Aroostook River Data Report
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Introduction

The Aroostook River Basin is the largest sub basin of the St John River lying almost entirely within the state of Maine. It has a drainage area of 2353 square miles at the international border of U.S. and Canada. The river segment of interest on the Aroostook begins in Masardis (River Mile 69) and flows to Washburn (RM 37), Presque Isle (RM 28), Caribou (RM 14), Fort Fairfield (RM 3) and eventually the international border (RM 0). In Canada, after an additional 4.6 miles, the Aroostook joins with the St John River.

The purpose of the data collection effort is to develop an updated water quality model of the Aroostook River. A model calibration data set was collected in 1987. A water quality model was setup on the USEPA supported model, QUAL2EU, but an additional verification data set to complete the model was never collected. The two low flow data sets collected in the summer of 2001 will be used to re-calibrate and verify the water quality model. The model is then typically used to predict worst case (low flow, high water temperature) water chemistry of such parameters as dissolved oxygen, algae, or nutrients. Regulatory measures on both point and non-point source pollutant inputs may be necessary if the model predictions for dissolved oxygen are lower than statutory requirements.

The data collection effort involved stakeholder participation from the towns of Washburn, Presque Isle, Fort Fairfield; McCain Foods; the Aroostook Band of MicMacs; and personnel from MDEP, Augusta; and the Northern Maine Regional Office of DEP in Presque Isle.

Point source discharges and their permitted licensed flows are as follows: Ashland (0.3 mgd), Washburn (0.28 mgd), Presque Isle (2.3 mgd), McCains (2.5 mgd), Caribou (1.41 mgd), Loring (2.5 mgd), and Fort Fairfield (0.6 mgd). The influence upon downstream water quality from the first two point sources is minor due to their low flow volume. The last four point sources have more flow volume and result in a noticeable difference in downstream water quality. Hence throughout the report, references to major point source discharges includes Presque Isle, McCain Foods, Caribou, and Fort Fairfield. Non-point source (NPS) inputs related to agricultural and forested land uses are also possible relevant pollution sources to the Aroostook watershed.

Technical Design of Study

Details of the technical design of the Aroostook River study are explained in the Aroostook River Work Plan (May 2000). Some of the highlights are repeated here for convenience. The sampling that was undertaken on the Aroostook River last summer involved two independent three-day low flow events for re-calibration of the water quality model. In addition, tributary sampling was undertaken during dry weather and wet weather conditions to assist in model non-point source (NPS) pollution estimates and give relative assessments of the likely subwatershed with NPS issues.

The low-flow data sets were collected in the summer of 2001 during the weeks of August 14-16 and August 28-30. The low flow three-day sampling events involved sampling the Aroostook River from Tuesday to Thursday at 13 locations and 6 tributary locations (table 1). Dissolved oxygen and temperature were sampled twice per day; in the early AM and early to mid afternoon. In addition phosphorus series (TP, PO4-P); nitrogen series (TN, NH3-N, NO2-N, NO3-N), chlorophyll a, ultimate BOD, TSS, and VSS were collected in the AM for laboratory analysis. Composite samples for the seven point source discharges were collected one day prior to the ambient samples (Monday to Wednesday) and sampled for N-series, P-series, chlorophyll a, TSS / VSS, and UBOD / BOD5. Each treatment plant tracks their own flow as part of discharge monitoring requirements. This data will be used to help compute pollutant load inputs for each point source. Flow was gaged on the Aroostook River below Grimes Mills and at major tributaries (Little Madawaska River, Presque Isle Stream, and Caribou Stream) at least one time during each three-day low flow survey. One set of cross sectional (transect) data was also collected prior to the three day low flow surveys. In addition, transect data was collected in the Caribou impoundment during the second low-flow survey at 12 locations.

The second component of the study involved sampling 16 tributary sites (table 2) a total of five independent times for DO, temperature, P-series, and TSS / VSS.; three of which were sampled under wet weather conditions and two under dry weather conditions. The wet weather tributary data sets were collected on the following dates of 2001: May 15, May 31 and June 3, and July 16. The dry weather tributary data sets were collected on August 13 and August 27 of 2001, both of which occurred one day prior to the three-day low flow data collection effort.

Table 1 Aroostook River 3-Day Low Flow Sampling Locations

Sta Code	Location	DO Temp	P-Series	N-Series	Chl a	BODu	TSS VSS
AR0	Rte 11 Bridge, Ashland	2/day	1/day	1/day	1/day	1/day	1/day
AR0a	Ashland below (Near Rte 11)	2/day	1/day	1/day	1/day	1/day	1/day
AR1	River Rd Bridge in Washburn	2/day	1/day	1/day	1/day	1/day	1/day
AR1a	Crouseville	2/day	1/day	1/day	1/day	1/day	1/day
AR2	1/2 mile upriver from Rte 1 bridge in Presque Isle (near Rte 164)	2/day	1/day	1/day	1/day	1/day	1/day
AR3	Maysville	2/day	1/day	1/day	1/day	1/day	1/day
AR4	McGraw	2/day	1/day	1/day	1/day	1/day	1/day
AR5	Above Caribou Dam	2/day	1/day	1/day	1/day	1/day	1/day
AR6	Adjacent Grimes Mill Rd,	2/day	1/day	1/day	1/day	1/day	1/day
AR7	Goodwin	2/day	1/day	1/day	1/day	1/day	1/day
AR8	Stevensville	2/day	1/day	1/day	1/day	1/day	1/day
AR9	Rte 1A Bridge Fort Fairfield	2/day	1/day	1/day	1/day	1/day	1/day
AR10	USA / Canada border	2/day	1/day	1/day	1/day	1/day	1/day
Presque Isle Stream							
PIS0	Park St Bridge	2/day	1/day	1/day	1/day	1/day	1/day
PIS8	Parson St Connector	2/day	1/day	1/day	1/day	1/day	1/day
PIS13	Railroad Trestle	2/day	1/day	1/day	1/day	1/day	1/day
Little Madawaska River							
LM1	Bowles Rd	2/day	1/day	1/day	1/day	1/day	1/day
LM2	Grimes Rd Grimes Mills	2/day	1/day	1/day	1/day	1/day	1/day
Caribou Stream							
CS	Near confluence with Aroostook	2/day	1/day	1/day	1/day	1/day	1/day
Effluents							
Station	Treatment Facility		P-Series	N-Series	Chl a	BODu	TSS
ASH	Ashland		24 hr composite sample				
WAS	Washburn						
PRI	Presque Isle						
MCC	McCain Foods						
CAR	Caribou						
LOR	Loring						
FTF	Fort Fairfield						

Table 2 Tributary Sample Location for Non-Point Source Assessment

Station Code	Location	Drainage Area mi^2	Wet Sampling Protocol	DO Temp	P-Series	TSS/VSS
t-SCS	St Croix Stream, Masardis	238	day after	1/day		
t-SPS	Squa Pan Stream, Masardis	5.7	same day			
t-MR	Machias River, Ashland	330	day after			
t-LMR	Little Machias R Ashland	63	day after			
t-AB	Alder Brook, Ashland	10.3	same day			
t-GAB	Gardner Brook, Wade	14.1	same day			
t-SB	Salmon Brook, Washburn	55	day after			
t-CB	Clayton Brook, Washburn	10	same day			
t-NBP	N Br Presque Isle Str, Maple	32	same day			
t-MB	Merritt Brook, Presque Isle	N/A small	same day			
t-HB	Hardwood Brook, Maysville	6.5	same day			
t-PB	Prestile Brook, Caribou	5.5	same day			
T-CS	Caribou Stream, Caribou	50	day after			
t-OB	Otter Brook, Caribou	18.5	same day			
t-GRB	Gray Brook, Fort Fairfield	6.2	same day			
t-HHB	Hockenhull Brook, Fort Fairf.	15.6	same day			

Hydrologic Data
Flow

The low flow data sets are initiated by the requirement of achieving a satisfactory low flow condition in the Aroostook River. The flows which initiate sampling are referred to as "trigger flows." Two trigger flows were targeted for the Aroostook study; the first of which was the satisfactory low flow trigger or 80% flow duration, and the second of which was the ideal low flow trigger or 90% flow duration. The USGS gage at Washburn was examined typically on Friday to determine whether or not sampling should be initiated beginning the Monday of the following week. The first and second trigger flows at the USGS gage in Washburn are 560 cfs and 390 cfs, respectively.

In a low flow survey, a steady river flow is as important as low flow conditions. The lack of runoff two weeks prior to the low flow surveys should also be targeted. Significant runoff during the sampling effort which result in greater than 50% flow deviations should be boundaries defining when sampling should cease due to excessive runoff.

The flows for both low flow surveys were well under the second 390 cfs trigger, and hence easily exceed expectations for an ideal low flow survey (figure 1). The average flow at Washburn for the first low flow survey (Aug 14-16) was 145 cfs and river flow was generally declining over the three day period. The average flow at Washburn for the second low flow survey was 127 cfs but flow rose from 107 to 133 cfs from August 27 to August 30 due to a precipitation events experienced from August 27-29. However, the 24% rise in river flow still is under the 50% flow deviation set in the work plan as suitable conditions for a steady flow condition. The flow on some of the tributaries, in particular, Presque Isle Stream was noticeably higher due to this runoff event. The precipitation reported by the Presque Isle Sewer District during this period (1.4 inches) was higher than other parts of the watershed (.4 to .5 inches) indicating that there was locally more rainfall in Presque Isle. However no sampling constraints were placed upon tributaries. For the most part there was no runoff two weeks prior to each survey, except for small precipitation events from August 20 to 22 (0.2 to 0.3 inches) in which flow at Washburn increased from 138 to 151 cfs over a two day period (8/20-22).

It should also be realized that both data sets were sampled at conditions close to 7-day 10 year low flow (7Q10). The first low flow event was 11% higher than 7Q10 and the second 19% lower than 7Q10 (figure 2). The 7Q10 flow is the design condition used for making model prediction runs for regulatory purposes. Hence when all factors relating to suitable river flow are considered collectively, conditions were extremely good for collecting low-flow model calibration data sets.

The wet weather event sampling targeted storm sizes greater than 1 inch of total rainfall preferably distributed somewhat evenly throughout the watershed. Obtaining this condition is difficult, since rainfall is ordinarily not distributed evenly in the summer, and, in particular, in a large watershed such as the Aroostook. Precipitation reported on the discharge monitoring reports from three treatment facilities (Ashland, Presque Isle, McCain Foods) is compared to period when sampling occurred on the Aroostook or its tributaries (figure 3).

These data indicate that during the first wet weather sampling event (May 15) precipitation was about 0.4 to 0.65 inches 48 hours prior to sampling, falling below the goal of the 1 inch storm. The Aroostook River flow was minimally affected during this wet weather event (figure 1).

The second wet weather sampling event was undertaken during the beginning of several consecutive days of storms, which resulted in a seven-fold increase in the Aroostook River flow (figure 1). Due to the uneven distribution of rainfall, the sampling occurred on two separate days; May 31 for the lower watershed, and June 3 for the upper watershed. The rainfall totals 48 hours prior to sampling were around 1.2 inches for the lower watershed (May 29-31) and 0.75 inches for the upper watershed (June 1-3). The upper watershed also received an additional 0.6 inches of rain from May 29-31 (figure 3). It is concluded that the second wet weather event generally met the goal of capturing a 1 inch storm.

Figure 1
Sampling Times Compared to Flow at USGS Washburn Gage
Summer 2001

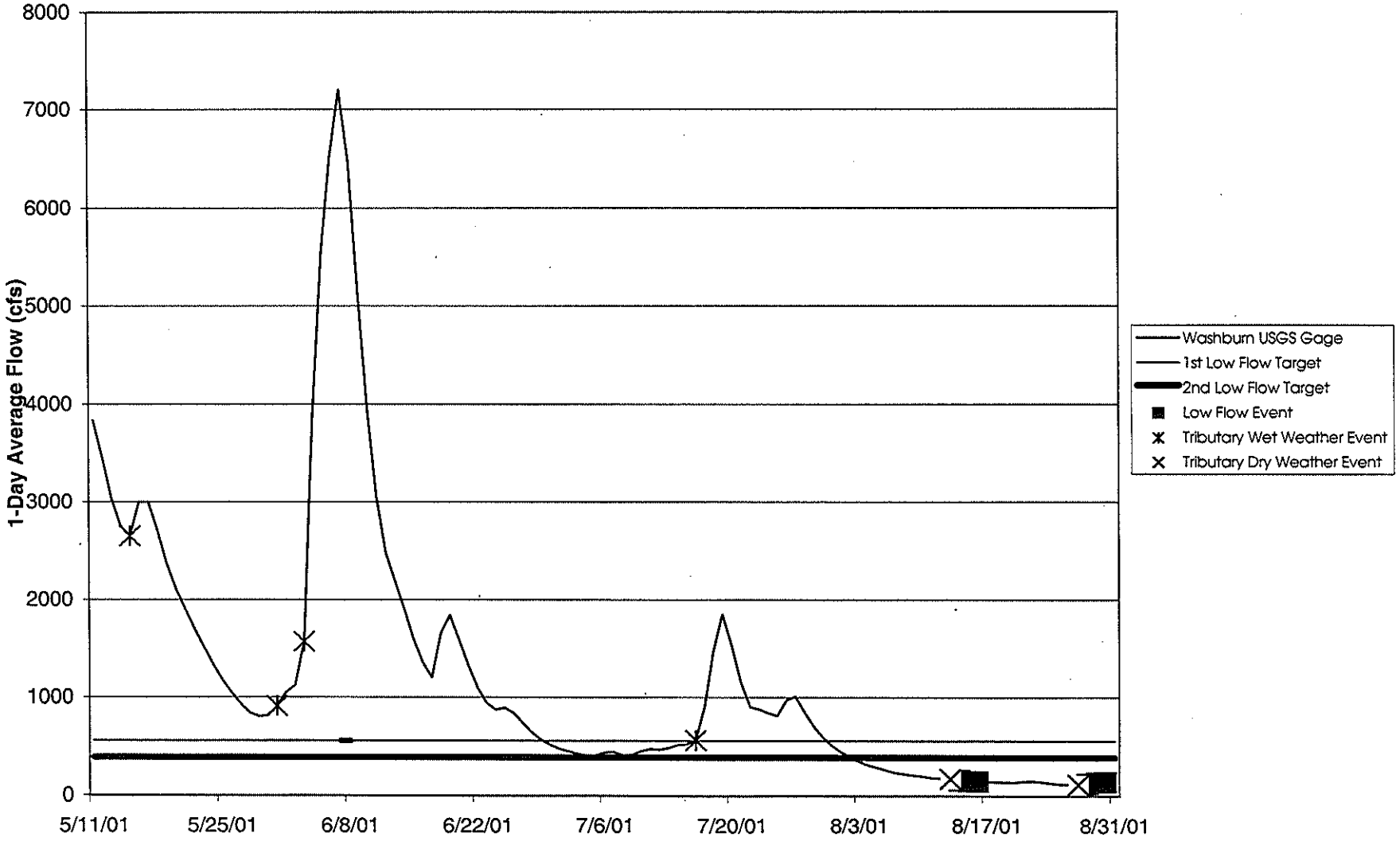
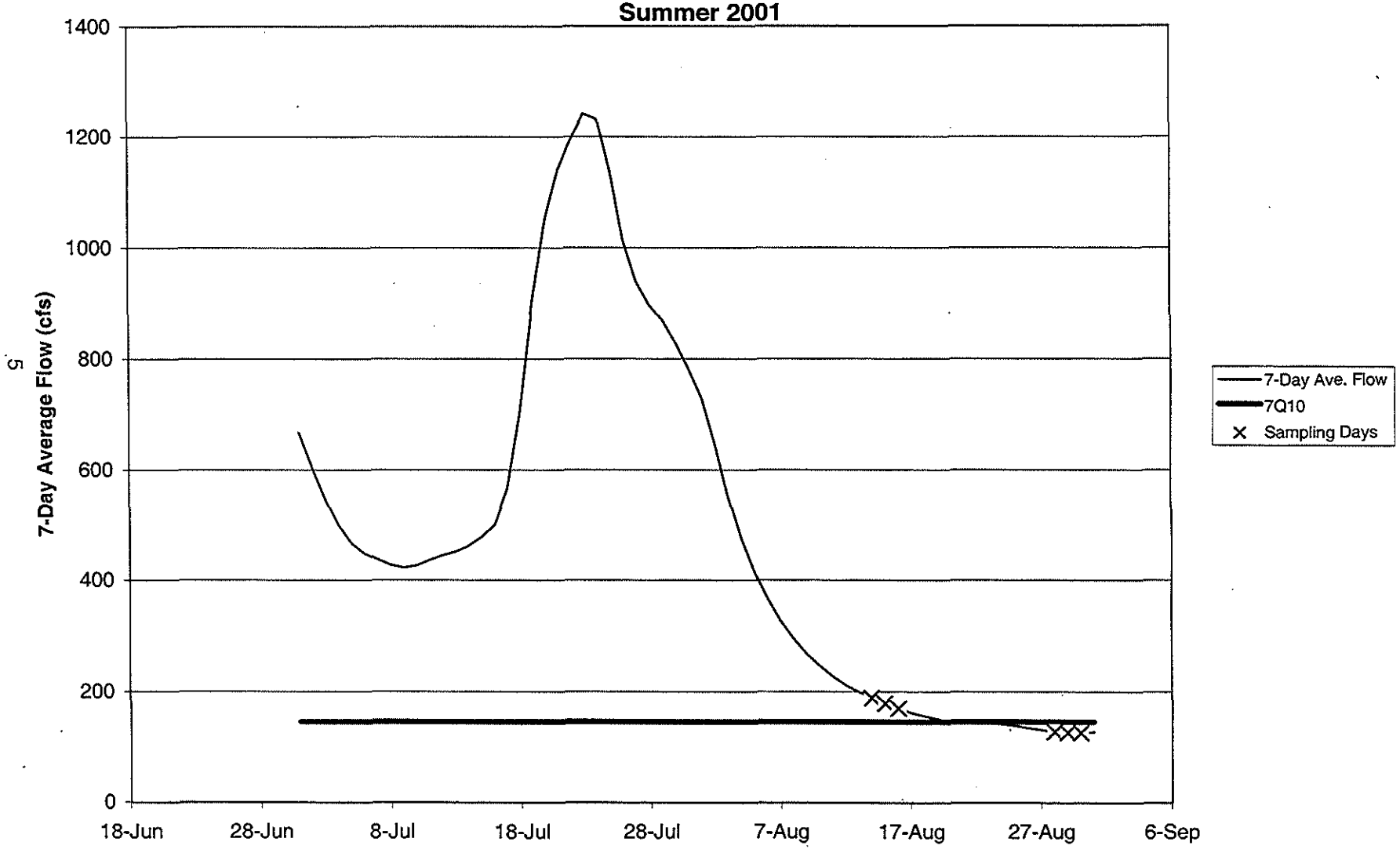


