked	C.K. LAM	日期 date	04-03-2004
批核 approved	S.K. WONG	日期 date	04-03-2004
部門 office	顧問工程管理部 CONSULTANTS MANAGEMENT DIVISION		

圖則編號 drawing no.	比例 scale
DCM/2004/002	N.T.S.

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## Figure 3 Location of the Tide Gauge



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Figure 2 - Location of the Tide Gauge

Source: Google Maps

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## Figure 4

Location of Survey Areas of Chinese White Dolphins

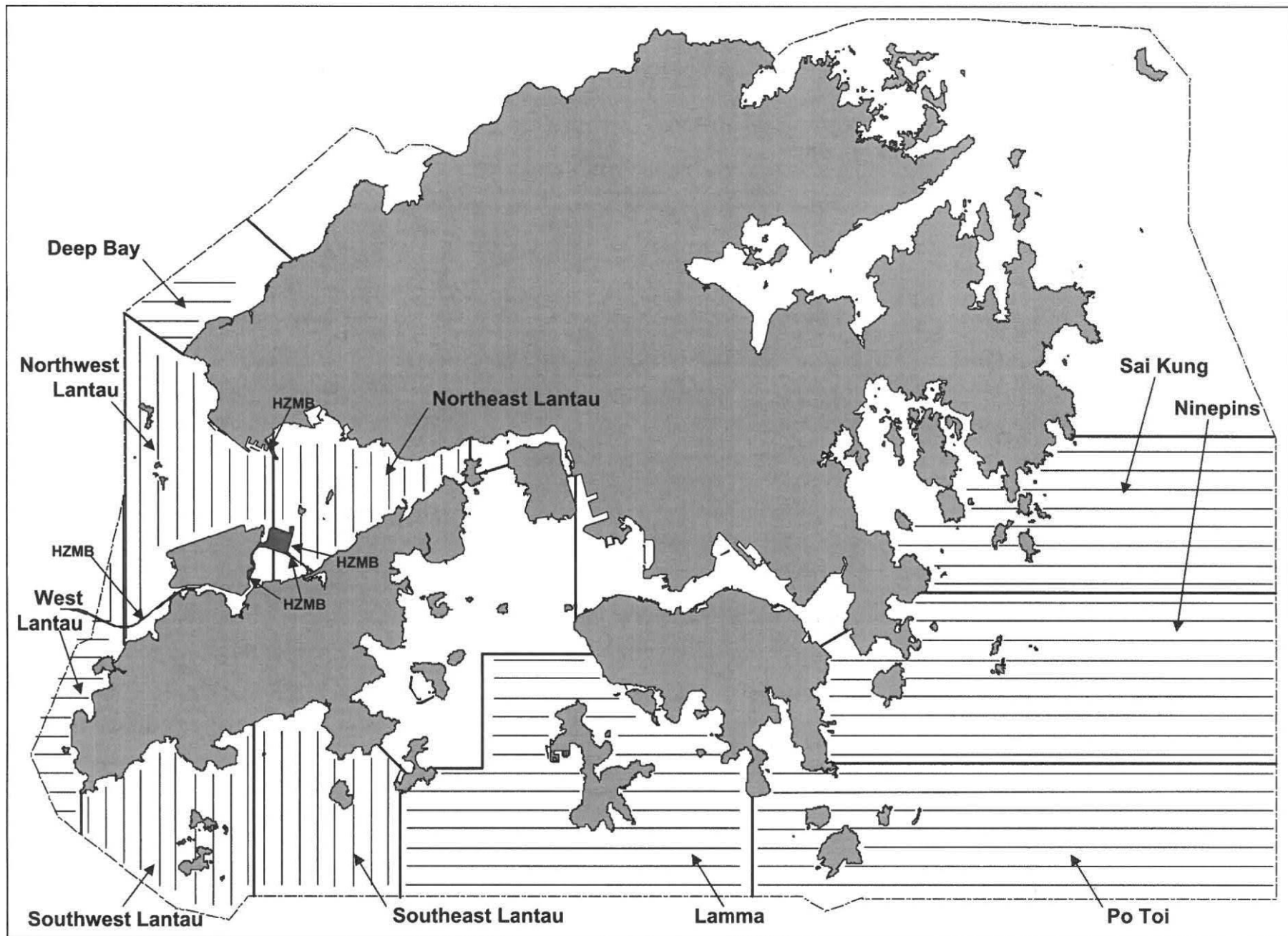


Figure 2 Ten Line-Transect Survey Areas within the Study Area chosen for the Present Monitoring Study (2016-17)

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## Appendix A Project Organization Chart

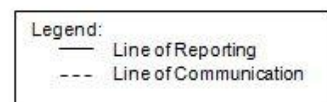
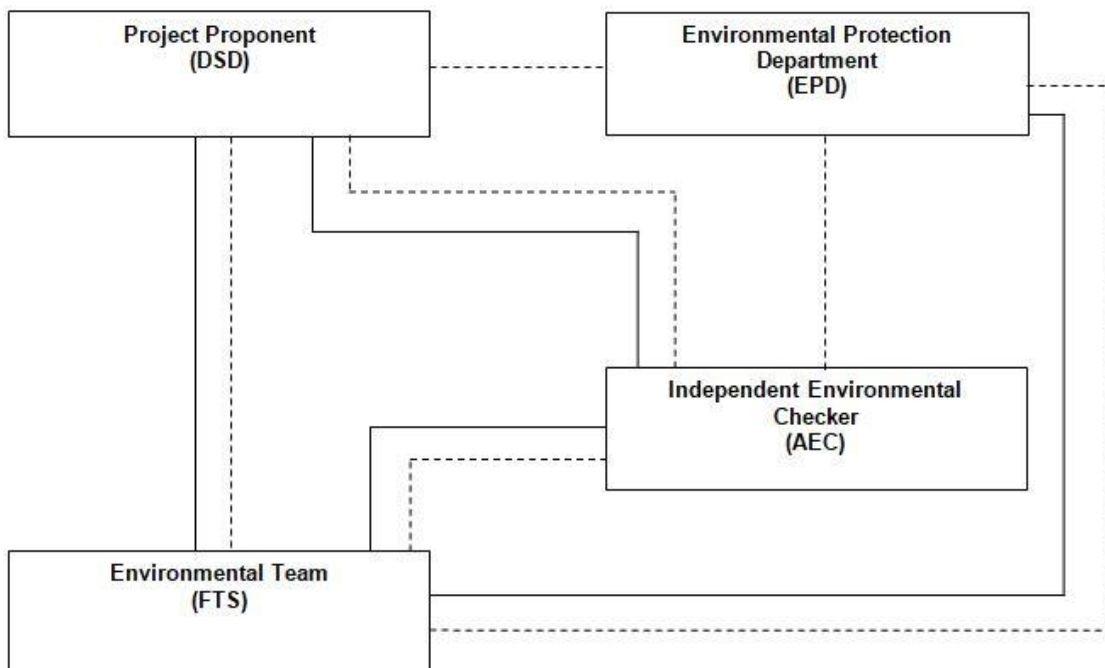
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## Appendix B

### Action and Limit Levels for Air Quality Monitoring

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## Action and Limit Levels for Air Quality Monitoring

Parameter	Action	Limit
Odour	One complaint received for specific odour event	Two or more independent complaints receive for specific odour event

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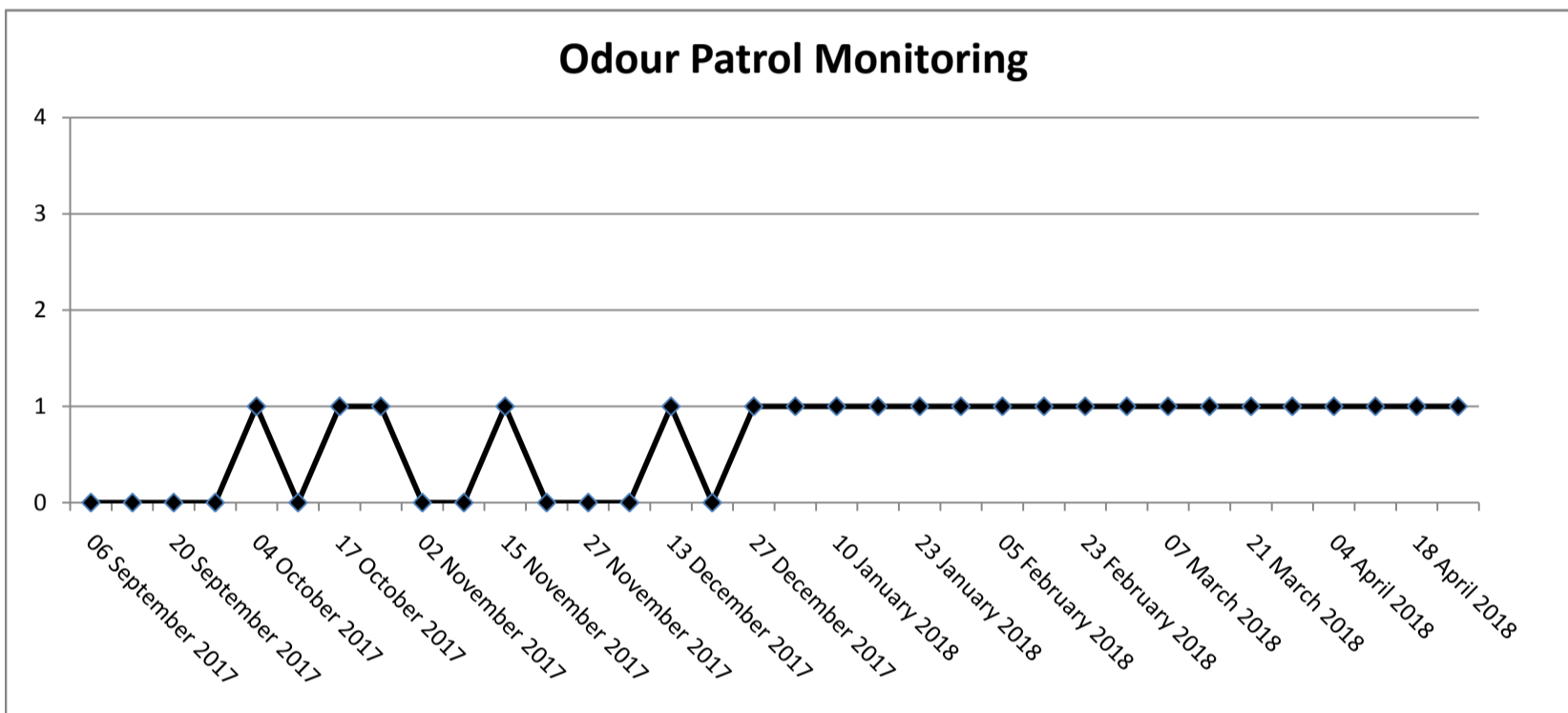
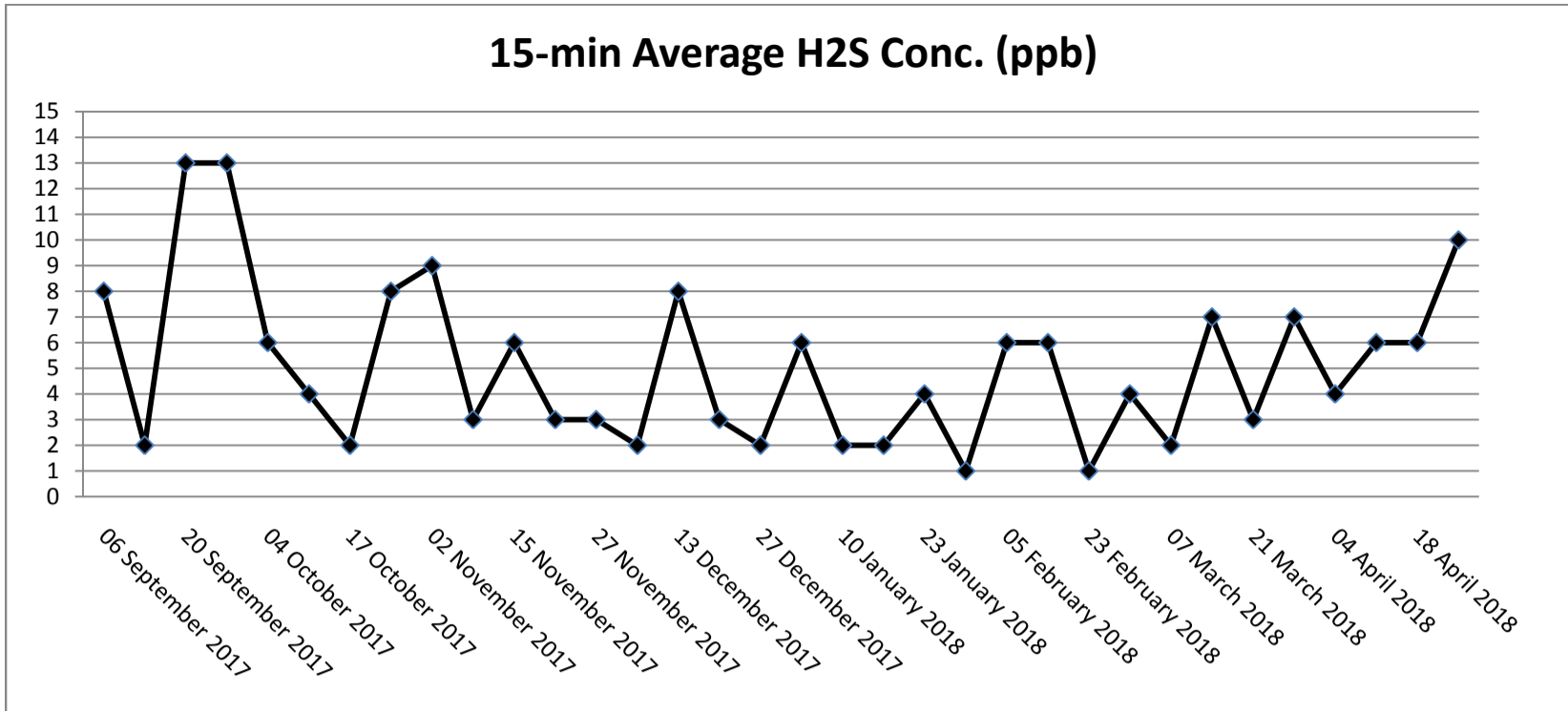
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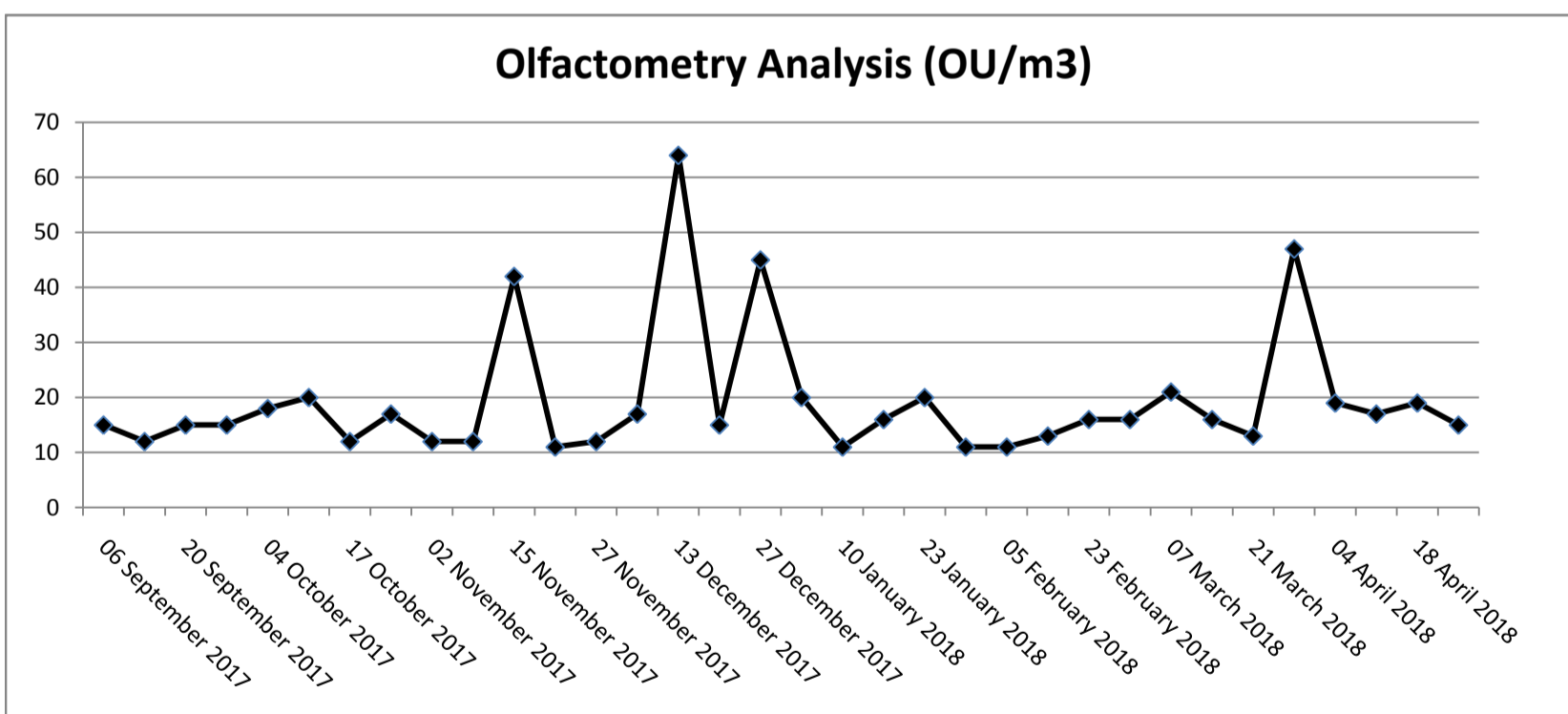
## Appendix C

### Graphical Presentation of Air Quality Monitoring





Note:  
Y-axis refers to the Odour Level: 0 - Not Detected; 1- Slight; 2 - Moderate; 3 - Strong; 4 - Extreme



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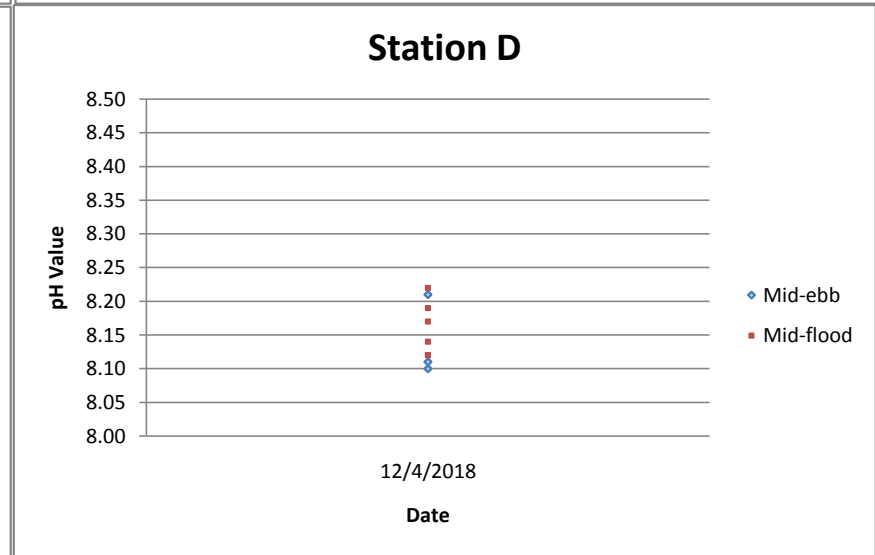
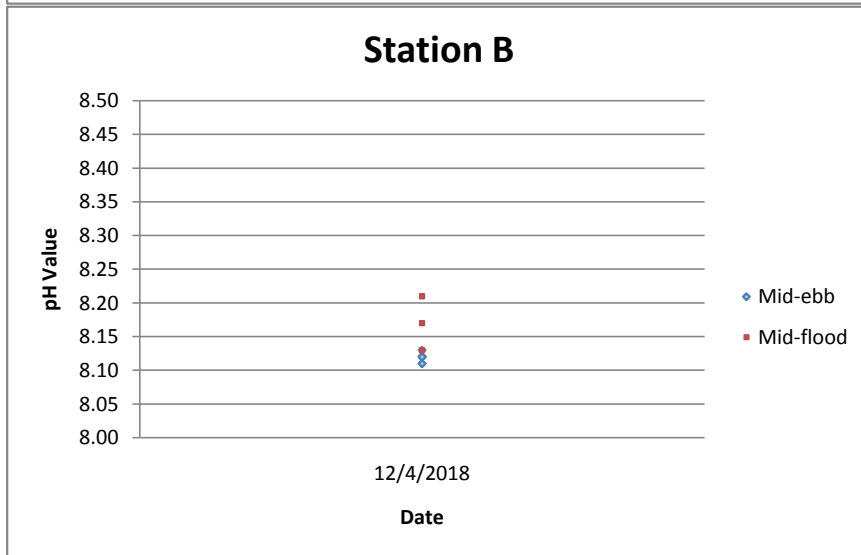
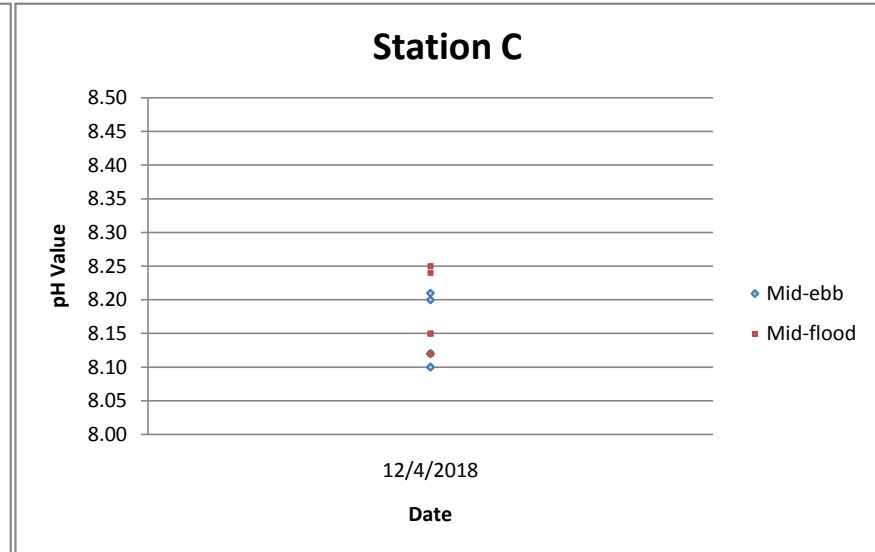
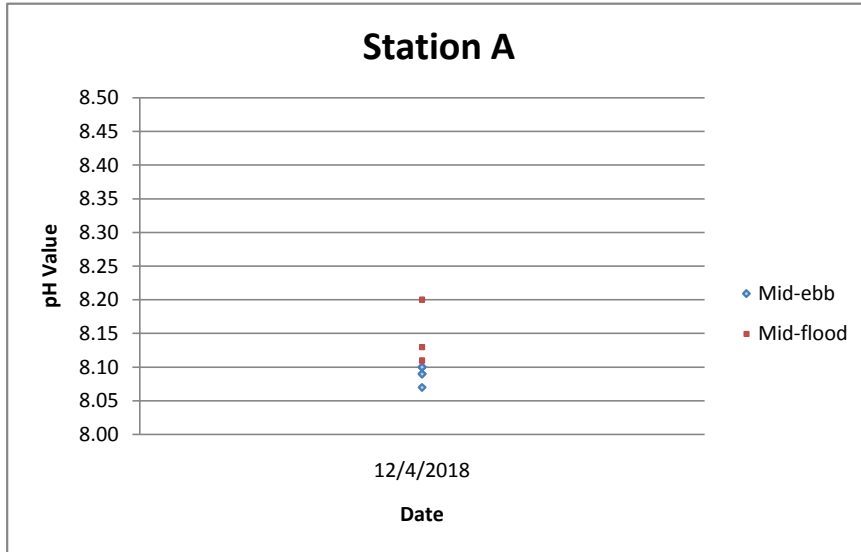
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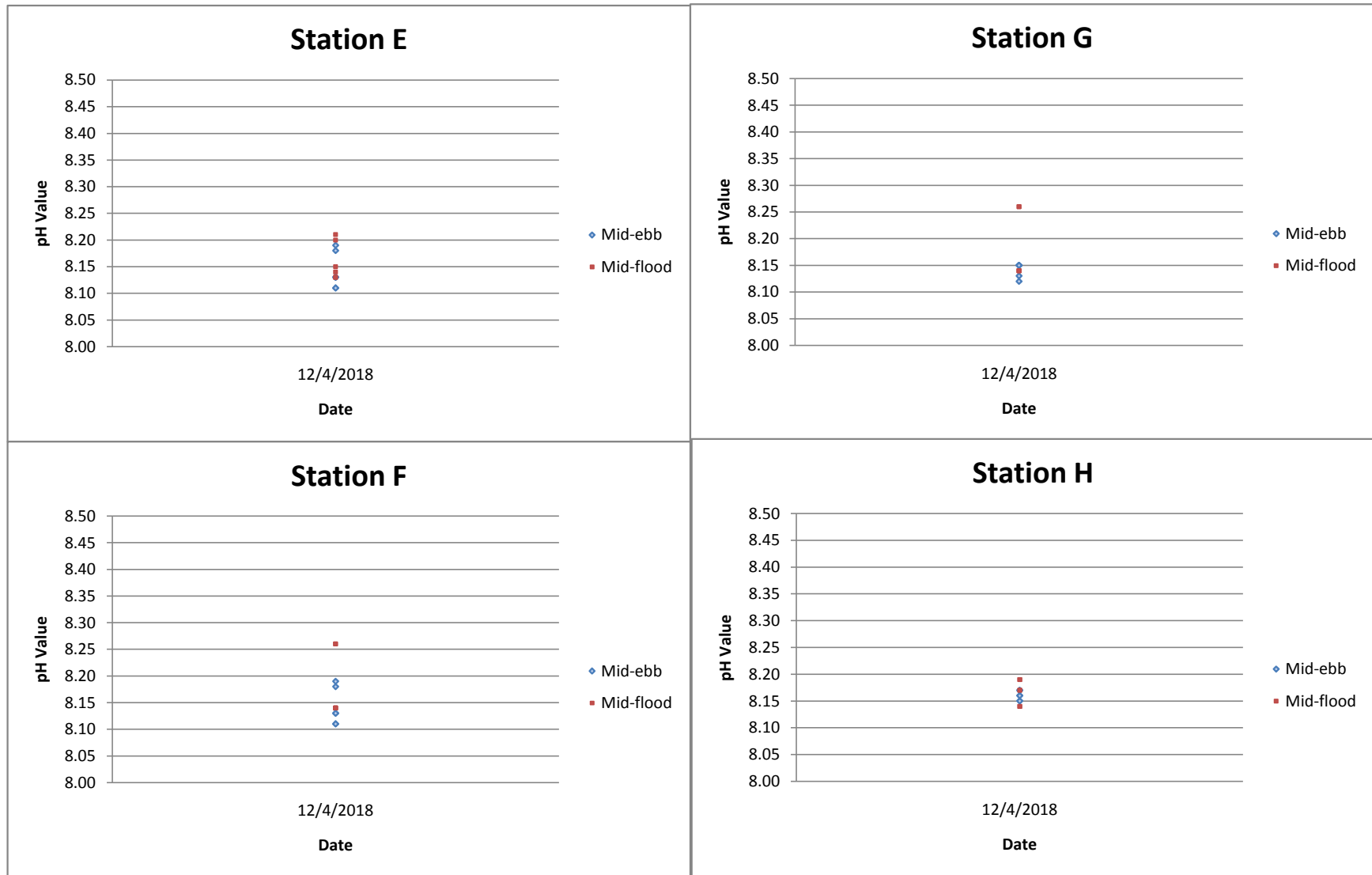
## Appendix D

### Graphical Presentation of Water Quality Monitoring

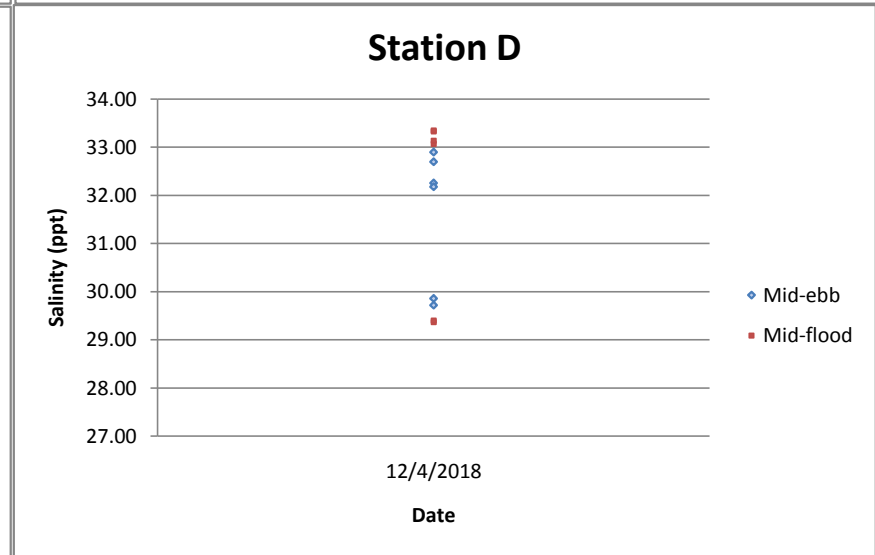
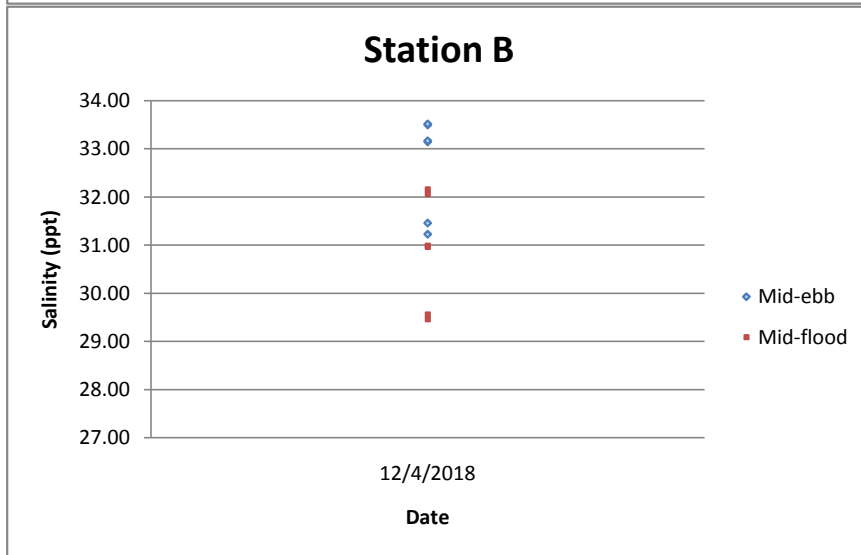
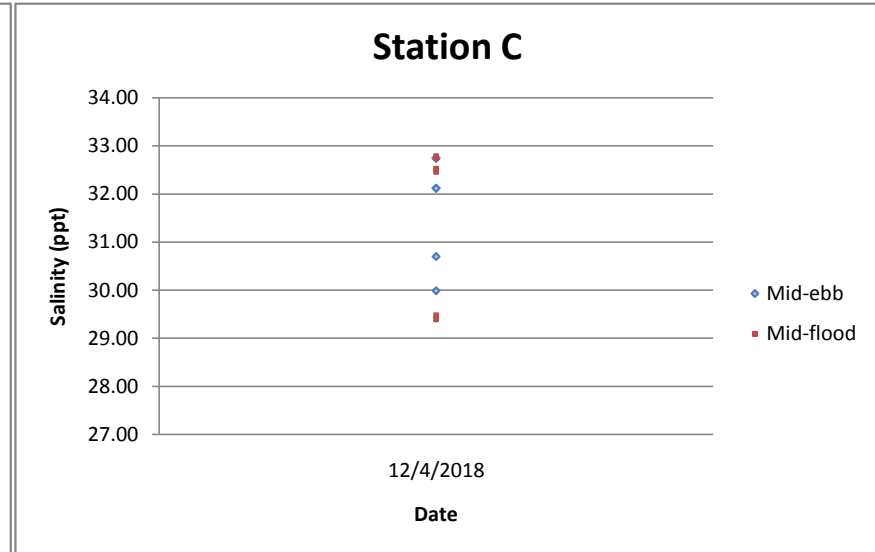
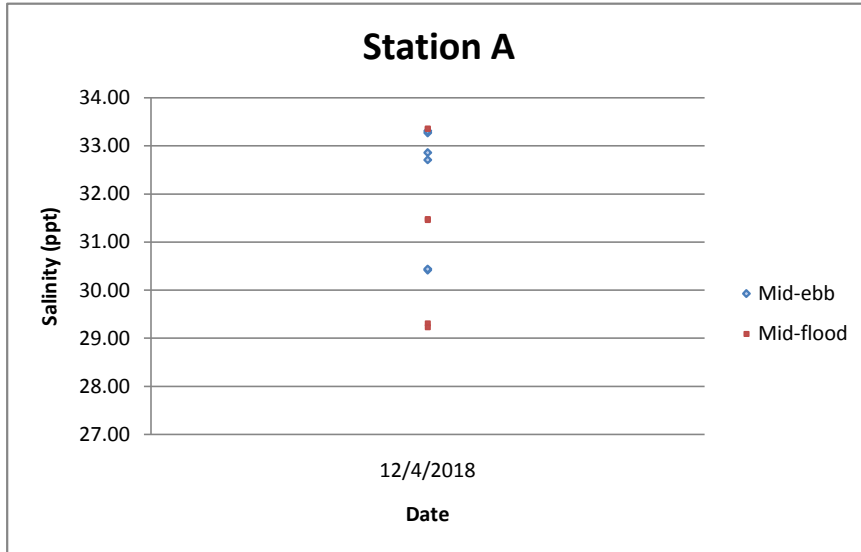
pH value



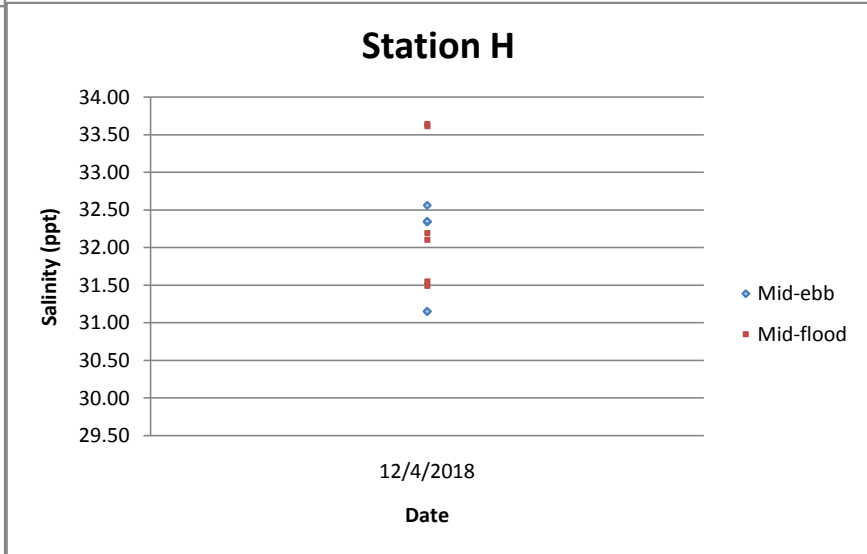
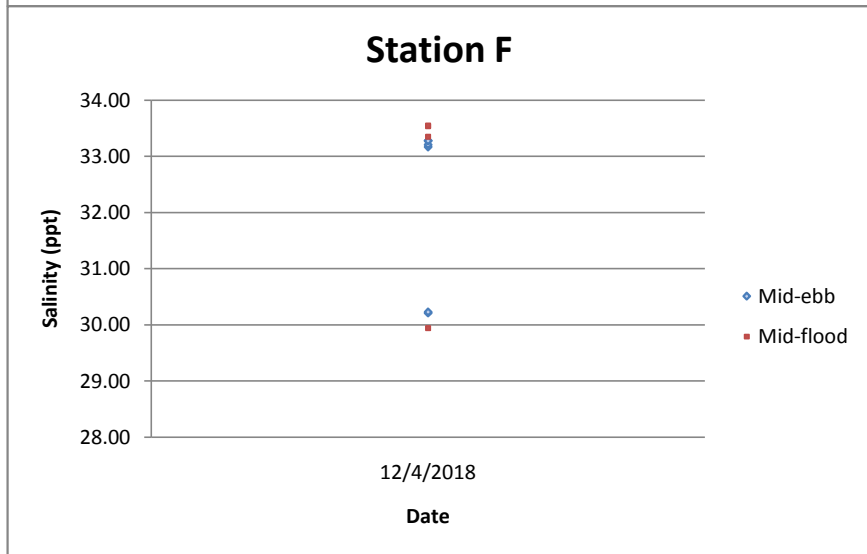
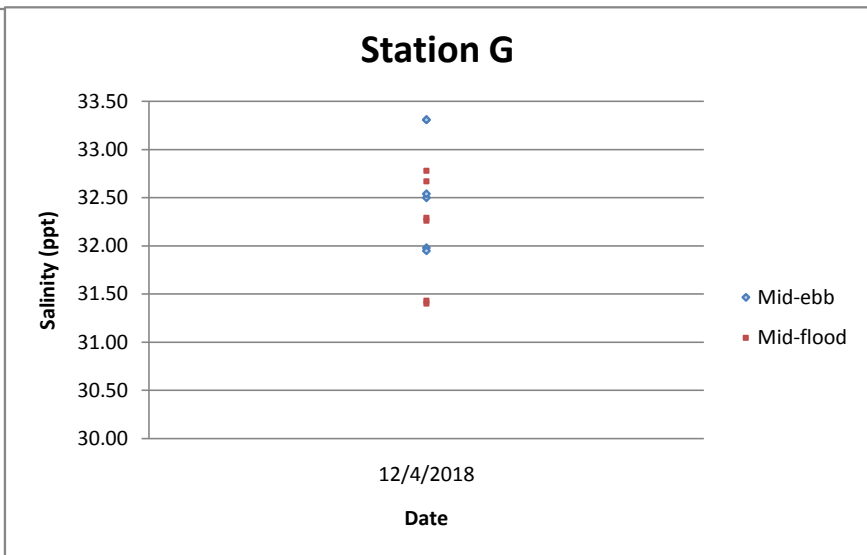
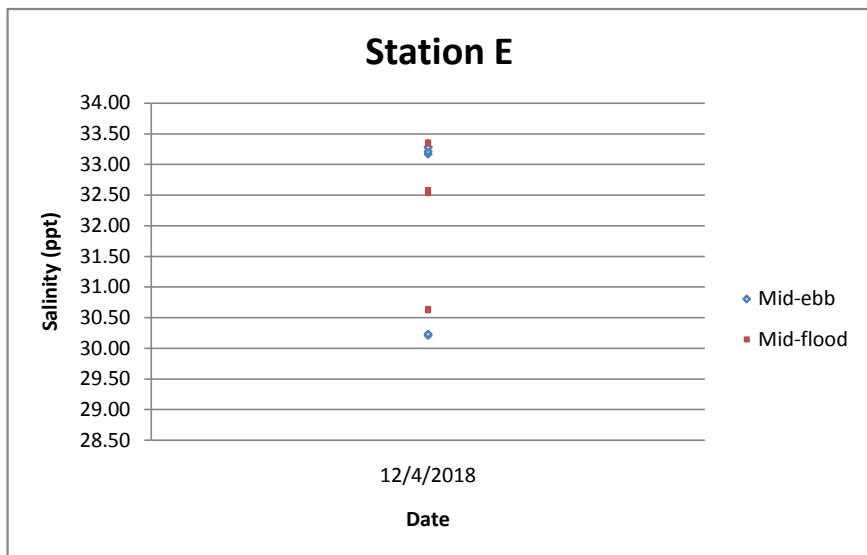
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# Salinity (ppt)