Figure 2
River Flow at Washburn USGS Gage Compared to 7Q10
Summer 2001



The third wet weather event was sampled on July 16 during what was originally intended to be a dry weather sampling event the day prior to a three-day low flow event. Rainfall distribution throughout the watershed was rather uneven during this precipitation event. Rainfall reported by the three treatment facilities varied from 0.4 to 1.6 inches (figure 3). The four-fold increase in flow recorded by the gage at Washburn (figure 1) indicates that significant runoff occurred following this precipitation event. The large amount of runoff was partially due to the wet antecedent moisture conditions, since in the two weeks prior to this event, frequent rainfall events occurred (figure 3).

In summary, the first wet weather event fell below expectations, but the second and third events were sampled during satisfactory runoff conditions.

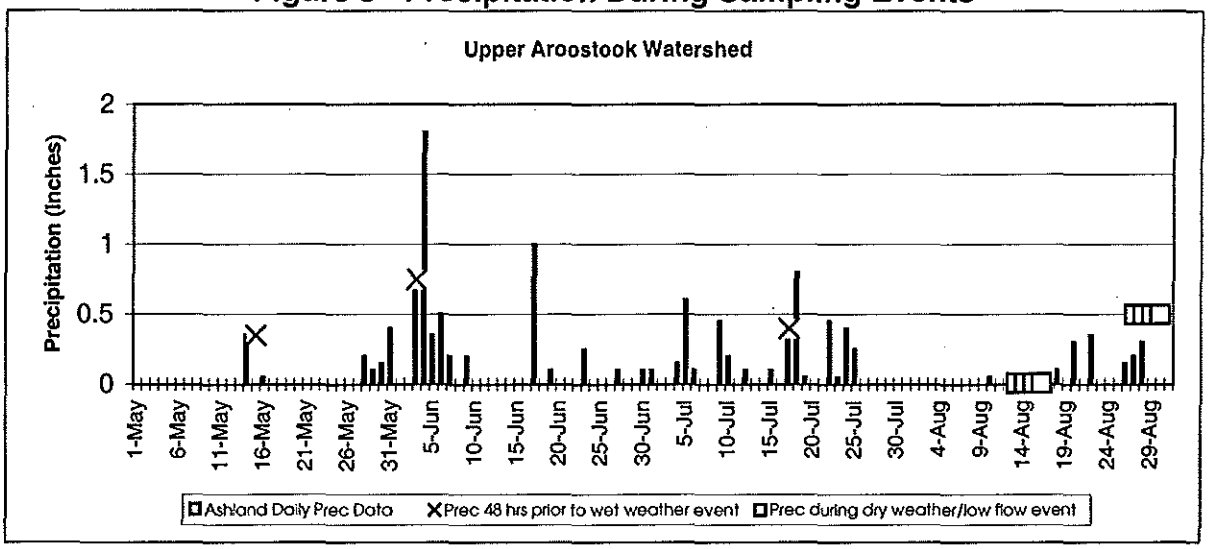
River Transects

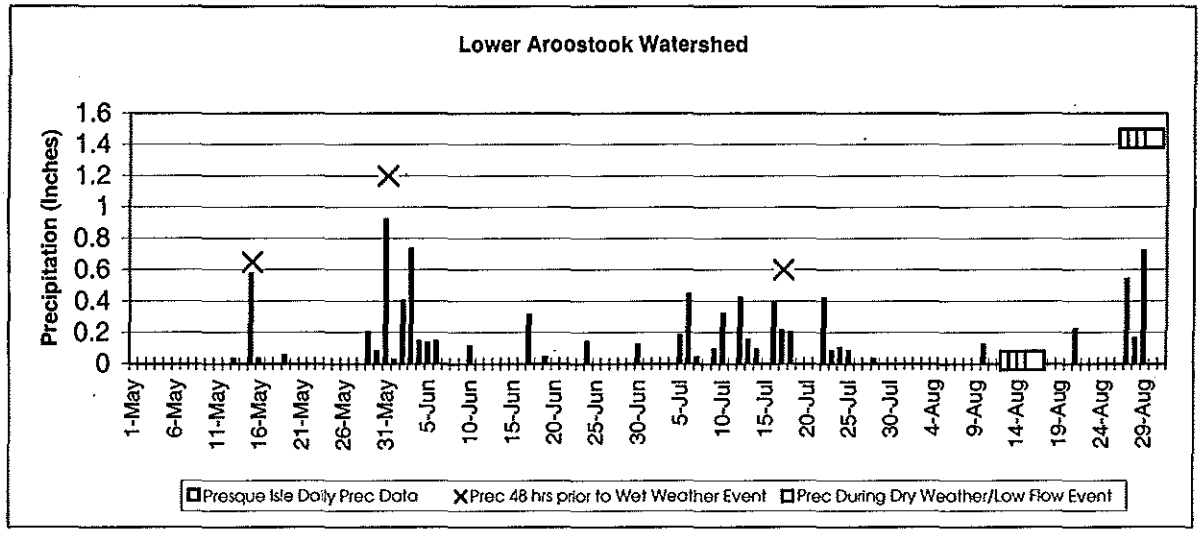
River transects were collected on August 22 at most sampling locations and four additional transects in-between Ashland and Presque Isle. Eleven additional transects were collected in the Caribou Dam impoundment during the second low flow survey. All of the transect data were collected at river flow conditions slightly under 7Q10 and provide valuable information of river hydraulic conditions at low flow. River widths were measured using GPS equipment. In wadeable locations, depth was measured every seven feet along a transect width using a surveying rod. The sites in the Caribou dam impoundment are not wadeable. Here depths were measured using a continuous recording depth fathometer that was attached to a boat. In all, 24 transects were measured and are summarized below (table 3). The transects are also plotted in chart format (Appendix 5).

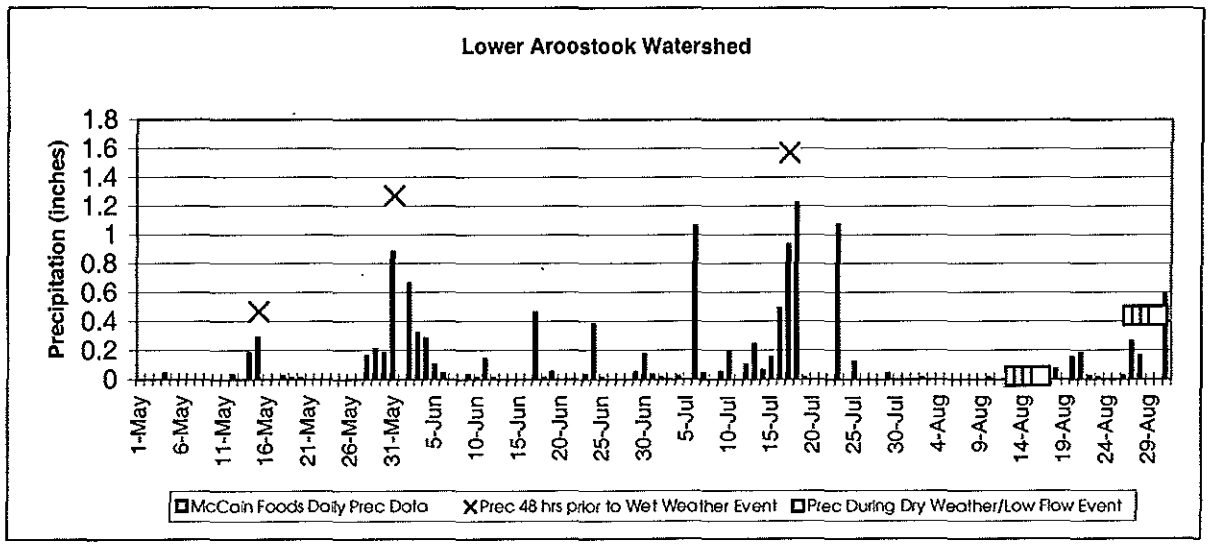
Table 3 Summary of Transect Data

Sta Code	Location	Area (ft^2)	Width (ft)	Ave Depth (ft)
AR0	Rte 11 Bridge, Ashland	217	128	1.70
AR0a	Ashland below (Near Rte 11)	228	148	1.54
AR0b	Sheridan East	214	165	1.30
AR0c	Upstream Gardner Brook	189	165	1.14
AR0d	Below Donnelly Island	160	400	0.40
AR1	River Rd Washburn	280	171	1.64
AR1a	Crouseville	523	475	1.10
AR1b	Railroad Trestle below Crouseville	186	215	0.87
AR2	0.5 Miles Up from Rte 1, Presque Isle	364	212	1.72
AR3	Maysville	196	131	1.50
AR3-1	Caribou Dam Impoundment	1744	436	4
AR3-2	Caribou Dam Impoundment	1944	352	5.52
AR3-3	Caribou Dam Impoundment	2249	446	5.04
AR3-4	Caribou Dam Impoundment	2657	423	6.28
AR4	Caribou Dam Impoundment McGraw	3079	477	6.45
AR4-1	Caribou Dam Impoundment Powerlines	3829	459	8.34
AR4-2	Caribou Dam Impoundment	4334	487	8.90
AR4-3	Caribou Dam Impoundment	4138	417	9.92
AR4-4	Caribou Dam Impoundment	5280	461	11.45
AR4-5	Caribou Dam Impoundment	6514	590	11.04
AR4-6	Caribou Dm. Impoundment Boat Launch	7031	550	12.78
AR5	100' Above Caribou Dam	7670	568	13.5
AR6	Adjacent Grimes Rd	280	167	1.68
AR7	Goodwin	258	218	1.18
AR8	Stevensville	227	395	0.57

Figure 3 Precipitation During Sampling Events







Ambient Chemical Data
Temperature and Dissolved Oxygen

Temperature and dissolved oxygen (DO) were sampled twice daily in each three day low flow survey; in the early morning and early to mid afternoon. In addition, continuous data was collected utilizing sondes above the Caribou dam (survey 1) and at the Goodwin site (survey 2). The average morning temperatures in the Aroostook for the first low flow survey (Aug 14-16) were around 20 °C in the shallower flowing areas and 22 to 24 °C in impoundments (figure 4). The afternoon temperatures in the Aroostook in the first survey were around 24 to 26 °C (figure 4). The average morning temperatures in the Aroostook for the second low flow survey (Aug 28-30) were around 18 °C in the shallower flowing areas and 19 to 20 °C in impoundments (figure 4). The afternoon temperatures in the Aroostook in the second survey were around 20 to 22 °C (figure 4).

When the diurnal fluctuations of temperature are examined, there is generally a trend of greater fluctuation in the shallower segments and less fluctuation in impoundments (figure 5). The average diurnal temperature fluctuation from both surveys combined was as large as 5 °C in flowing segments and as small as 1 °C in impoundments. The largest diurnal temperature fluctuation of 6.5 °C occurred on Presque Isle Stream below the treatment plant outfall. This is probably due to both the shallowness of this stream and the large amounts of urbanized land adjacent to both stream banks.

The dissolved oxygen data is characterized by large diurnal fluctuations due to the significant growths of both bottom-attached (benthic) and floating algae (phytoplankton). There is similarly a trend of greater fluctuation in the shallower flowing sections and less fluctuation in impoundments (figure 6). There is also a trend of less fluctuation above the significant point source discharges. In the segments above major point source discharges (first five upstream locations and background tributary) average diurnal DO fluctuations are generally around 1 to 2 ppm. Below major point source discharges, average diurnal DO fluctuations range from 5 to 9 ppm in the shallower flowing segments and 1 to 4 ppm in impoundments.

When the daily minimum DO is compared to statutory criteria, it can be observed that all locations on the Aroostook met or exceeded minimum requirements (figure 7). However it should be mentioned that even though satisfactory worst case conditions of high water temperature and low river flow occurred, point source discharges were collectively at less than 4% of their licensed BOD load. When the tributary sites are examined, it can be observed that the two sites below the PISD outfall on Presque Isle Stream were 1 to 2 ppm below minimum criteria and a third (background) site marginally met or was slightly under criteria.

The daily maximum DO sampled in the afternoon were all supersaturated (> 100% saturation). The readings are generally much higher below major point source discharges and in the shallower flowing sections as compared to impoundments. In the segments above major point source discharges, daily maximum DO is around 100% of saturation. Below major point source discharges, daily maximum DO ranges from 150% to 240% of saturation in the shallower flowing segments and 120% to 150% of saturation in impoundments.

The data sonde continuous monitoring compares reasonably well to instantaneous measurements utilizing dissolved oxygen meters (figures 8a, 8b) with the exception of the August 28 afternoon meter reading of 19.1 ppm for DO at Goodwin compared to the sonde reading of 15.2 ppm. The data sonde shows a similar trend observed by the meter readings of larger diurnal fluctuation of DO and temperature at Goodwin when compared to the site above the Caribou dam.