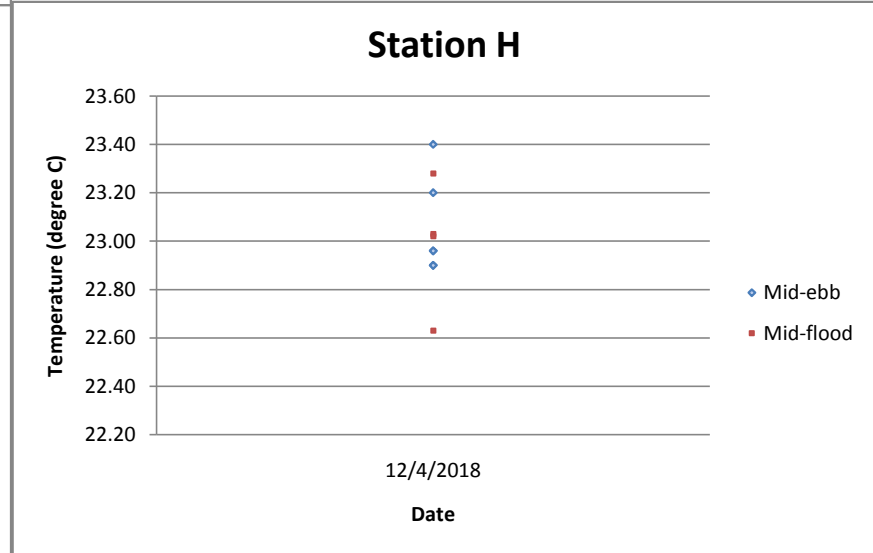
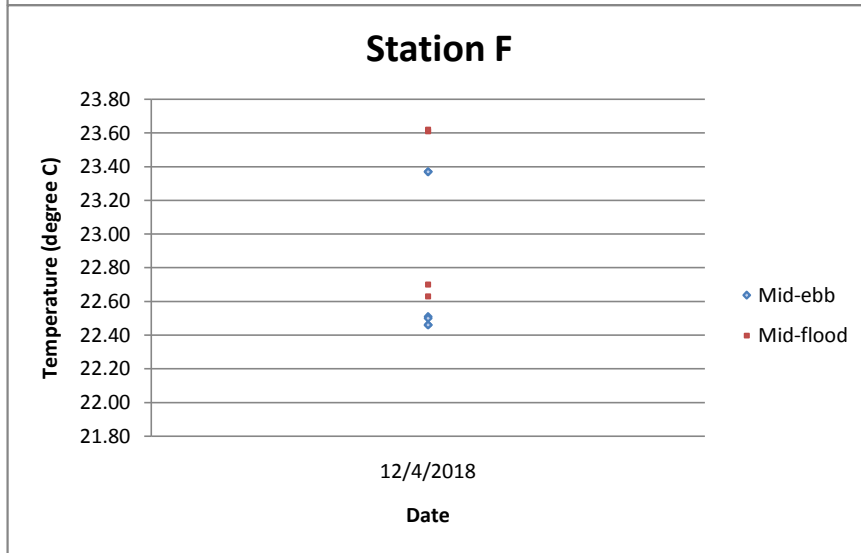
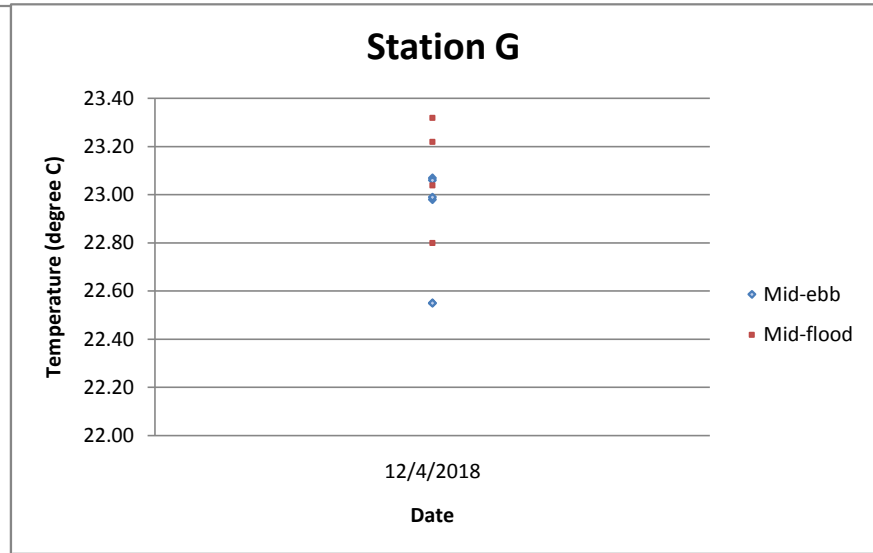
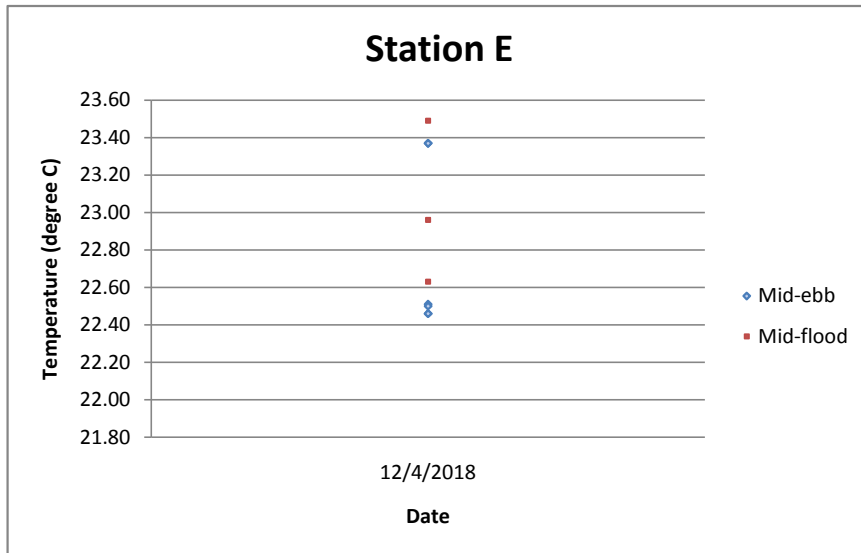


Salinity (ppt)



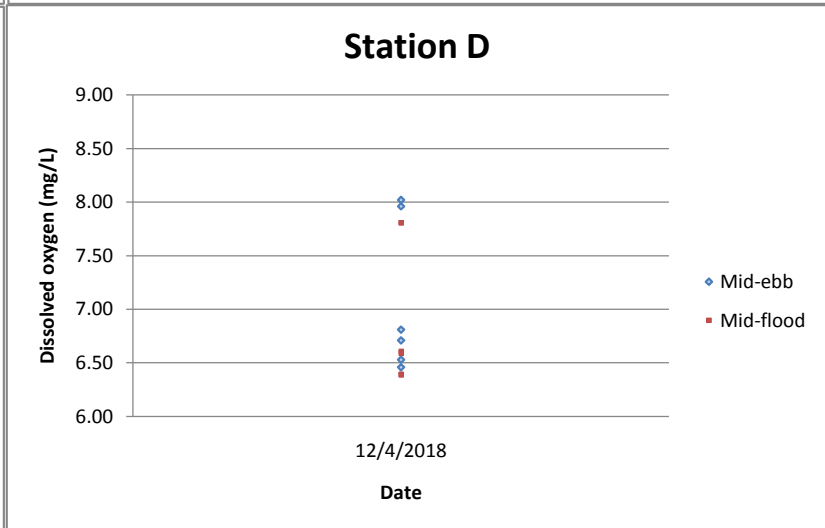
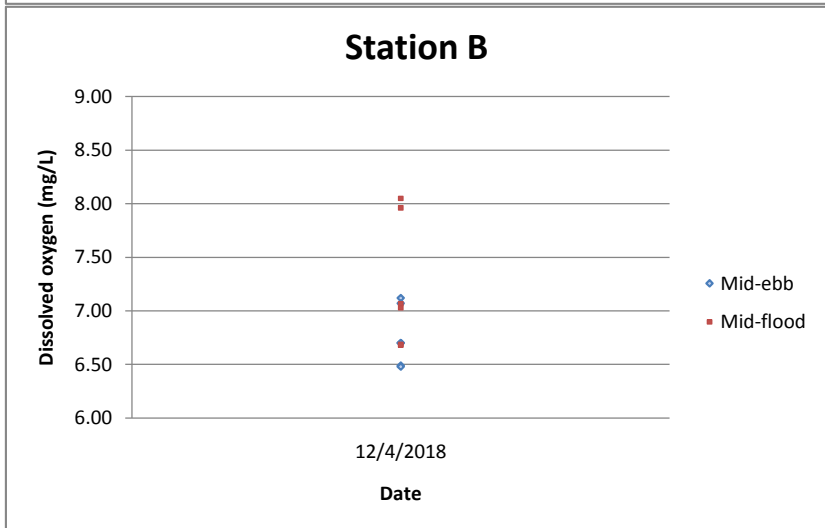
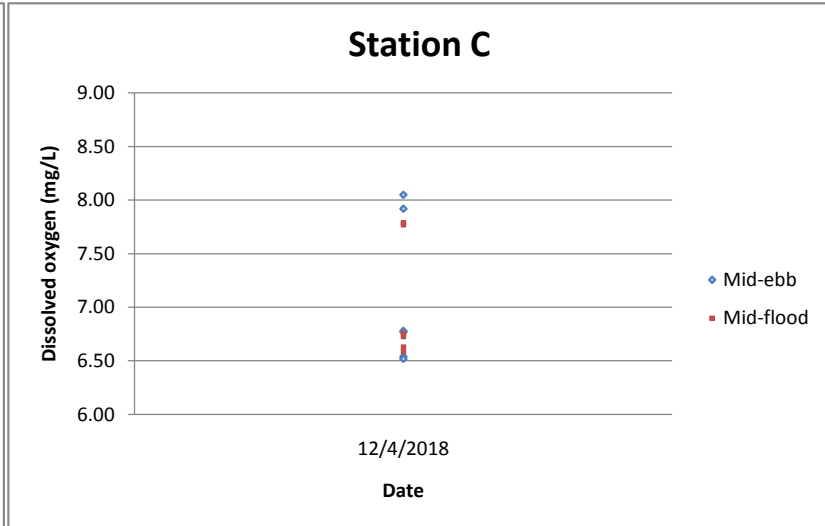
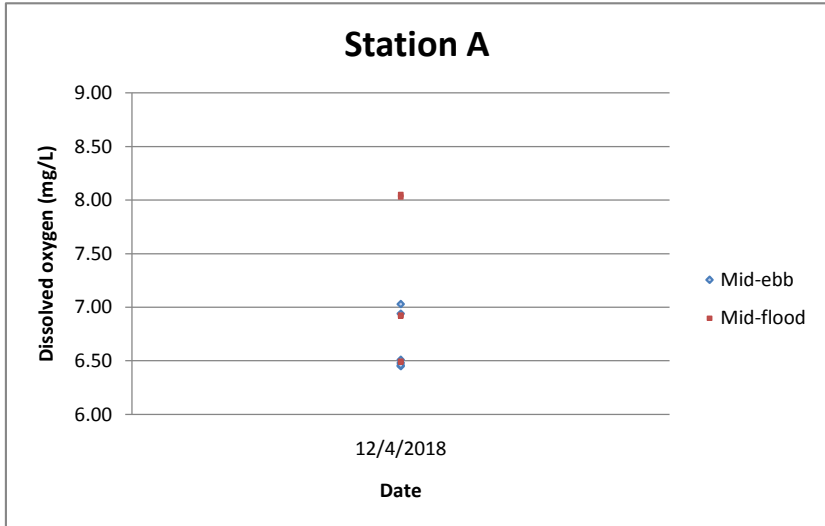


Temperature (degree C)

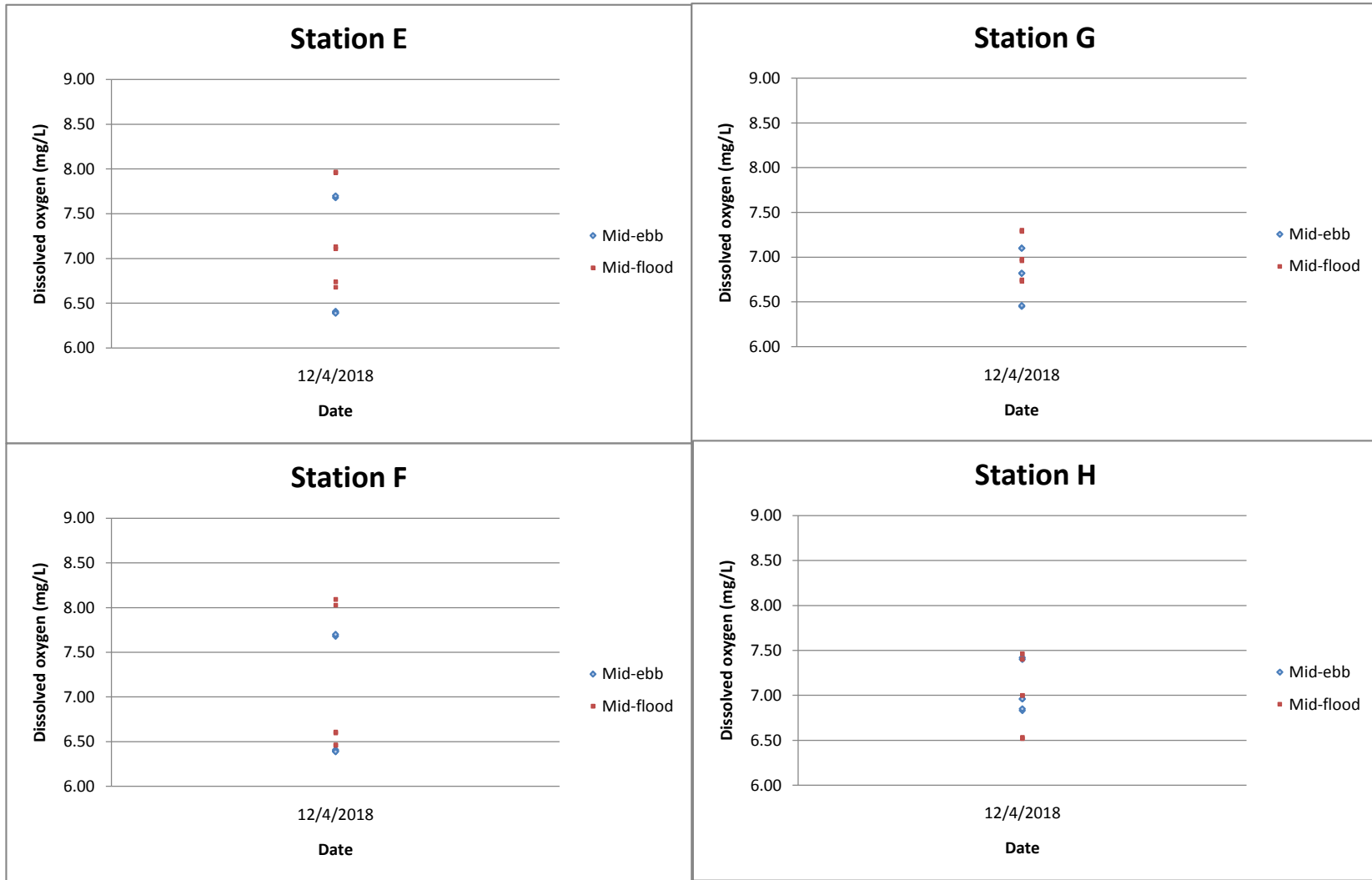




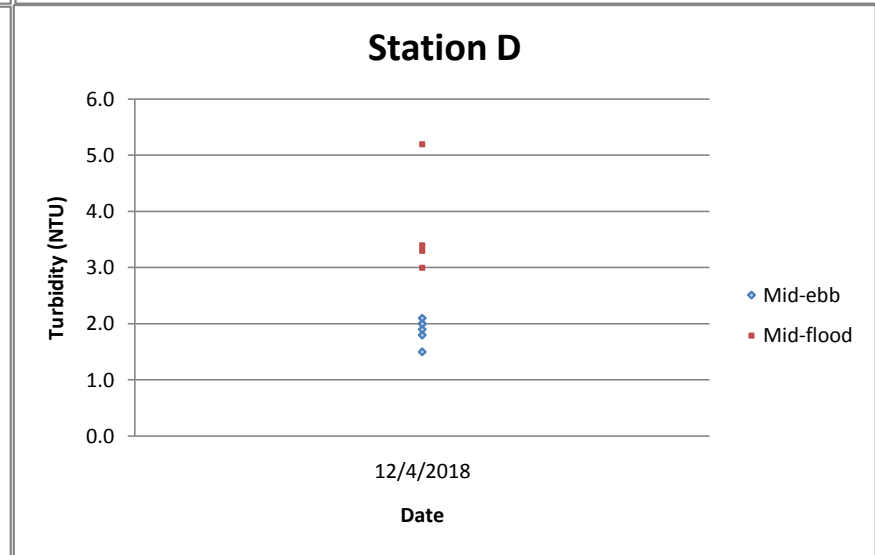
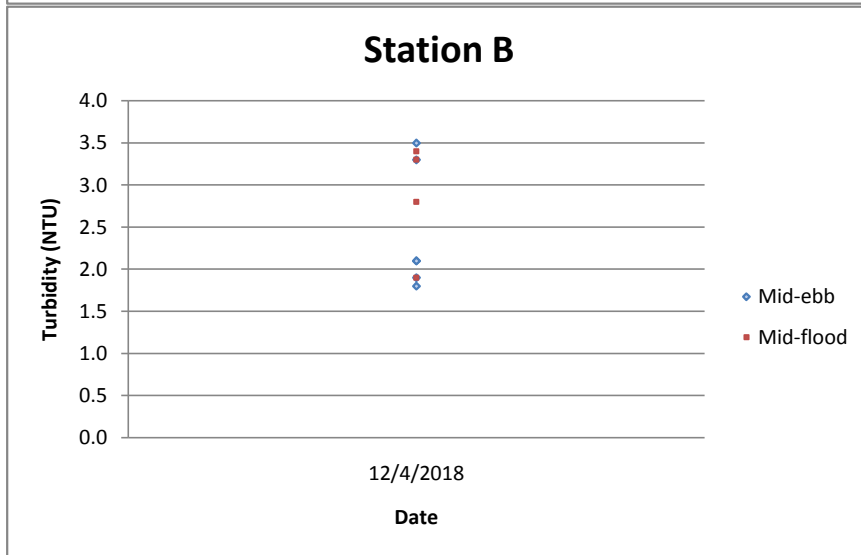
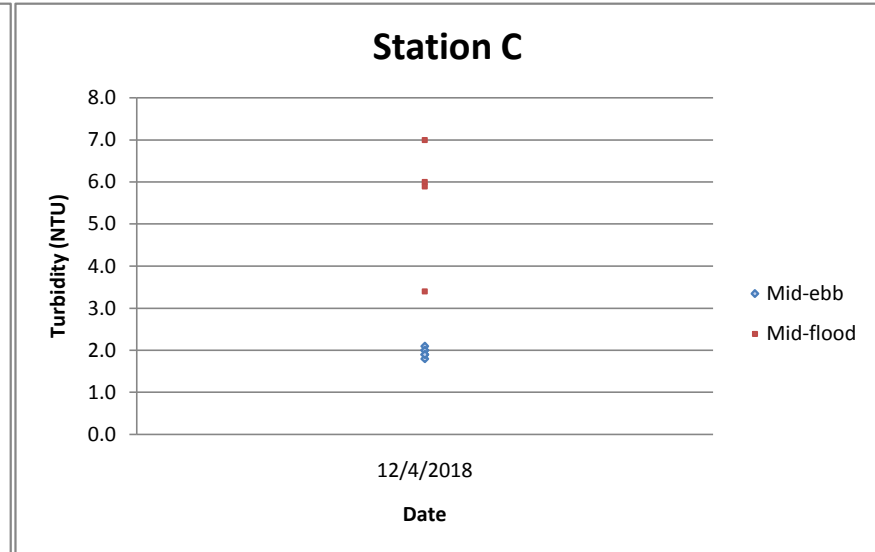
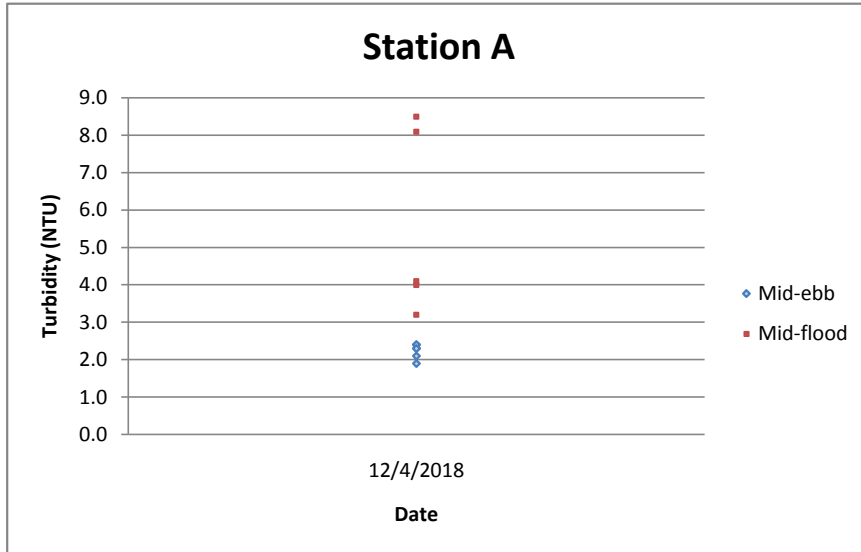
Dissolved oxygen (mg/L)



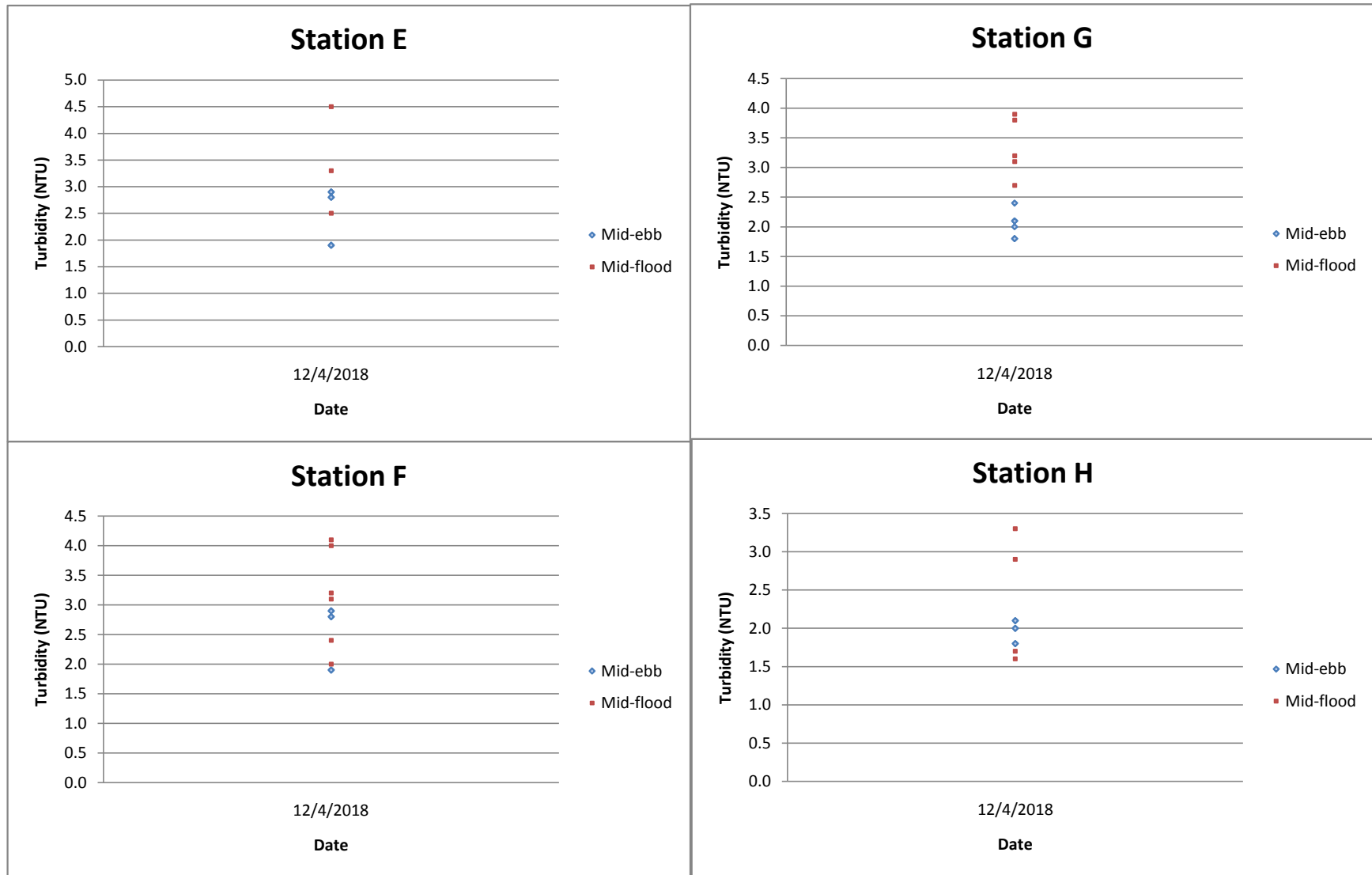
Dissolved oxygen (mg/L)



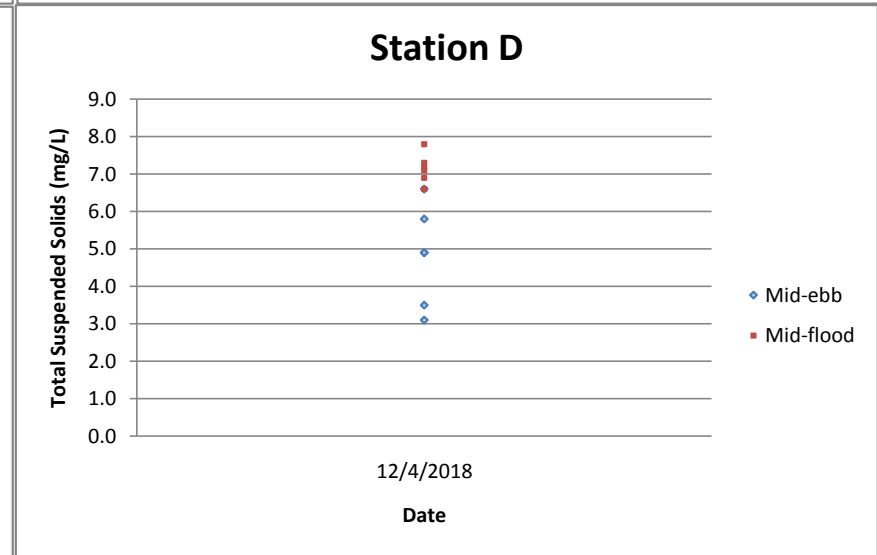
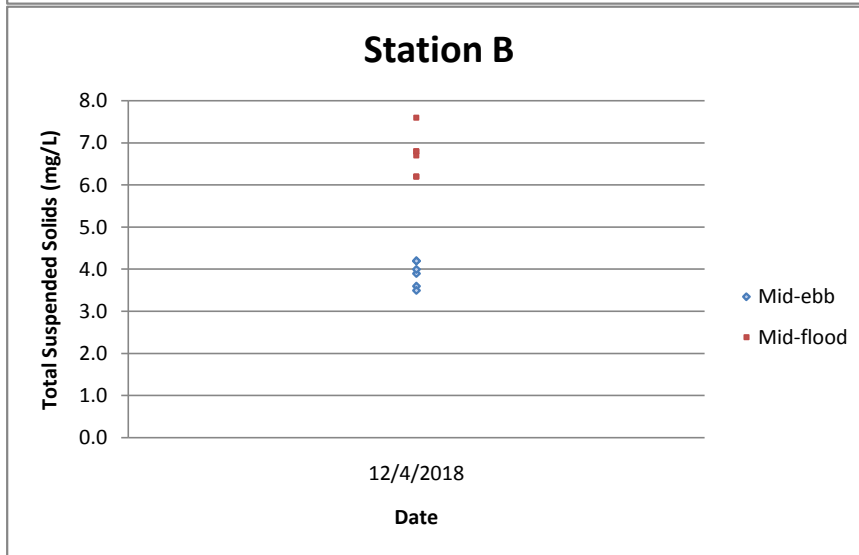
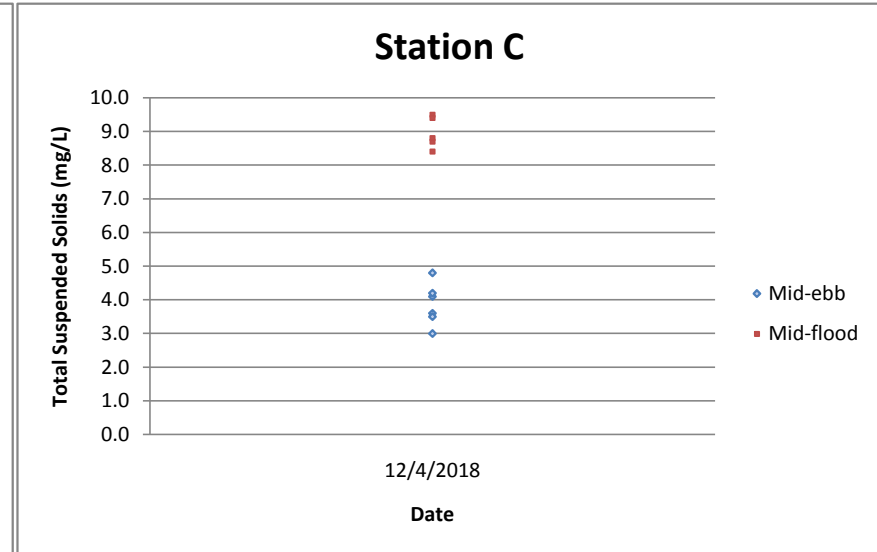
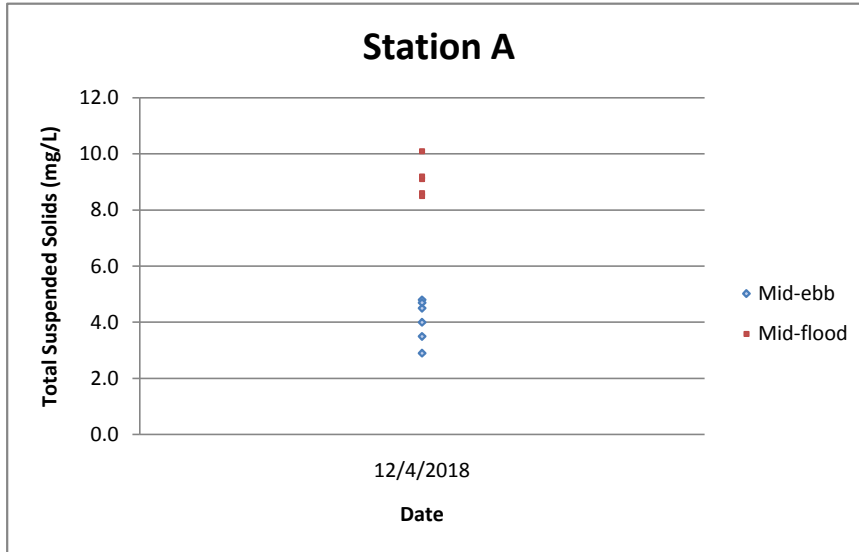
# Turbidity (NTU)



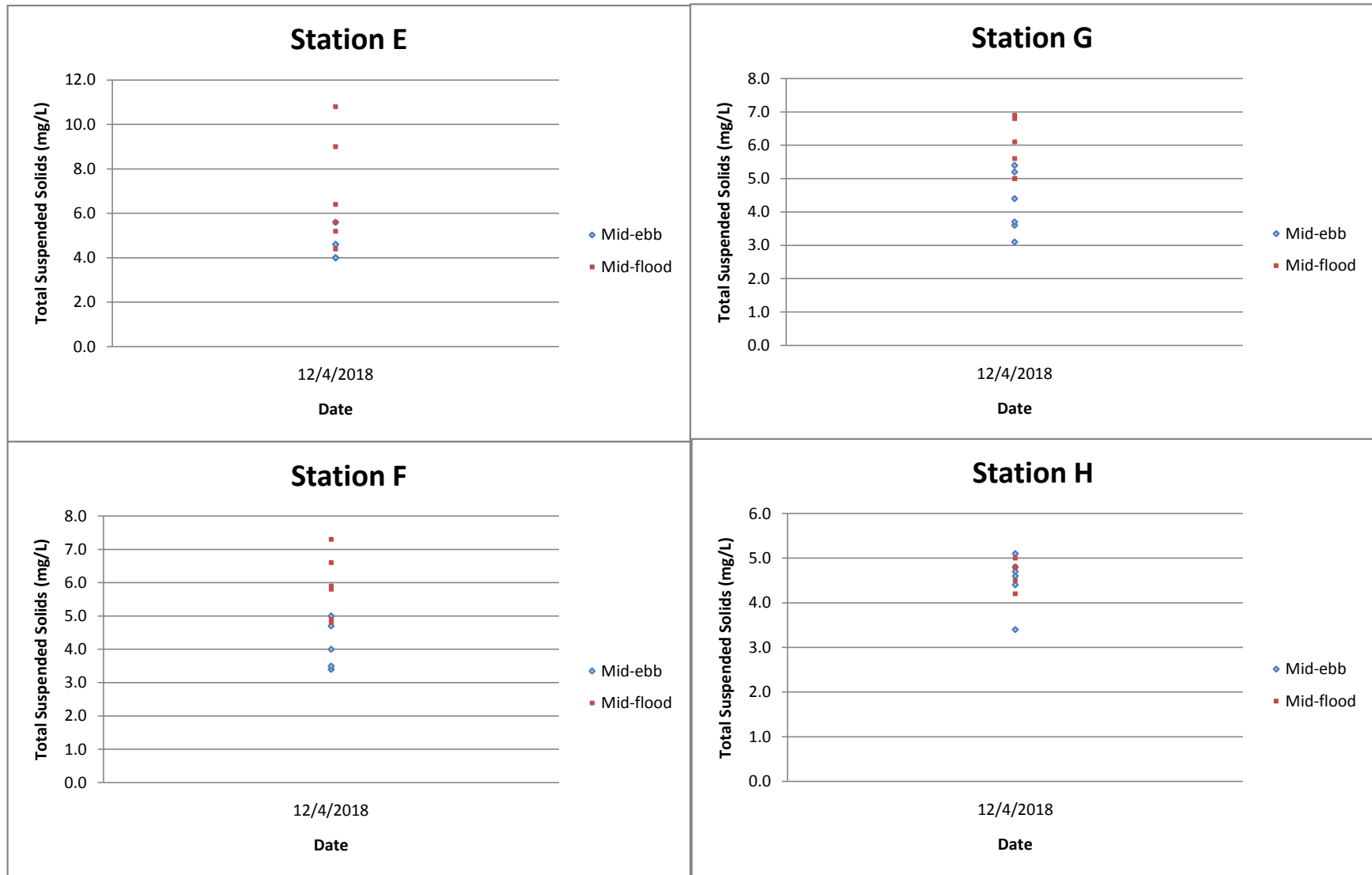
# Turbidity (NTU)



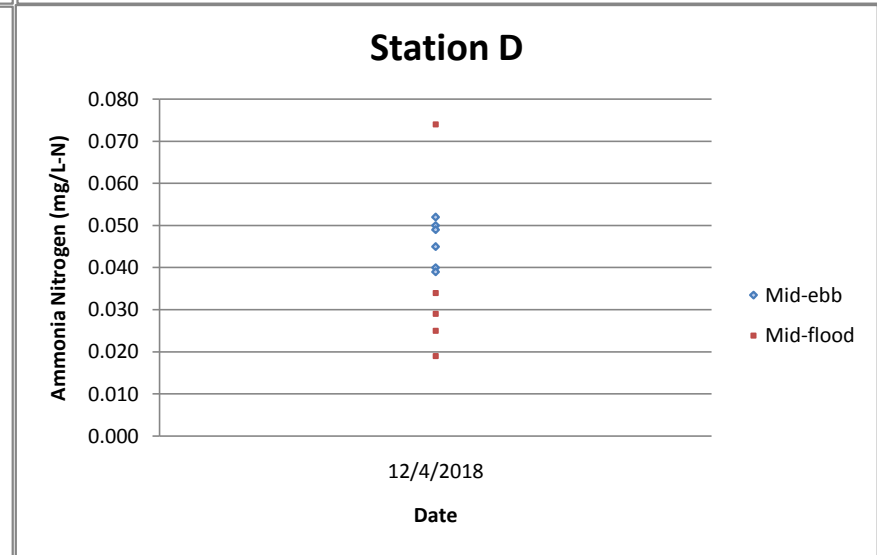
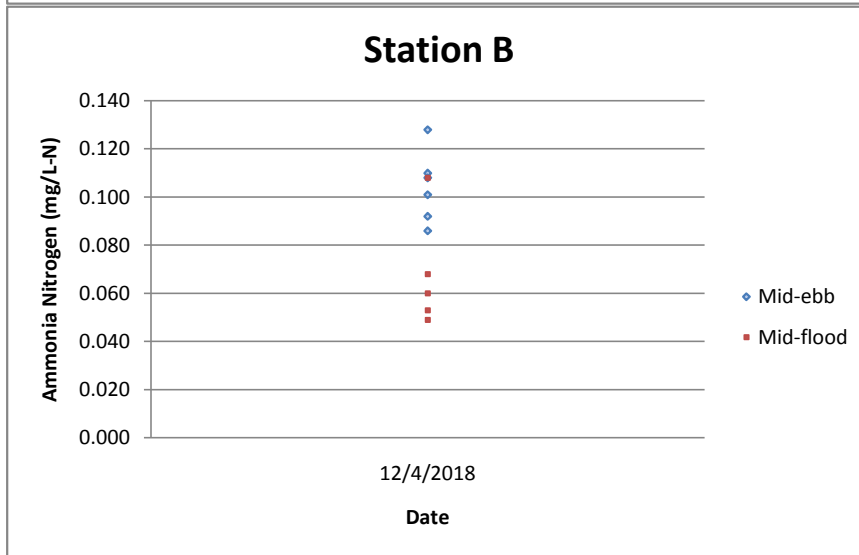
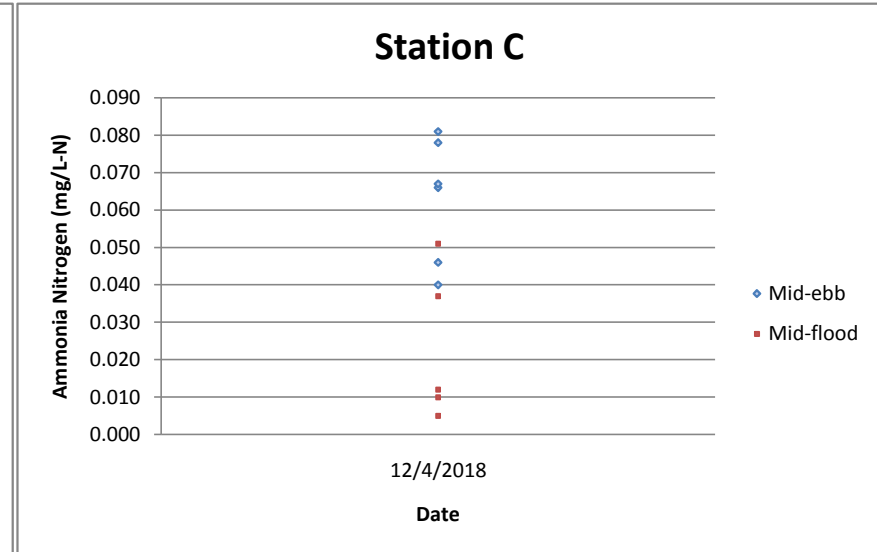
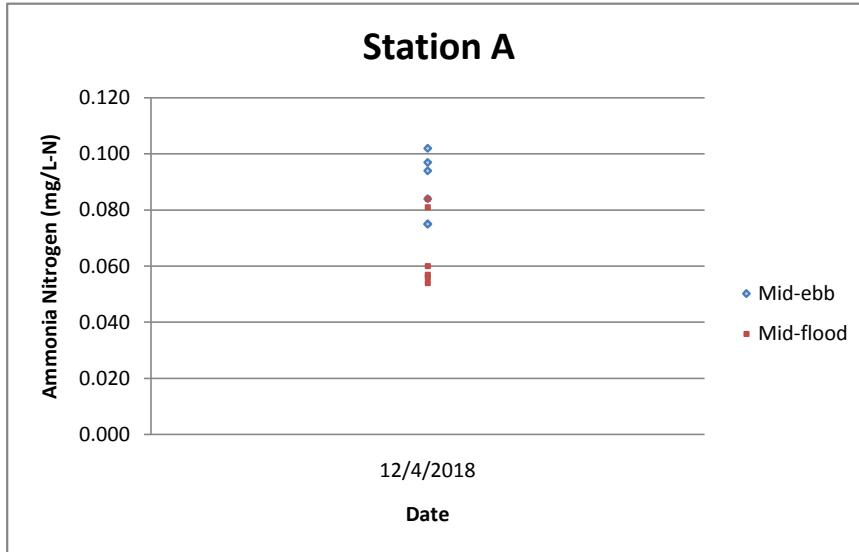
Total Suspended Solids (mg/L)



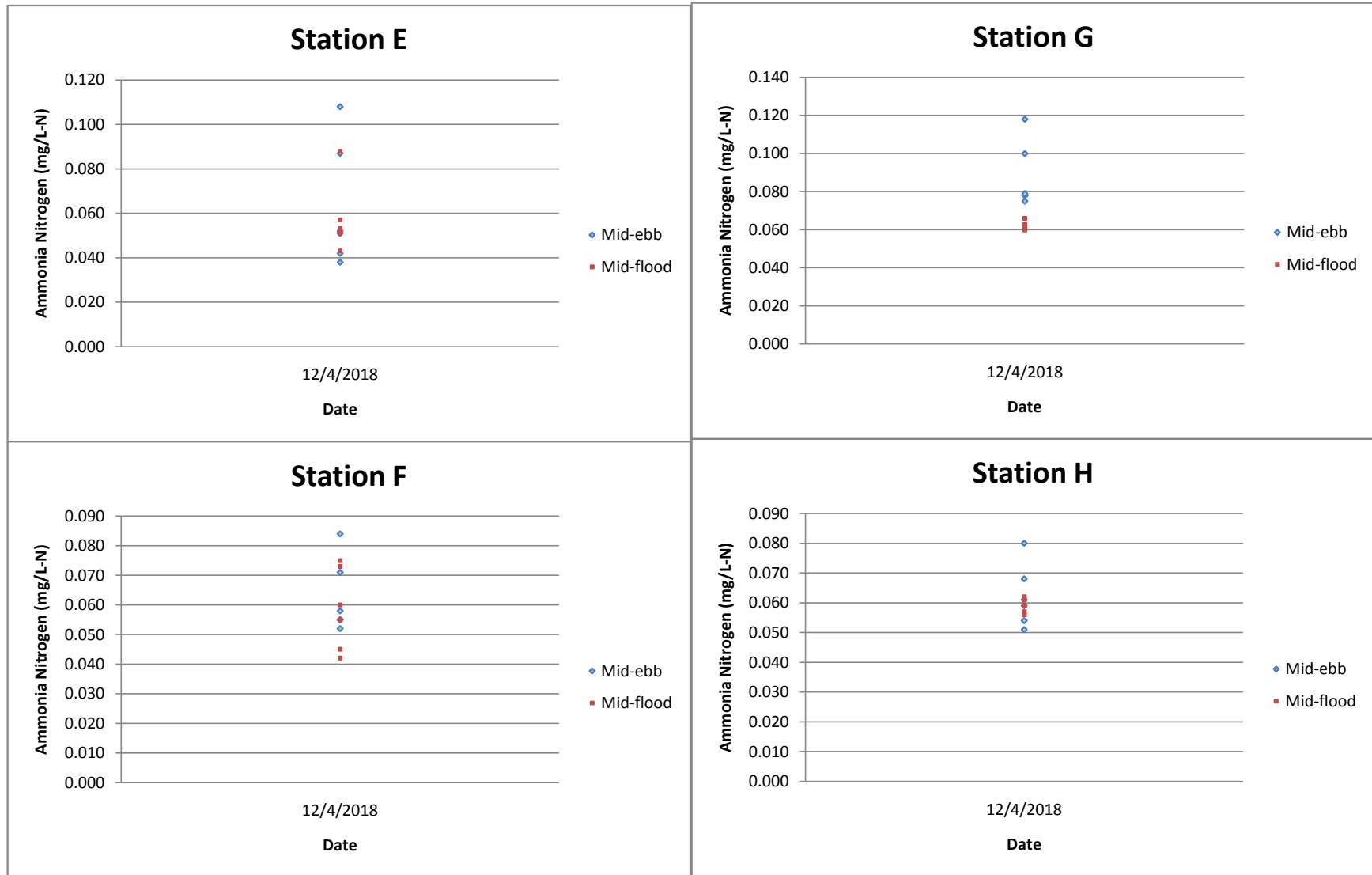
Total Suspended Solids (mg/L)



Ammonia Nitrogen (mg/L-N)

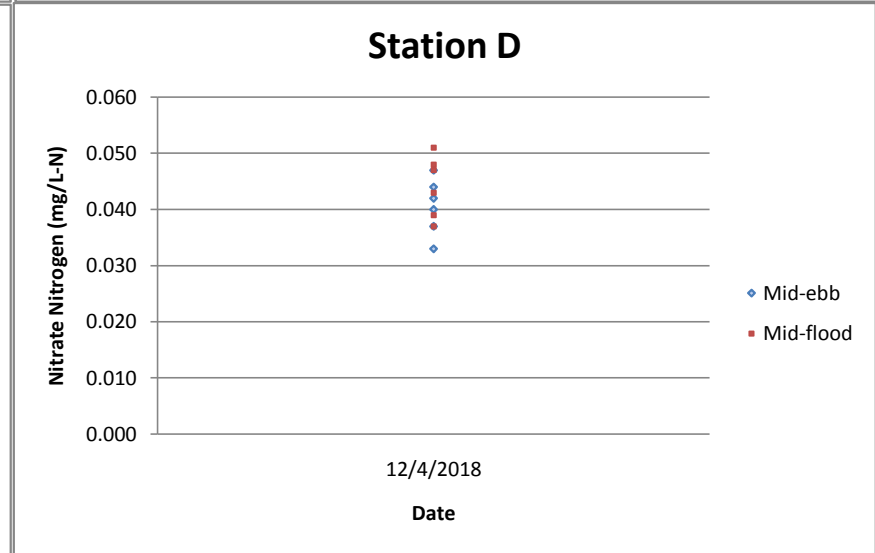
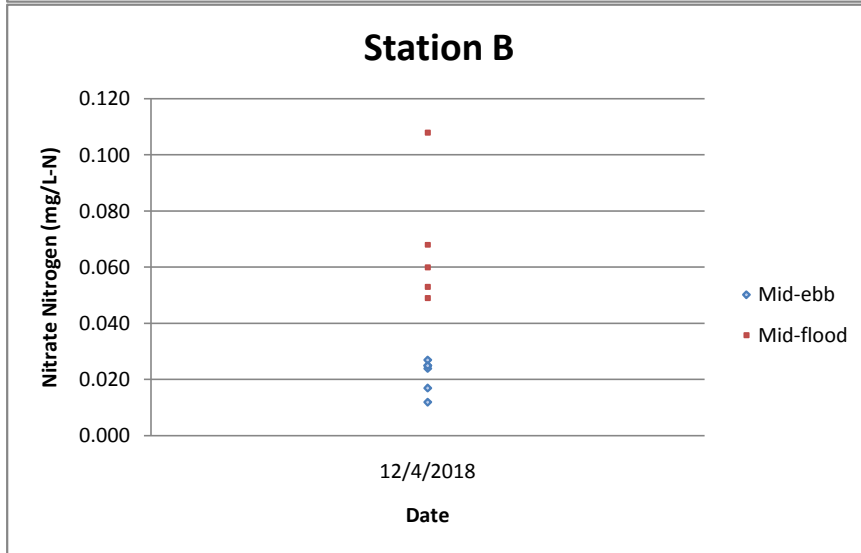
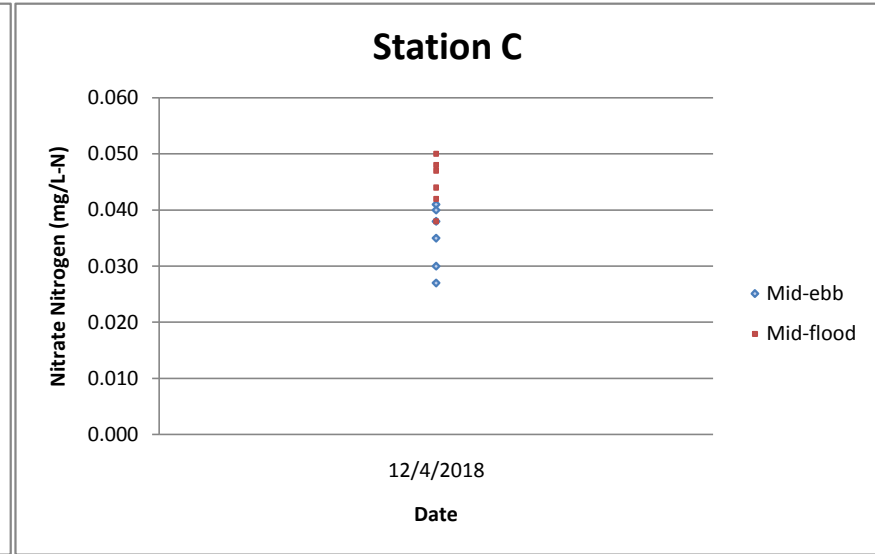
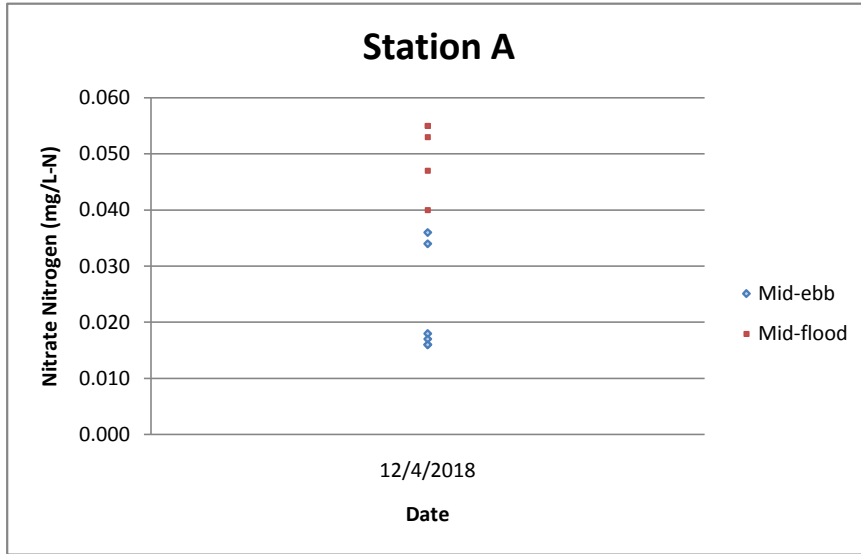


Ammonia Nitrogen (mg/L-N)

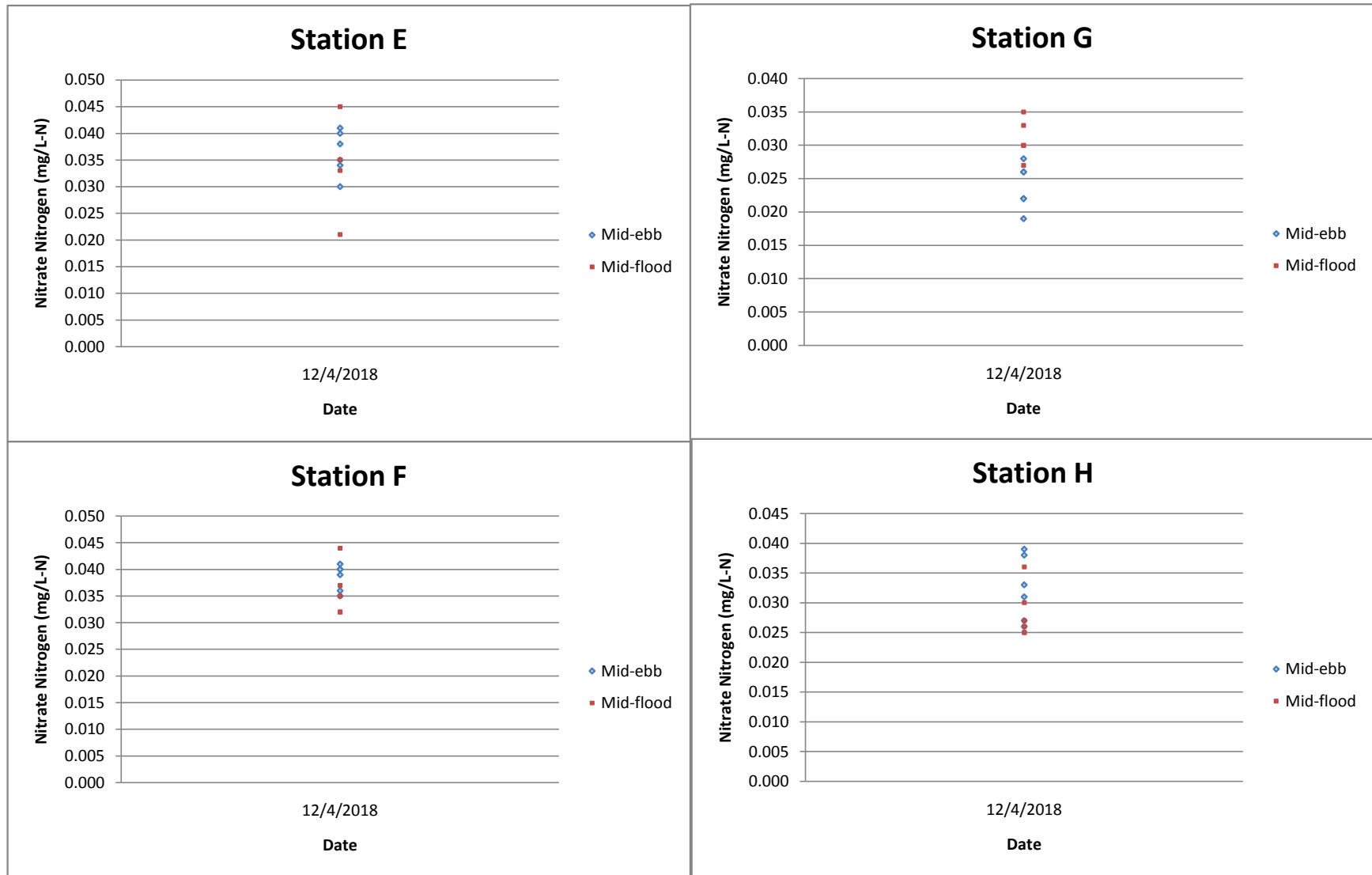




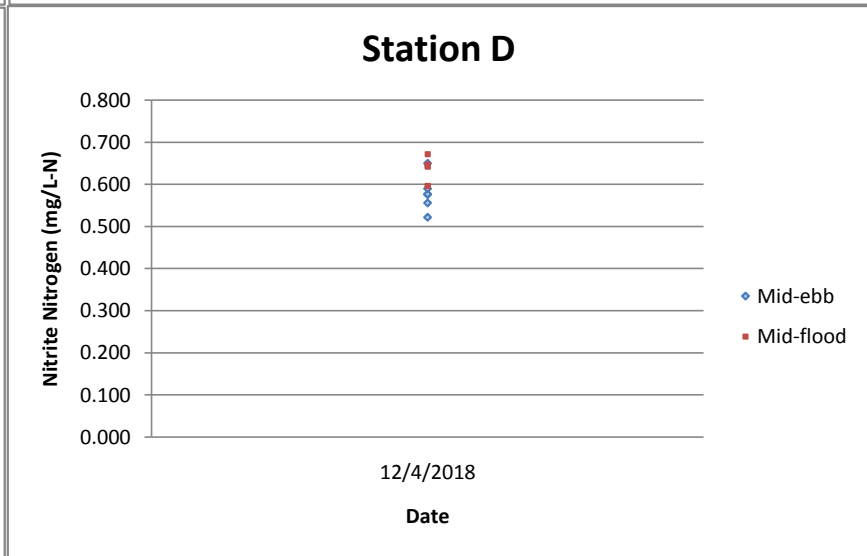
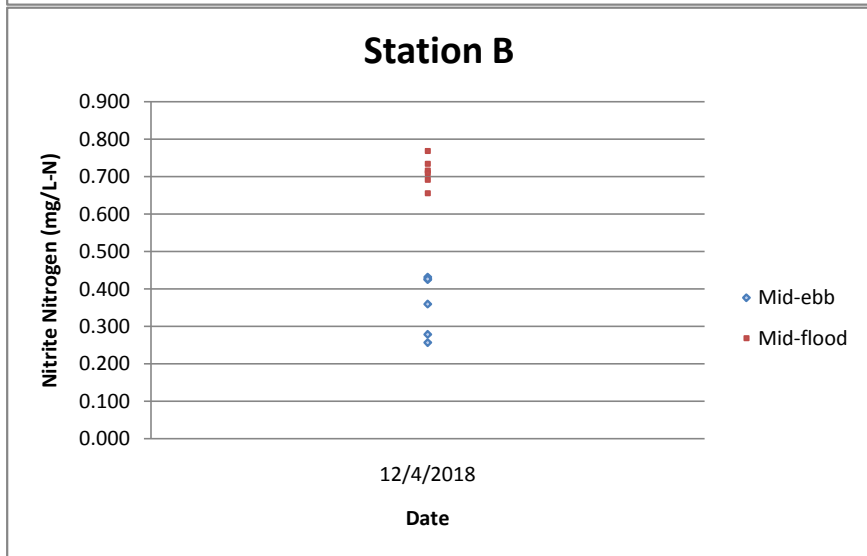
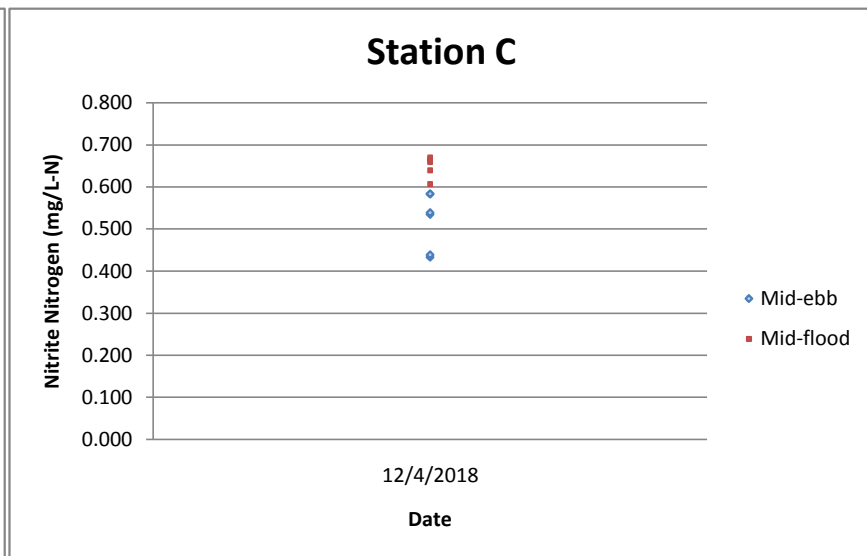
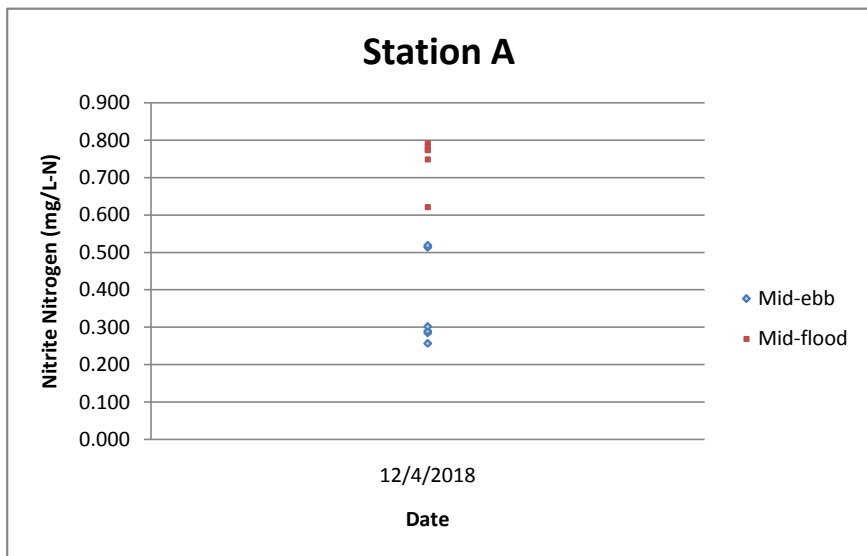
Nitrate Nitrogen (mg/L-N)



Nitrate Nitrogen (mg/L-N)

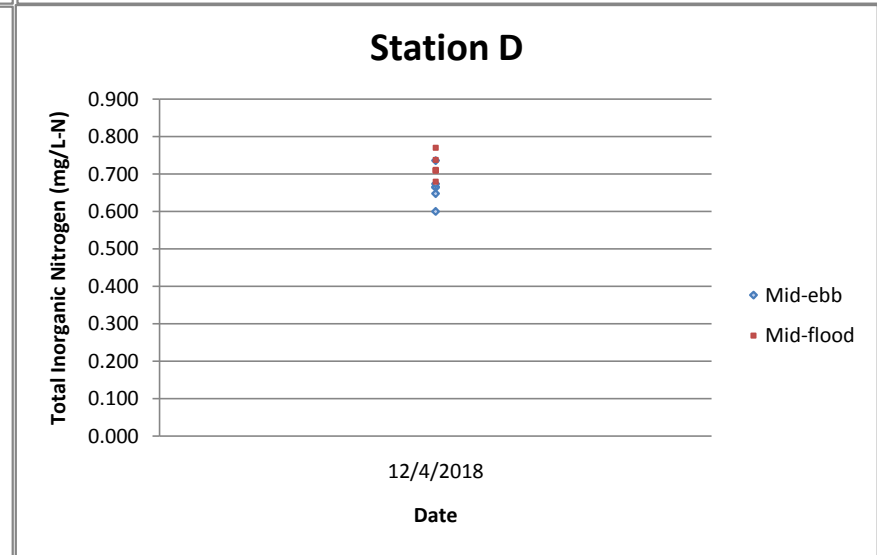
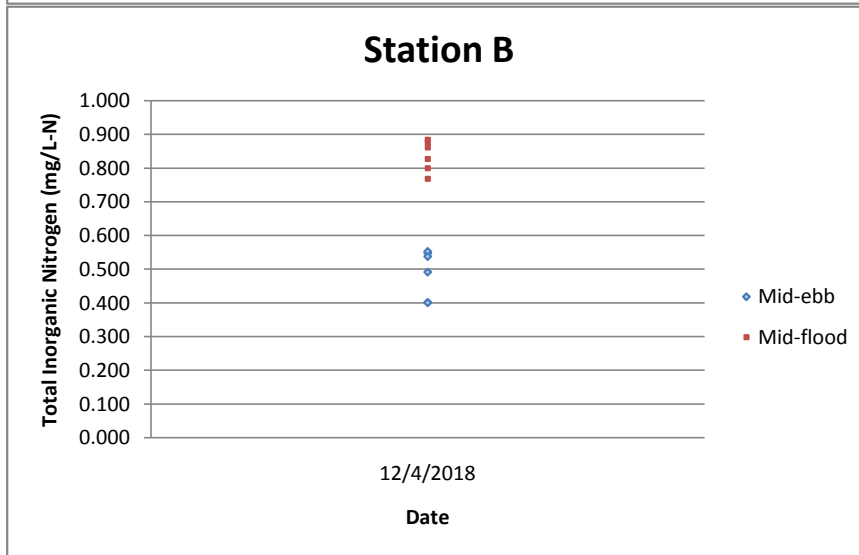
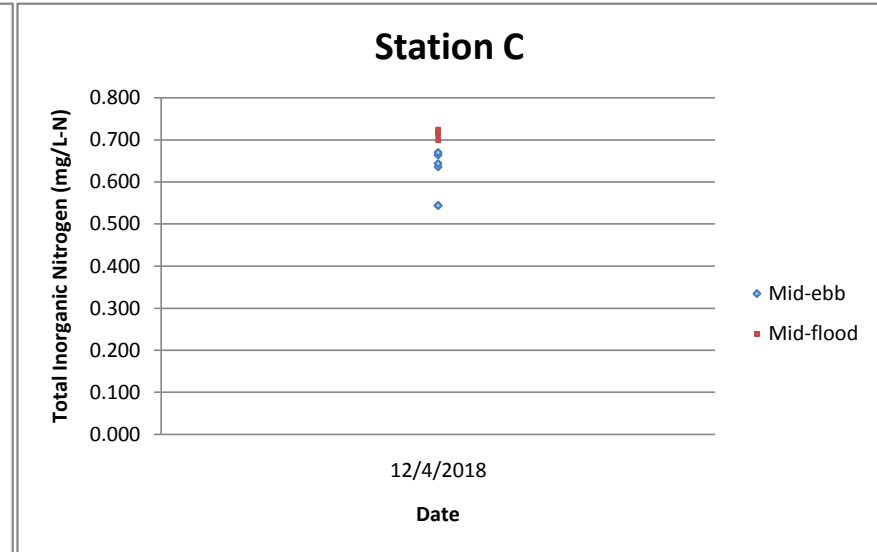
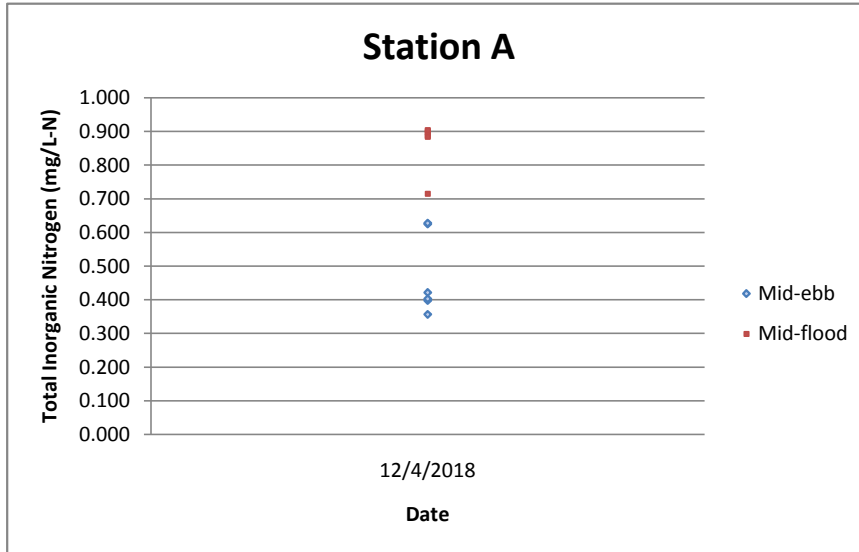


Nitrite Nitrogen (mg/L-N)

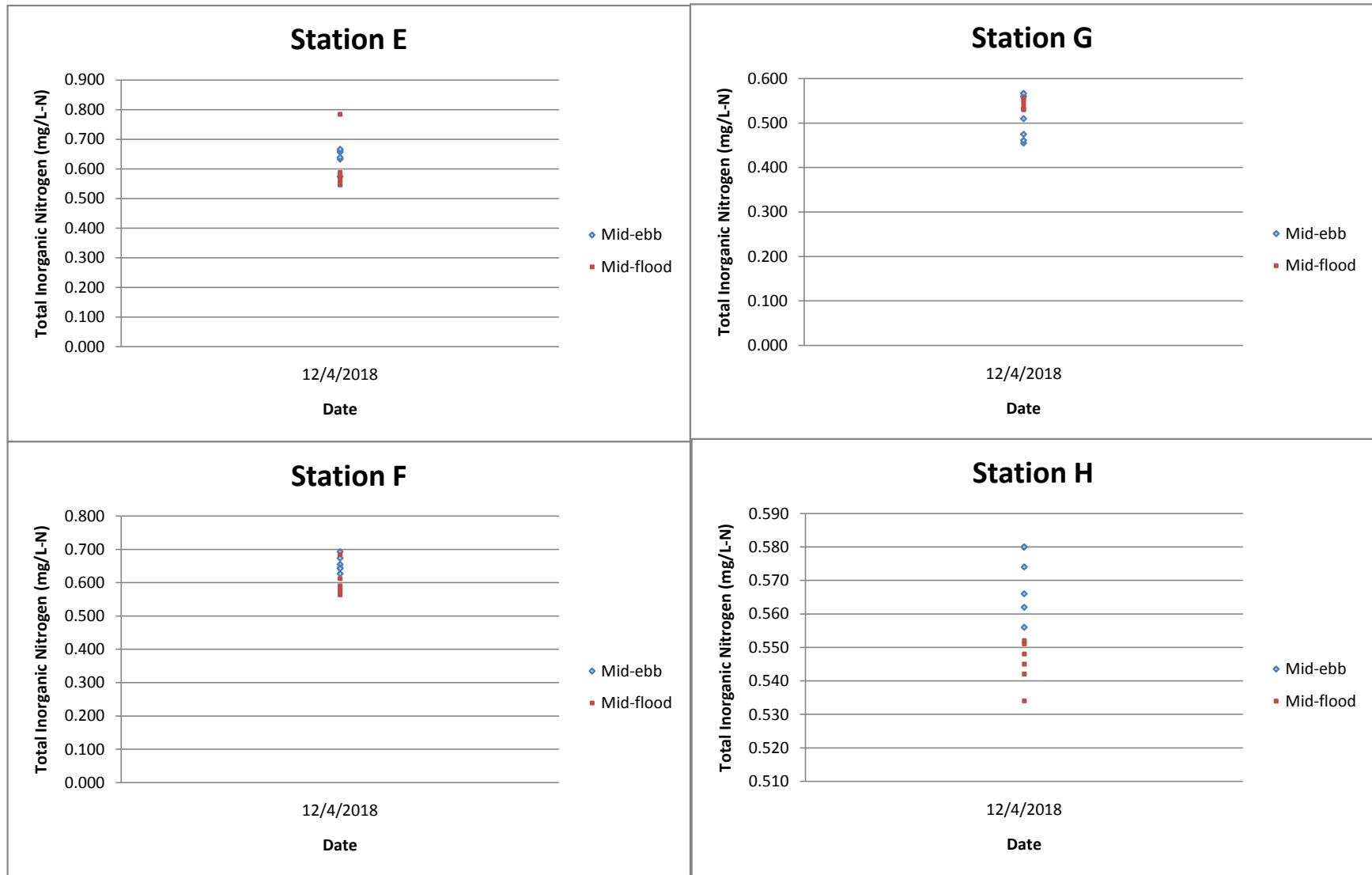




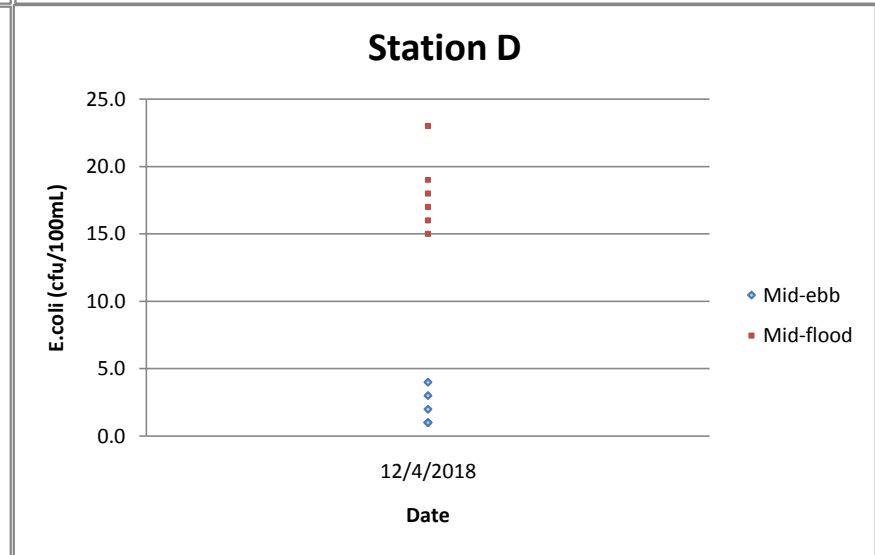
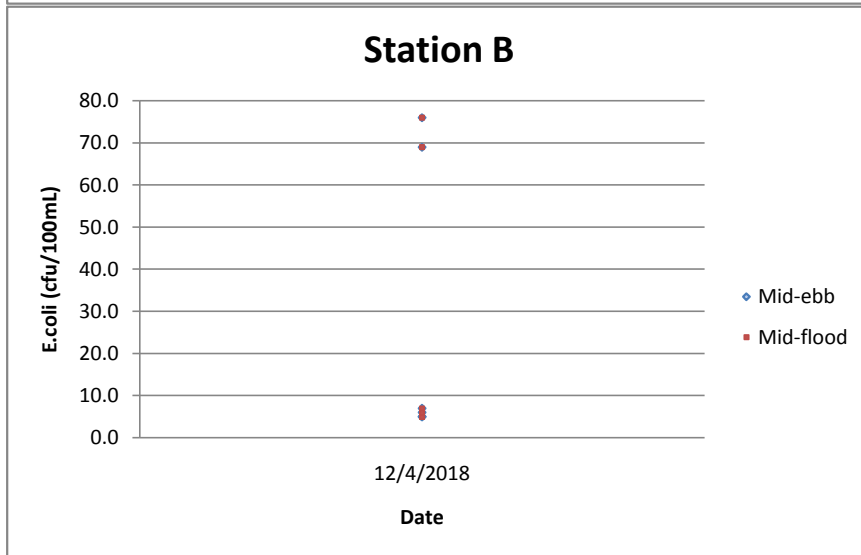
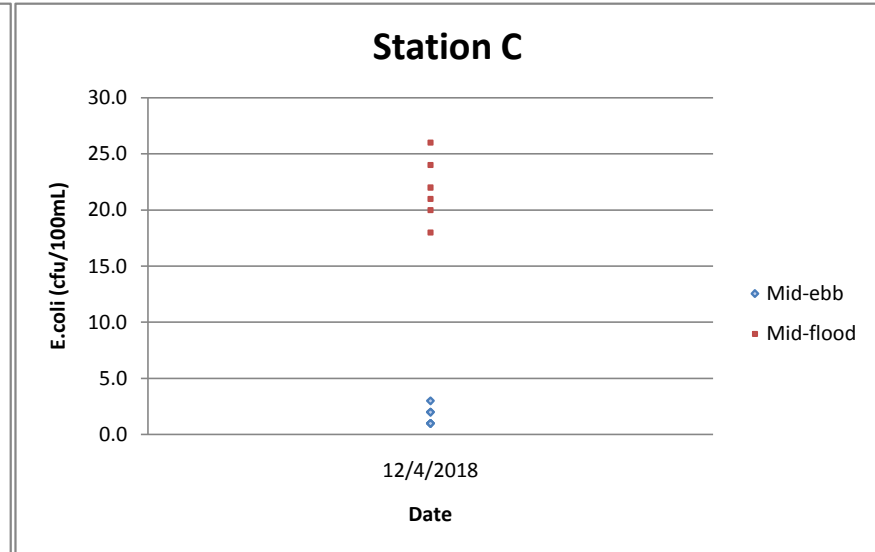
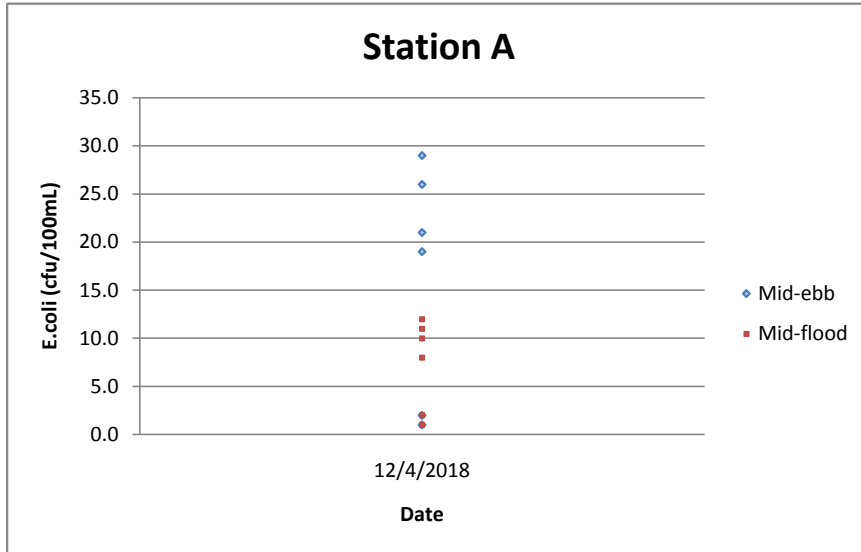
Total Inorganic Nitrogen (mg/L-N)