Nutrients

Total phosphorus (TP) and orthophosphorus (OPO4) were sampled on the morning run of each sampling day. TP shows an increasing trend in the downstream direction of the Aroostook River (figure 9). TP concentrations were generally under 10 ppb in the first five stations on the Aroostook, which are upstream of all major point source discharges. TP concentrations average about 20 ppb below the Presque Isle and McCain Food discharges and increase to a maximum of 70 to 80 ppb below the Caribou and Loring

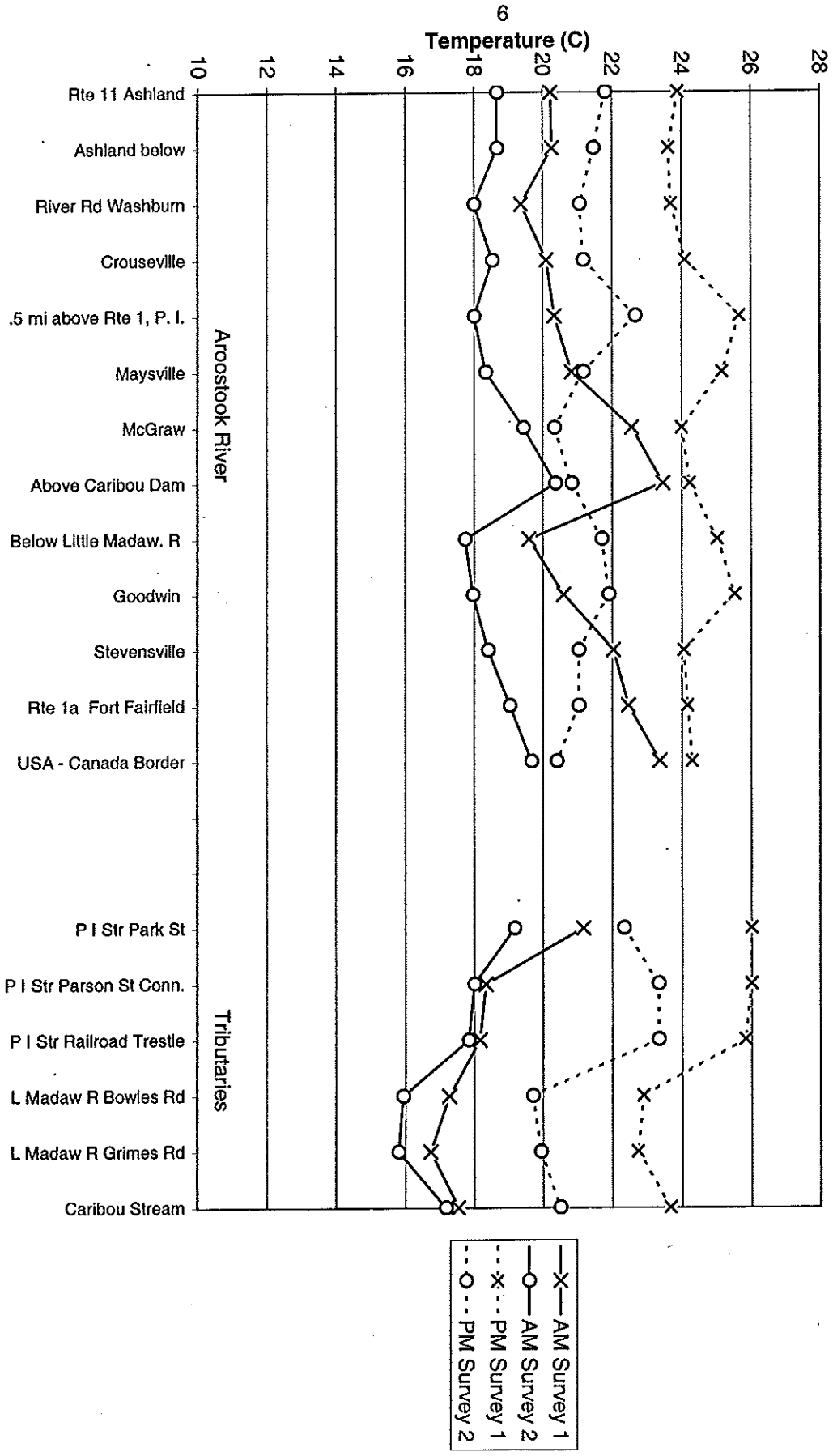


Figure 4
Average Temperature

Figure 5
Diurnal Temperature

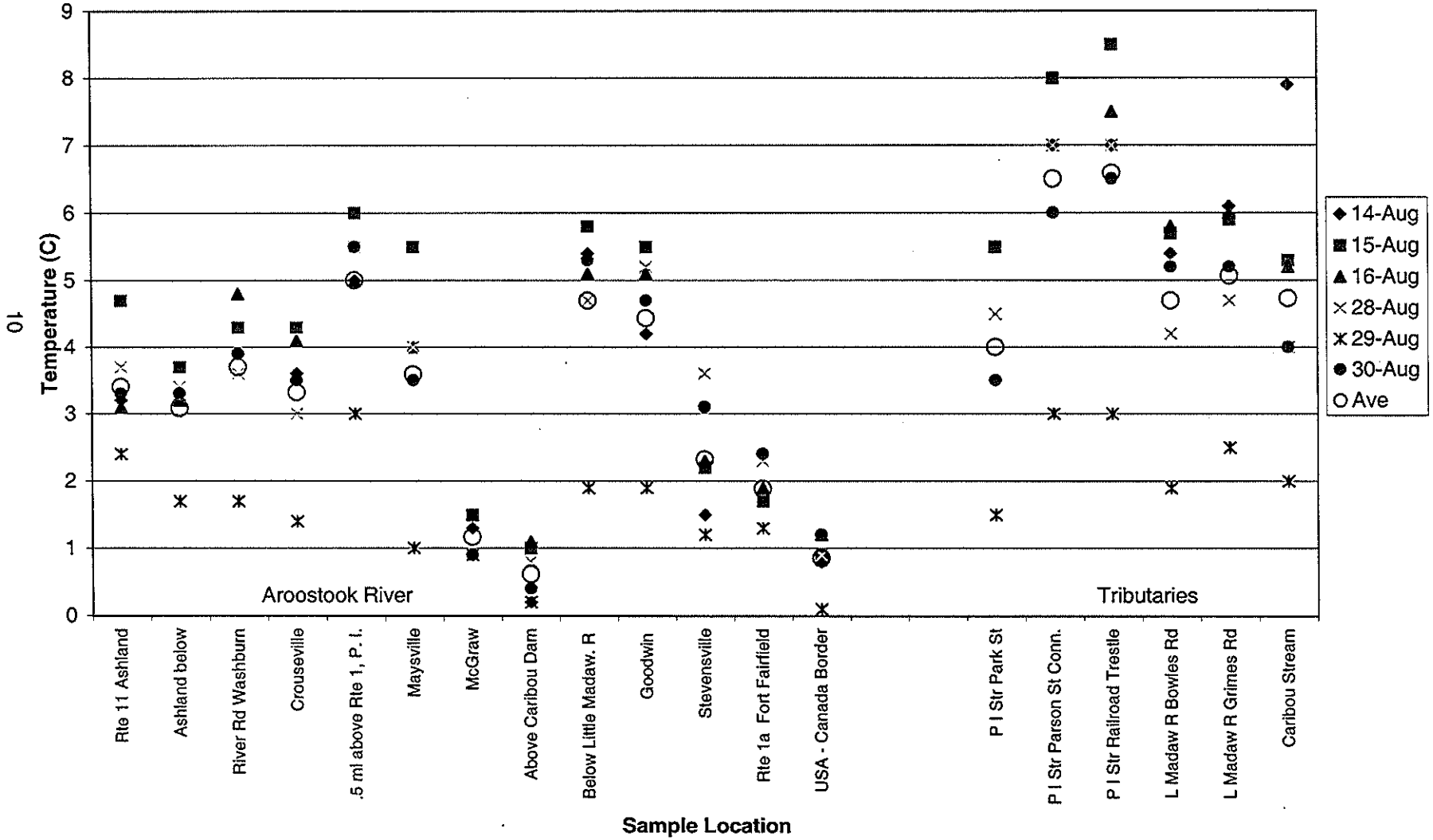
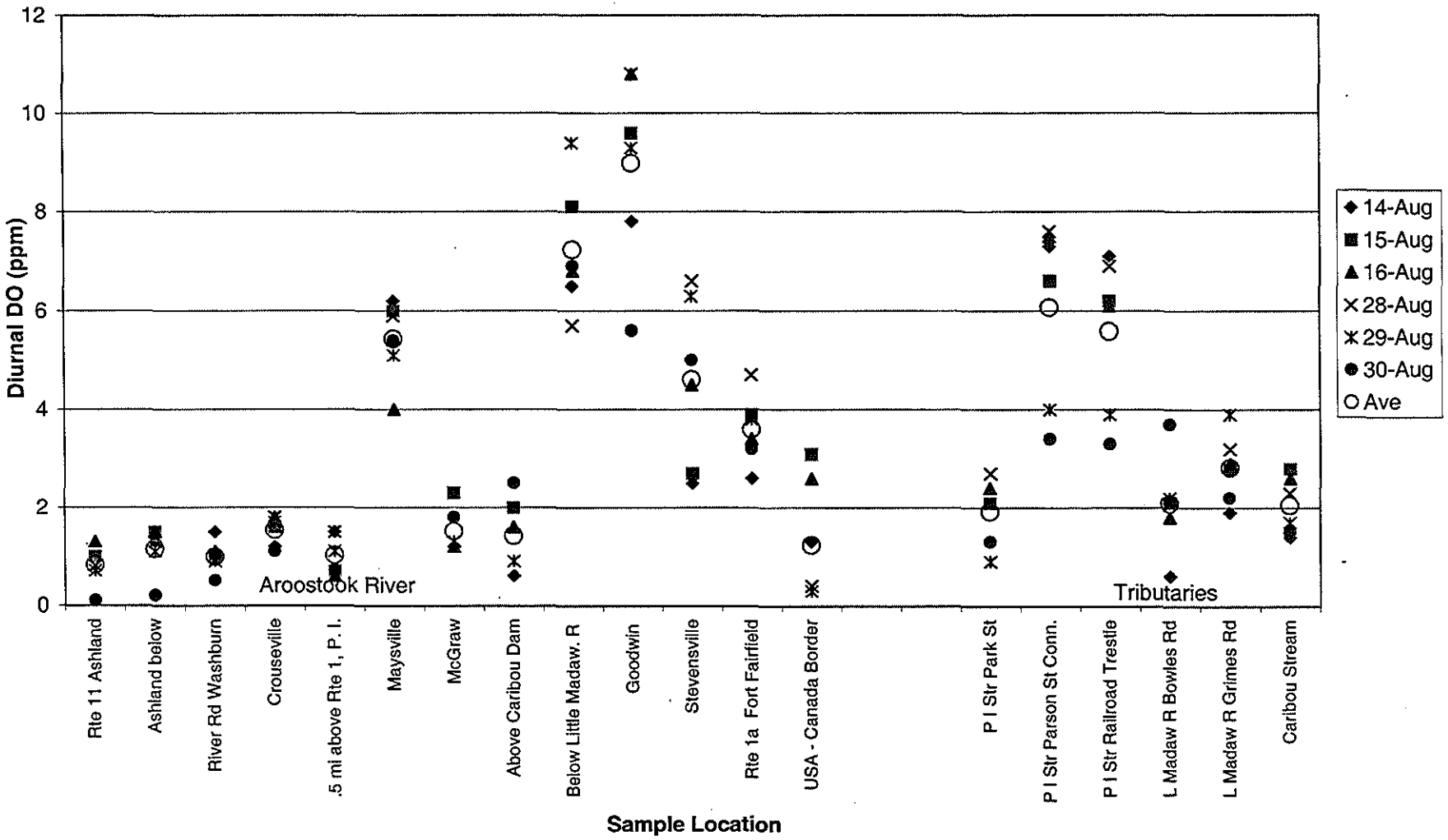