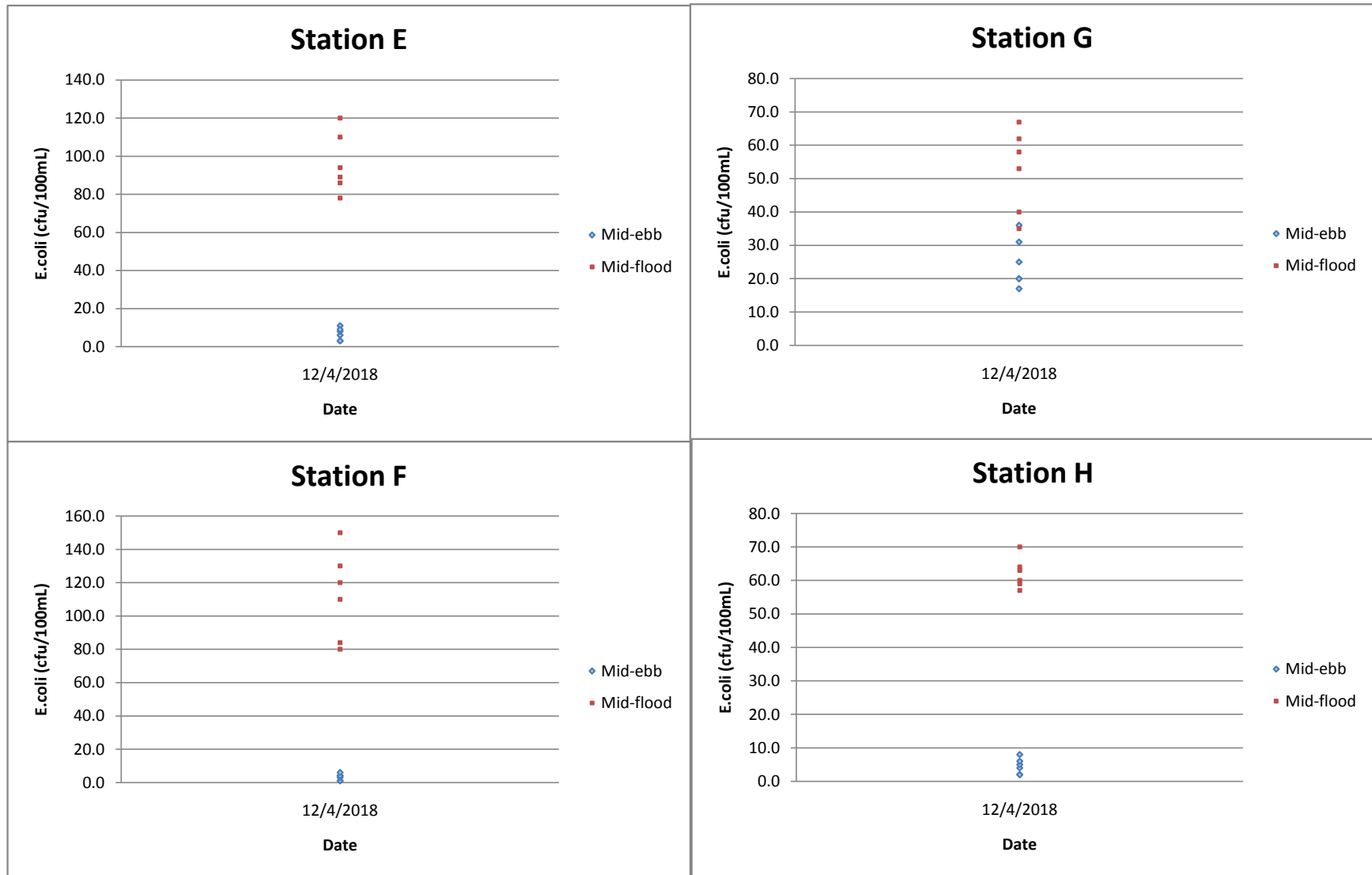
Total Inorganic Nitrogen (mg/L-N)



E.coli (cfu/100mL)

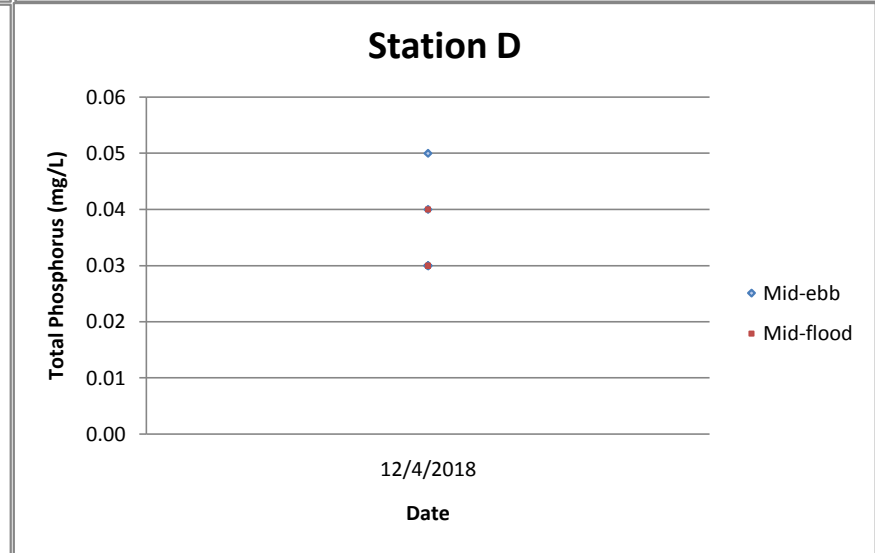
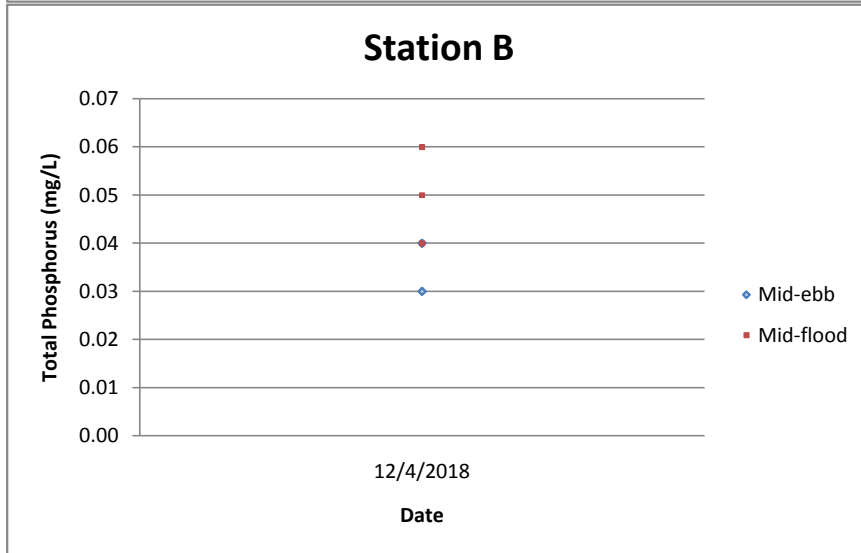
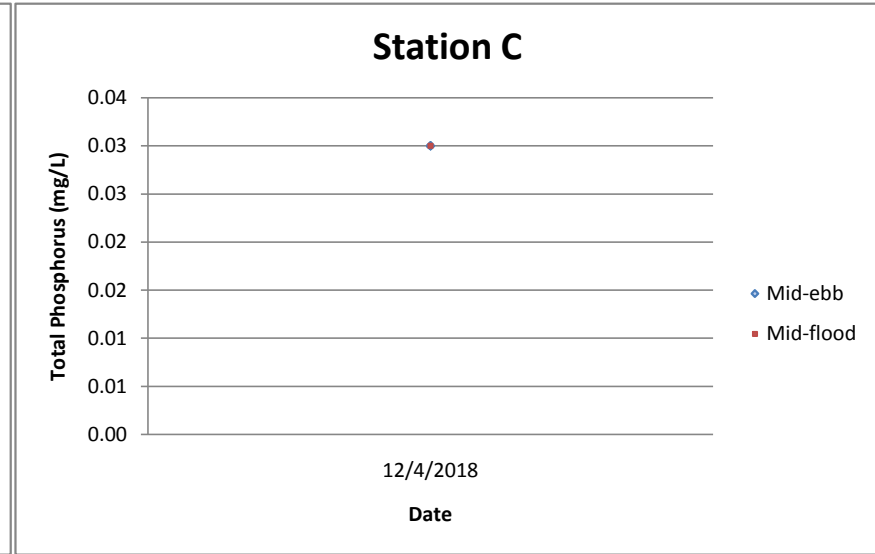
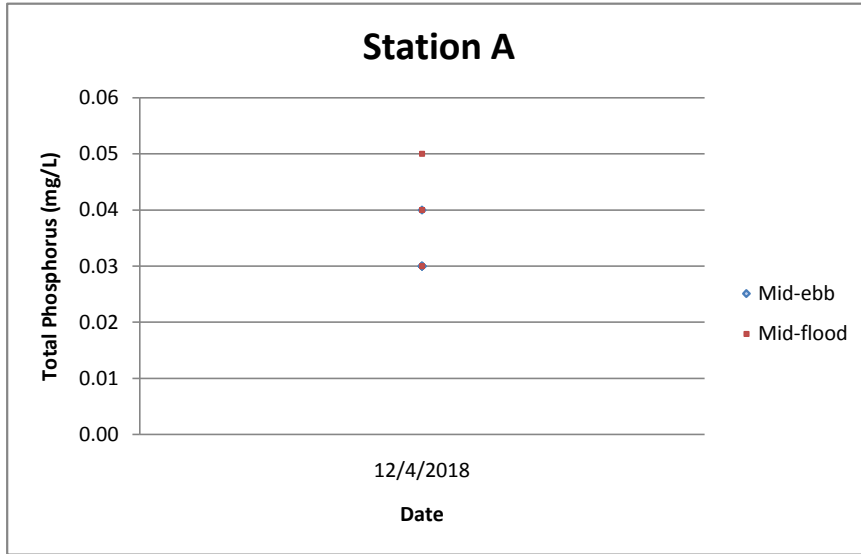


E.coli (cfu/100mL)

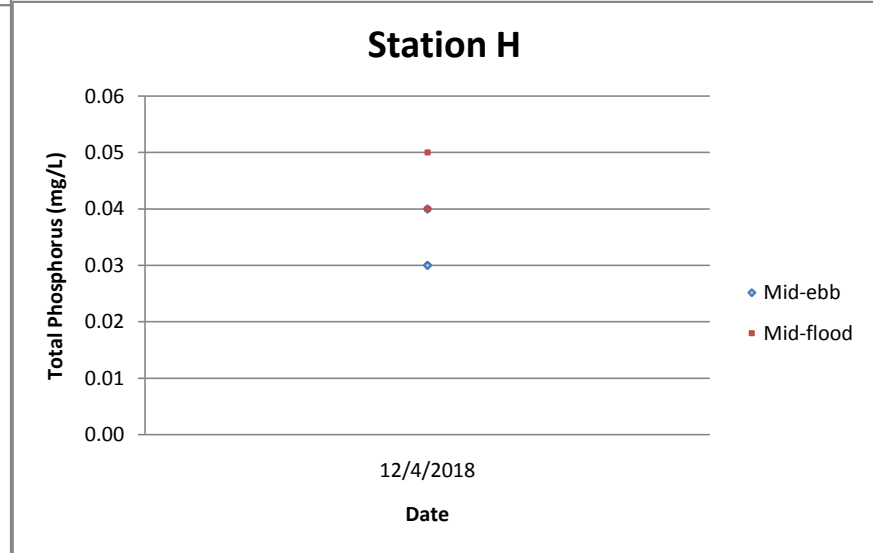
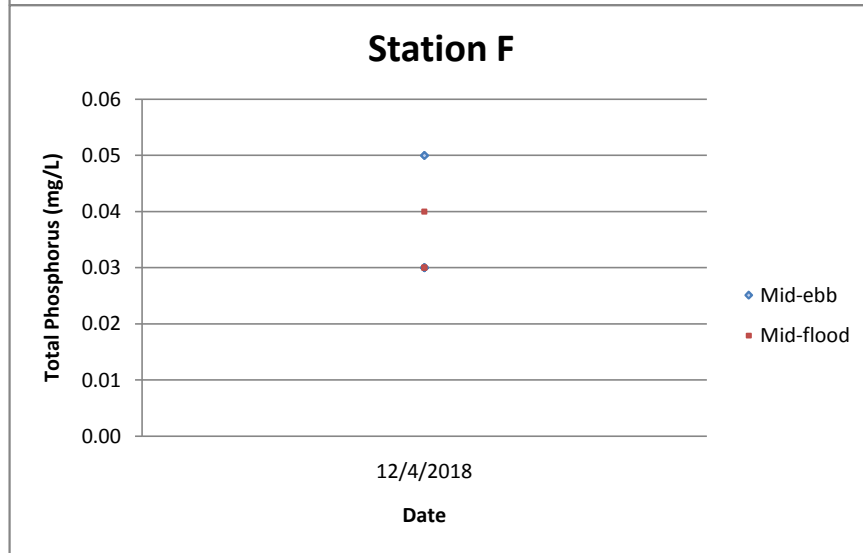
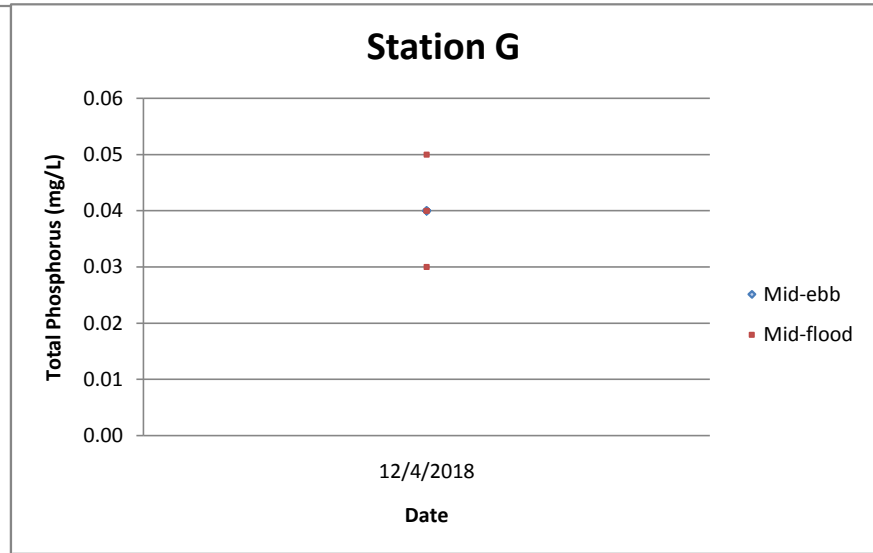
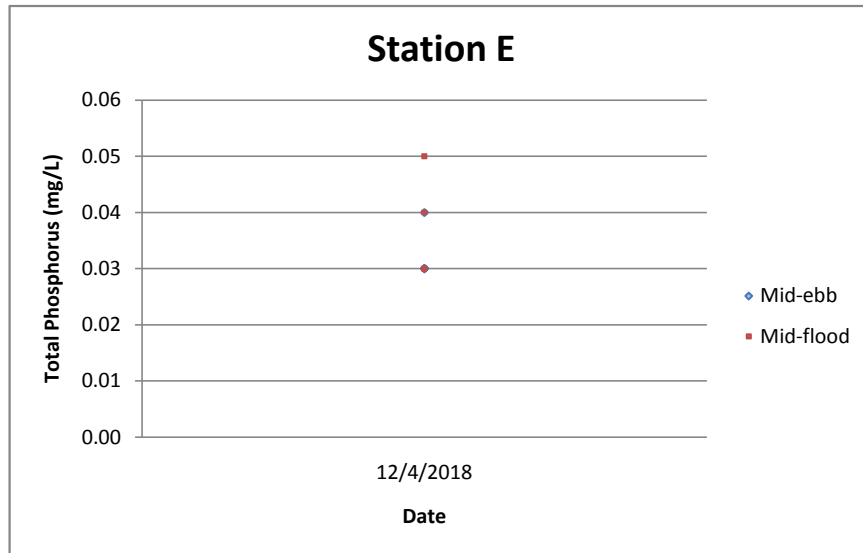




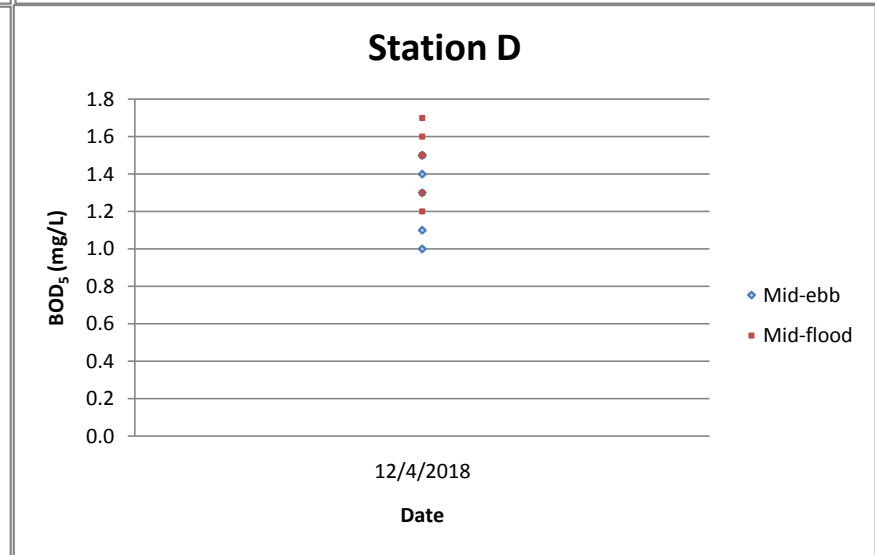
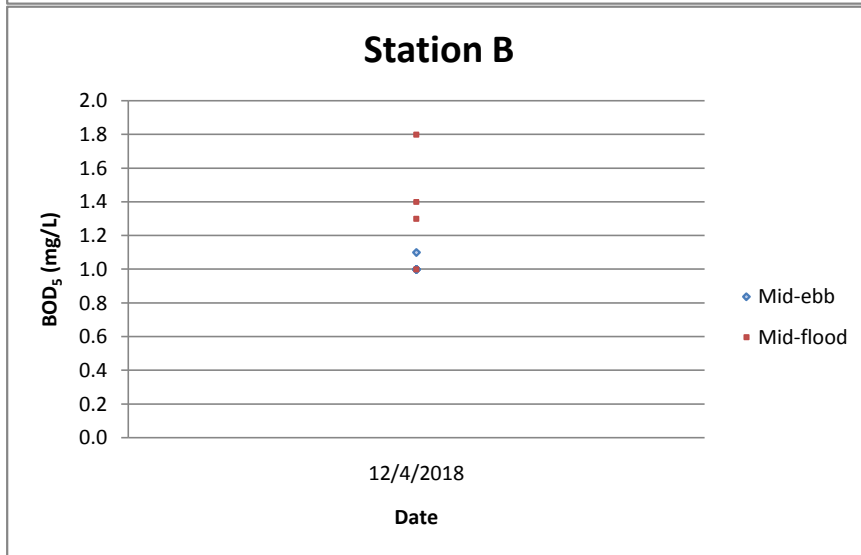
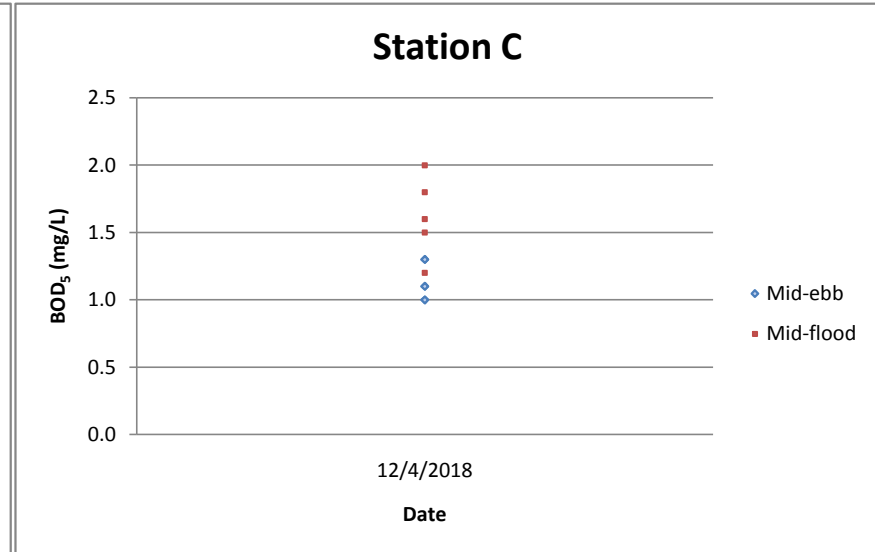
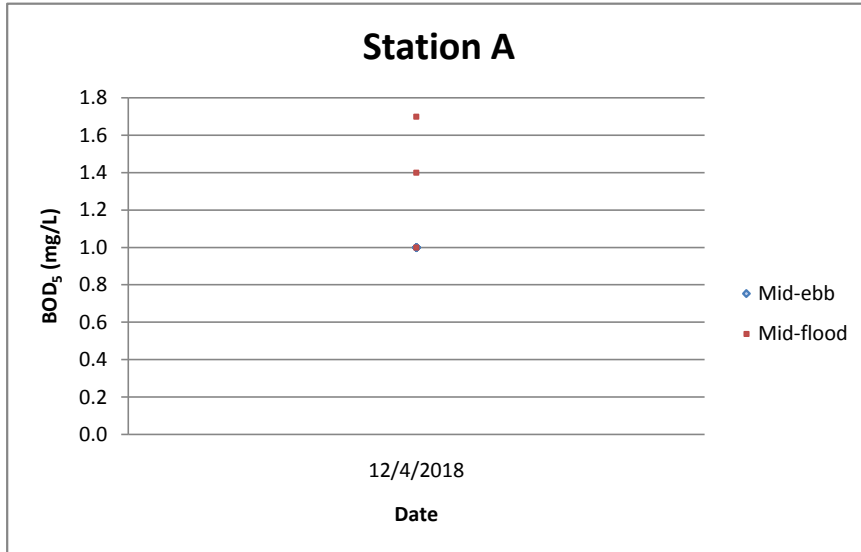
Total Phosphorus (soluble and particulate) (mg/L)



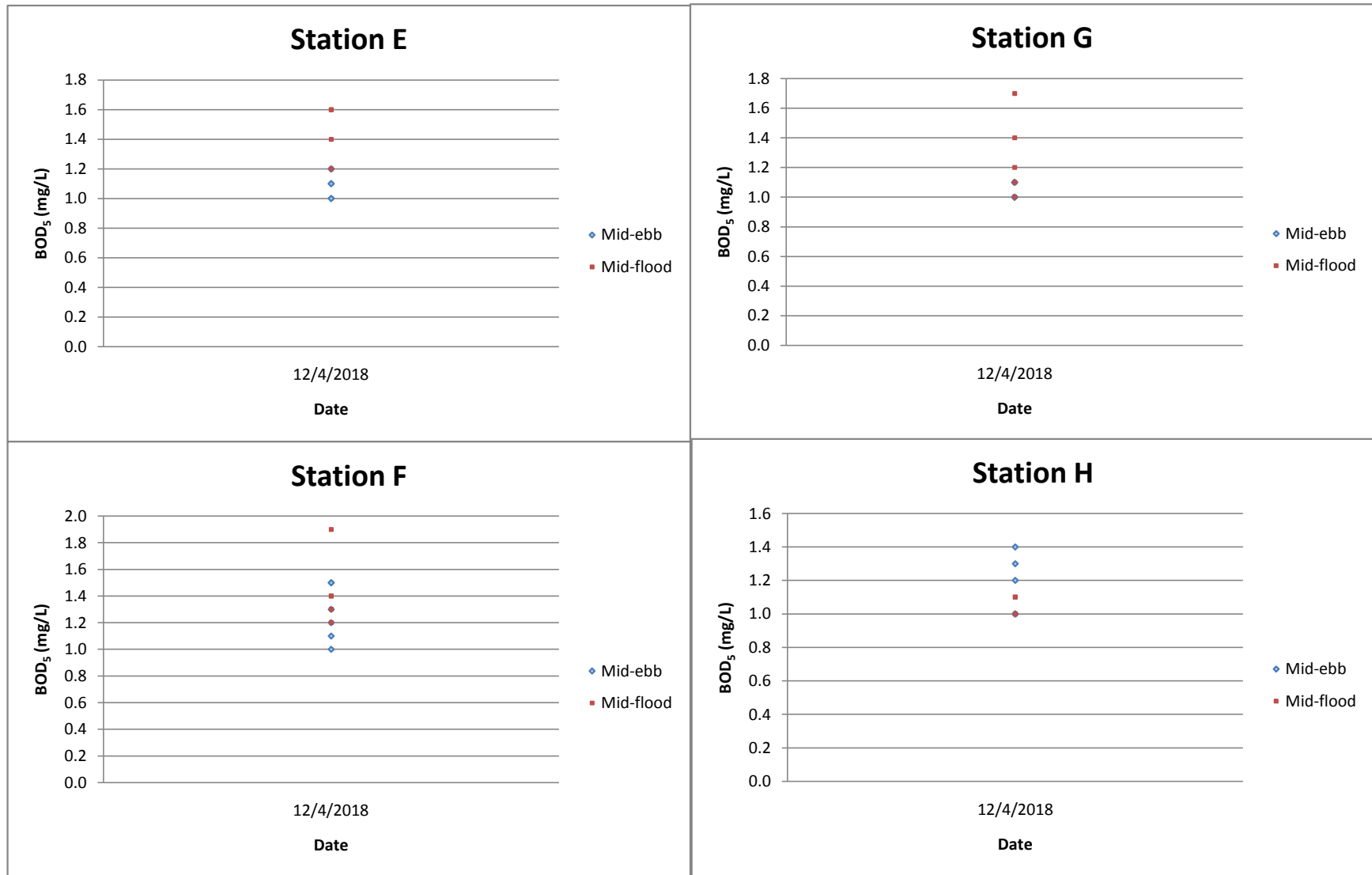
Total Phosphorus (soluble and particulate) (mg/L)



BOD<sub>5</sub> (mg/L)



BOD<sub>5</sub> (mg/L)



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Report No.: 0041/17/ED/0311A

## Appendix E

### Tidal Data obtained from Ma Wan Marine Traffic Station

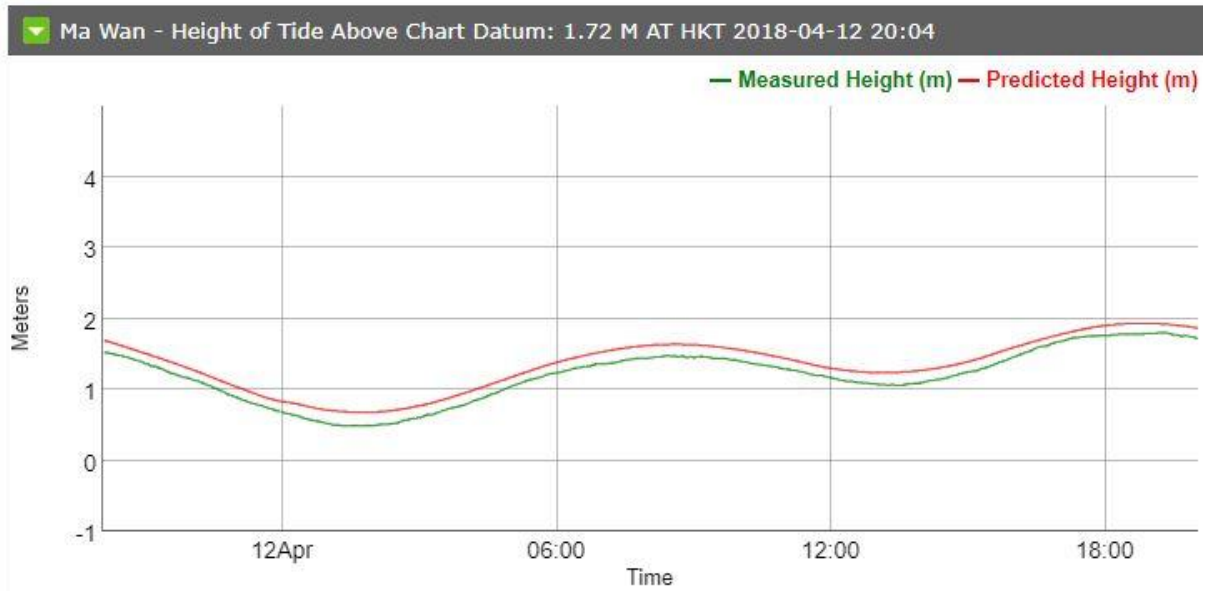
# FUGRO TECHNICAL SERVICES LIMITED

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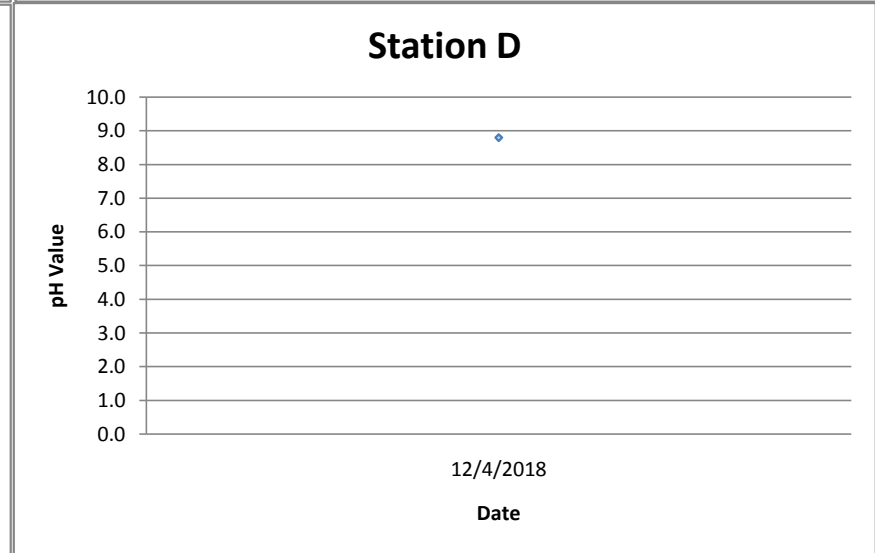
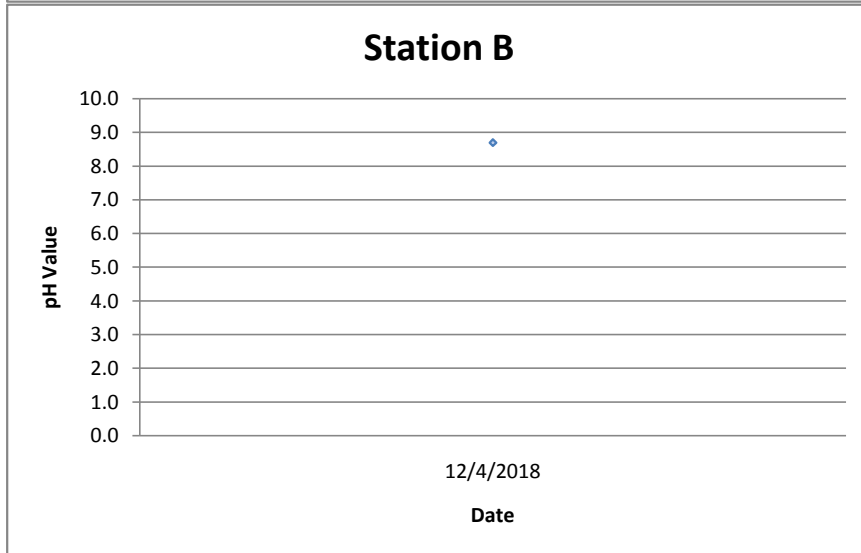
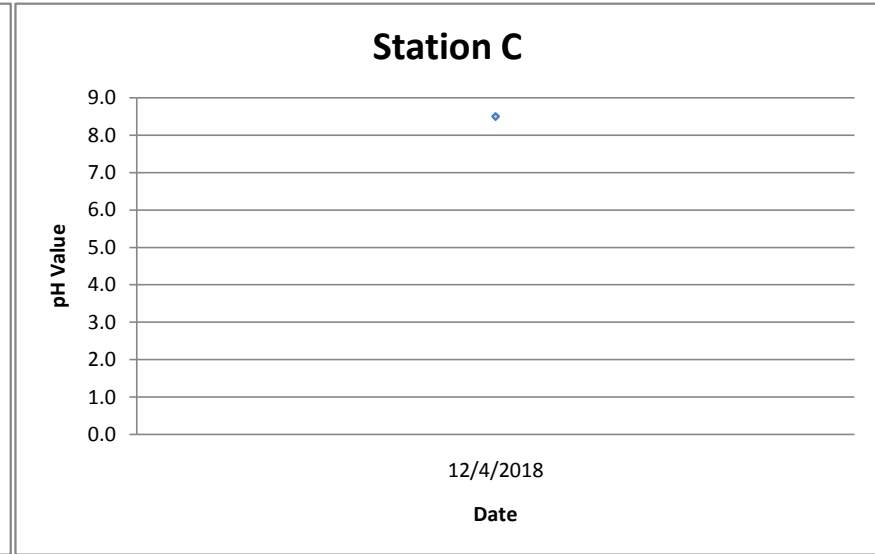
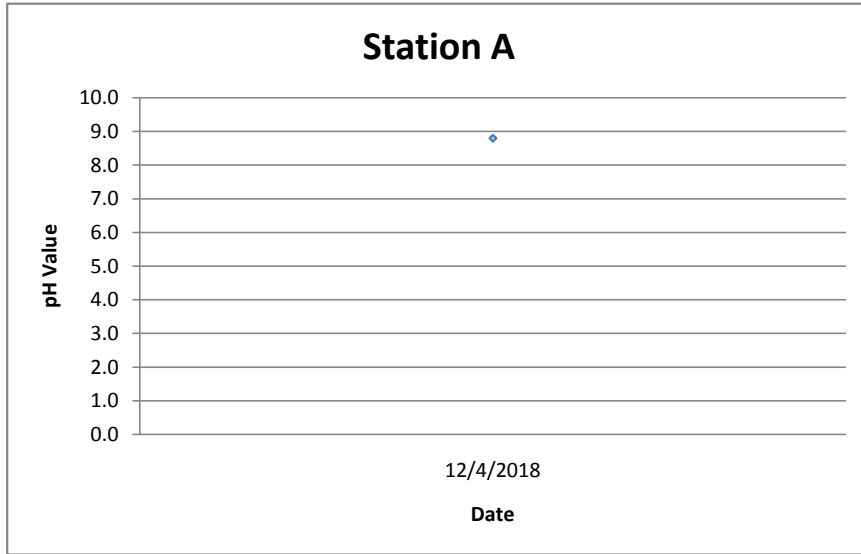
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## Appendix F