Figure 6
Diurnal Dissolved Oxygen



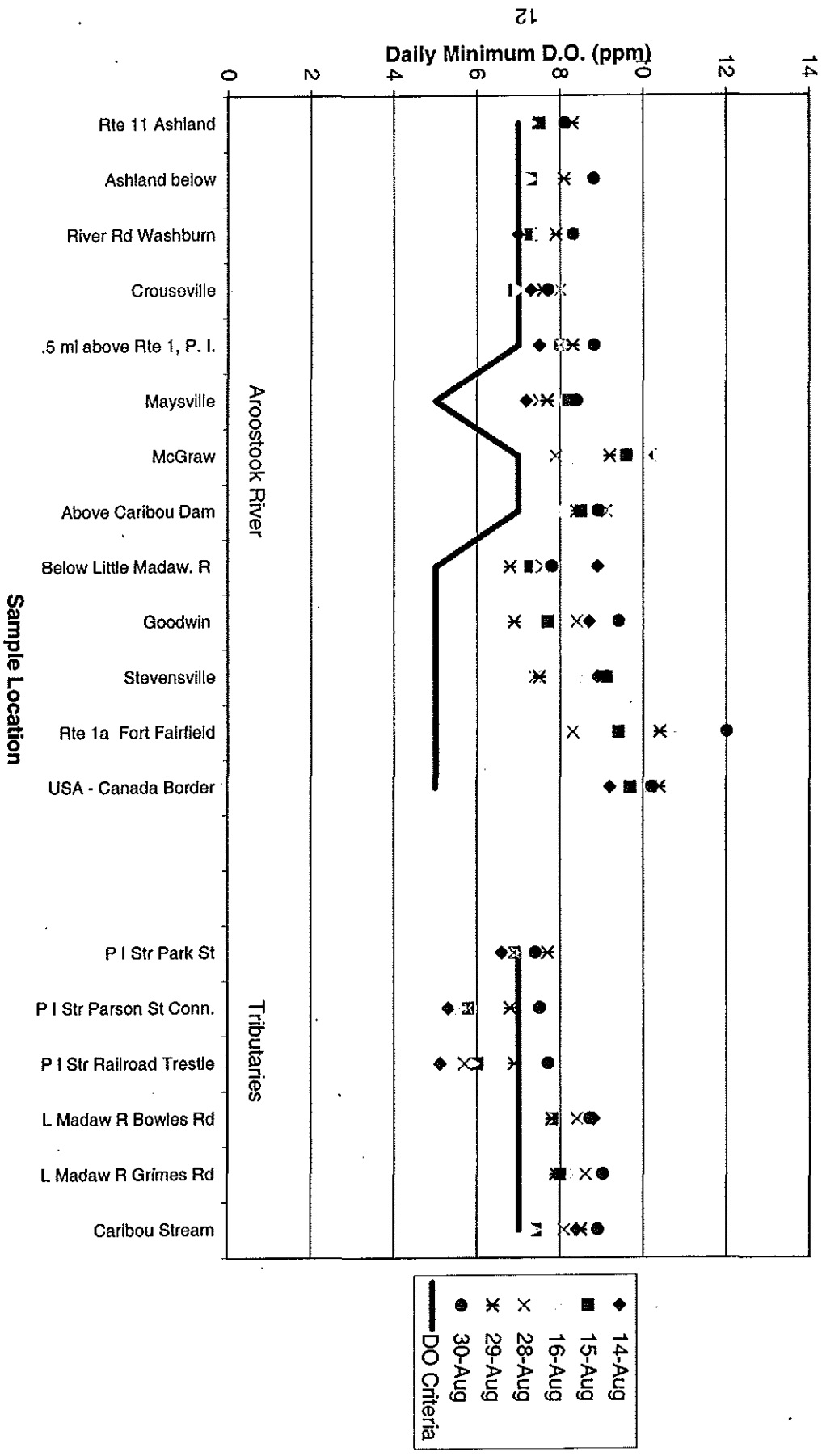


Figure 7
Summary of Minimum Dissolved Oxygen

Figure 8
Afternoon Maximum Dissolved Oxygen

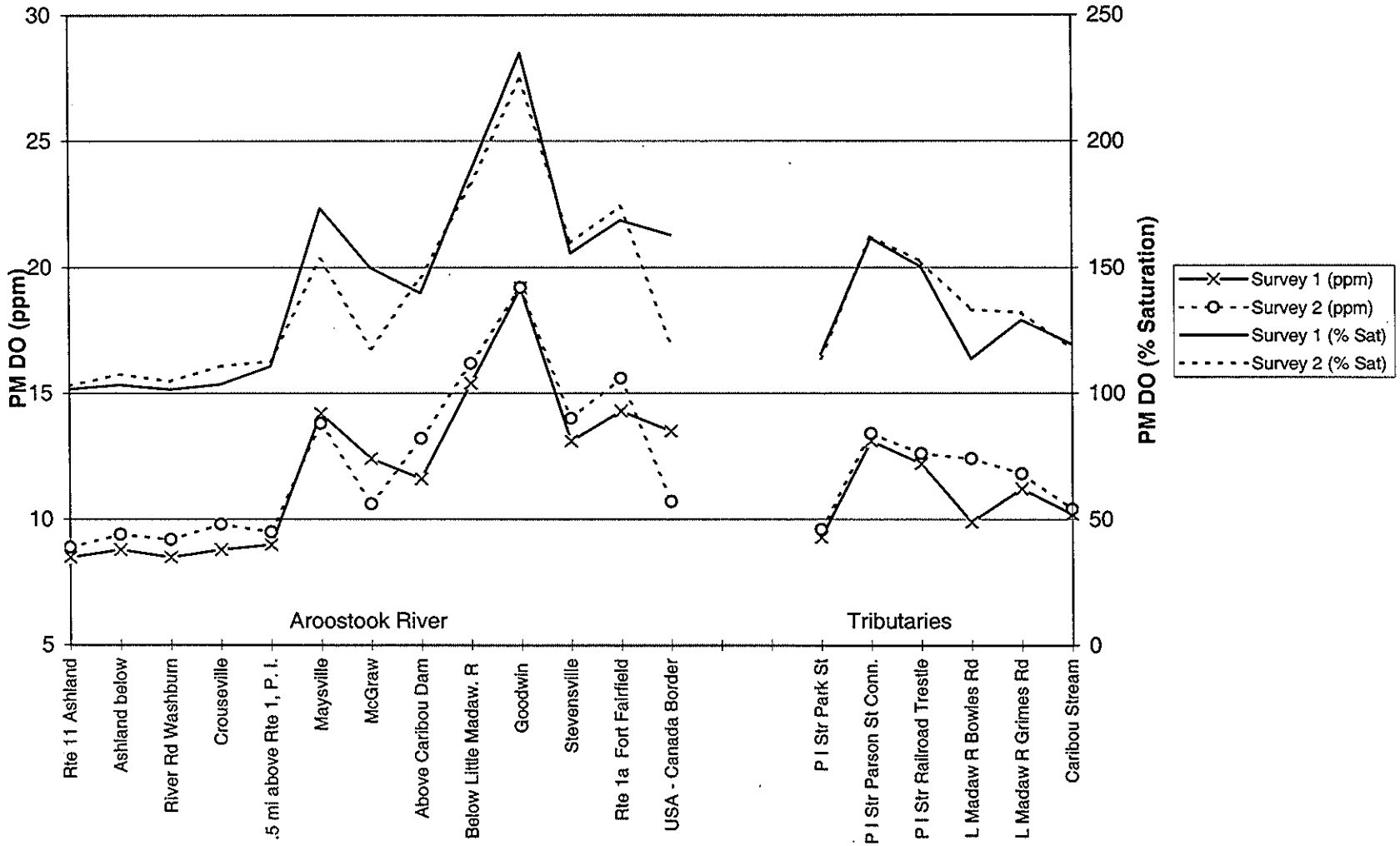


Figure 8a
Data Sonde Above Caribou Dam
Survey 1

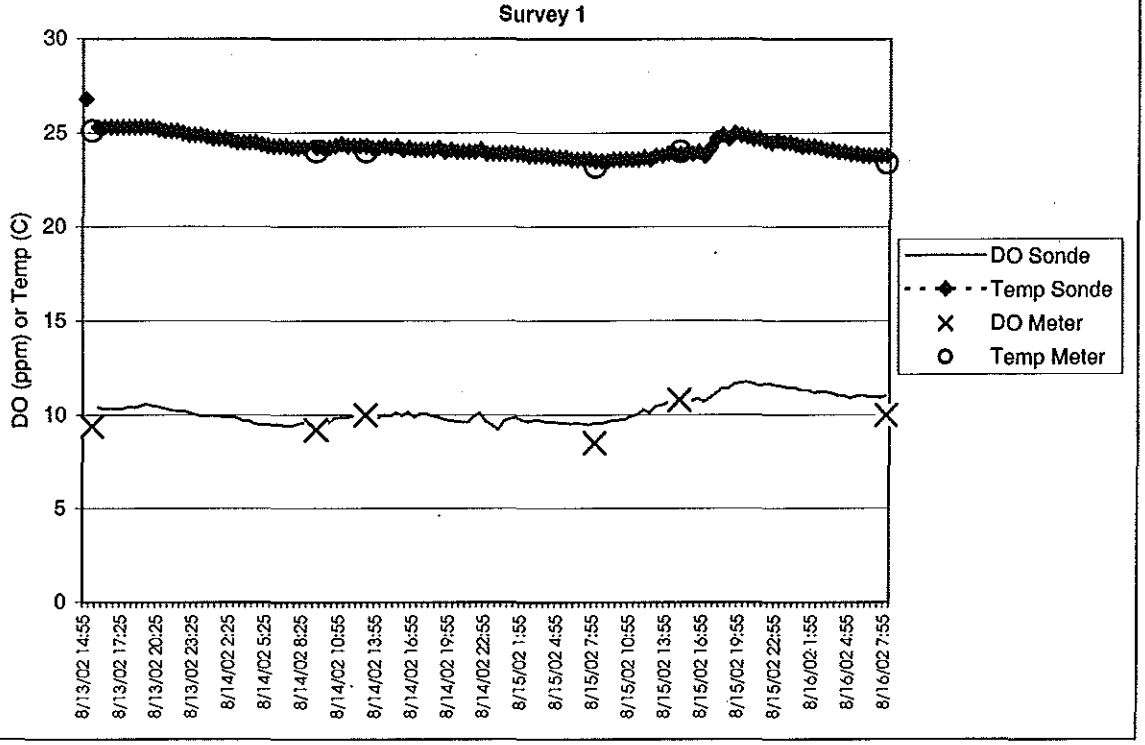
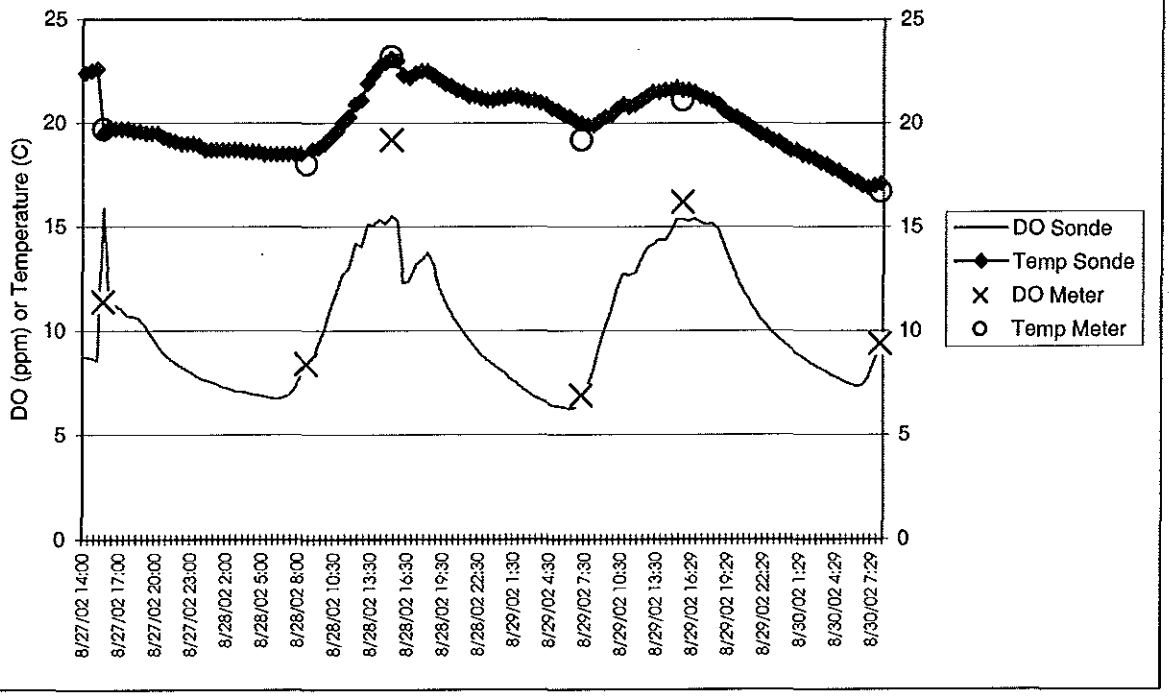


Figure 8b
Data Sonde Goodwin
Survey 2



discharges. TP concentrations decrease to 20 to 60 ppb in the final three locations before the USA/Canada border in the Tinker Dam impoundment.

On the tributary locations, TP concentrations average about 10 ppb on the two Little Madawaska River stations and Caribou Stream. On Presque Isle Stream, TP concentrations range from 20 to 40 ppb above the Presque Isle discharge and range from 30 to 120 ppb below the discharge.

Total nitrogen (TN) concentrations are generally around 0.3 ppm in the first five stations on the Aroostook, which are upstream of all major point source discharges (figure 10). There is a large increase in TN below Presque Isle, which is due primarily to the McCain Foods discharge. The majority of the nitrogen increase observed here is nitrate nitrogen, and hence most of the ammonia nitrogen has already been oxidized within McCain's treatment plant before being discharged to the Aroostook River. TN concentrations average about 2 ppm at the McGraw sampling location in the Caribou dam impoundment. TN concentrations show a declining trend from McGraw to the USA/Canada border where concentrations range from 0.6 to 1 ppm.

On the tributary locations, TN concentrations range from about 0.5 to 1 ppm except at the two locations on Presque Isle Stream below the treatment plant where concentrations are sometimes as high as 1.5 to 2 ppm.

Chlorophyll a and Secchi Depth

Samples were collected in the morning and analyzed for chlorophyll a (CHLA) to determine levels of phytoplankton in the water column. CHLA levels show an increasing trend in the downstream direction and at location below point source discharges (figure 11). Levels are at about 2 ppb above major point source discharges and increase to a range of 10 to 21 ppb in the first low flow survey in the Caribou dam impoundment. These levels are indicative of a eutrophic state. In the second low flow survey CHLA levels in the Caribou dam impoundment range from 5 to 9 ppb. CHLA levels below the Caribou dam and into the Tinker dam impoundment are usually in-between 5 to 10 ppb but sometime exceed 10 ppb and similarly show a eutrophic state. CHLA levels on tributary locations are usually under 5 ppb.

Although not qualitatively sampled, large levels of benthic algae were observed in the Aroostook River, in particular, below the Caribou dam to the Tinker dam impoundment. The benthic algae are also evident in Presque Isle Stream below the treatment plant discharge.

Secchi depth measurements were made at impoundment locations. In the Caribou dam impoundment secchi depth showed little variability for both low flow surveys and averaged around 2.5 meters. In the Tinker dam impoundment secchi depth averaged 1.6 meters and 2.2 meters in the first and second low flow surveys, respectively.

Ultimate BOD

Samples were collected for ultimate BOD analysis in the morning. Ultimate BOD samples are run in the laboratory for a period of 60 days or more and DO depletion observed for several readings. A least square regression model is run to determine the most appropriate fit of a curve to the observed BOD Vs time plot. The final ultimate BOD and the laboratory (bottle) BOD decay rate are obtained from the regression equation. The raw BOD data and the results of the regression are tabulated in a spreadsheet format in the appendix. The nitrogenous component of the BOD is obtained from a difference of initial and final nitrate nitrogen times a stoichiometric factor of 4.33. The carbonaceous component of BOD is obtained from a difference of total BOD and nitrogenous BOD.

The total ultimate BOD of the Aroostook River was typically around 3 to 5 ppm at the sample locations upstream of all major point source discharges and at the Little Madawaska River and Caribou Stream locations (figure 12). These values are typical of areas with low to moderate pollution. TBOD at Aroostook River locations below point source discharge were typically around 5 to 8 ppm showing moderate levels of pollution. TBOD on the on Presque Isle Stream above the treatment plant location

Figure 9
Total Phosphorus

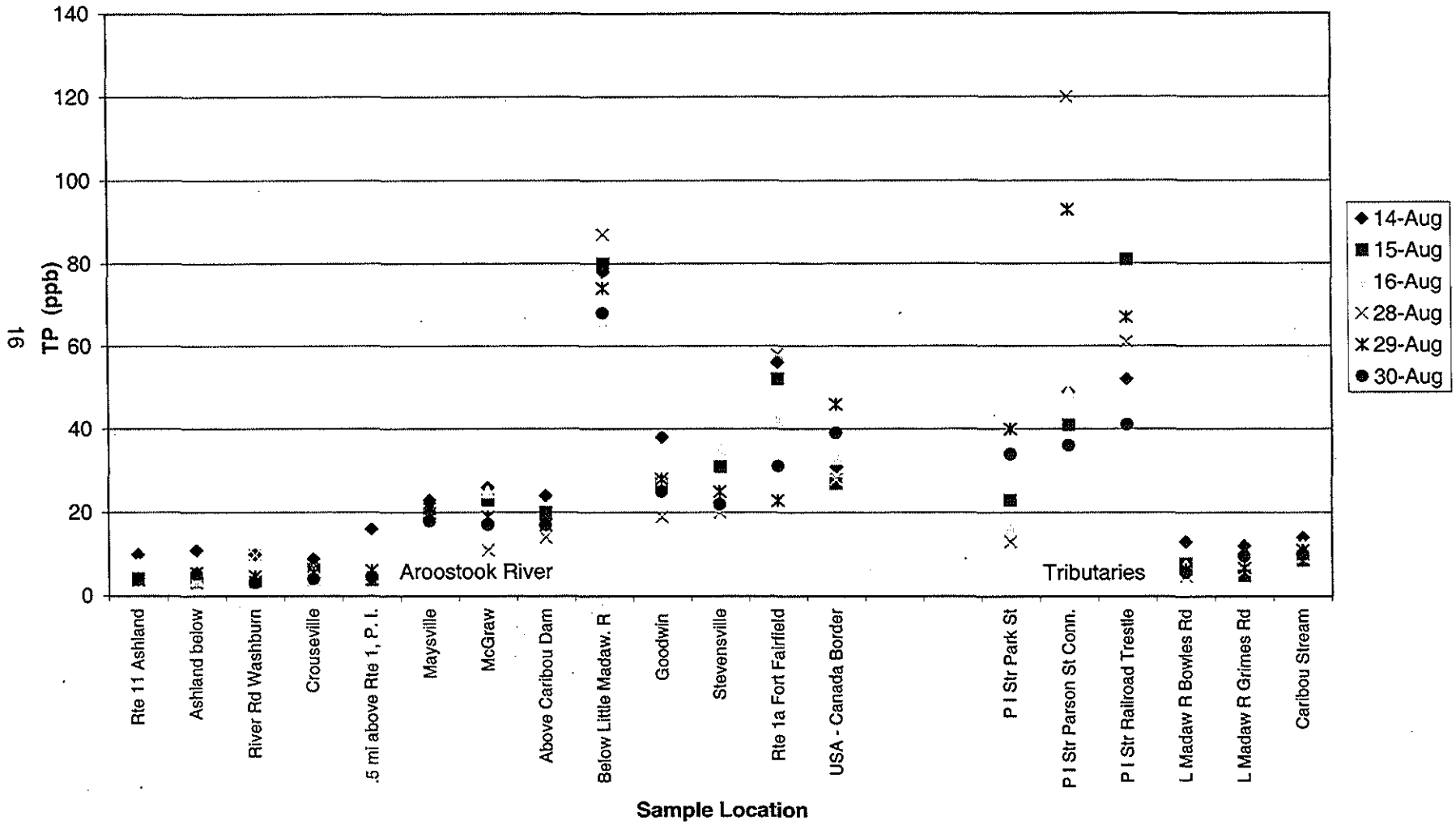


Figure 10
Total Nitrogen

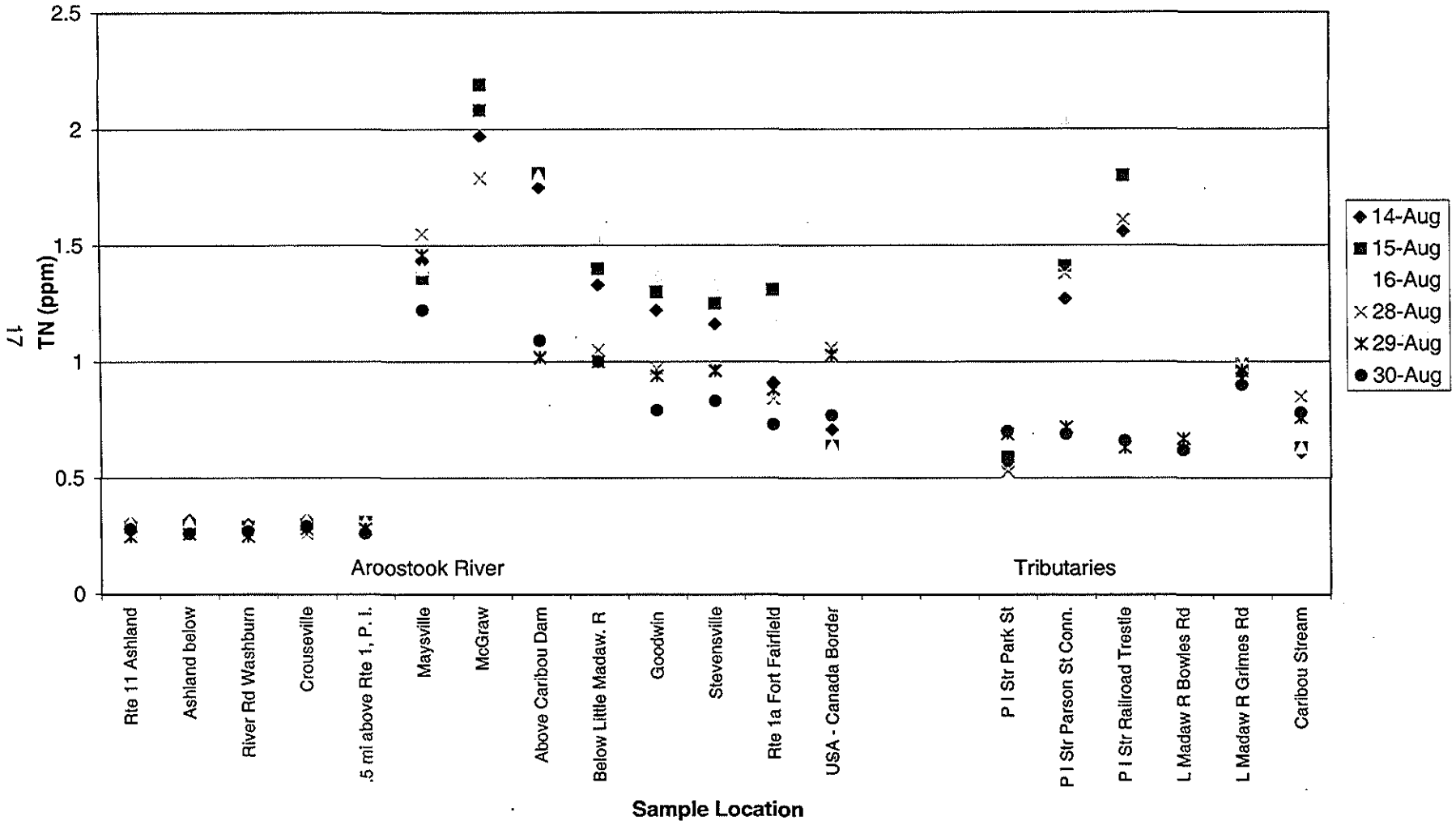
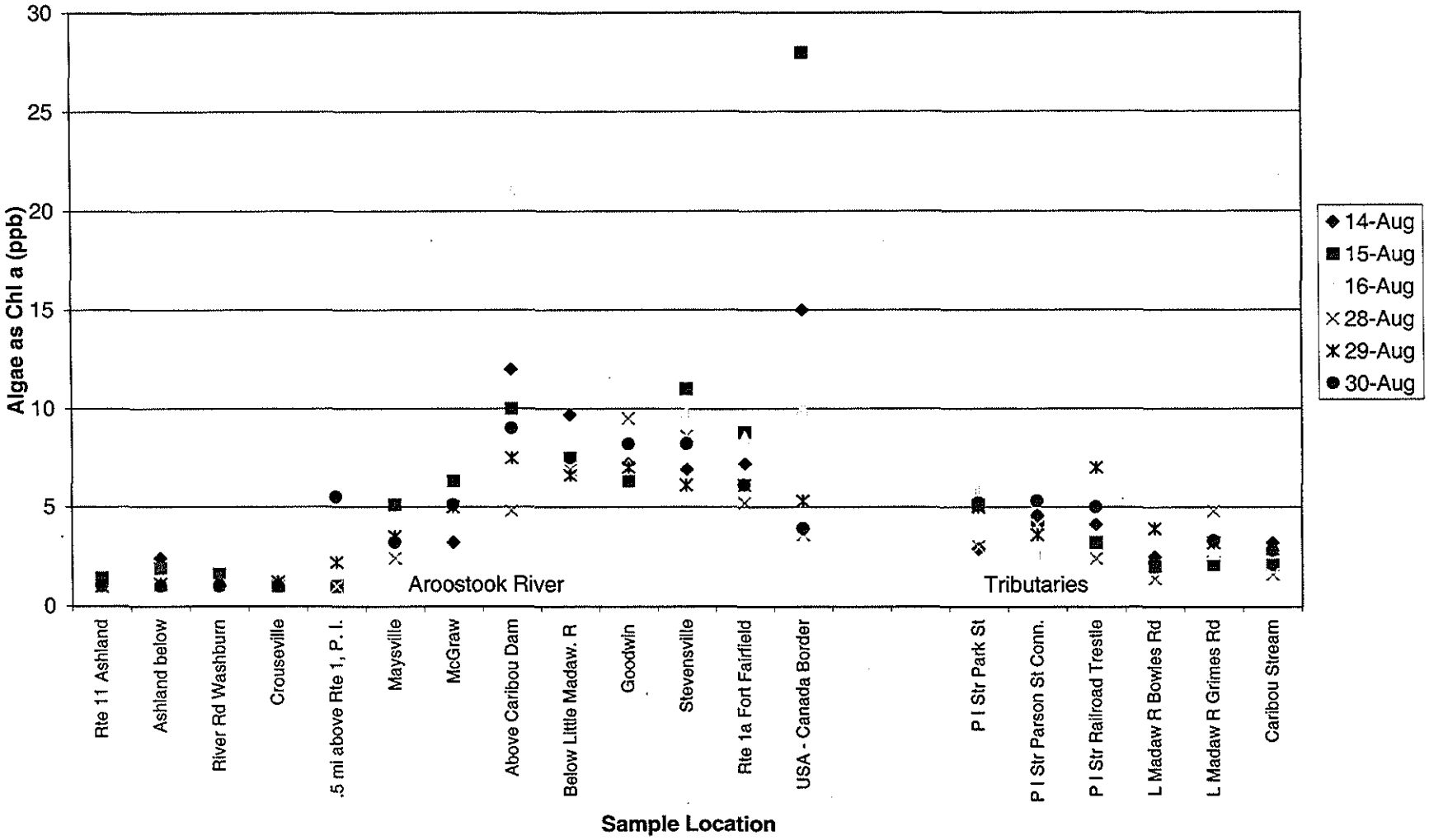


Figure 11
Chlorophyll A



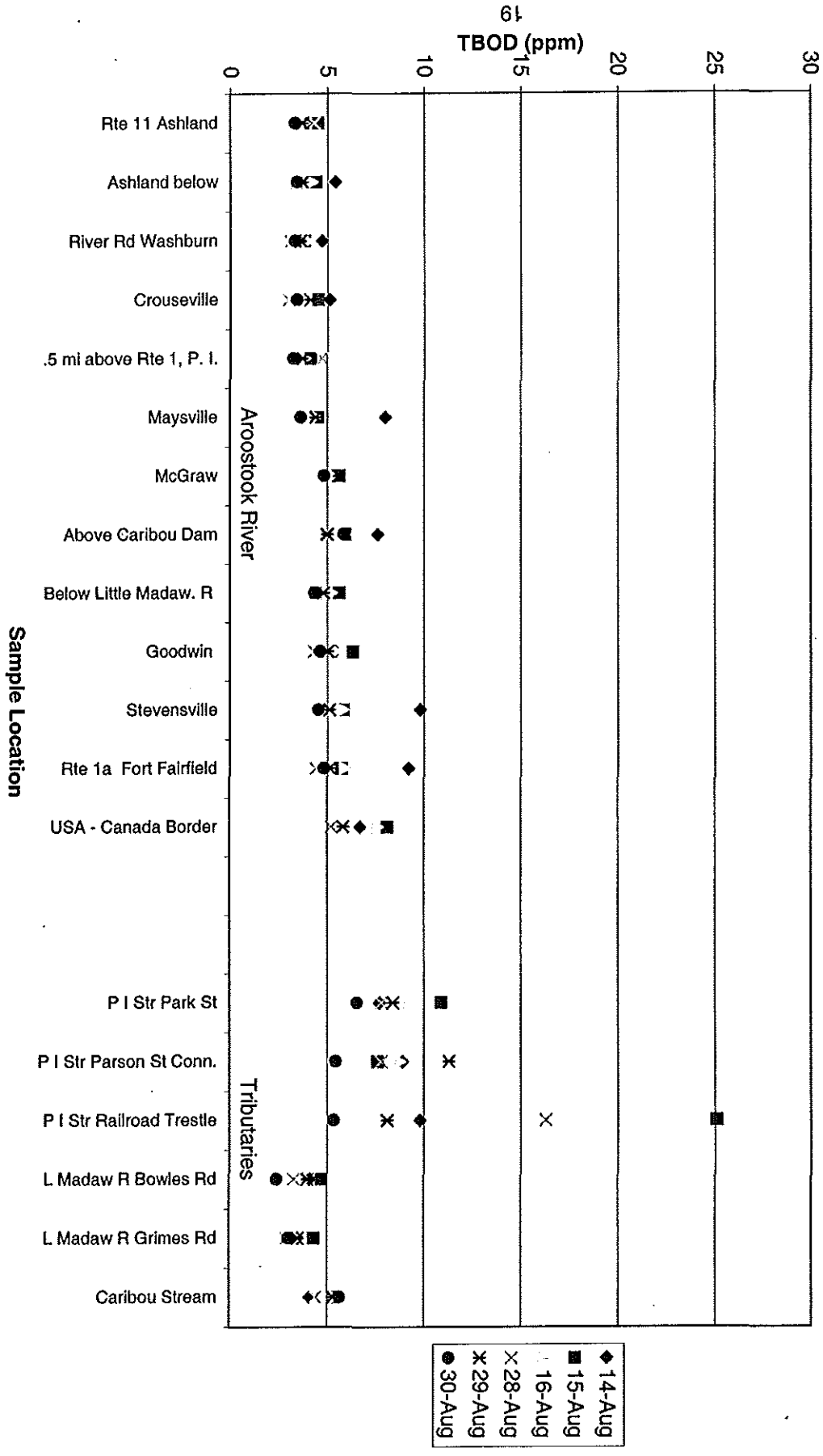


Figure 12
Total Ultimate BOD

ranged from 6 to 11 ppm and are much higher than what would ordinarily be expected for a background location. TBOD levels on Presque Isle Stream below the treatment plant generally maintained this range.The laboratory bottle BOD decay rate averaged about 0.06 /day for both low flow surveys. The bottle decay rate is ordinarily considered a lower boundary of the actual river BOD decay rate assigned for modeling purposes.

Effluent Chemical Data

Seven point source discharges were collected as composite samples in the days prior to the ambient sampling. When the effluent data are plotted comparatively as input loads, it can be observed that McCain Foods, Caribou, and Fort Fairfield are the three largest point source inputs of pollutant loads, and Presque Isle, Loring, Ashland, and Washburn comparatively have a much smaller input (figures 13-15).

When effluent BOD5 loads are compared to allowable licensed amounts, all plants were discharging under 6% of their licensed BOD5 during both low flow surveys except Presque Isle which was at 10% and 17% of their licensed BOD5 in survey 1 and 2, respectively (figure 16). Presque Isle is a plant that performs at advanced treatment levels and has licensed BOD limits that are much lower than a conventional secondary plant. Collectively, the seven treatment plants were at 3.9% and 3.7% of their licensed BOD5 loads in low flow survey 1 and 2, respectively.

The effluent CBODu/BOD5 ratio is an important consideration when undertaking the model prediction design runs. The model predicts the amount of ultimate BOD that fits in the river, while still maintaining minimum DO criteria. However the amount of allowable BOD is licensed as BOD5. The CBODu/ BOD5 factor is the conversion factor needed to convert model results to licensed amounts. The individual plots for each effluent are plotted in the appendix and summarized below in tabular form.

Table 4 Effluent CBODu to BOD5 Ratio

Effluent	Ultimate CBOD / BOD5
Ashland	2.91
Washburn	10.34
Presque Isle	3.52
McCain Foods	3.52
Caribou	2.26
Loring	3.64
Fort Fairfield	1.80

Wet and Dry Weather Tributary Sampling

The wet weather and dry weather tributary samples are collectively plotted for TSS (figure 17) and TP Figure 18. There is usually an expected trend of lower dry weather TSS and TP compared to wet weather TSS and TP, except at the North Branch of Presque Isle Stream location in Mapleton, where both dry weather and wet weather TP and TSS are high. There is also the expected trend of lower TSS and TP in sampling locations of the upper watershed as compare to sampling locations in the lower watershed, due to a larger portion of the upper watershed with forested cover. The following table summarizes the potential of non-point source pollution on each tributary (based upon TSS and TP sampling).