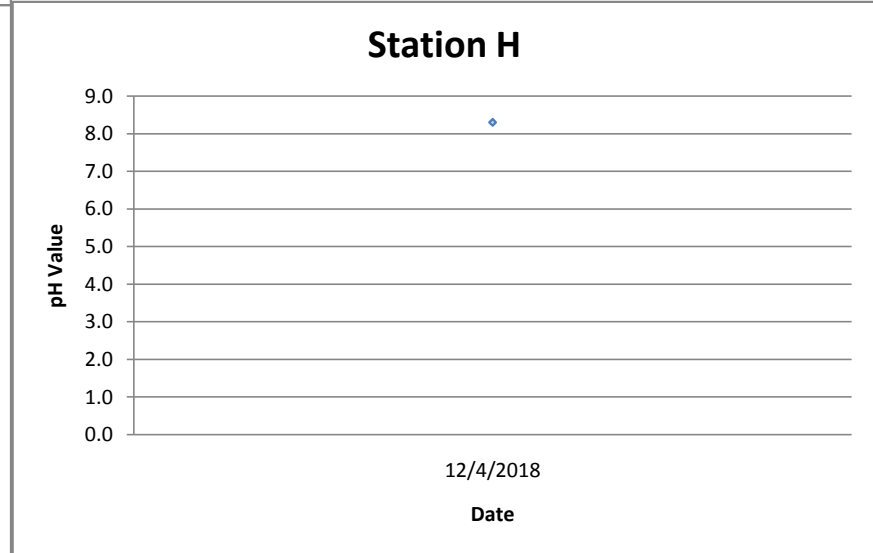
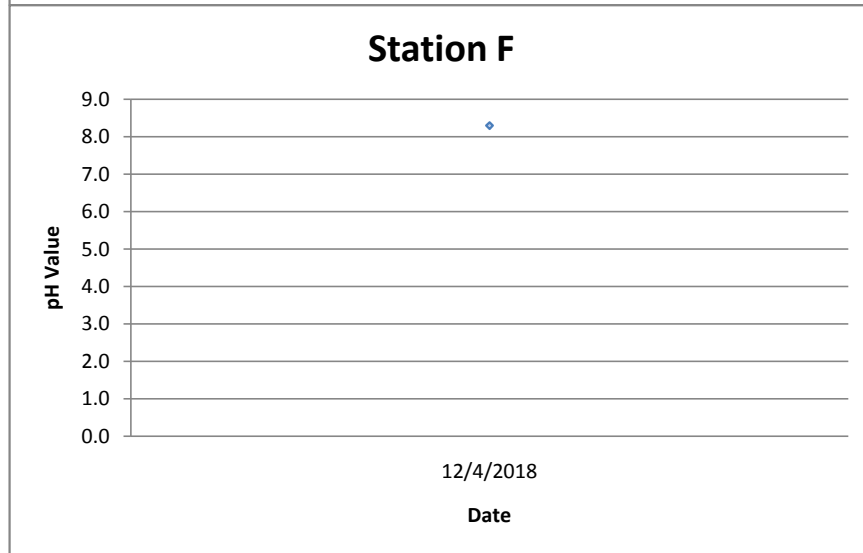
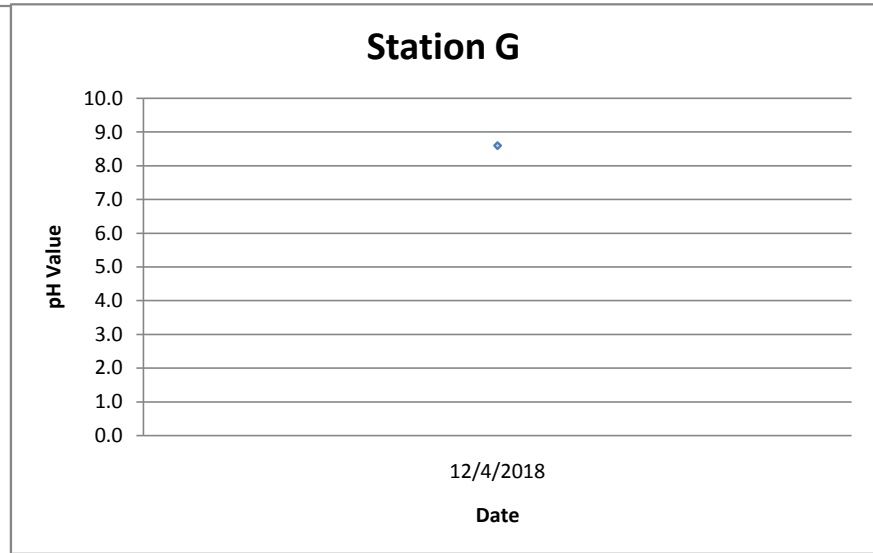
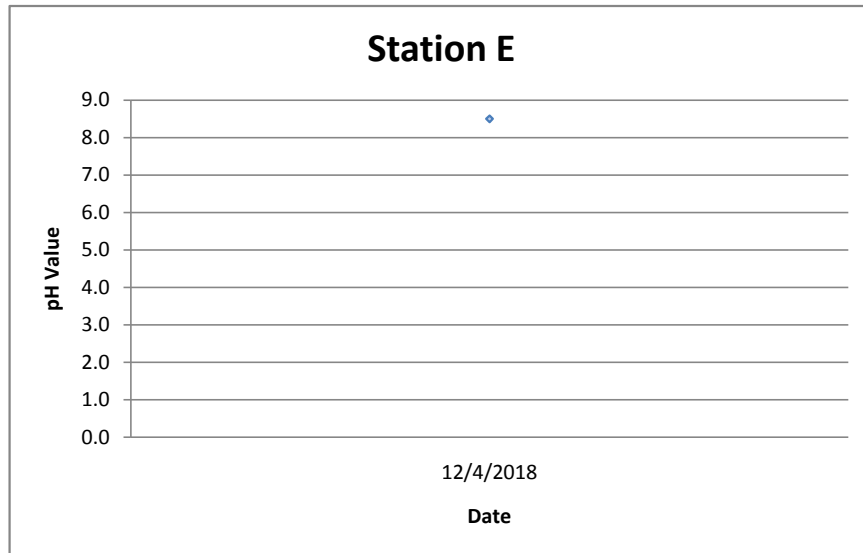
### Graphical Presentation of Sediment Quality Monitoring and Benthic Survey

pH value

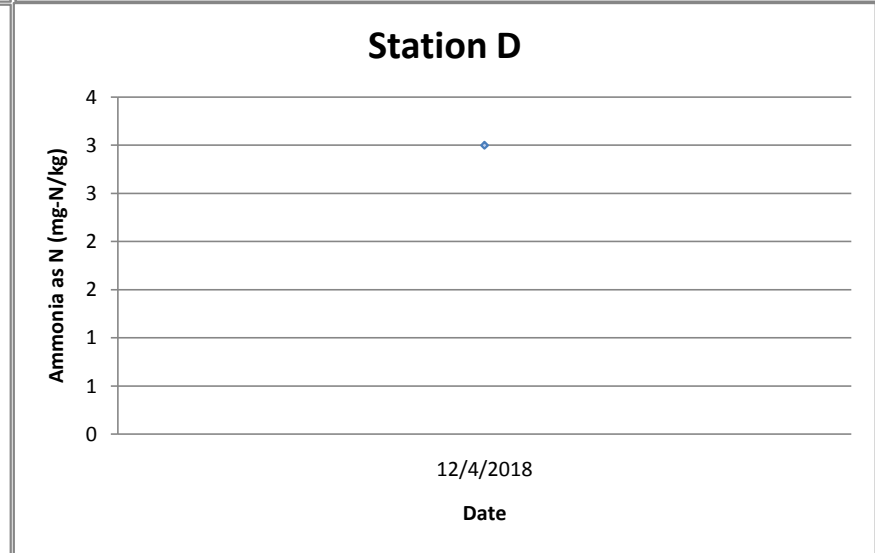
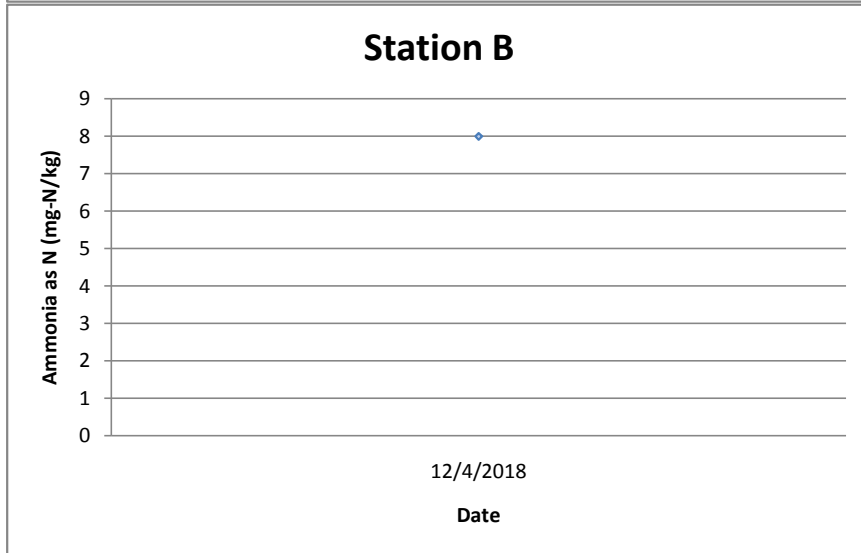
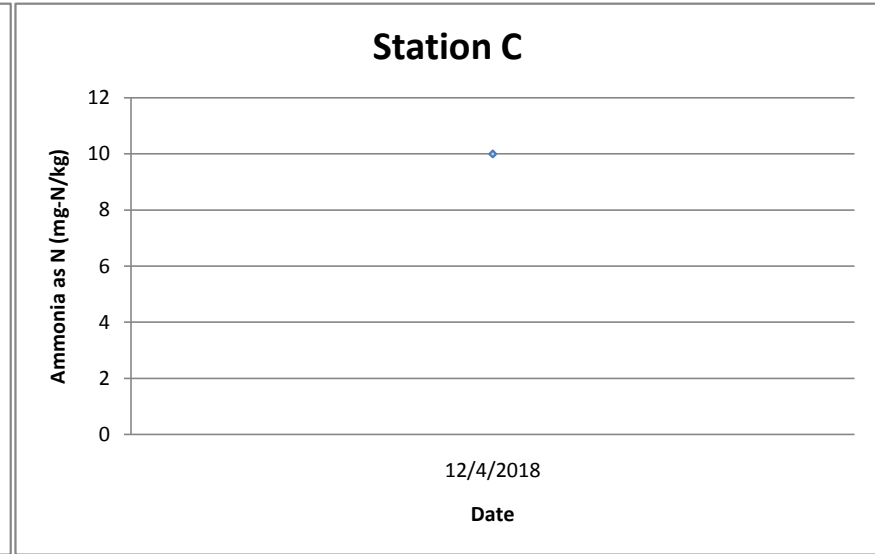
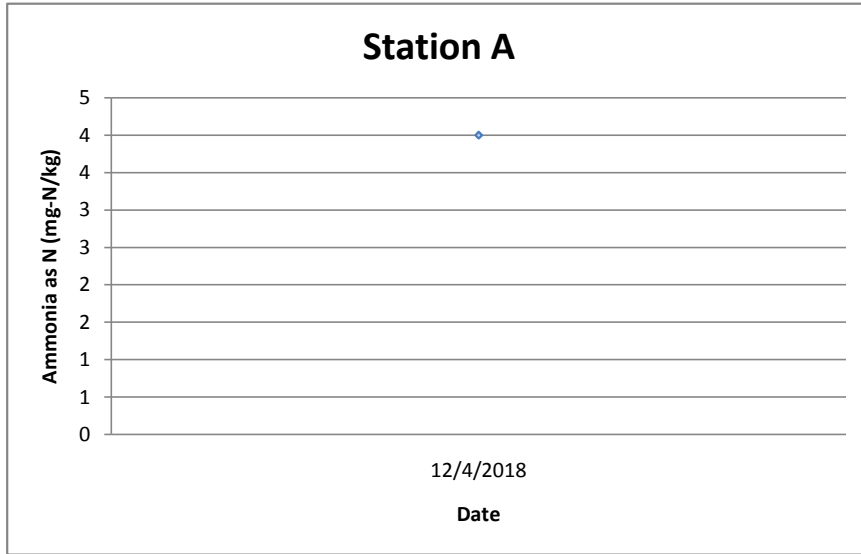




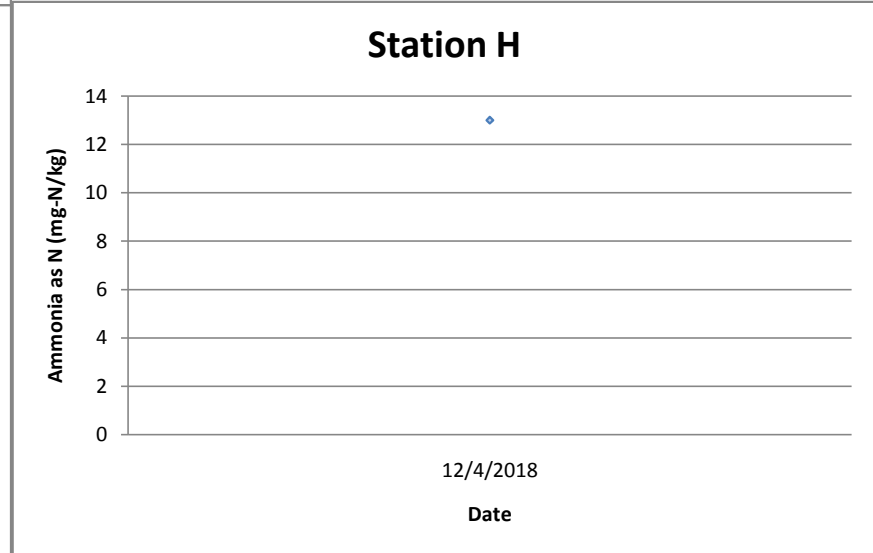
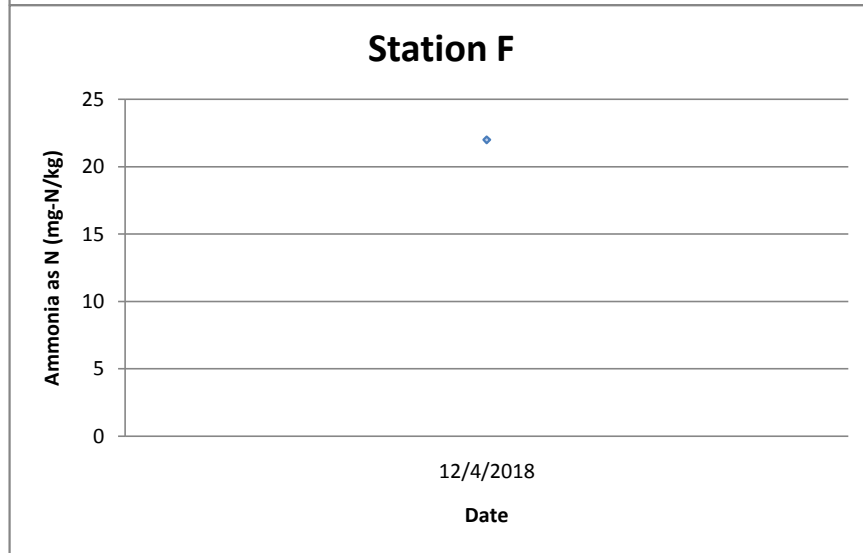
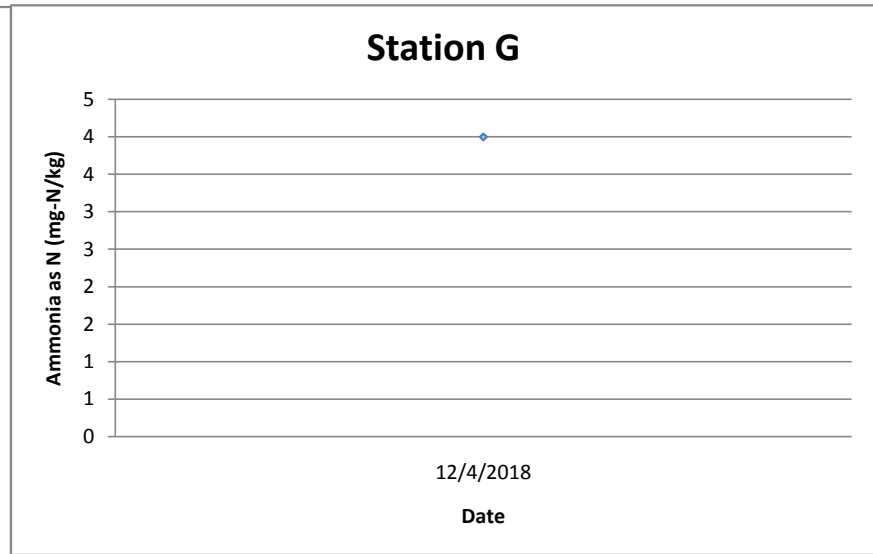
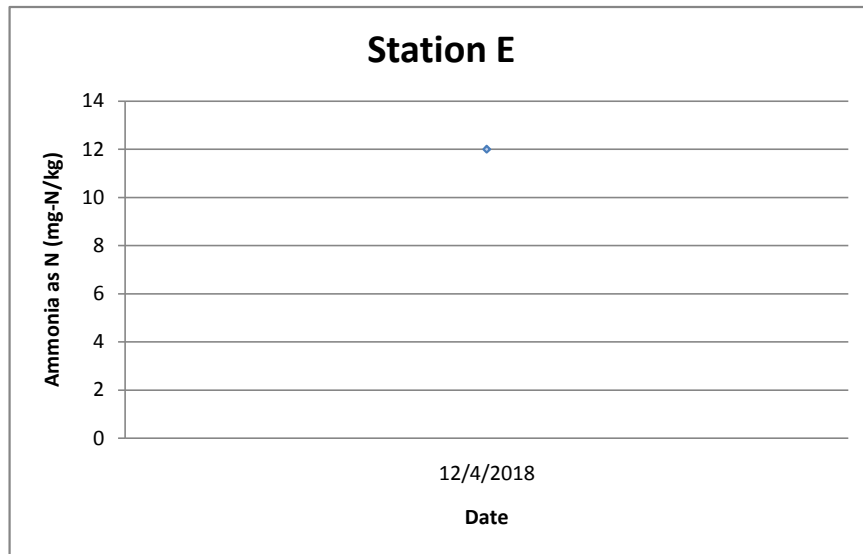
pH value



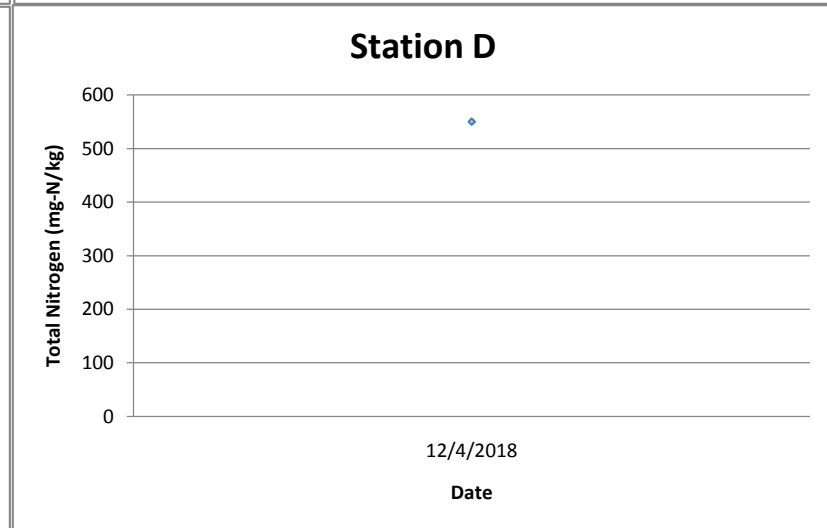
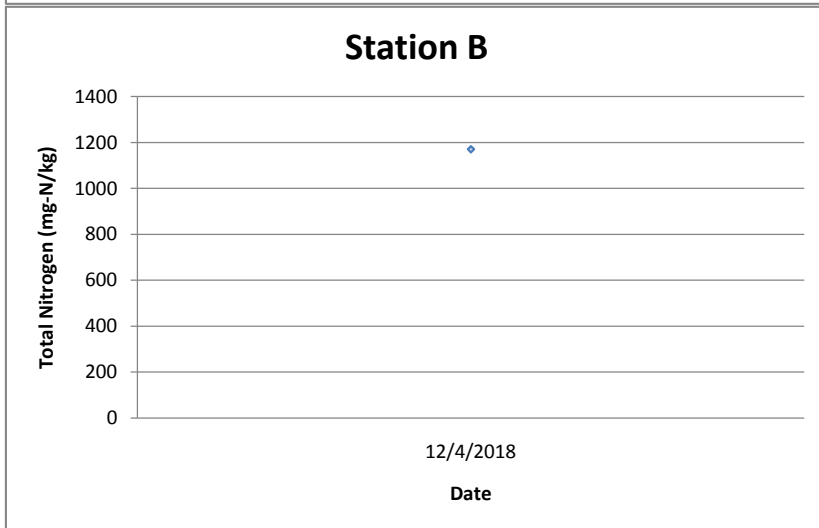
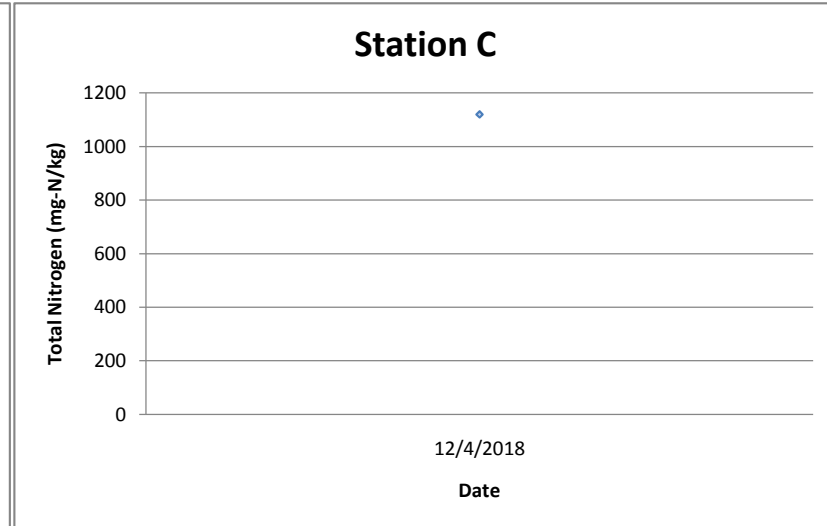
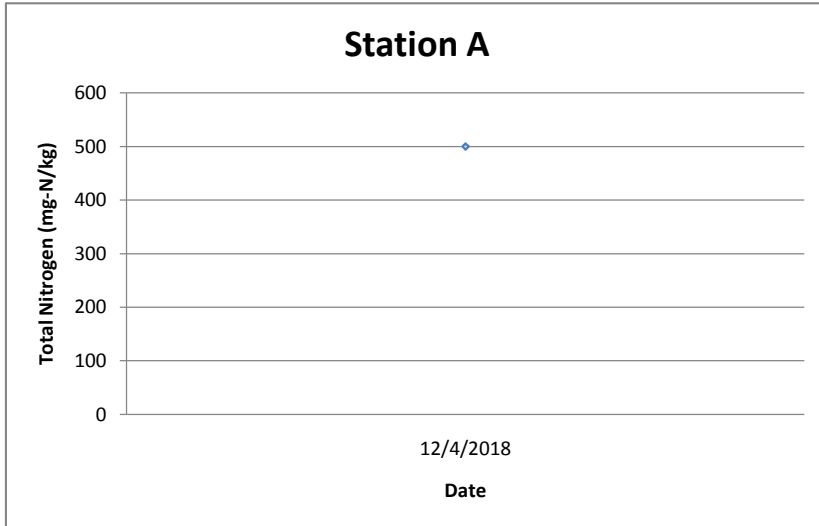
Ammonia Nitrogen (mg-N/kg)



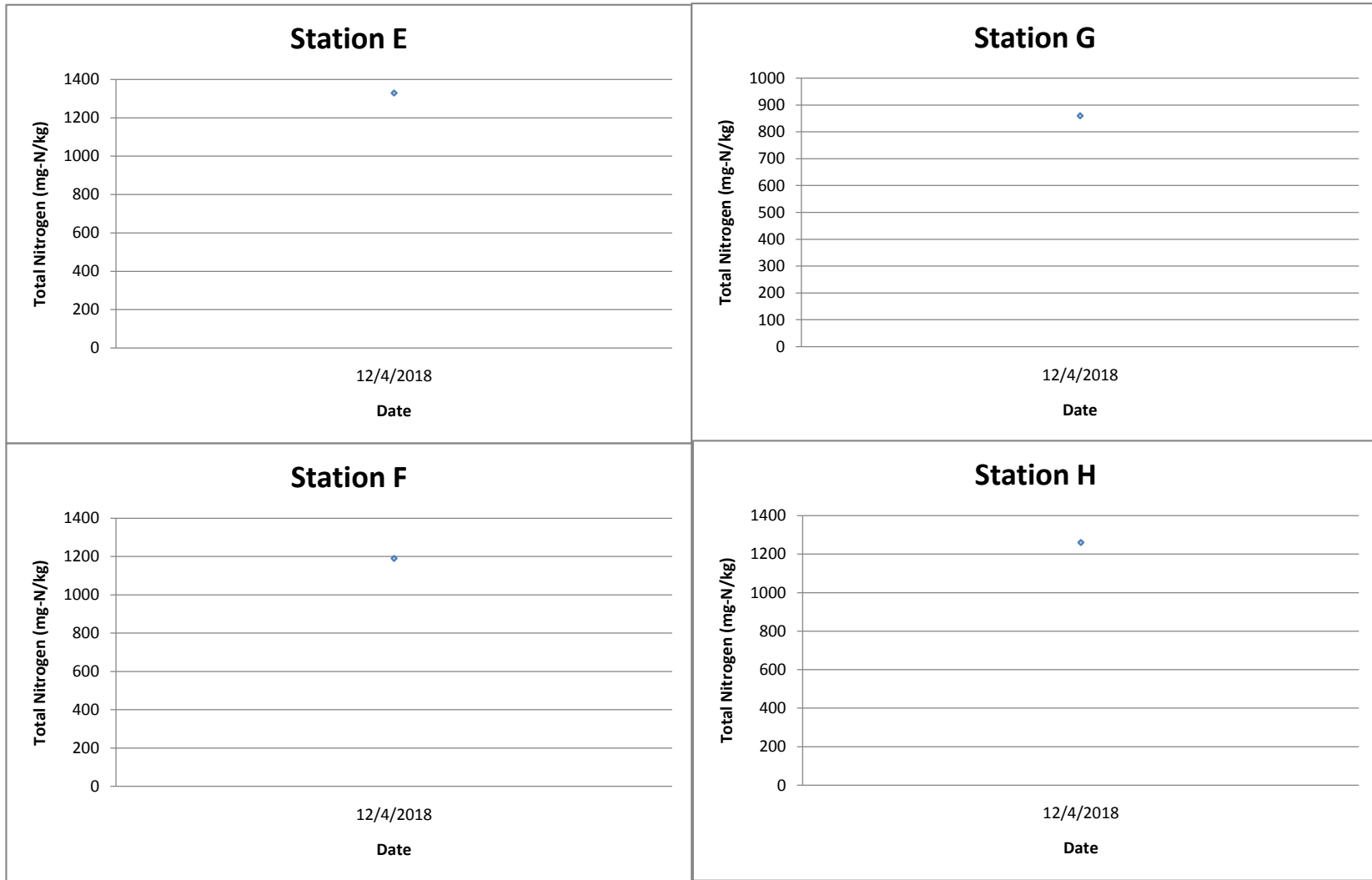
Ammonia Nitrogen (mg-N/kg)



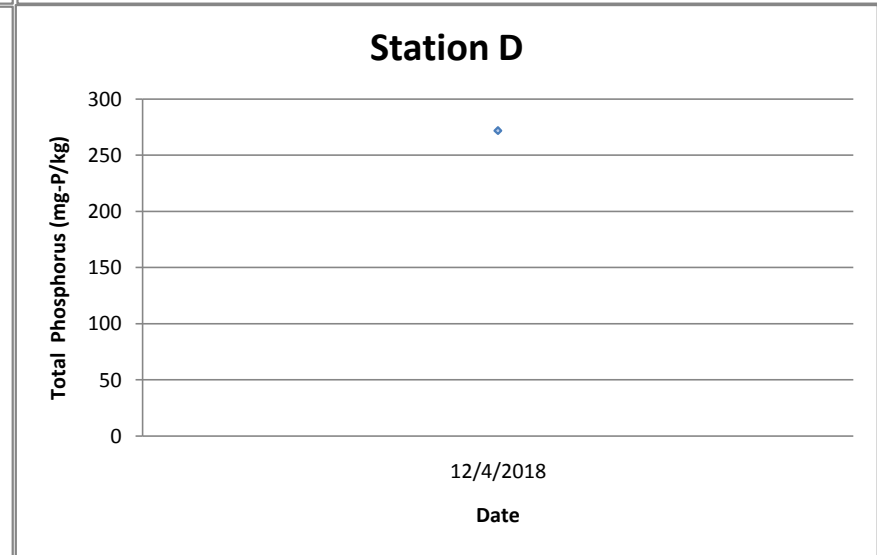
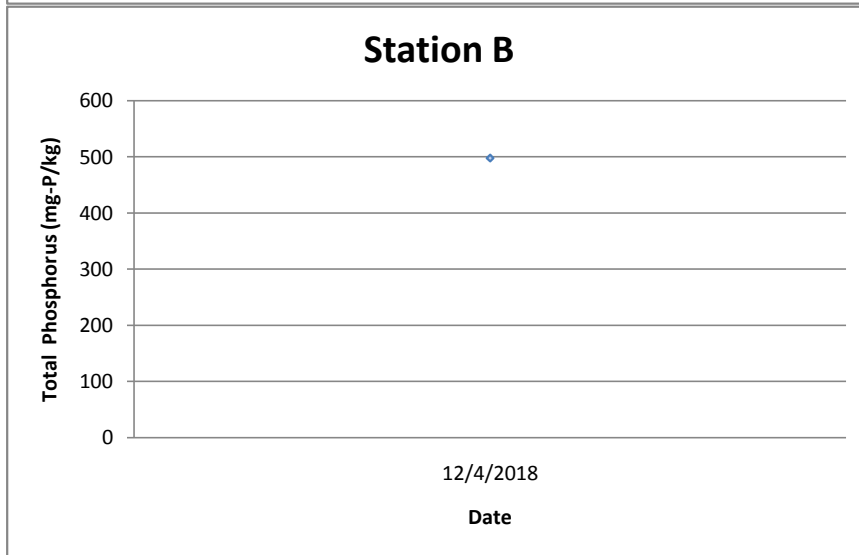
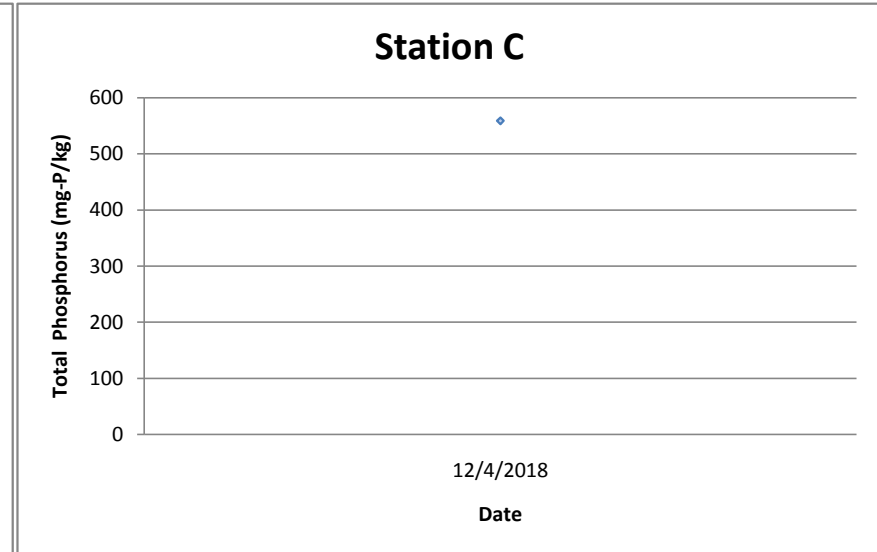
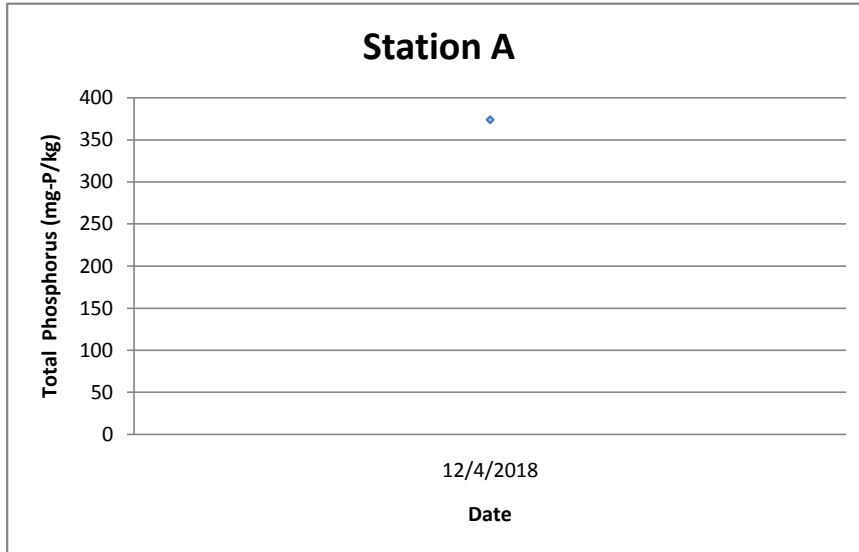
Total Nitrogen (mg-N/kg)



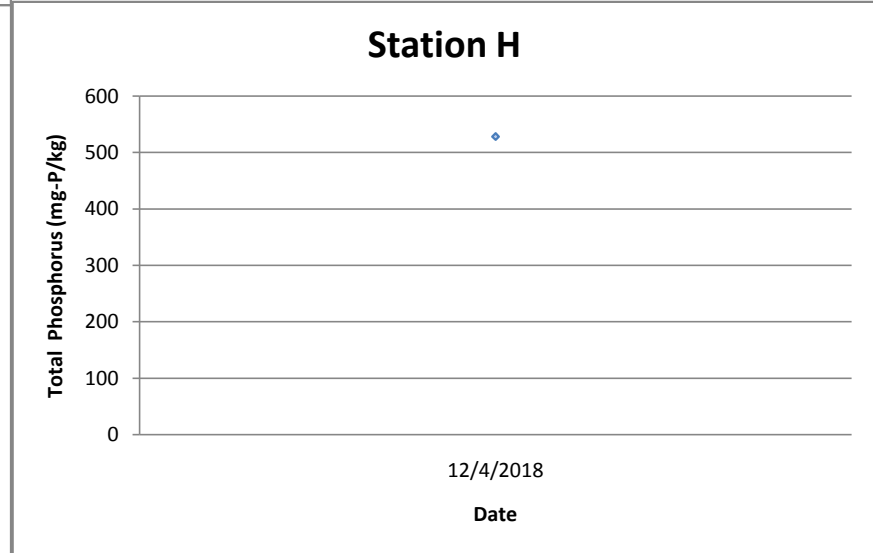
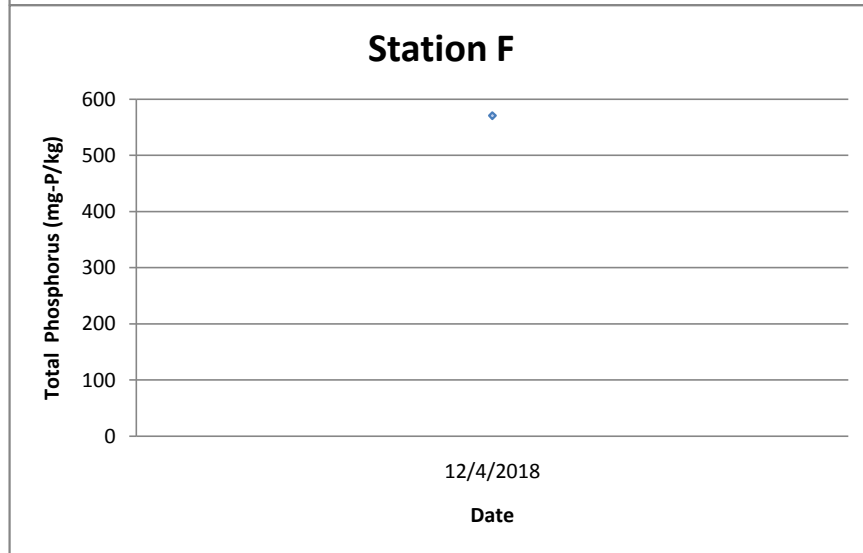
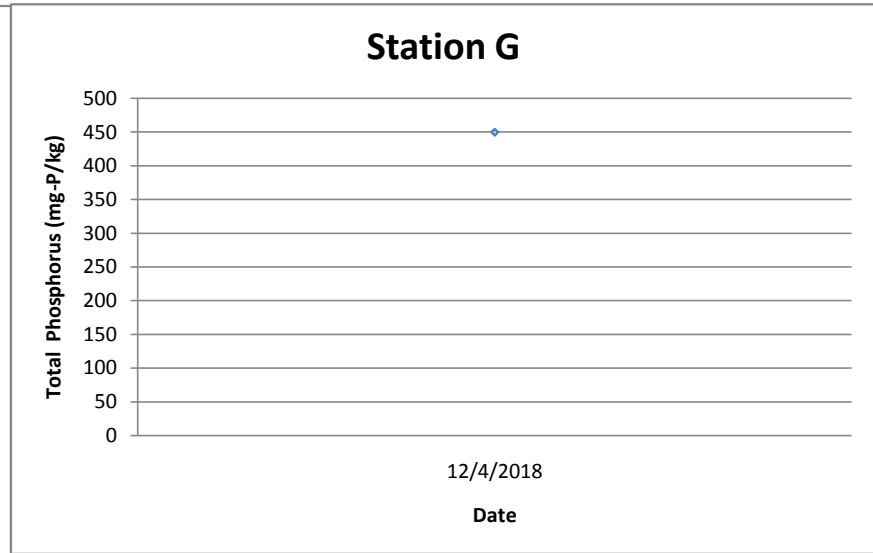
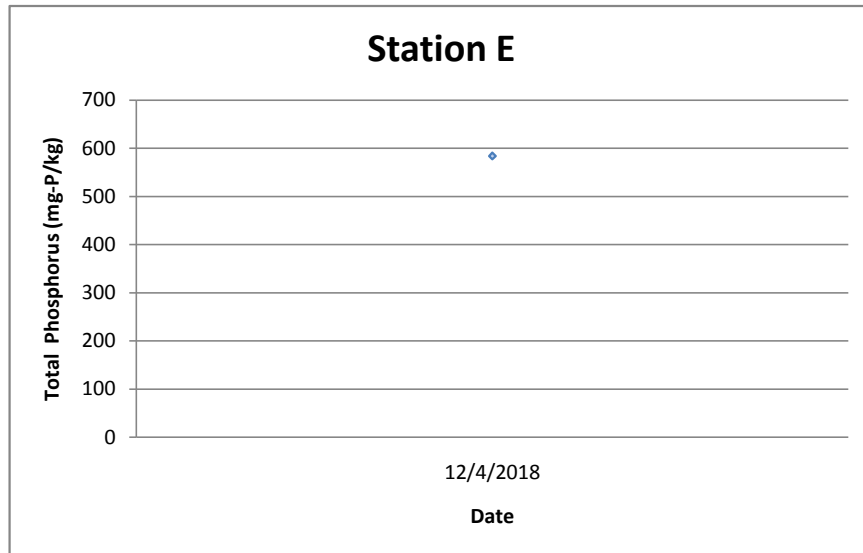
Total Nitrogen (mg-N/kg)