Figure 13
Effluent Total Phosphorus Discharged
8/13 to 8/15 and 8/27 to 8/29

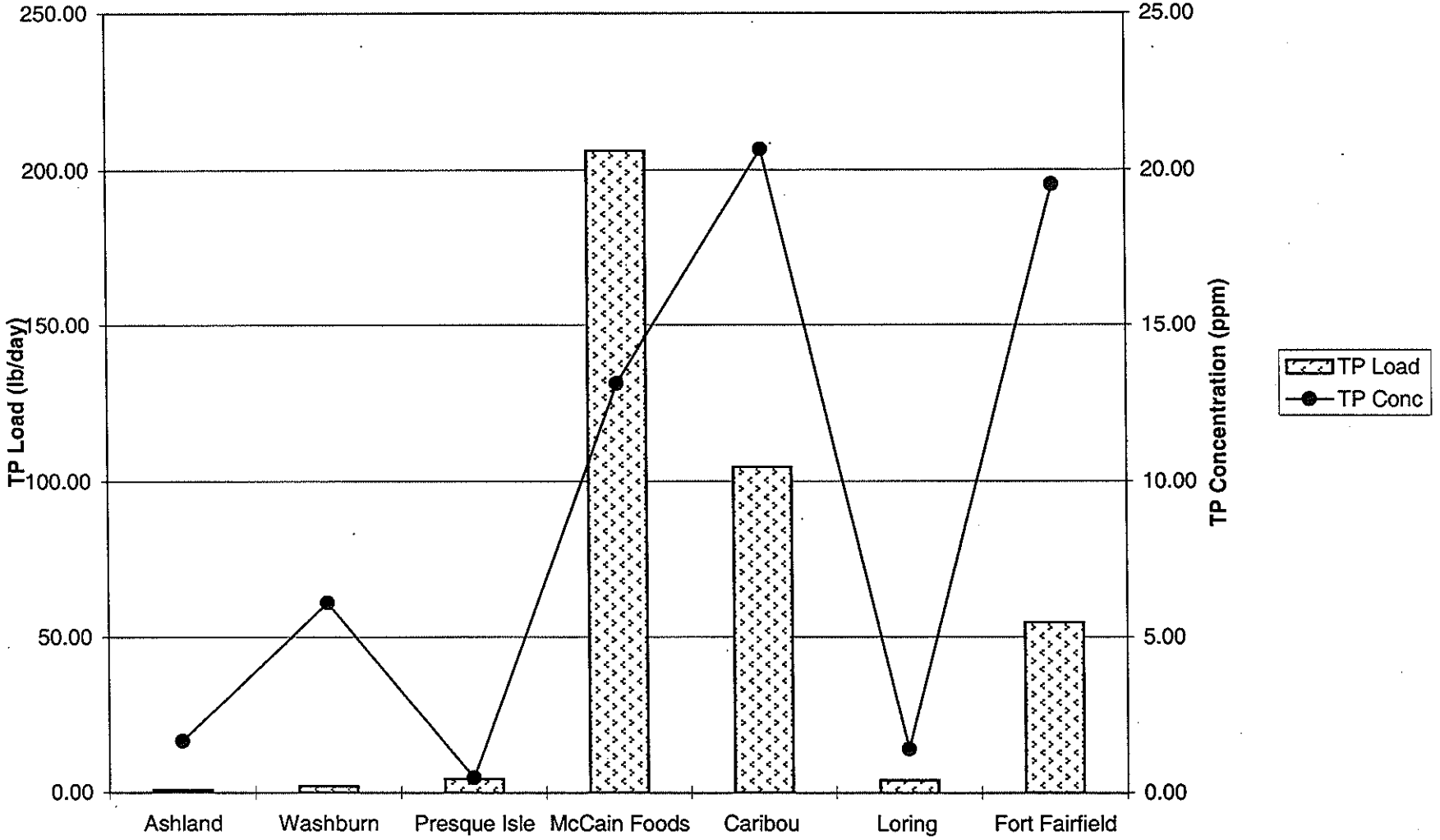


Figure 14
Effluent Total Nitrogen Discharged
8/13 to 8/15 and 8/27 to 8/29

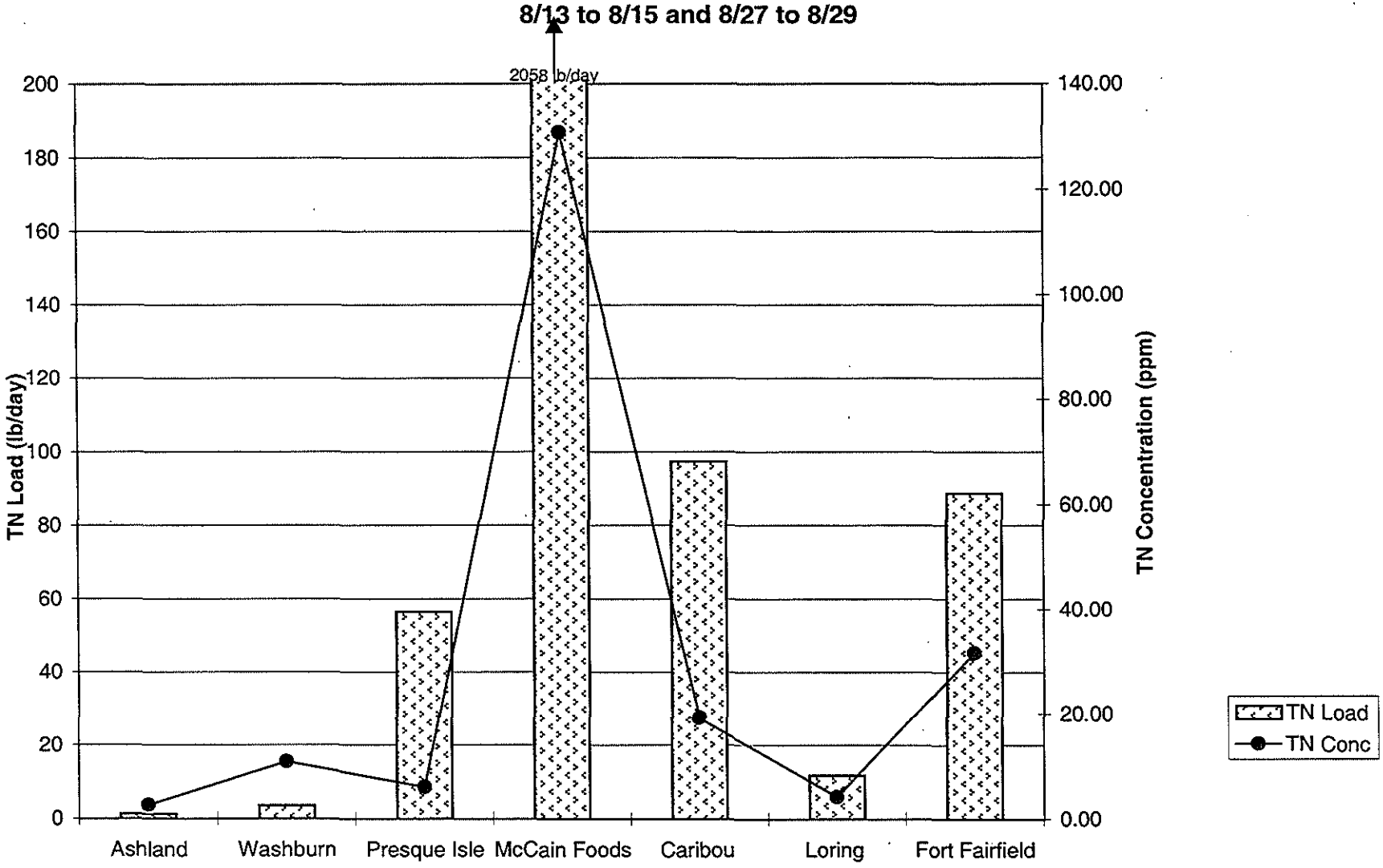


Figure 15
Effluent Total Ultimate BOD Discharged
8/13 to 8/15 and 8/27 to 8/29

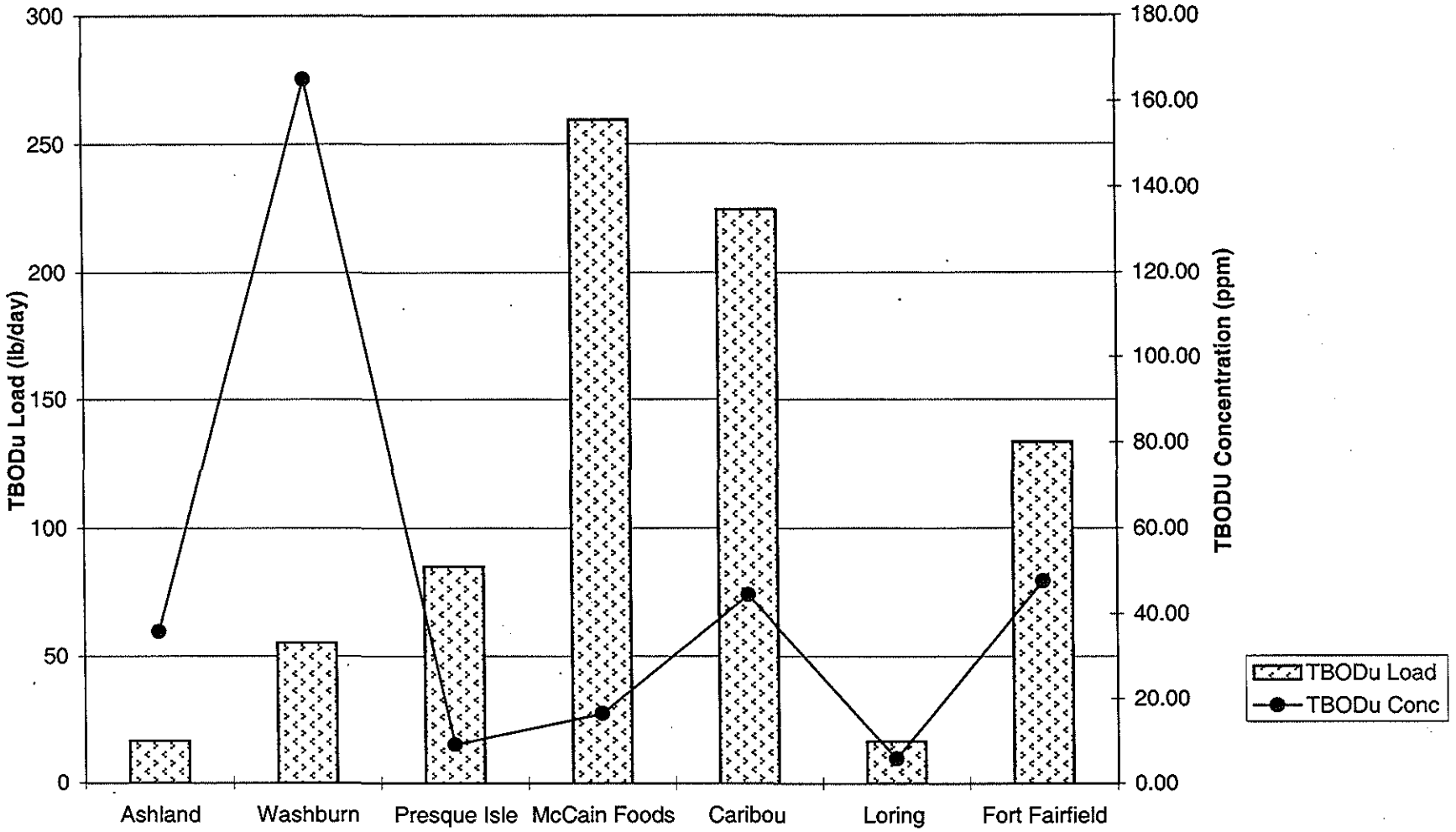


Figure 16
Effluent BOD5 Discharged Compared to Licensed BOD5

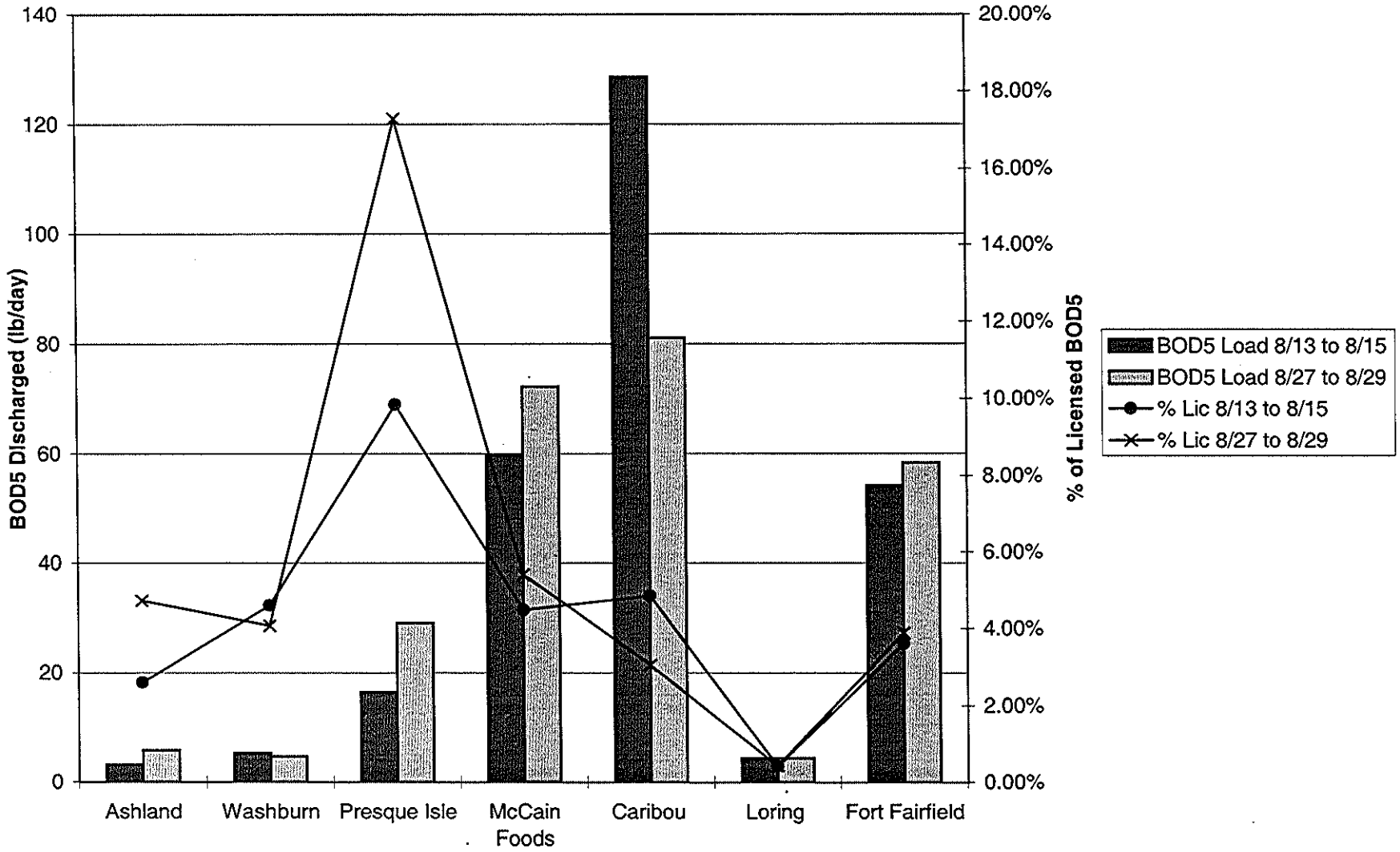
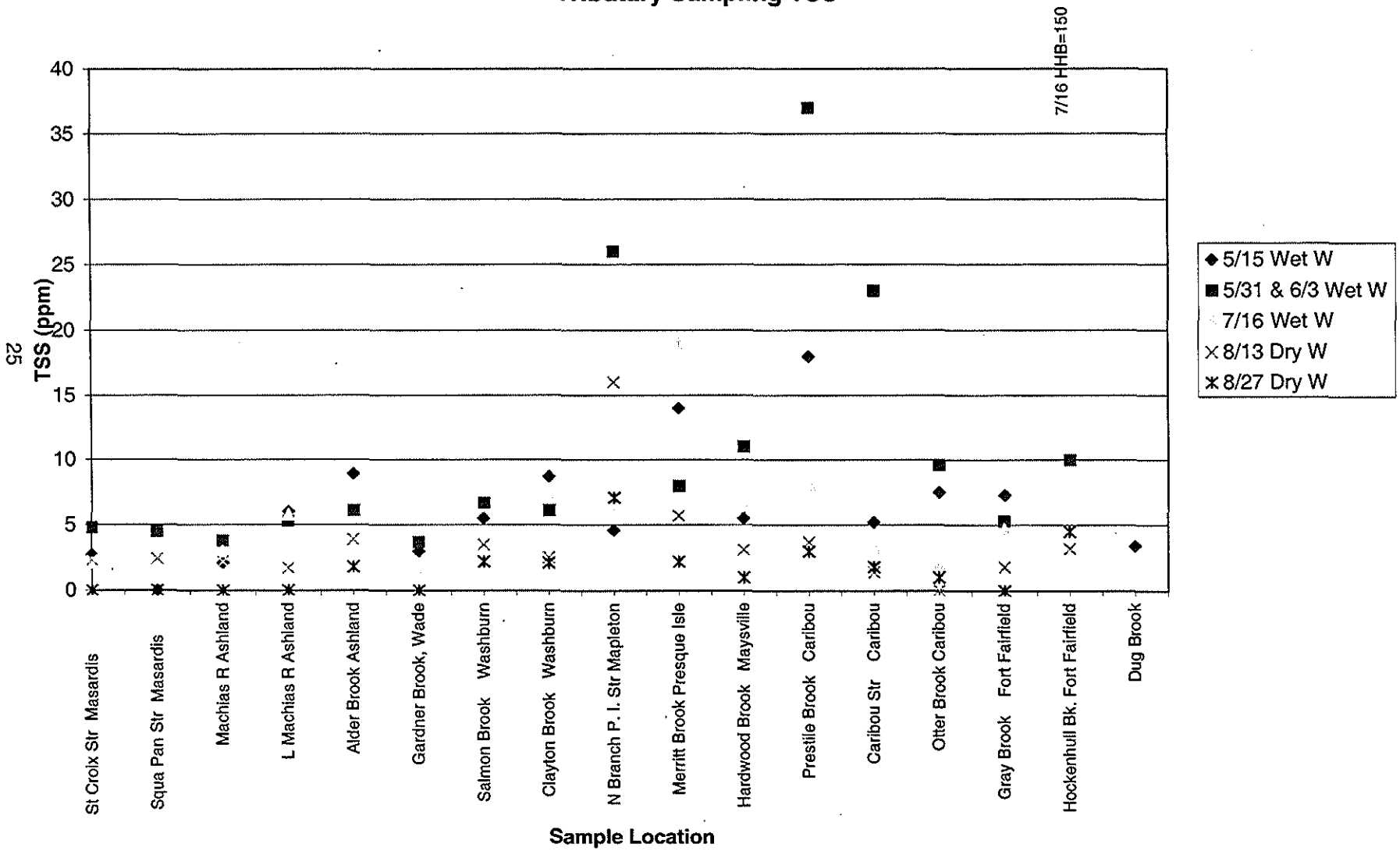