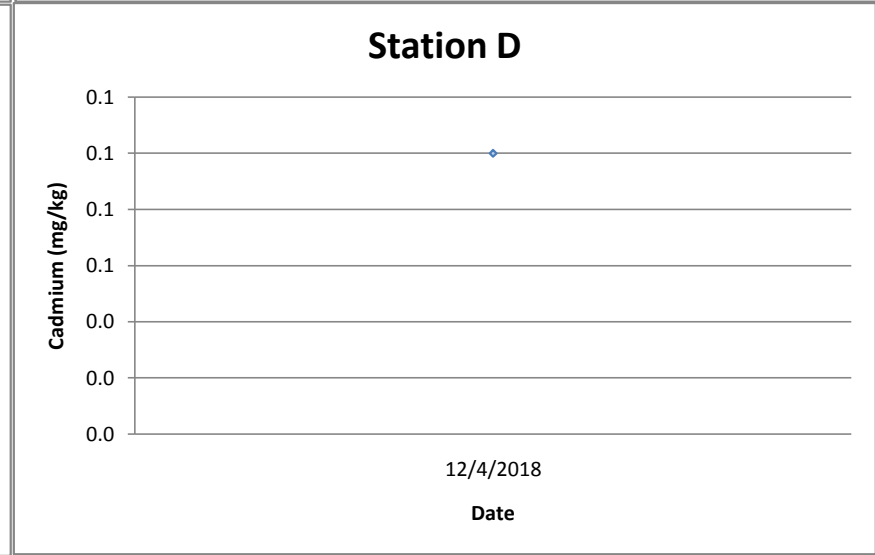
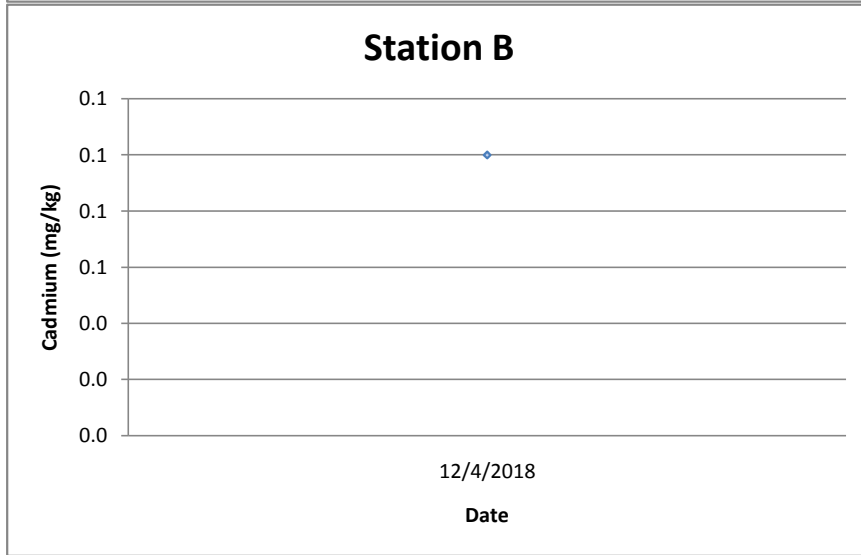
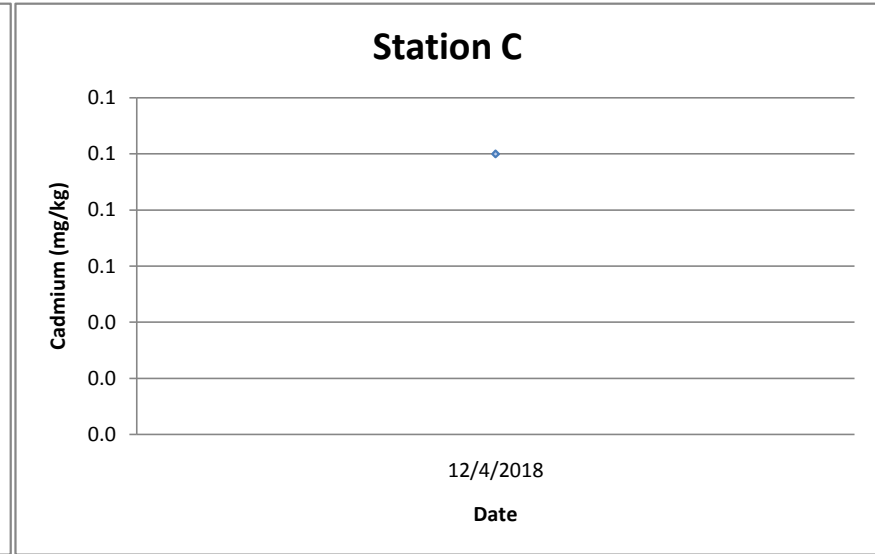
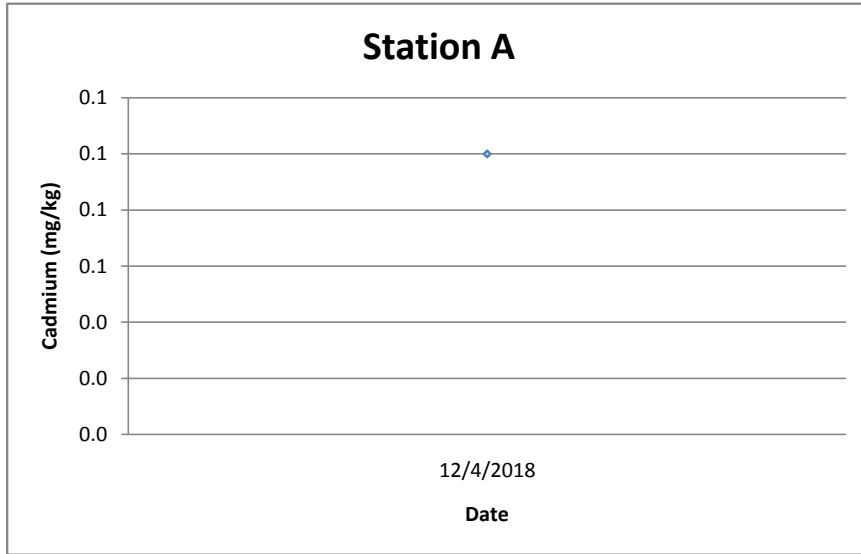
Total Phosphorus (mg-P/kg)



Total Phosphorus (mg-P/kg)

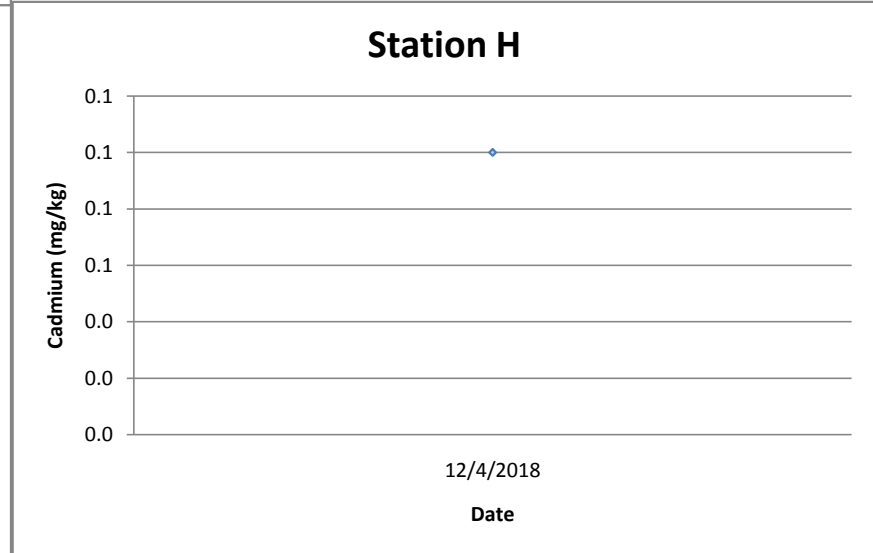
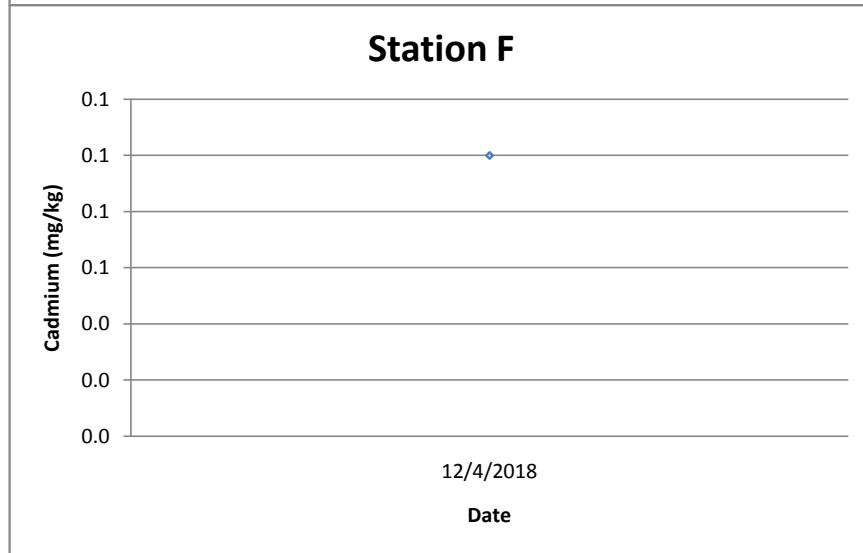
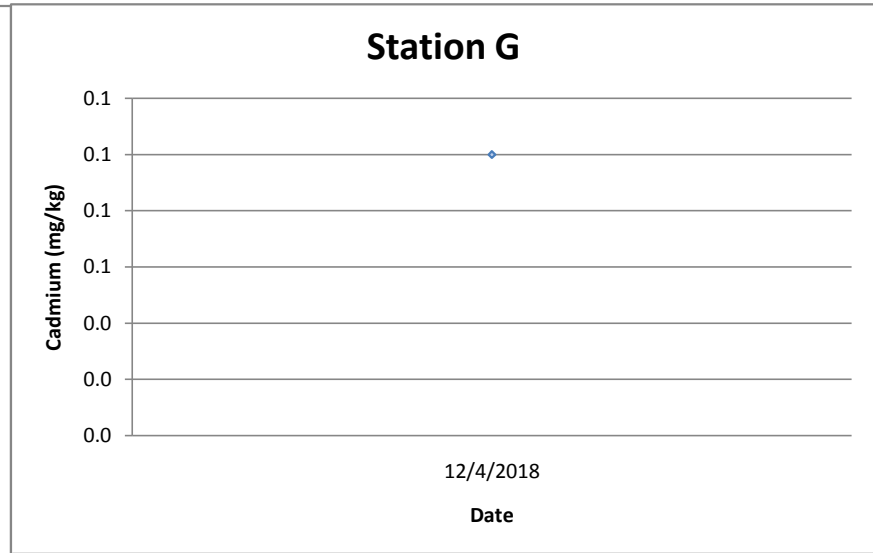
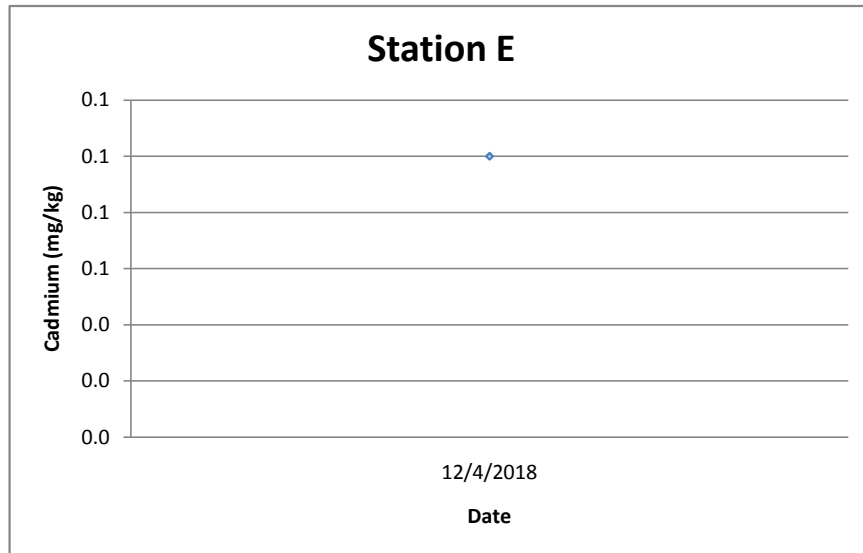


Cadmium (mg/kg)

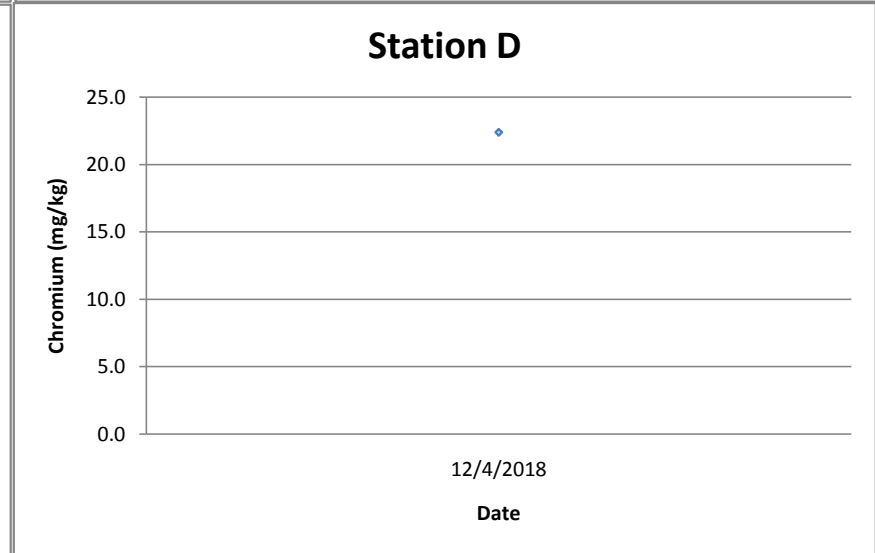
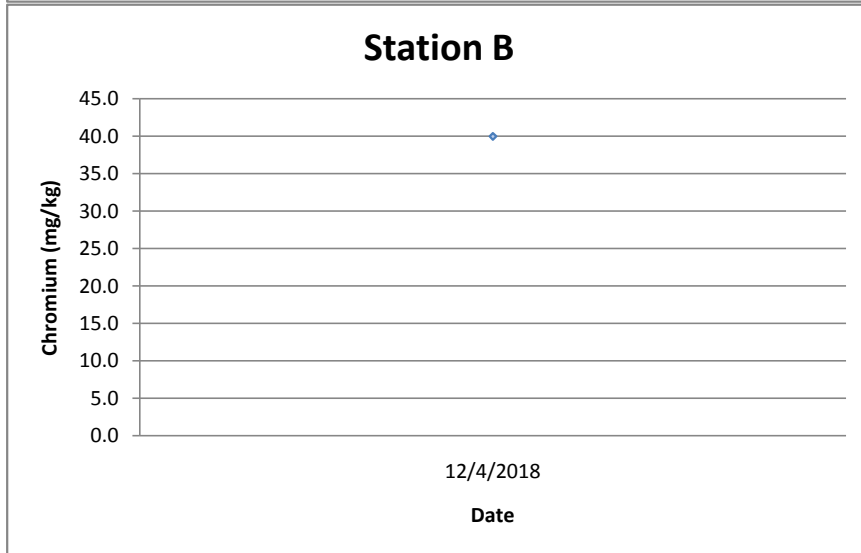
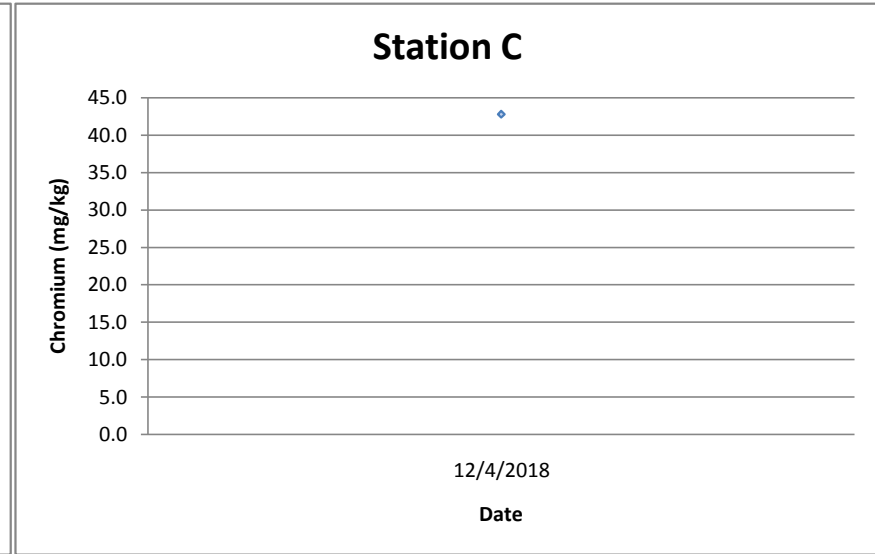
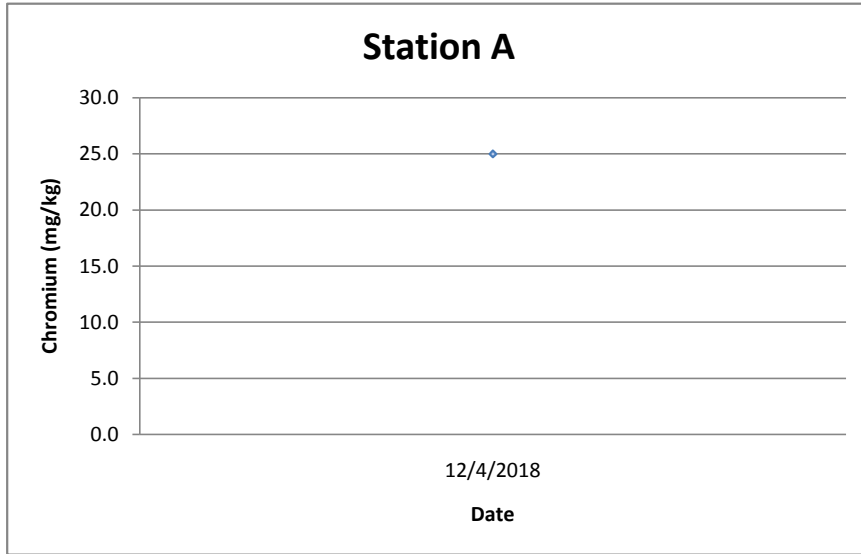




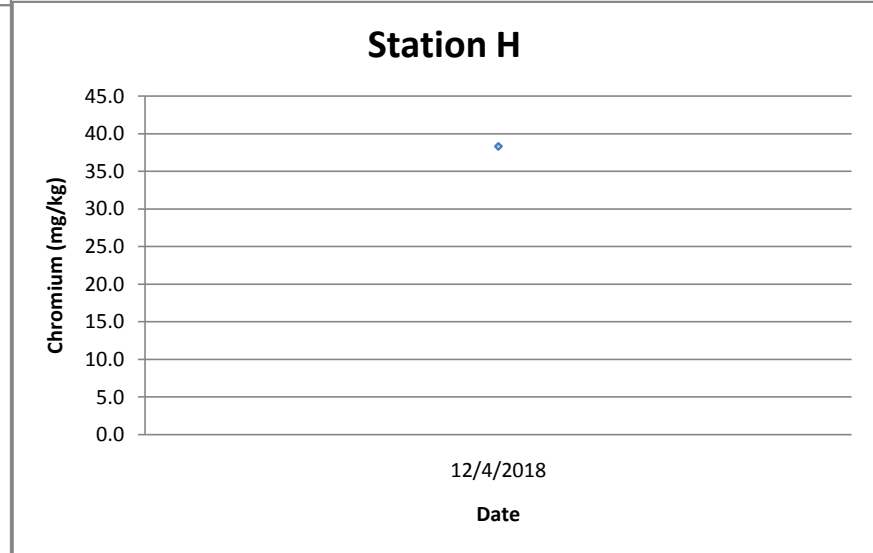
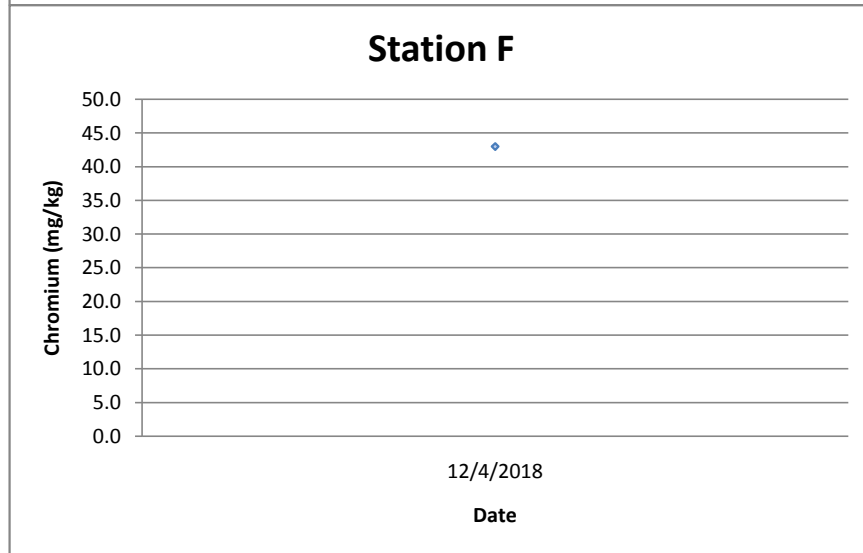
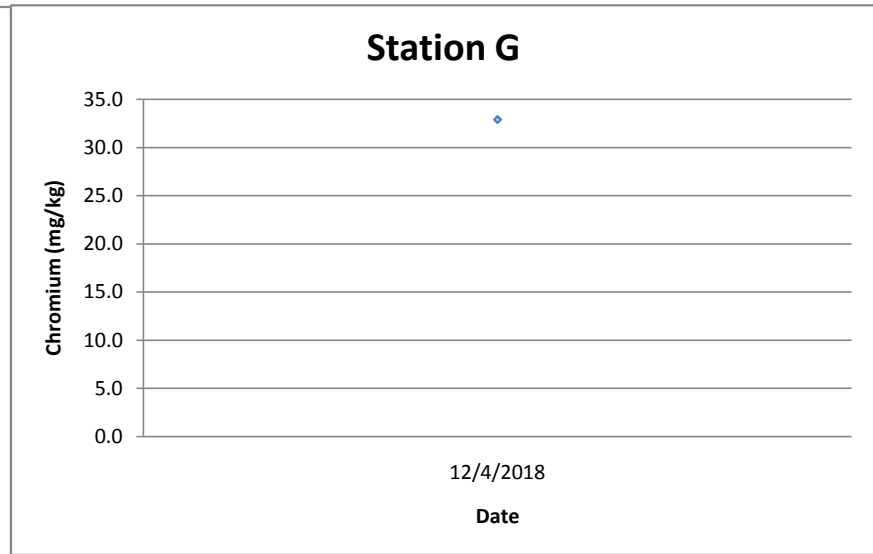
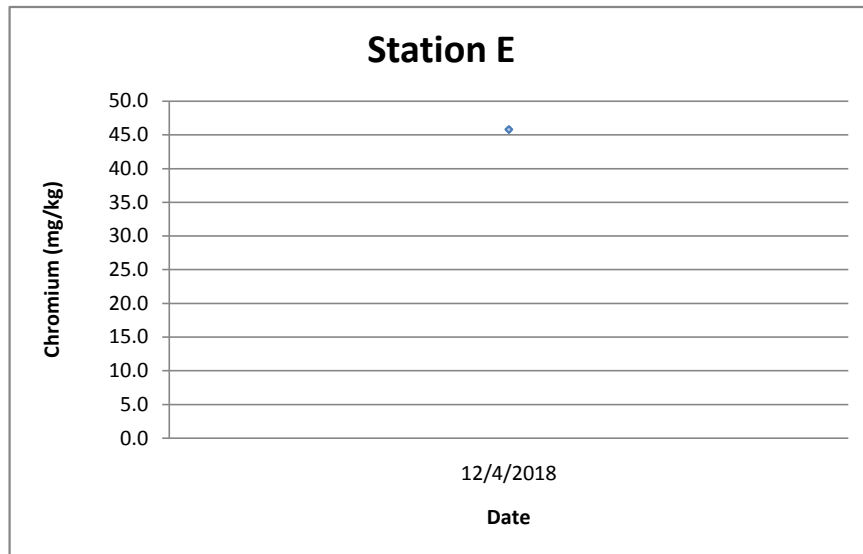
Cadmium (mg/kg)



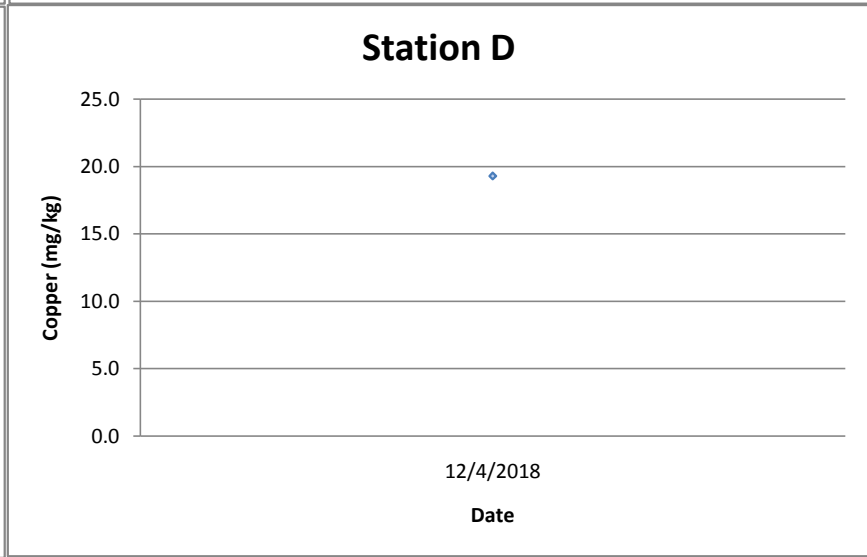
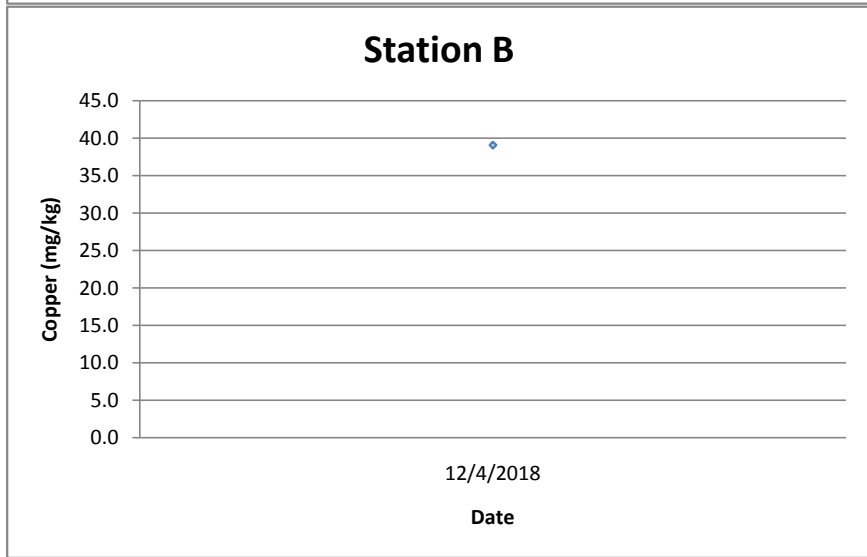
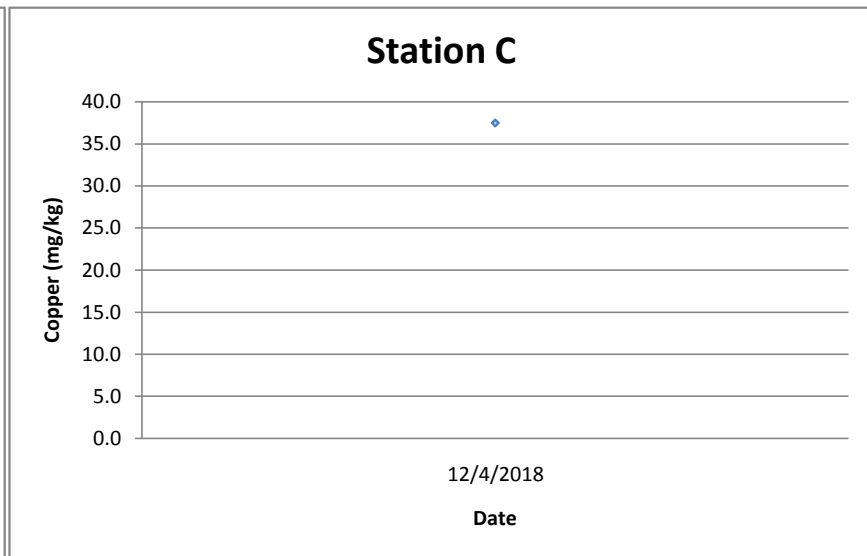
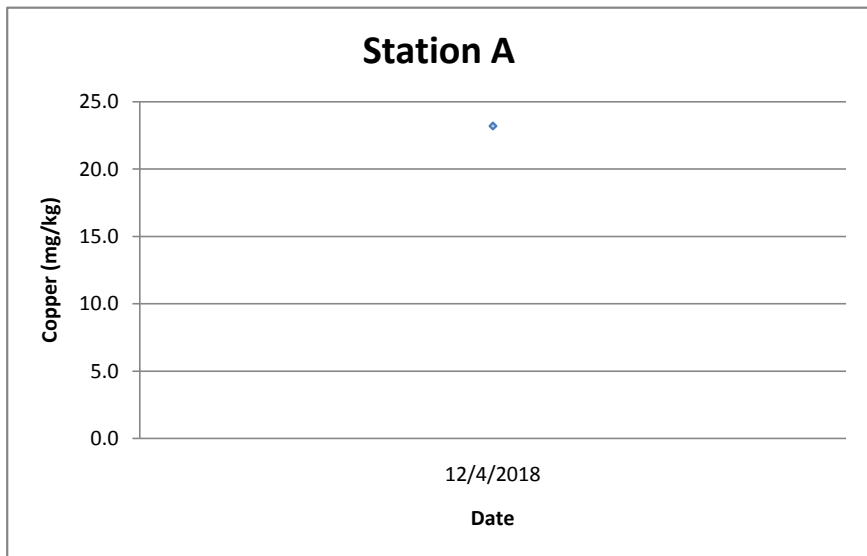
Chromium (mg/kg)



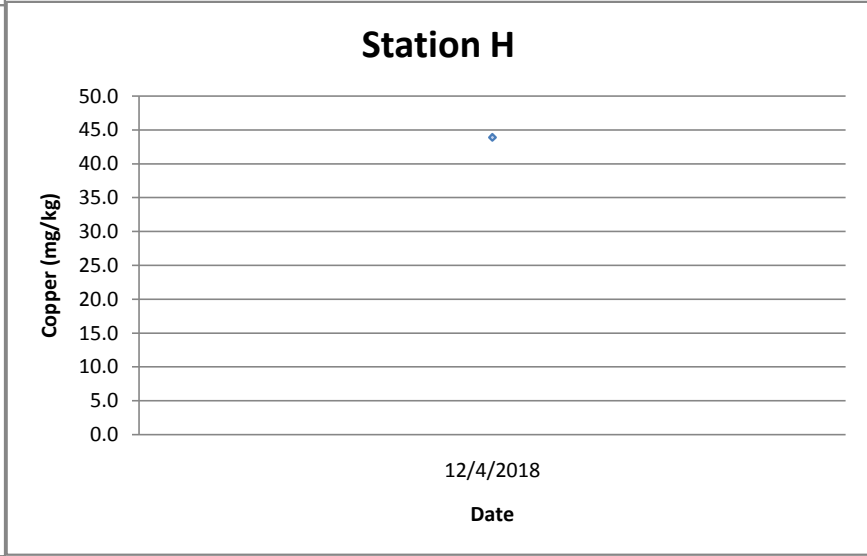
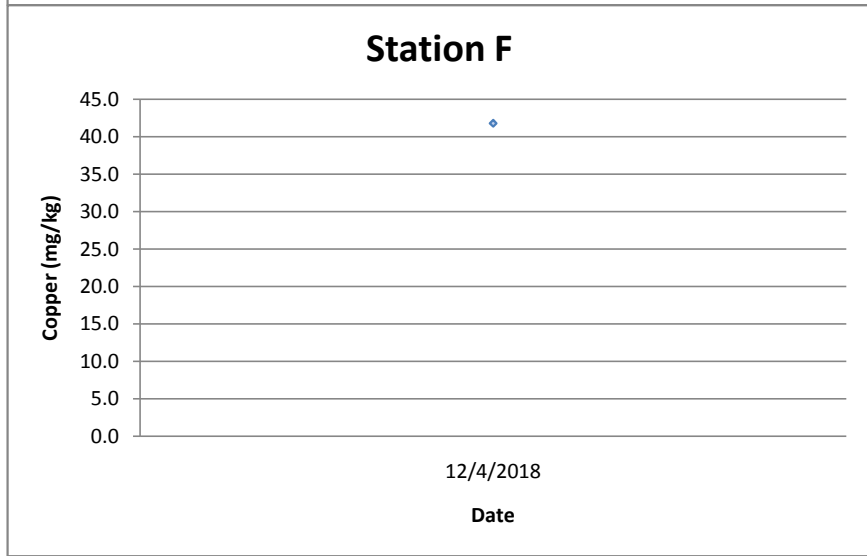
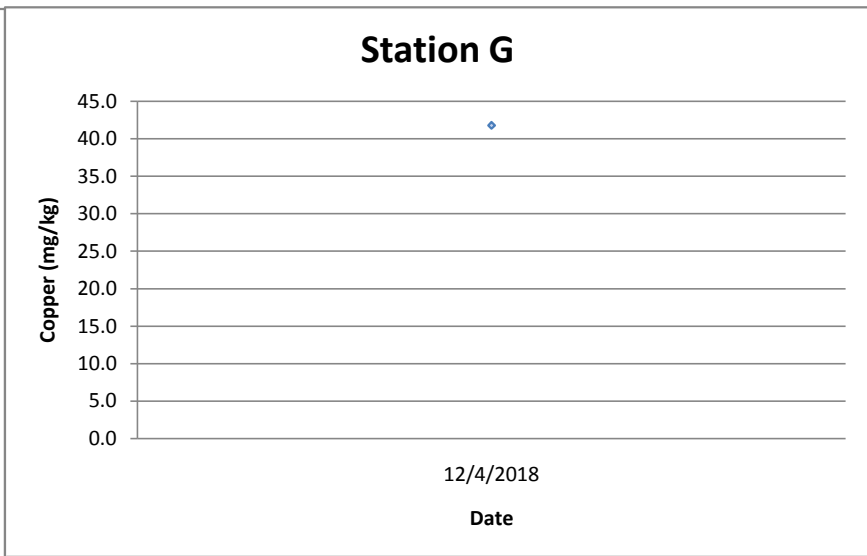
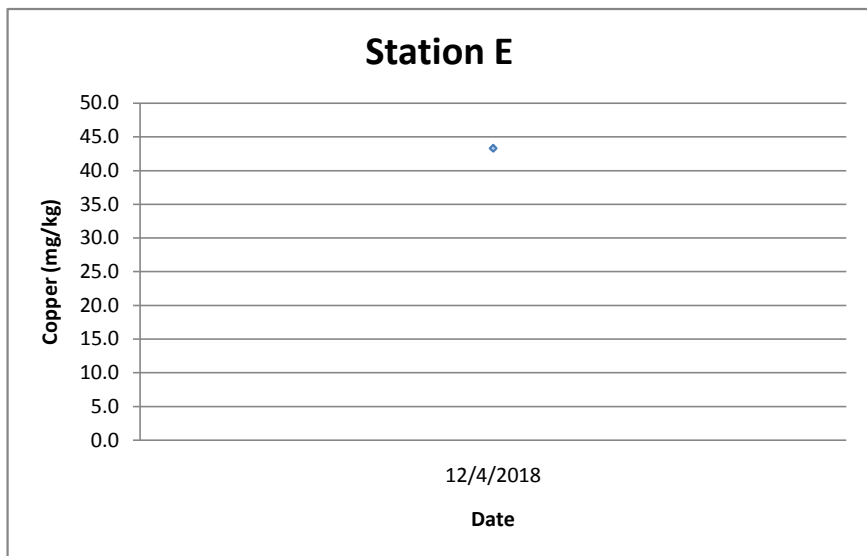
Chromium (mg/kg)