Figure 17
Tributary Sampling TSS



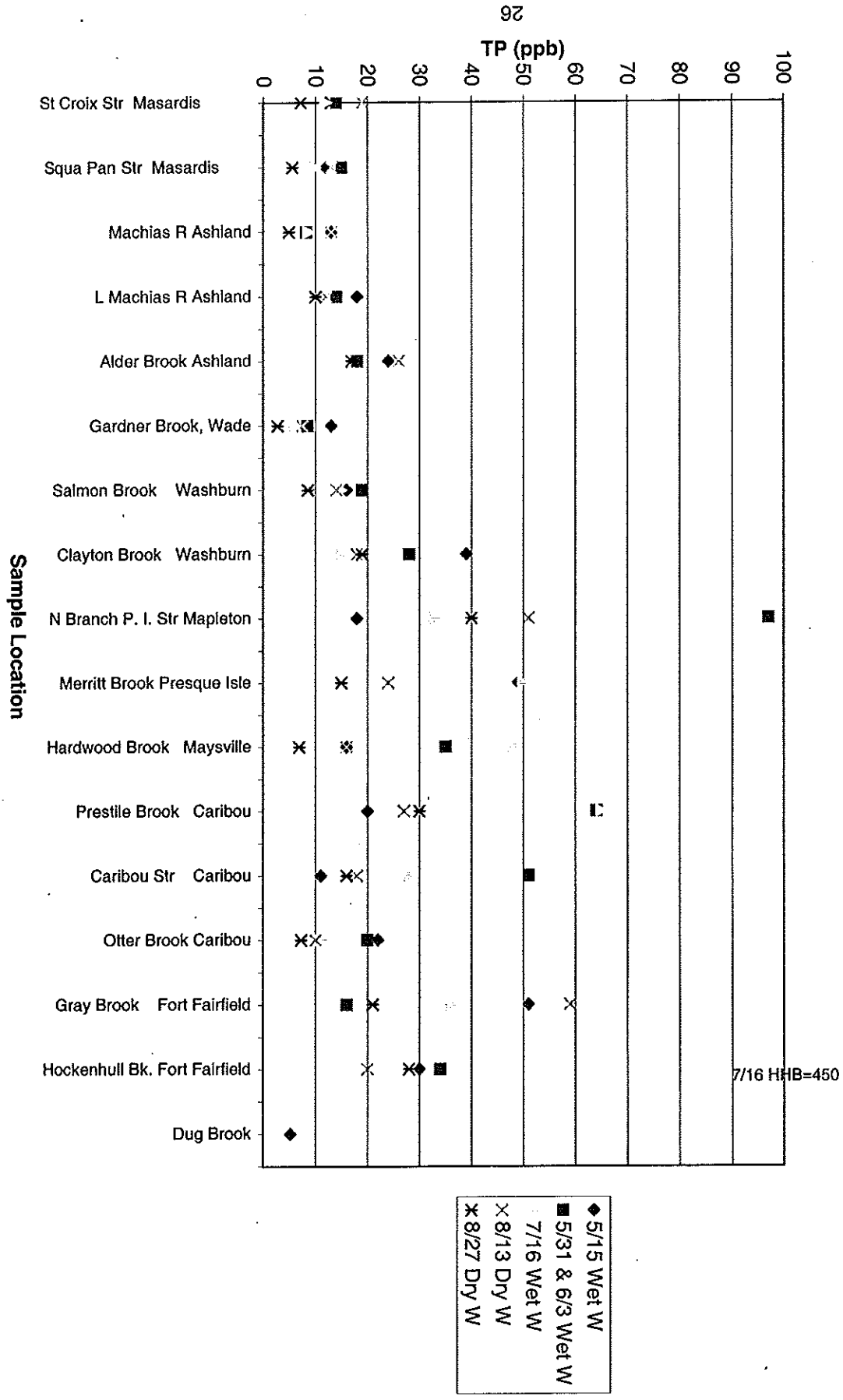


Figure 18
Tributary Sampling TP

Table 5 – Non-Point Source Pollution Potential of Tributaries

Tributary	NPS Pollution Potential
St Croix Stream, Masardis	Low
Squa Pan Stream	Low
Machias River, Ashland	Low
Little Machias River, Ashland	Low
Alder Brook, Ashland	Moderate
Gardner Brook, Wade	Low
Salmon Brook, Washburn	Moderate
Clayton Brook, Washburn	Moderate
North Branch Presque Isle Stream, Mapleton	High
Merritt Brook, Presque Isle	High
Hardwood Brook, Maysville	High
Prestile Brook, Caribou	High
Caribou Stream, Caribou	High
Otter Brook, Caribou	Moderate
Gray Brook Fort Fairfield	High
Hockenhull Brook, Fort Fairfield	High

Quality Control

Proper quality control was followed to assure that all of the data that will be collected is good data. Dissolved oxygen meters were calibrated initially before sampling and checked periodically throughout the day. In addition, the meters were cross checked both prior to sampling and after completion of sampling with adjacent sampling teams to assure the readings from one portion of the river to another are consistent and accurate.

In the QC check of dissolved oxygen meters amongst adjacent teams, river water is collected in a bucket and after calibration of the meters, the dissolved oxygen and temperature are recorded. The dissolved oxygen readings should agree to within 0.3 ppm to be considered acceptable and temperatures to within 2 ^{o}C. An examination of the field cross checks indicates that these goals were usually achieved (figure 19).

The WRI Laboratory in Orono was used for a majority of the laboratory analysis. . The WRI laboratory does not analyze for BOD. The NMRO of DEP's laboratory did the analysis of all ambient BOD. The HETL in Augusta did the analysis for all effluent BOD samples.

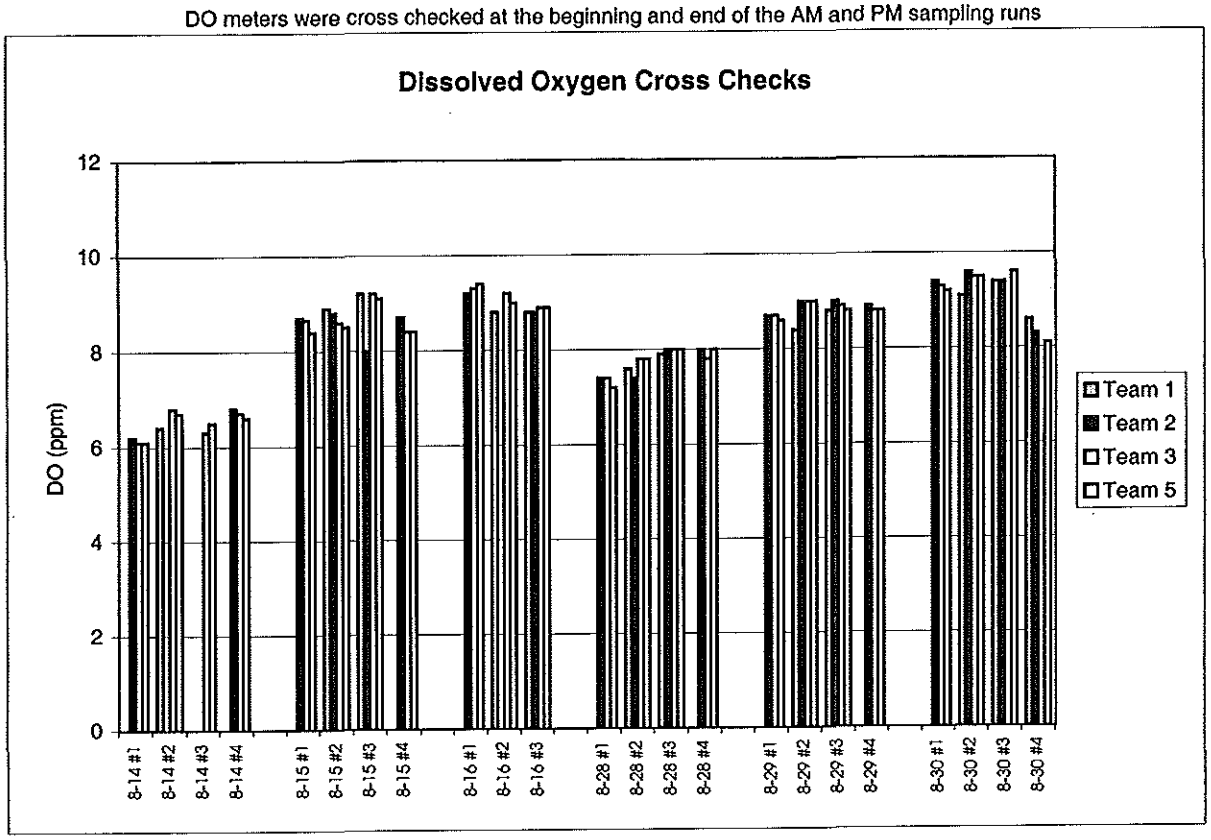
Duplicate sampling (as recommended in the work plan) was undertaken at one river location, one tributary location, and one effluent for each day of sampling. This results in an overall duplicate coverage of 12% per day. The results of the duplicate sampling indicate satisfactory results occurred. Of the 101 duplicate samples that were analyzed, a total of 78% of the duplicates were within 10% of sample results and 88% were within 20% of sample results (table 6). The duplicate results also indicate that dissolved oxygen and temperature are the most reliable measurements followed by nitrate nitrogen, total nitrogen, and total phosphorus. Total BOD and chlorophyll a were less reliable with the latter being the least reliable. Ammonia nitrogen and nitrite nitrogen were not analyzed as duplicates due to the fact that the results of theses parameters were often either very low or below the detection limits of analysis.

Table 6 Duplicate Samples Deviation

Parameter	Number Samples	Average Deviation	% with Deviation < 10%	% with Deviation < 20%
Ambient				
Dissolved Oxygen	12	1%	100%	100%
Temperature	12	0.6%	100%	100%
Total Phosphorus	11	12.6%	54%	73%
Total Nitrogen	11	1.7%	100%	100%
Total BOD	11	13.6%	54%	73%
Chlorophyll a	11	28.9%	54%	63%
Nitrate Nitrogen	11	1.5%	100%	100%
Effluent				
Total Phosphorus	5	6.1%	80%	100%
Total Nitrogen	5	22.6%	80%	80%
Total BOD	3	33%	33%	66%
Chlorophyll a	4	14.6%	25%	75%
Nitrate Nitrogen	5	3.7%	80%	100%
Total	101		78%	88%

Figure 19 Dissolved Oxygen Meter Field Cross Checks

DO meters were cross checked at the beginning and end of the AM and PM sampling runs