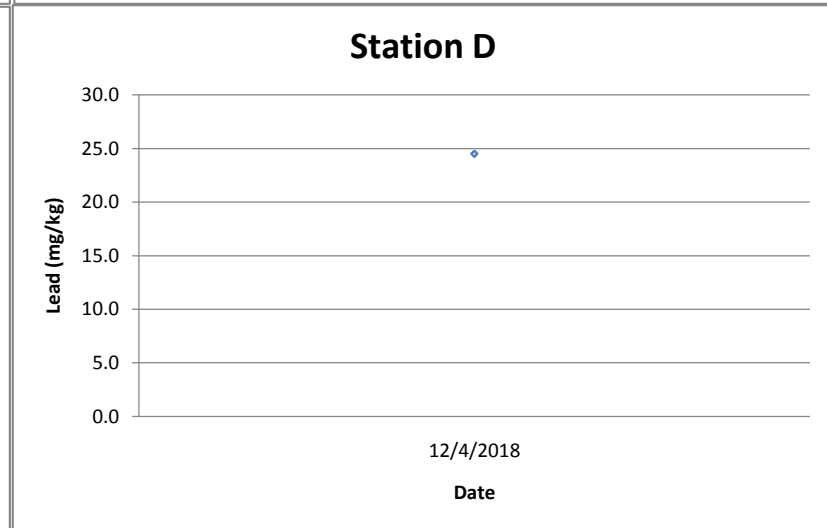
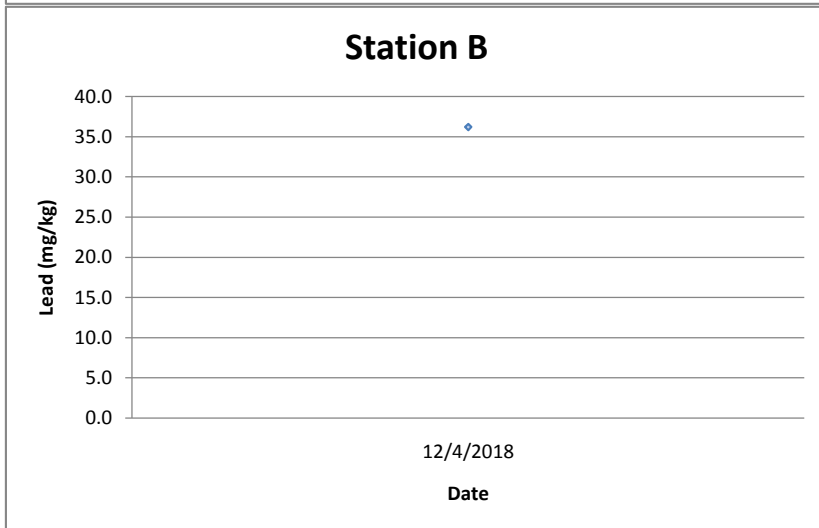
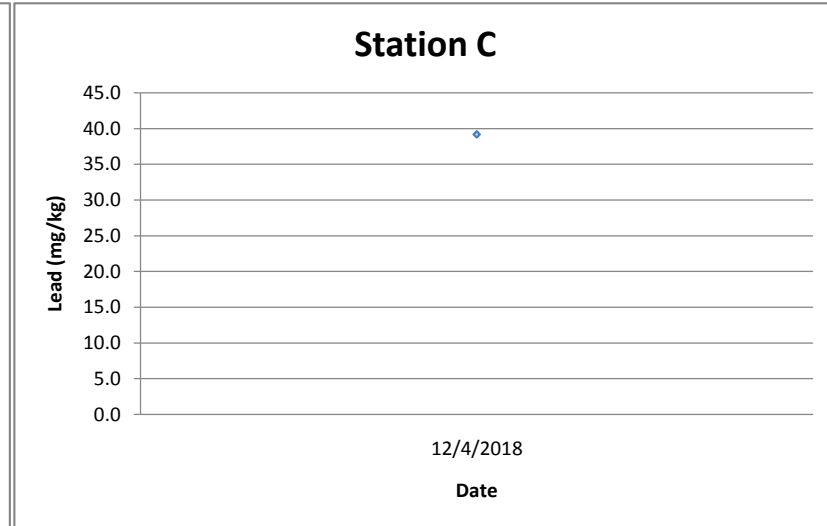
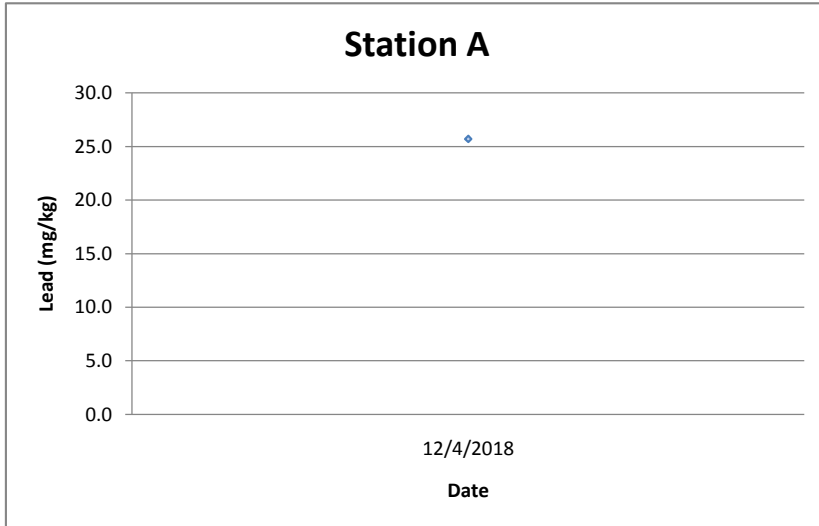
Copper (mg/kg)



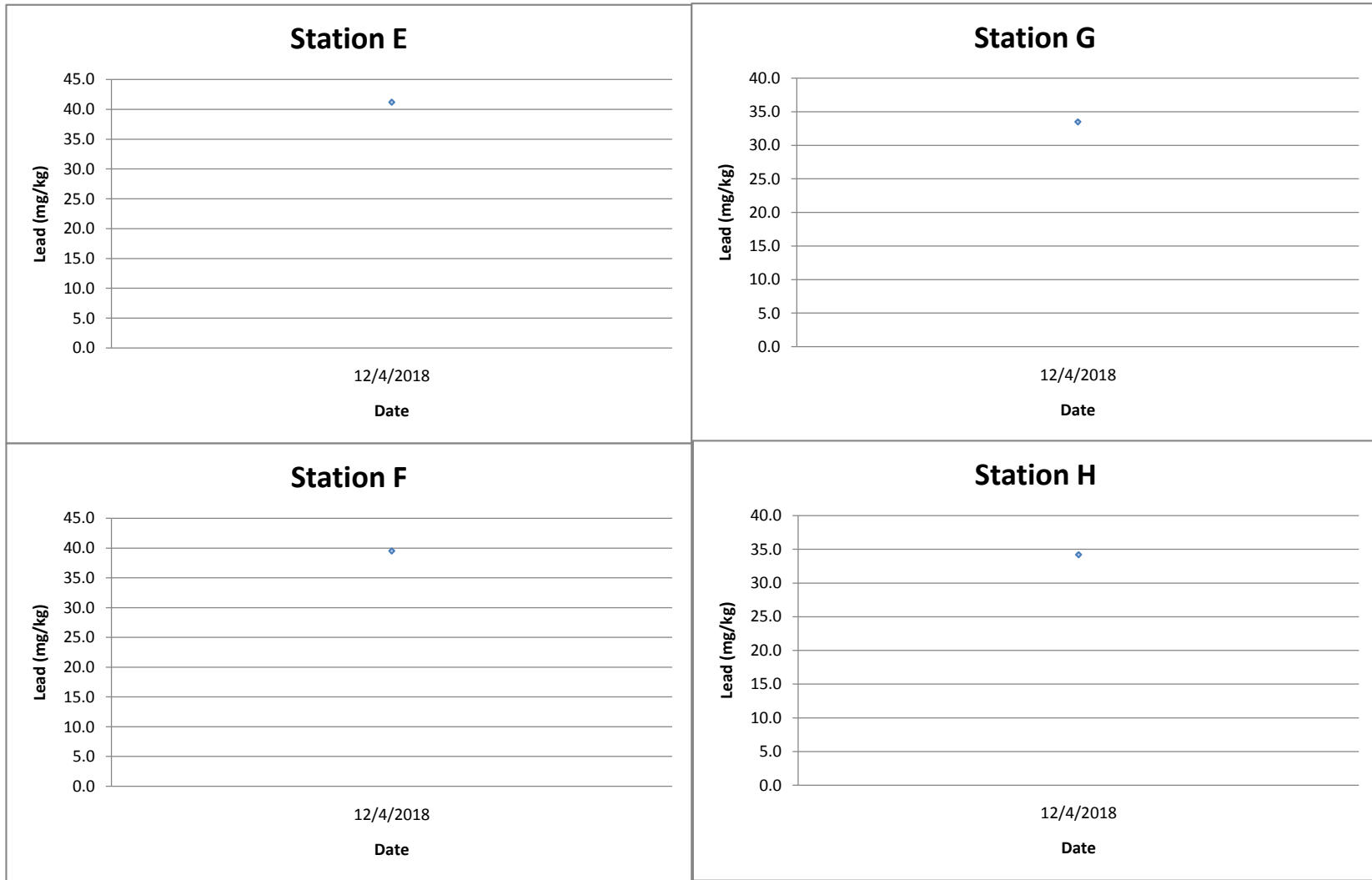
Copper (mg/kg)



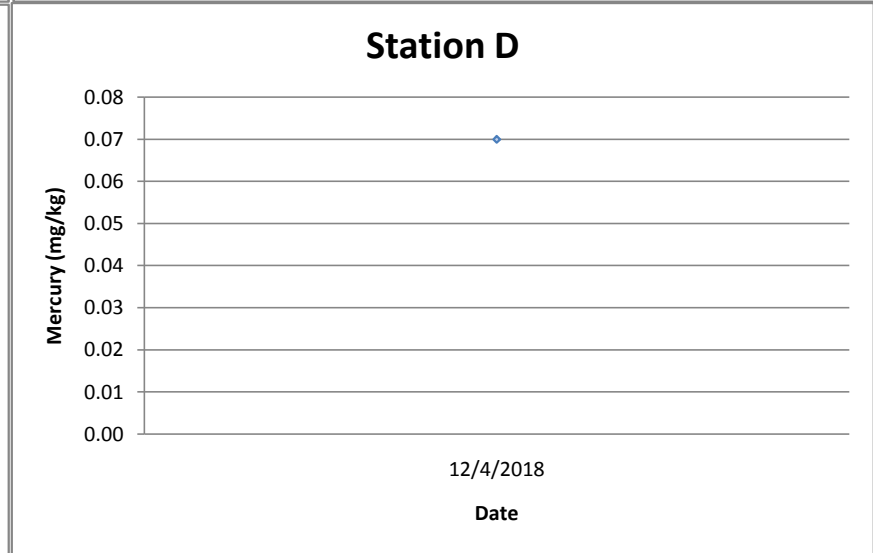
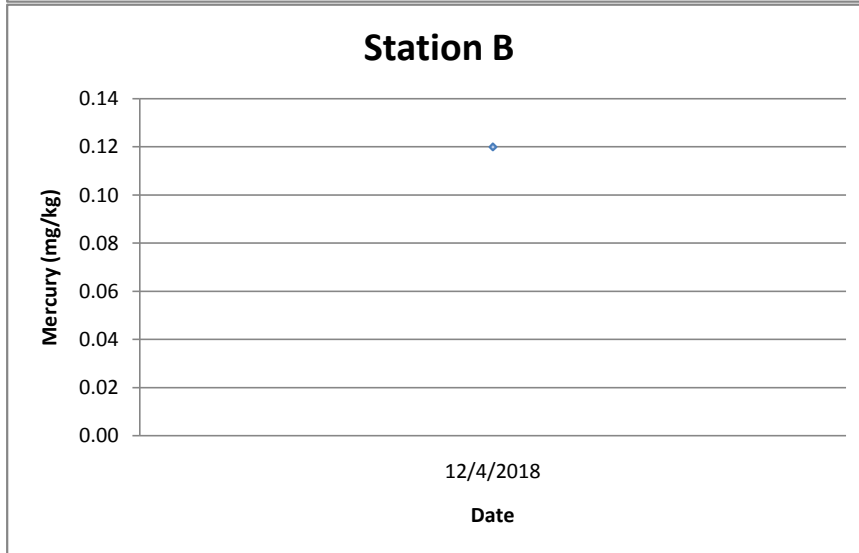
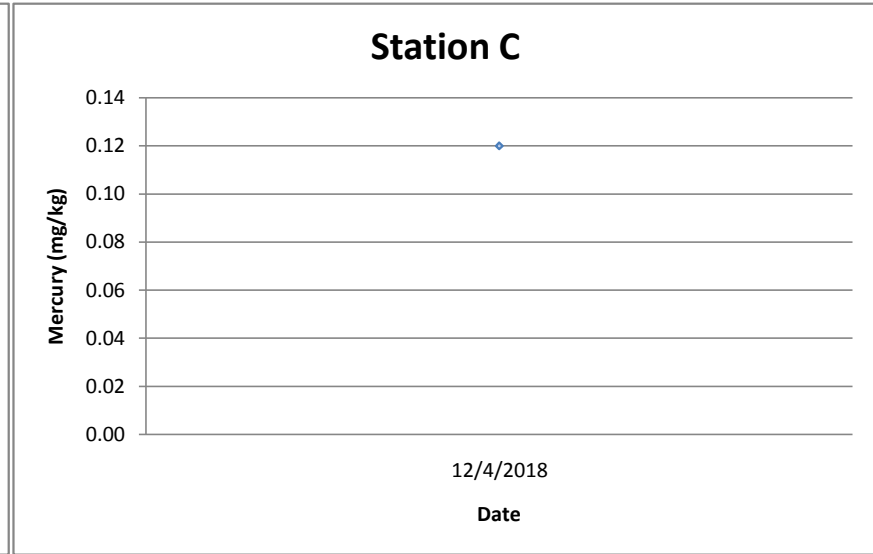
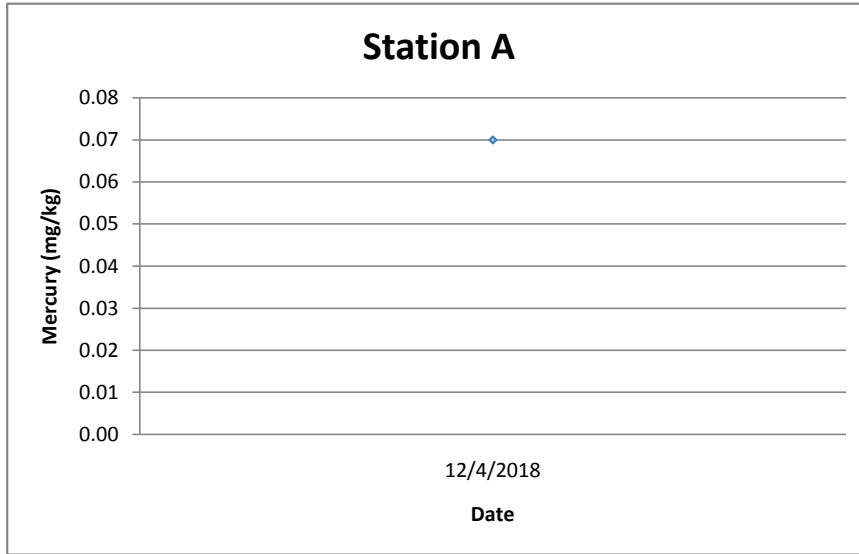
Lead (mg/kg)



Lead (mg/kg)

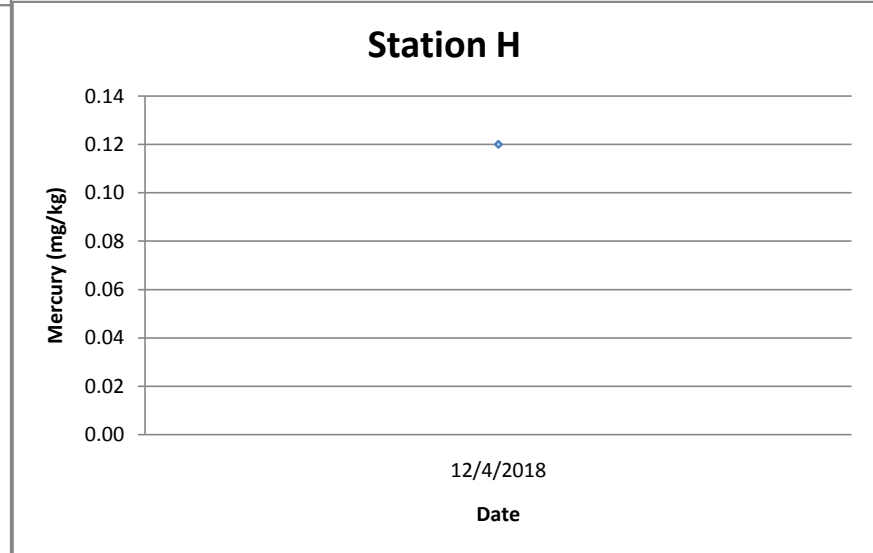
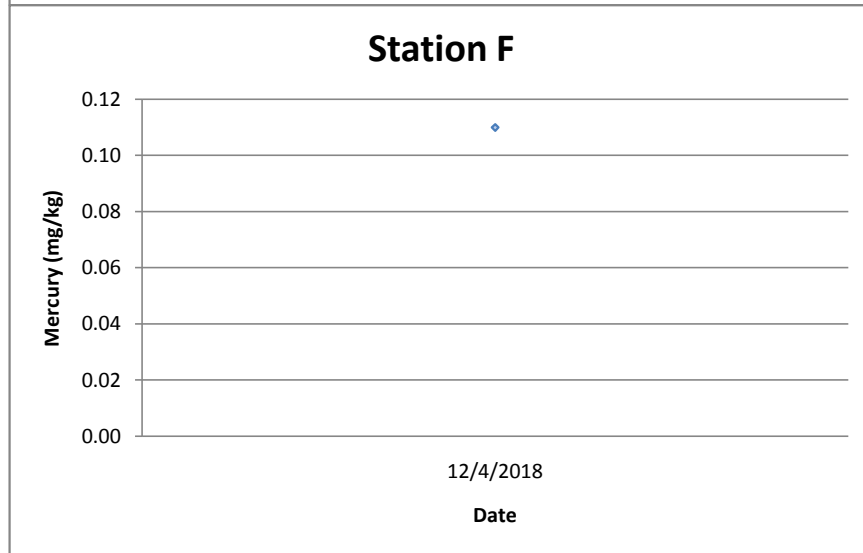
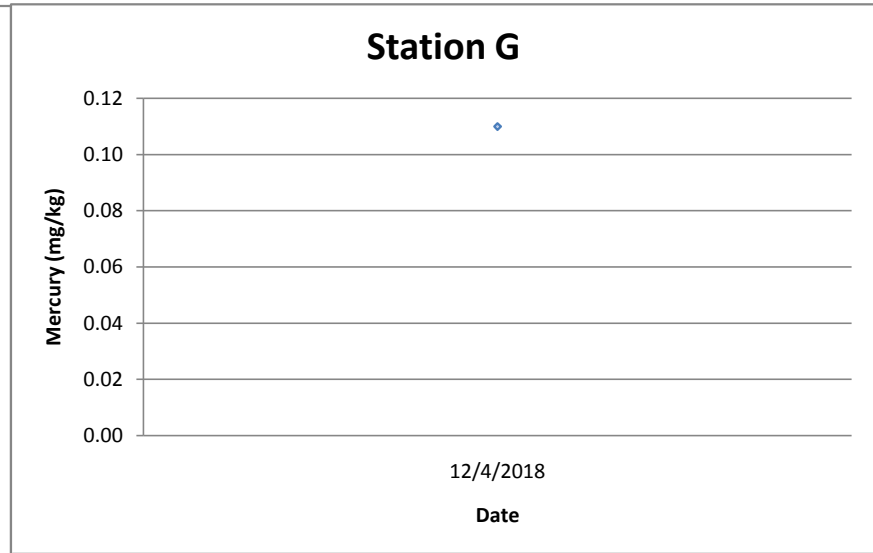
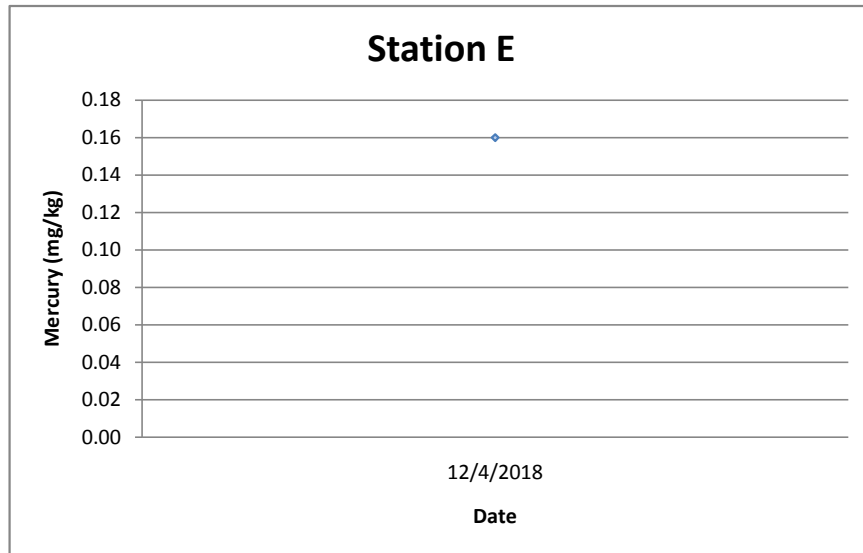


Mercury (mg/kg)

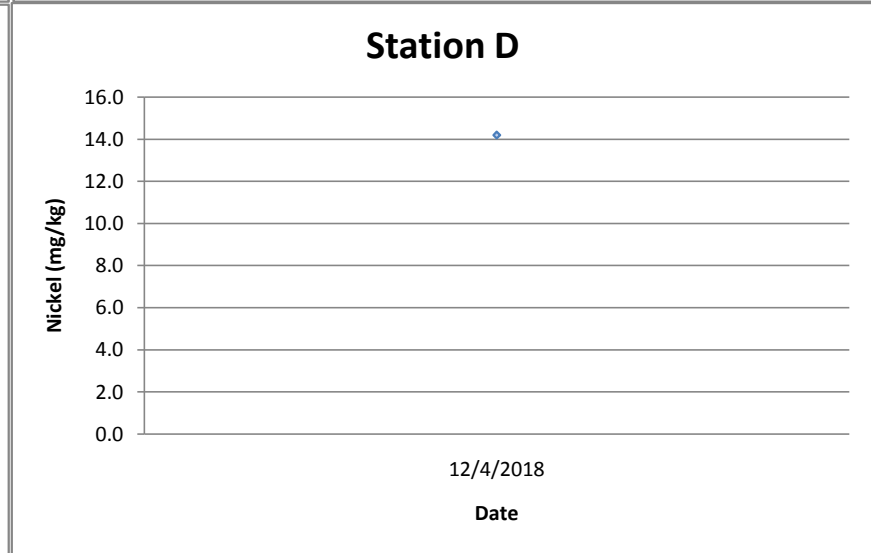
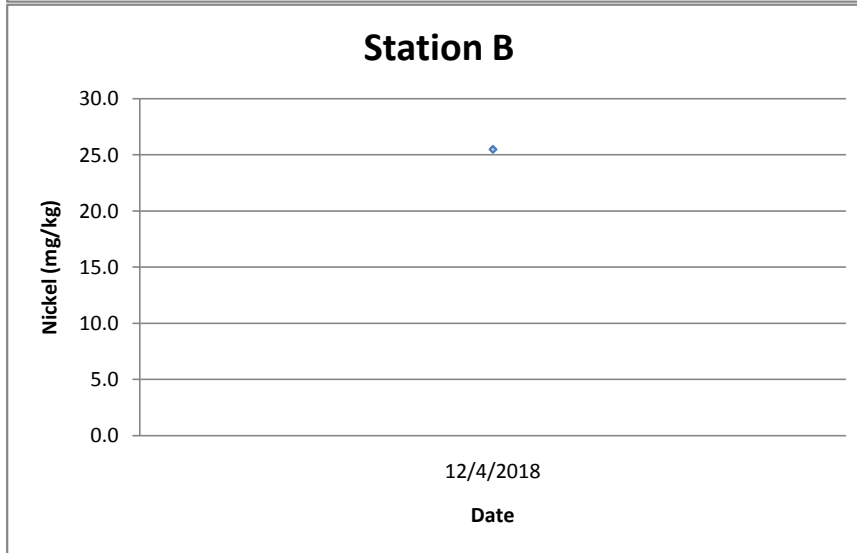
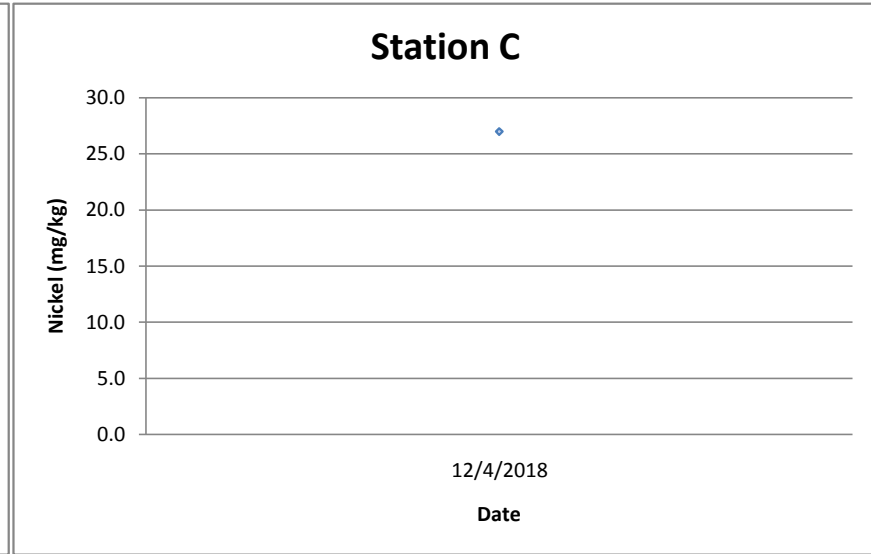
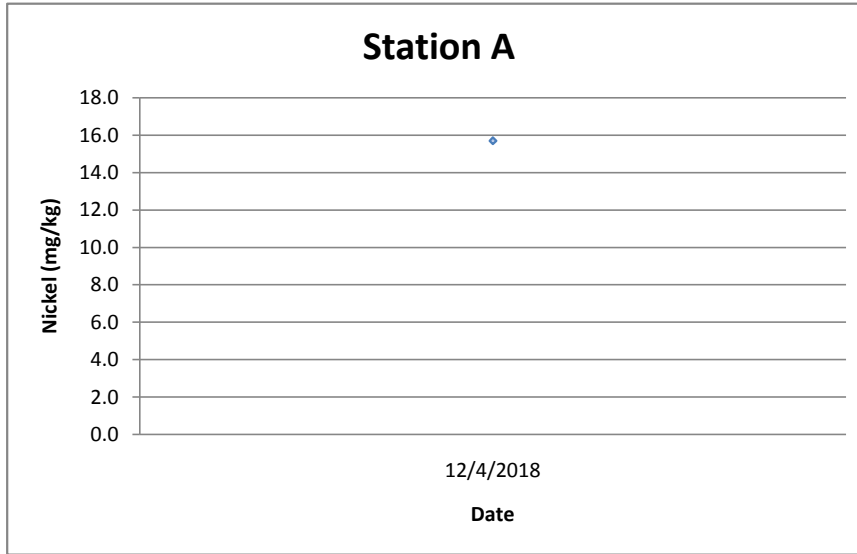




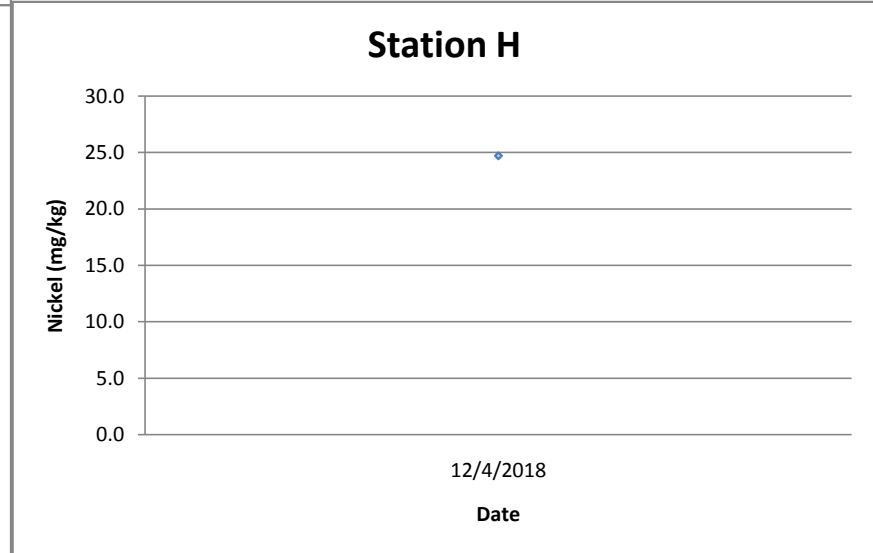
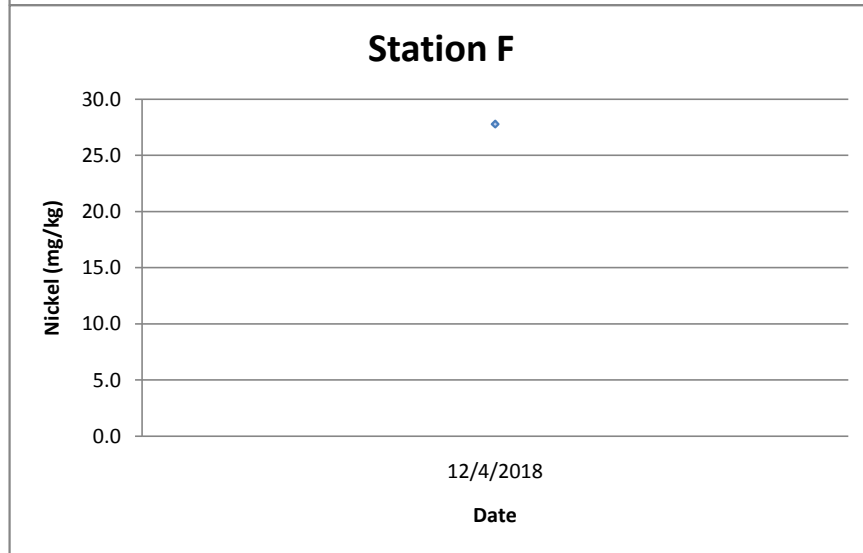
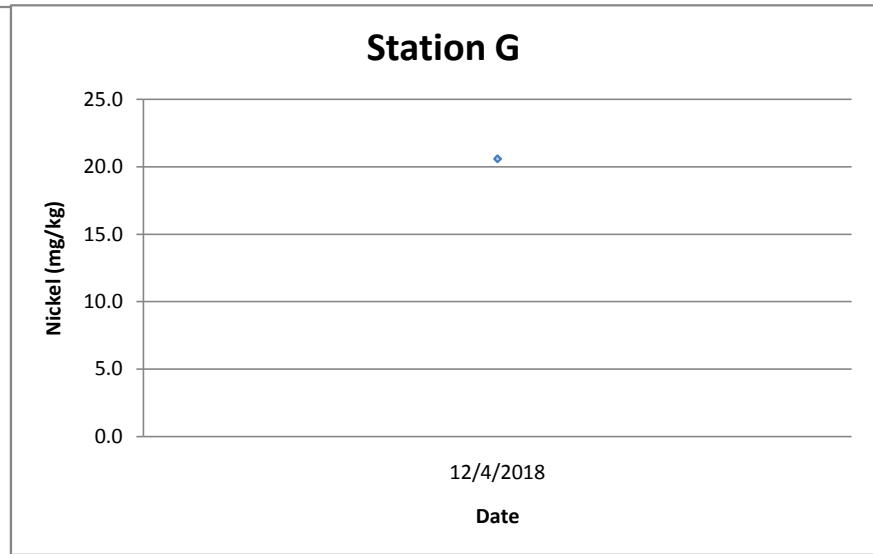
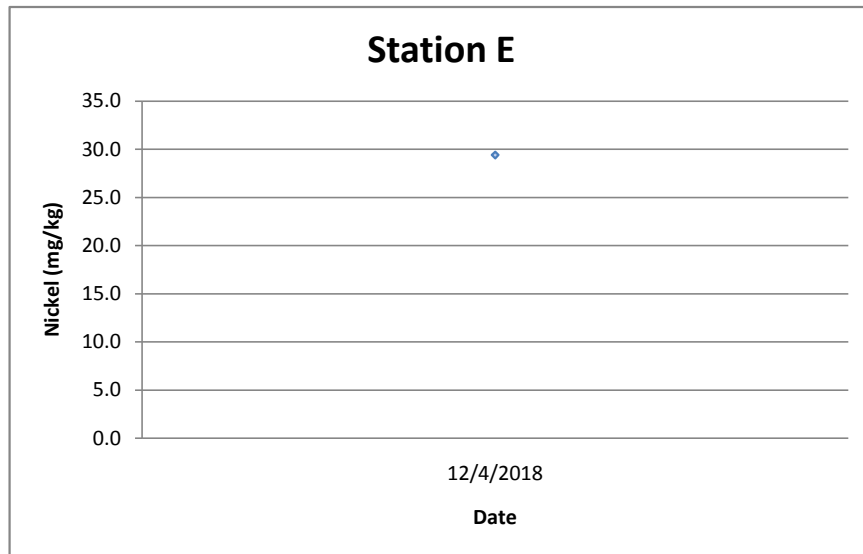
Mercury (mg/kg)



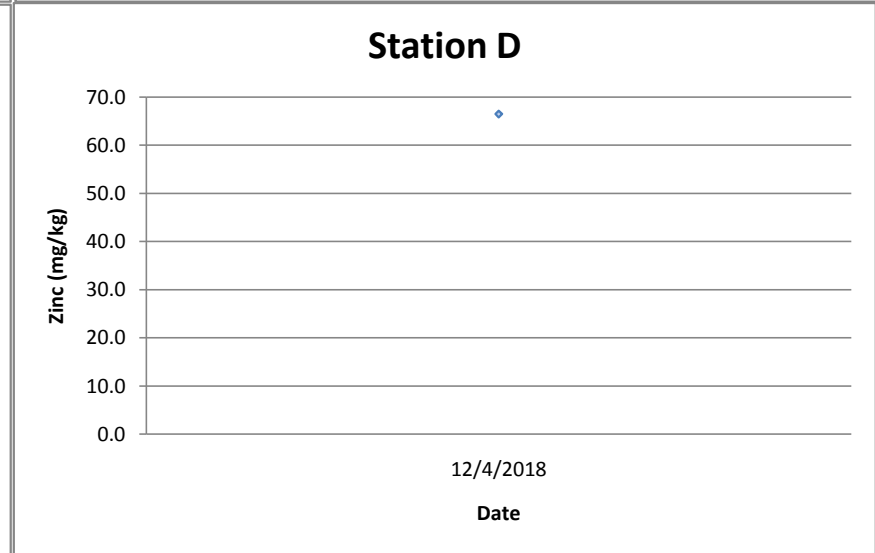
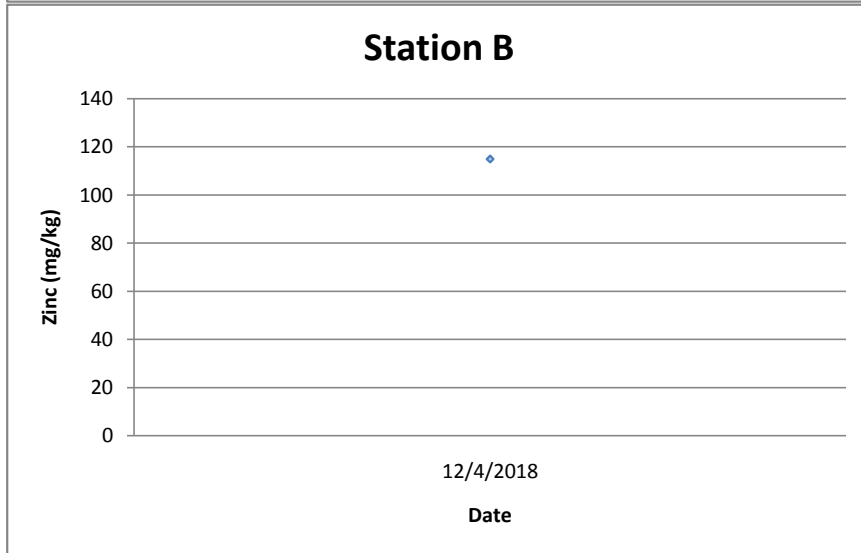
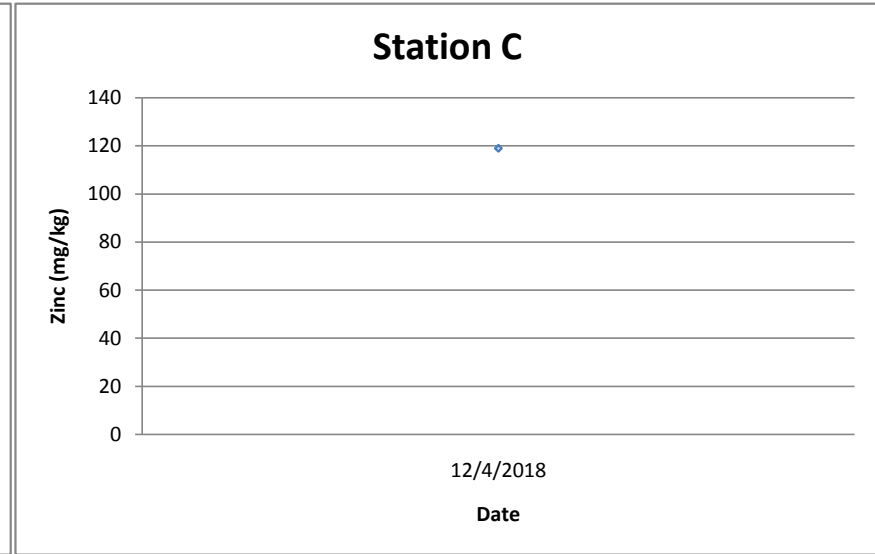
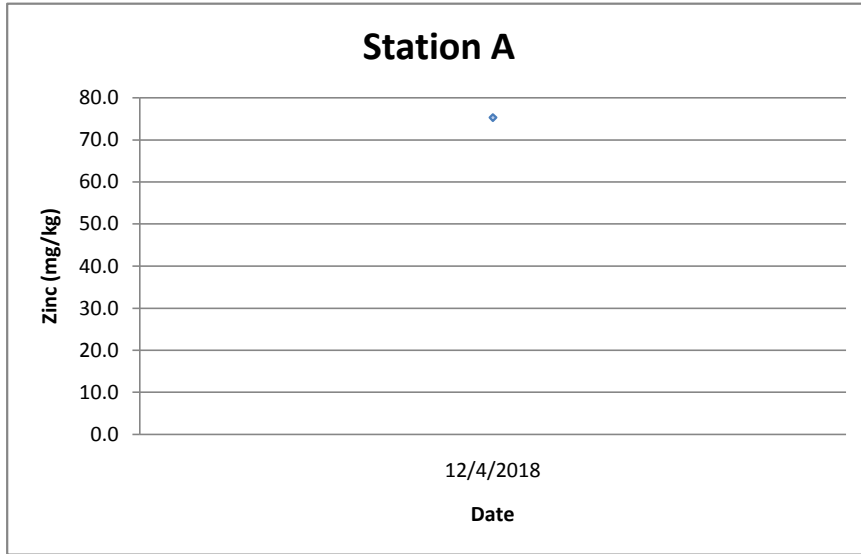
Nickel (mg/kg)



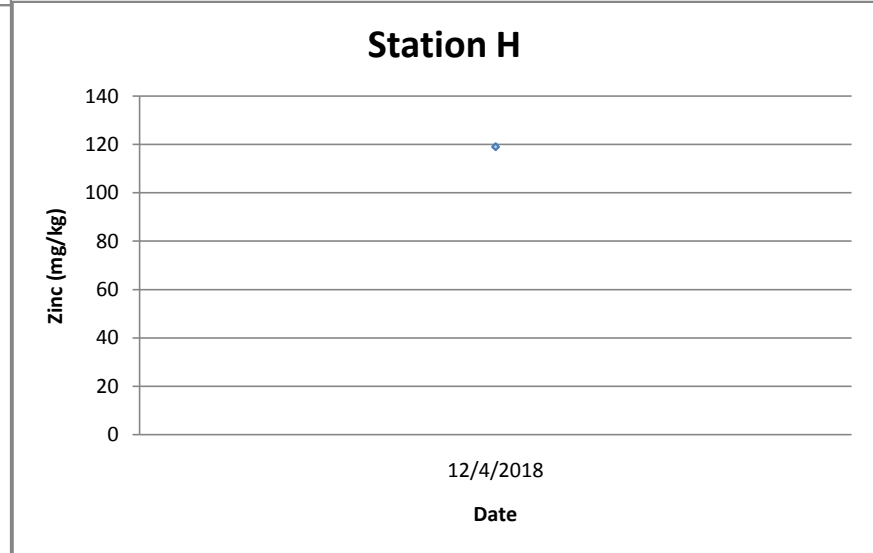
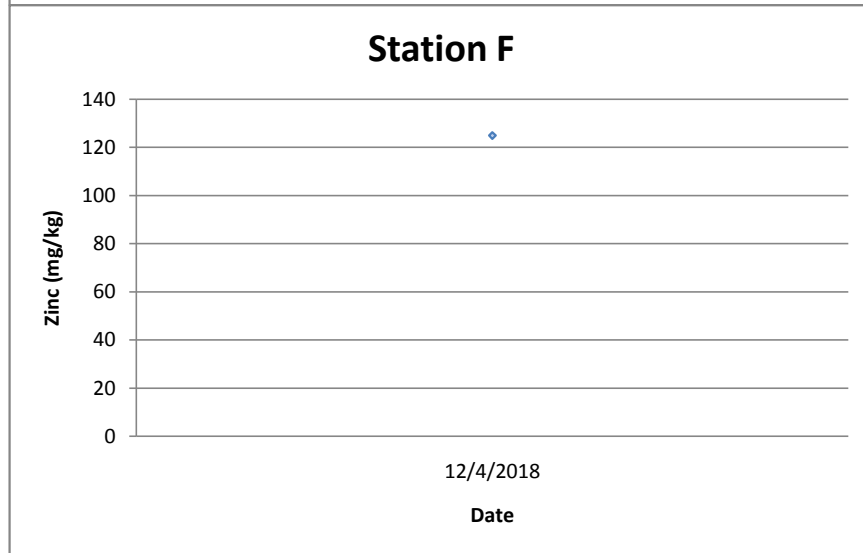
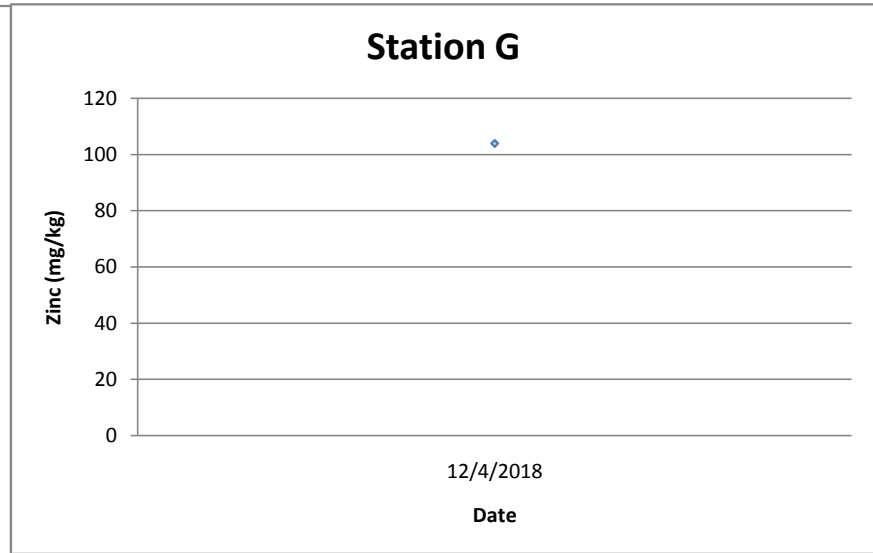
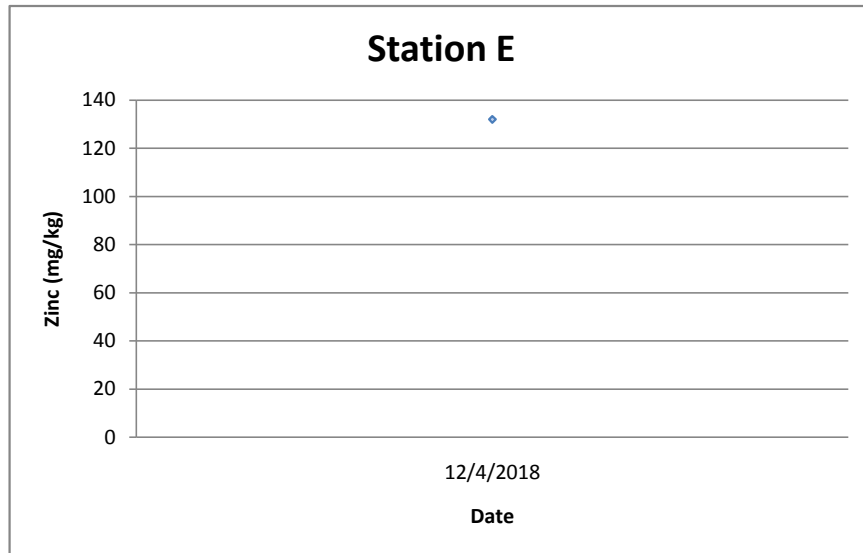
Nickel (mg/kg)



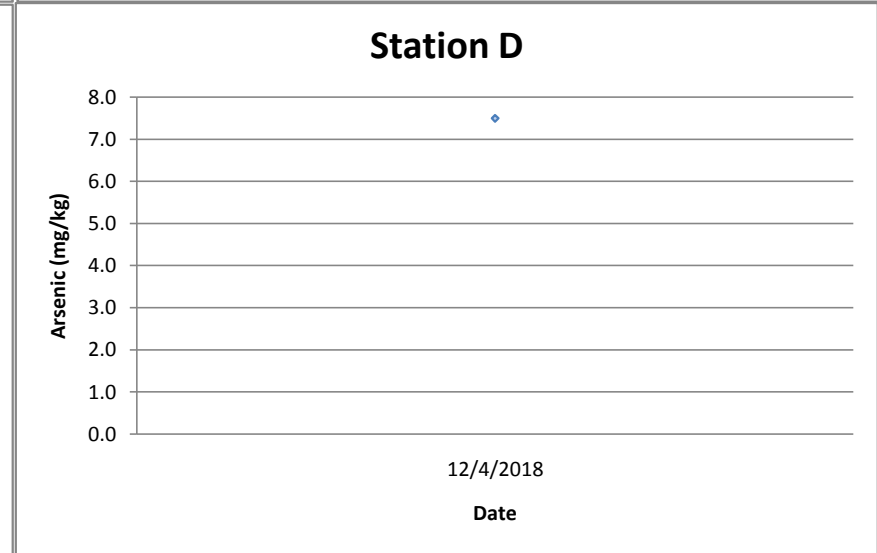
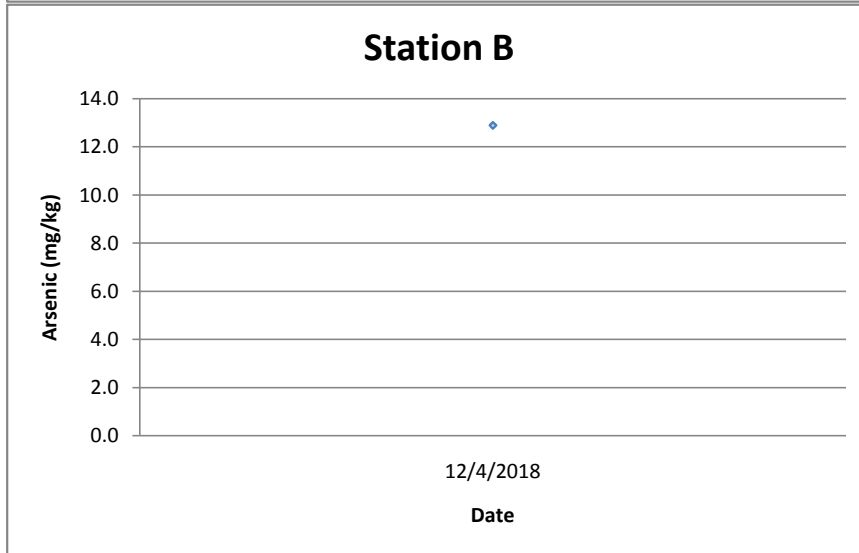
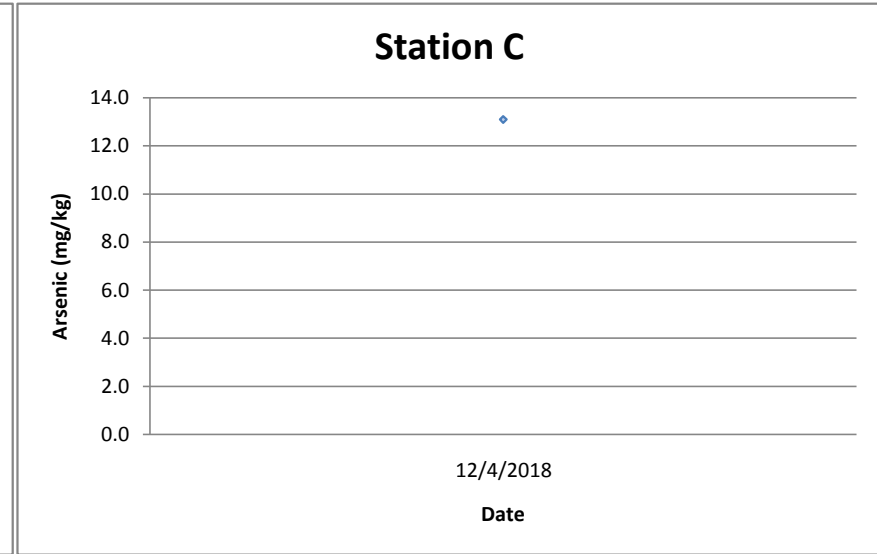
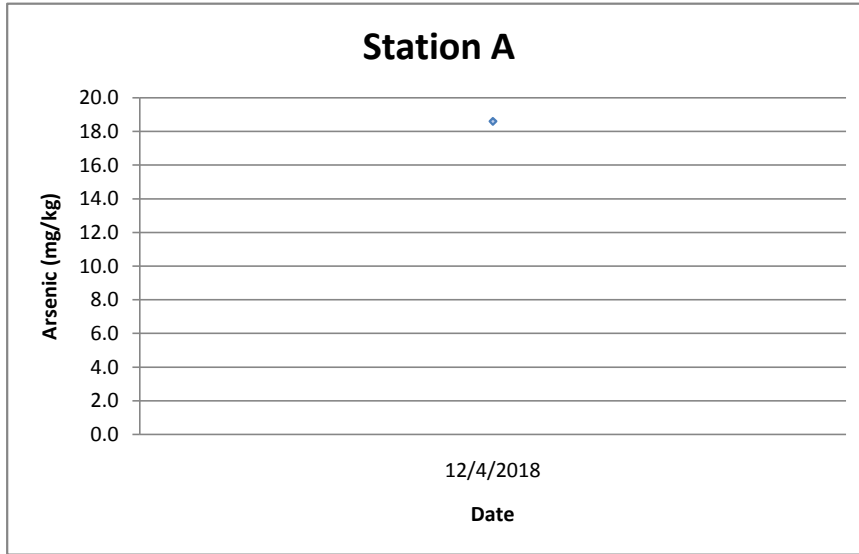
Zinc (mg/kg)



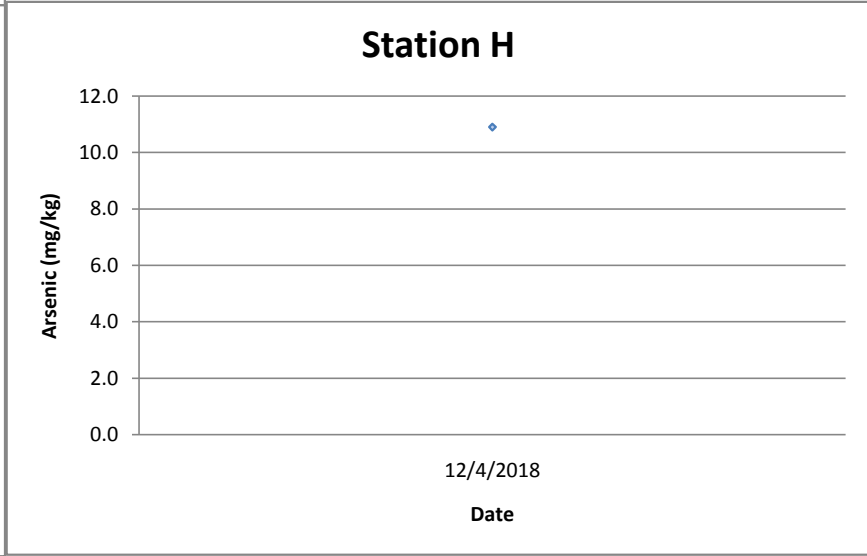
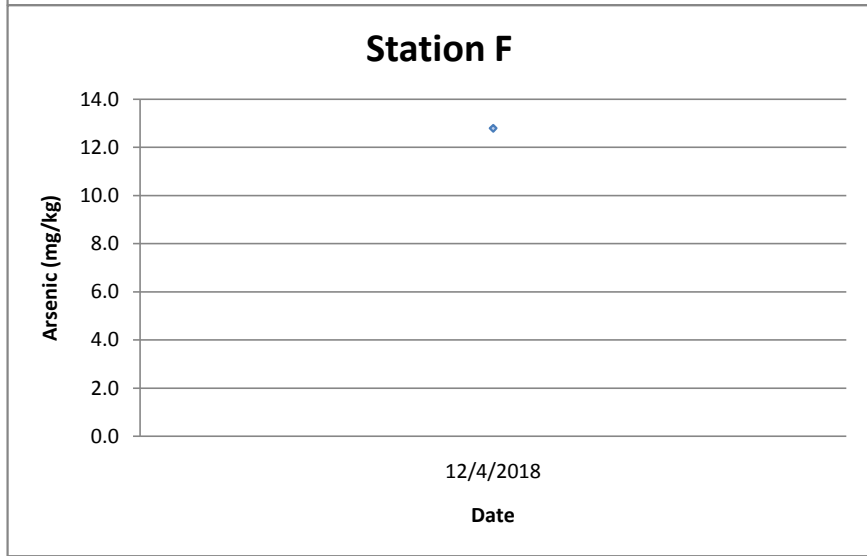
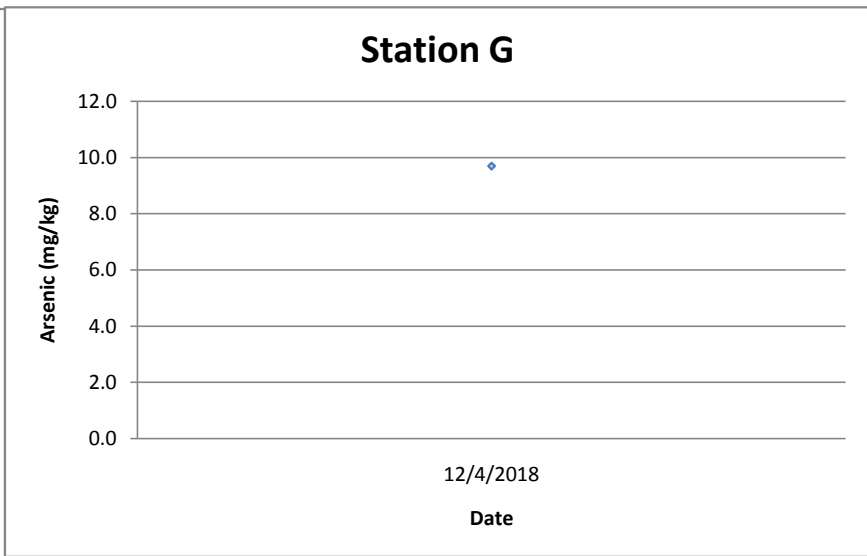
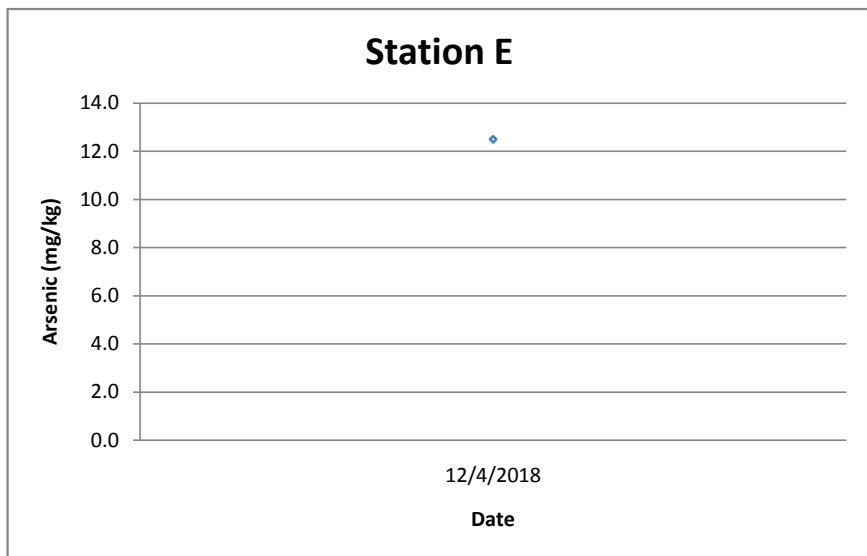
Zinc (mg/kg)



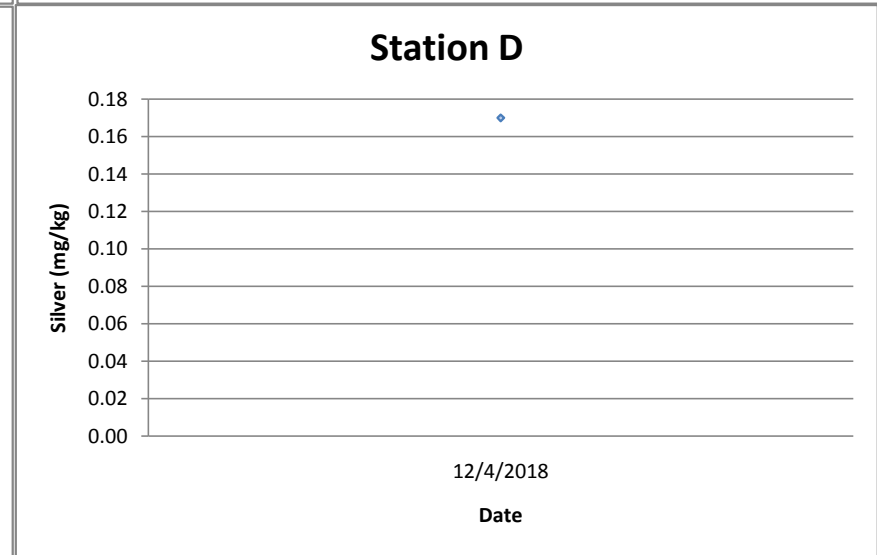
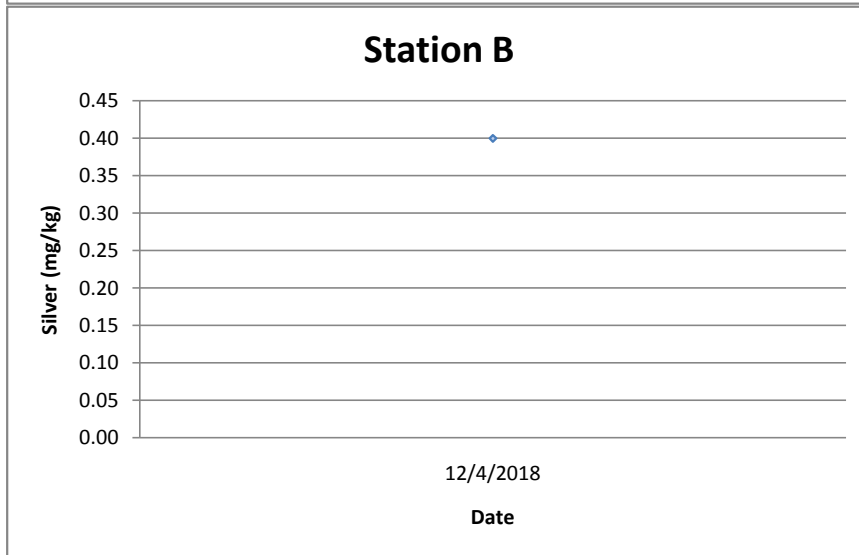
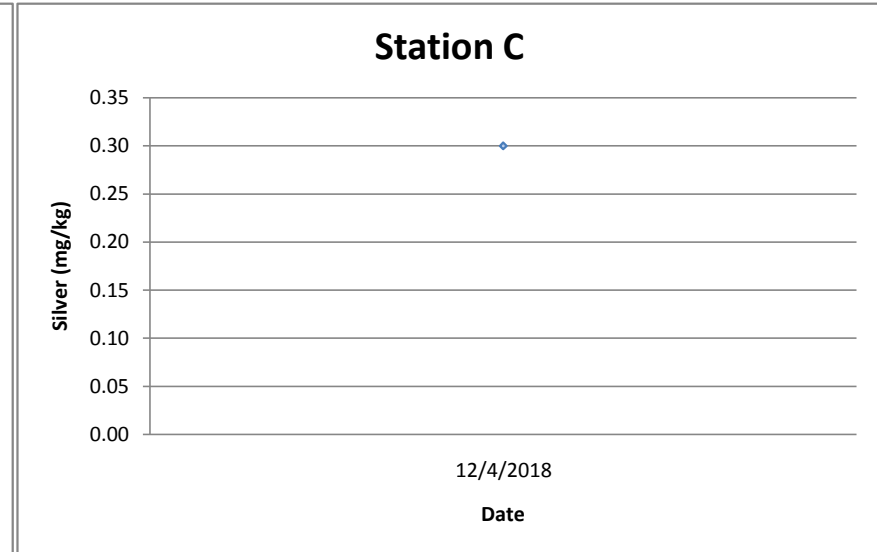
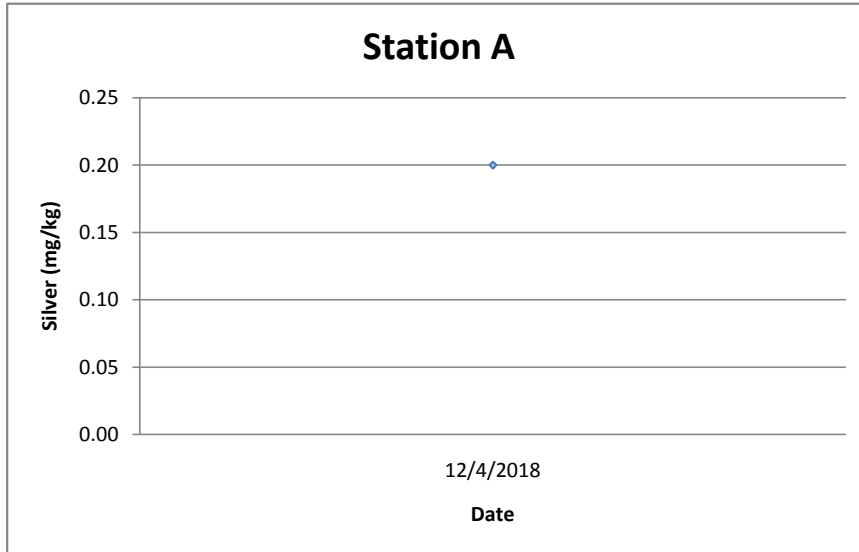
Arsenic (mg/kg)



Arsenic (mg/kg)

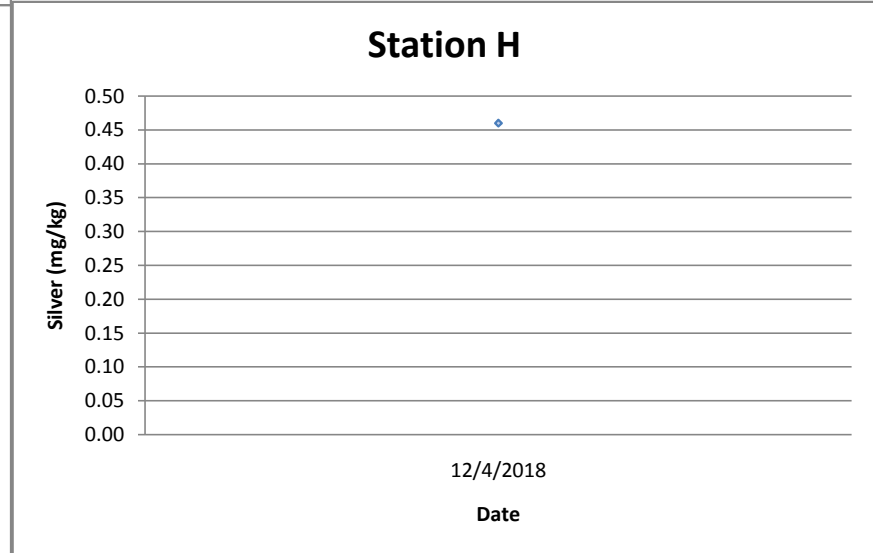
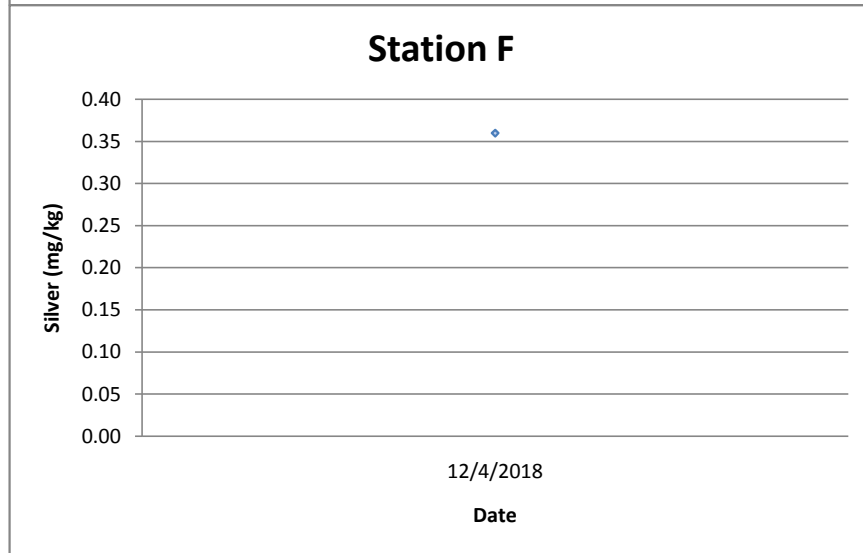
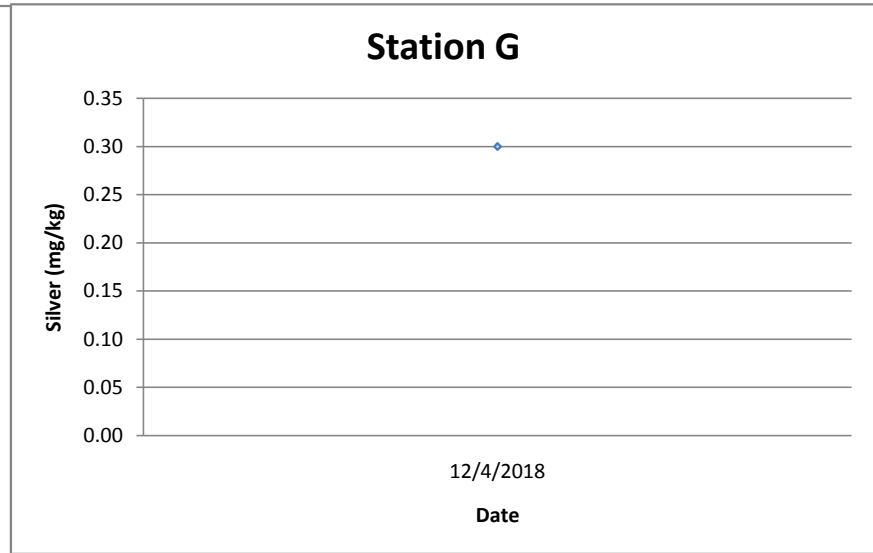
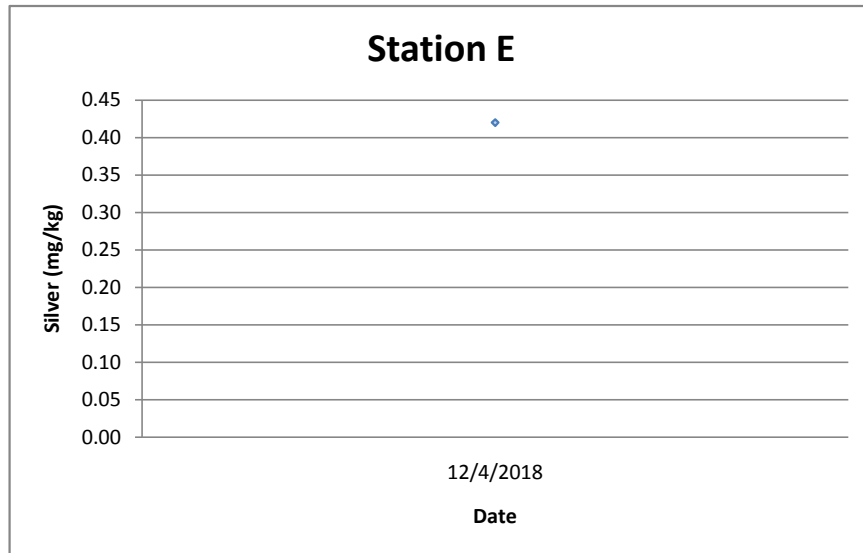


Silver (mg/kg)





Silver (mg/kg)



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Report No.: 0041/17/ED/0311A

## Appendix G

### Environmental Mitigation Implementation Schedule (EMIS)

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EP Ref.	EIA Ref.	WMP Ref.	Environmental Protection Measures	Location of the measures	Implementation Status
<b>Air Quality</b>					
NA	4.5	NA	Odour reduction measures like aeration, chemical dosing system shall be implemented to reduce any odour impacts to an acceptable level.	SHWSTW	Implemented
3.4	4.5	NA	Sewage treatment works including sludge thickening tanks, the sludge pump house and sludge press house shall be completely enclosed.	SHWSTW	Implemented
3.4	4.5	NA	Exhaust air shall be ventilated to an odour scrubber prior to discharge. Ventilating air to a biological treatment unit with 95% odour removal efficiency prior to stack exhaust shall be implemented	SHWSTW	Implemented
<b>Water Quality</b>					
3.3	NA	4.01	To avoid impacts on the marine ecology due to effluent discharge, the disinfection facility as in Part B of the EP shall be equipped with an UV disinfection system capable of removing at least 99.9% of E.coli from the sewage	SHWSTW	Implemented
<b>Waste Management</b>					
3.6	NA	NA	Transportation of sludge shall be carried out in fully enclosed containers, or be placed in sludge skips with tarpaulin covers	SHWSTW	Implemented
NA	NA	5.02	Trip-ticket system mentioned shall be implemented. Trip-ticket is required for each truckload delivered to the landfills facilities according to WBTC No. 31/2004.	SHWSTW	Implemented
NA	NA	5.02	The acceptance criteria for Landfill disposal should be followed, i.e. solid content of sludge waste should be more than 30%.	SHWSTW	Implemented
NA	NA	5.02	The disposal of grit & debris (if any) generated during primary screening works should follow the requirement set in the WMP Section 4.05.	SHWSTW	Implemented
NA	NA	5.03	The wet sludge should be temporarily stored at the sludge buffer tank. It should then be transported to the centrifuge building for dewatering and discharged to the container for disposal. The whole process should be managed by the automatic electronic electronic system and monitored by the operators during operation.	SHWSTW	Implemented
NA	NA	5.04	The other solid waste material such as sediment and grit, refuse containers or collection bags should be temporarily stored in slips at designated area. Operators should ensure sufficient space is identified and provided for temporary storage of waste materials to facilitate collection. Storage of waste material on site will be kept to a minimum to avoid nuisance to local residents.	SHWSTW	Implemented
NA	NA	5.05	Chemical wastes which likely to be generated by activities arise from the maintenance, shall followed the Waste Disposal (Chemical Waste) (General) Regulation, includes Schedule 1 of the Regulation.	SHWSTW	Implemented
NA	NA	5.06	In case of unlikely occurred chemical spillage, procedures should be followed as according to the WMP Section 5.06.	SHWSTW	Implemented
NA	NA	5.07	Temporary storage areas should be identify and provided for the temporary storage of general	SHWSTW	Implemented

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EP Ref.	EIA Ref.	WMP Ref.	Environmental Protection Measures	Location of the measures	Implementation Status
			refuse to facilitate collection		
NA	NA	5.07	Domestics wastes refuse generated on-site will be stored in enclosed bins or compaction units separately	SHWSTW	Implemented
NA	NA	5.07	Sufficient dustbins should be provided for domestic waste if required.	SHWSTW	Implemented
NA	NA	5.07	Domestics wastes should be cleared daily and will be disposed off to the nearest licensed landfill or refuse transfer station.	SHWSTW	Implemented
NA	NA	5.07	Separate labeled bins should be provided to segregate the waste generated by workforce. Waste recycle collector should be employed to collect the segregated waste	SHWSTW	Implemented
NA	NA	5.07	Cardboard and paper packaging (for plant, equipment and materials) should be recovered on site, properly stockpiled in dry condition and covered to prevent cross contamination by other materials.	SHWSTW	Implemented
NA	NA	5.07	Office waste should be minimized through using papers on both sides. Communication by electronic means should be used as far as possible.	SHWSTW	Implemented
NA	NA	5.07	The burning of refuse on-site is prohibited by law and shall not be undertaken	SHWSTW	Implemented
NA	NA	5.07	Toilet wastewater shall be transported to the STW for treatment	SHWSTW	Implemented
NA	NA	5.07	Arrangement for collection of recyclable materials by recycling contractors should be followed as according to the WMP Section 5.07.	SHWSTW	Implemented
NA	NA	5.08	All recycling materials removed by the recycling contractors should be properly recorded before the removal. The natures and quantities of the recycling materials, the date of removal and the name of the recycling contractor should be recorded.	SHWSTW	Implemented
NA	NA	5.09	To maintain the site in a clean and tidy condition during the operation, general measures specified in the WMP should be implemented on site at all times. Regular site inspections shall be undertaken by the management team to ensure the measures are implemented.	SHWSTW	Implemented
NA	NA	5.10	Daily cleaning should be performed daily after work within the plant and the public areas immediately next to the site.	SHWSTW	Implemented
NA	NA	5.11	The work officer in charge of the corresponding area should perform daily inspection on the items mentioned in the WMP Section 5.10. If observations were discovered, the work officer should record the result of the inspection on an inspection checklist with photos taken and submitted to the inspectors or Chief Technical Officer for review on the following day. Any deficiency should be rectified promptly.	SHWSTW	Implemented
NA	NA	5.12	Weekly tidying should be performed weekly within the site.	SHWSTW	Implemented
NA	NA	5.13	The inspector should perform Weekly Inspection on the items mentioned in the WMP Section 5.12. If observations were discovered, the work officer should record the result on an inspection checklist and submitted to the Chief Technical Officer for review on the following day. Any deficiency should be rectified promptly.	SHWSTW	Implemented

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Report No.: 0041/17/ED/0311A

EP Ref.	EIA Ref.	WMP Ref.	Environmental Protection Measures	Location of the measures	Implementation Status
NA	NA	5.14	All wastes generated through the operational phase will be managed in accordance with the protocols set out in the WMP Section 5.14.	SHWSTW	Implemented

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