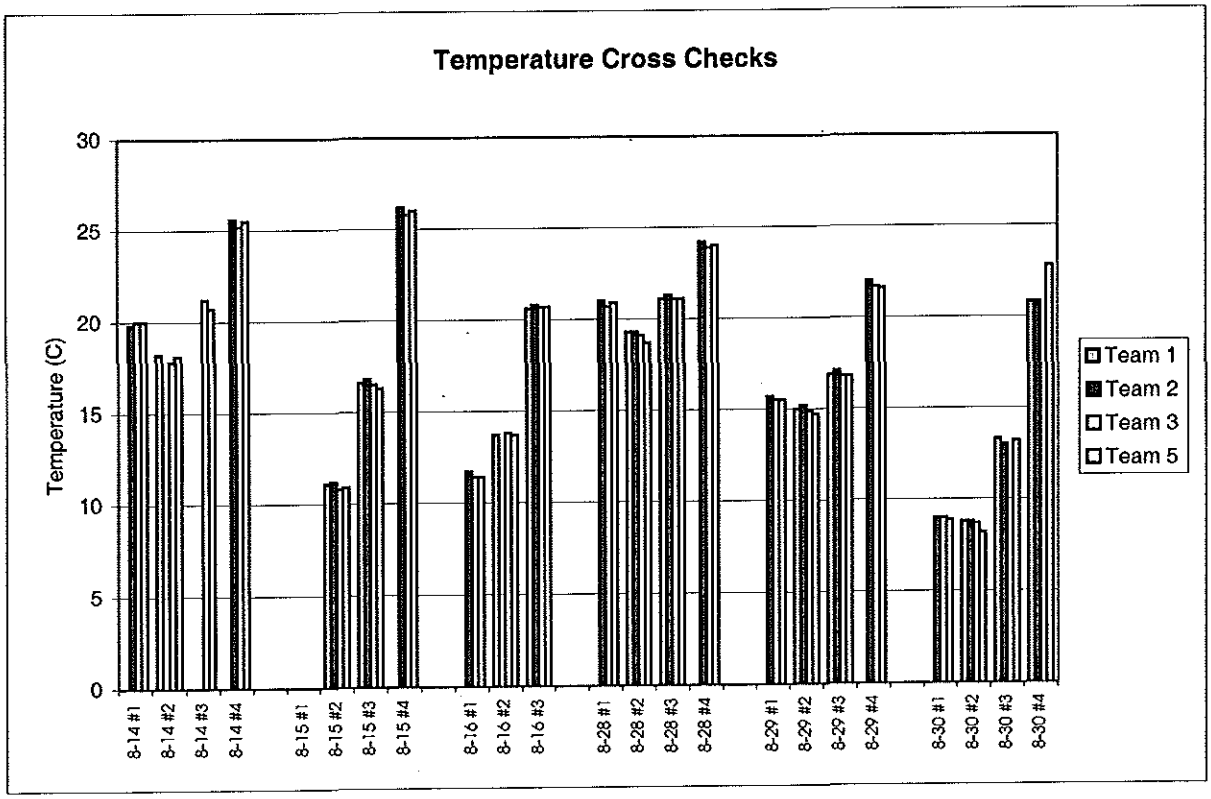


Figure 20a
Ambient Dissolved Oxygen / Temperature Vs Field Duplicates

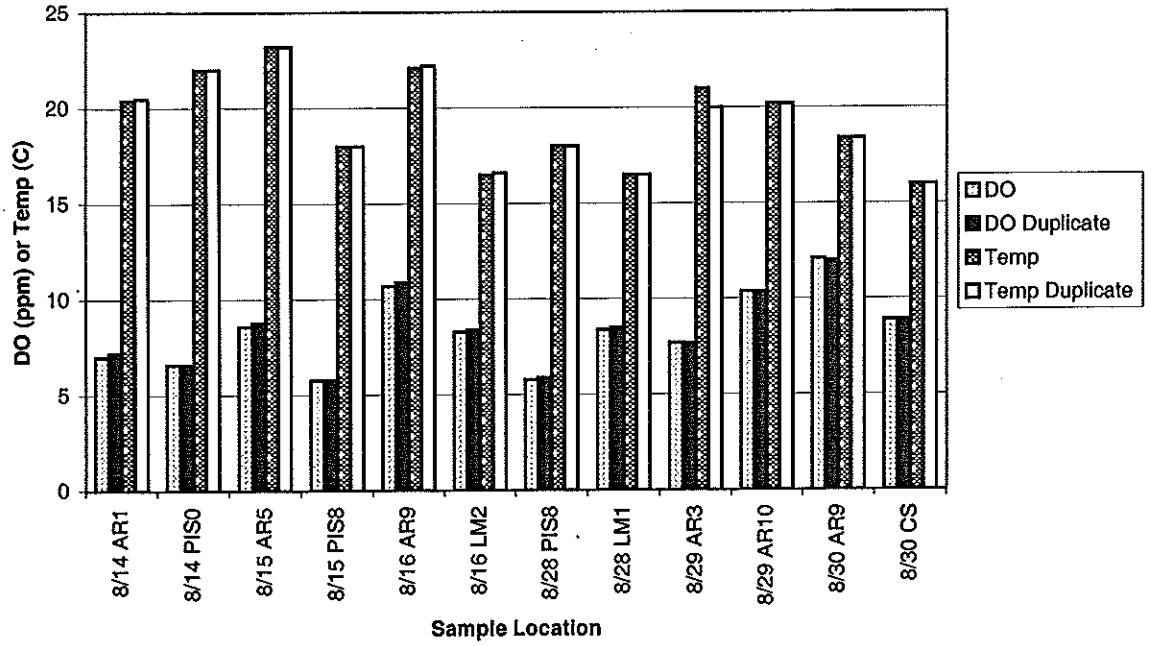


Figure 20b
Ambient Nitrate Nitrogen Samples Vs Duplicates

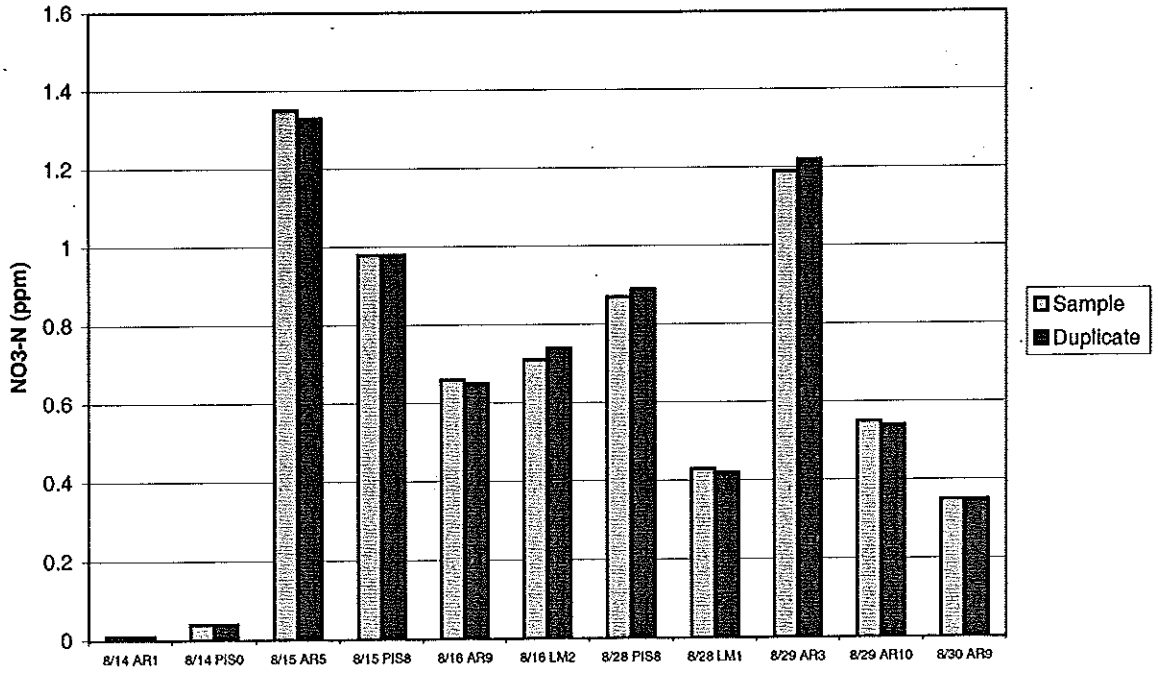


Figure 20c
Ambient Total Phosphorus Samples Vs Duplicates

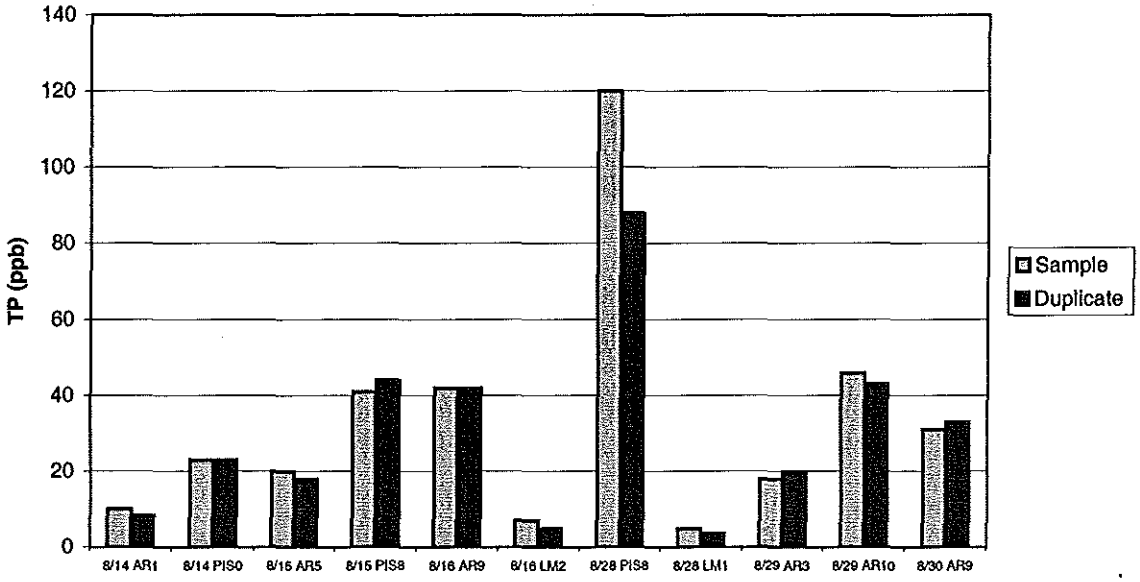


Figure 20d
Ambient Total Nitrogen Samples Vs Duplicates

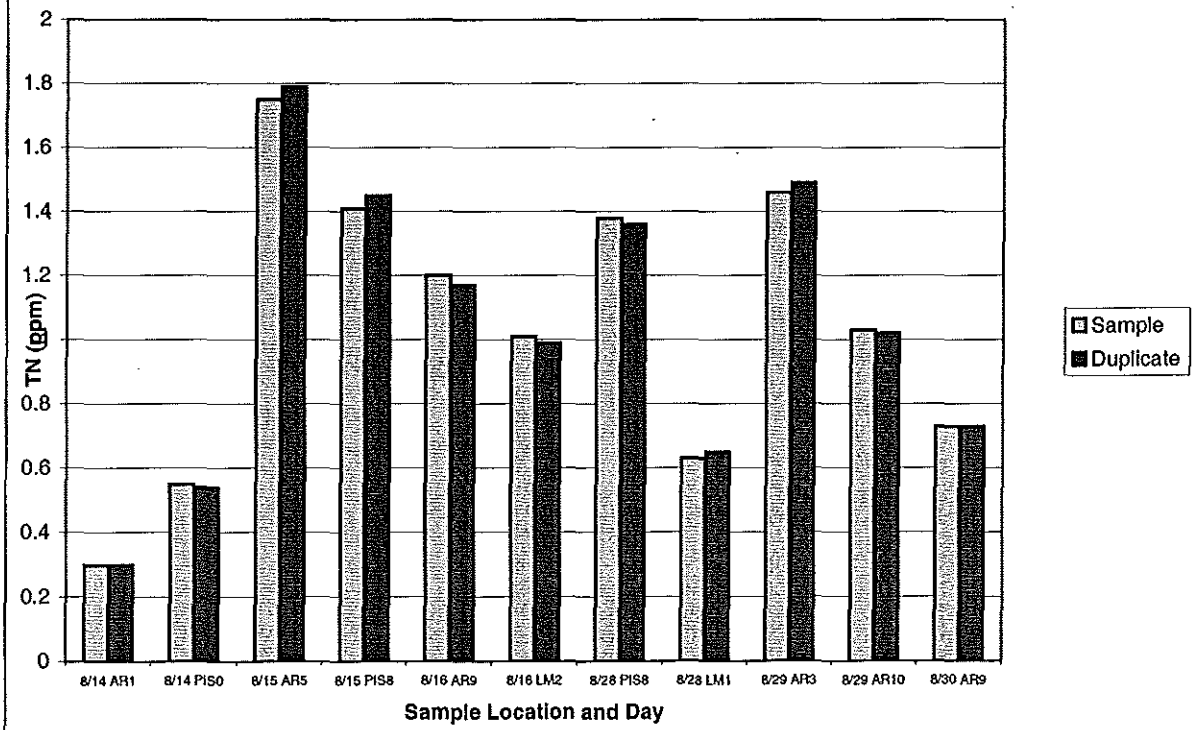


Figure 20e
Ambient Total BOD Samples Vs Duplicates

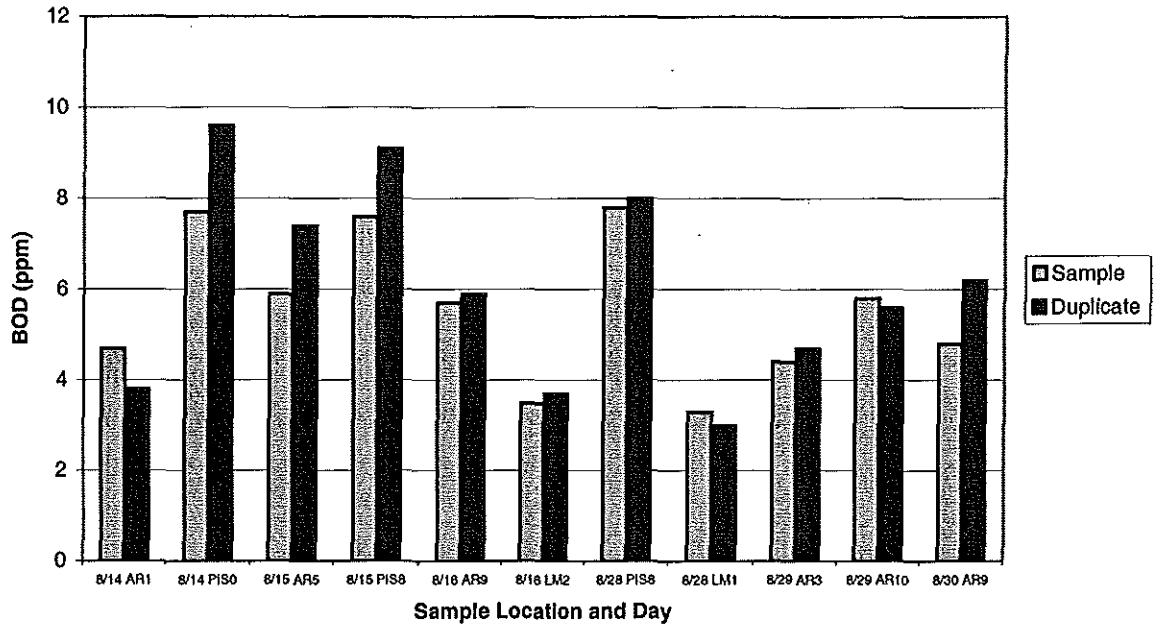
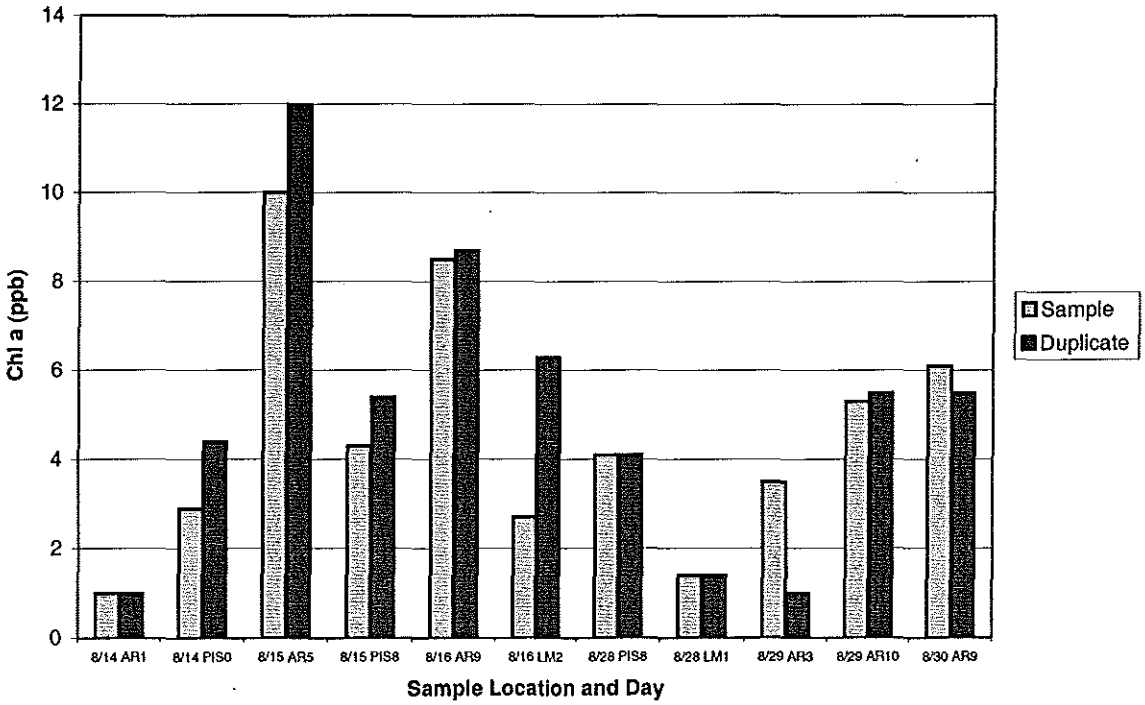
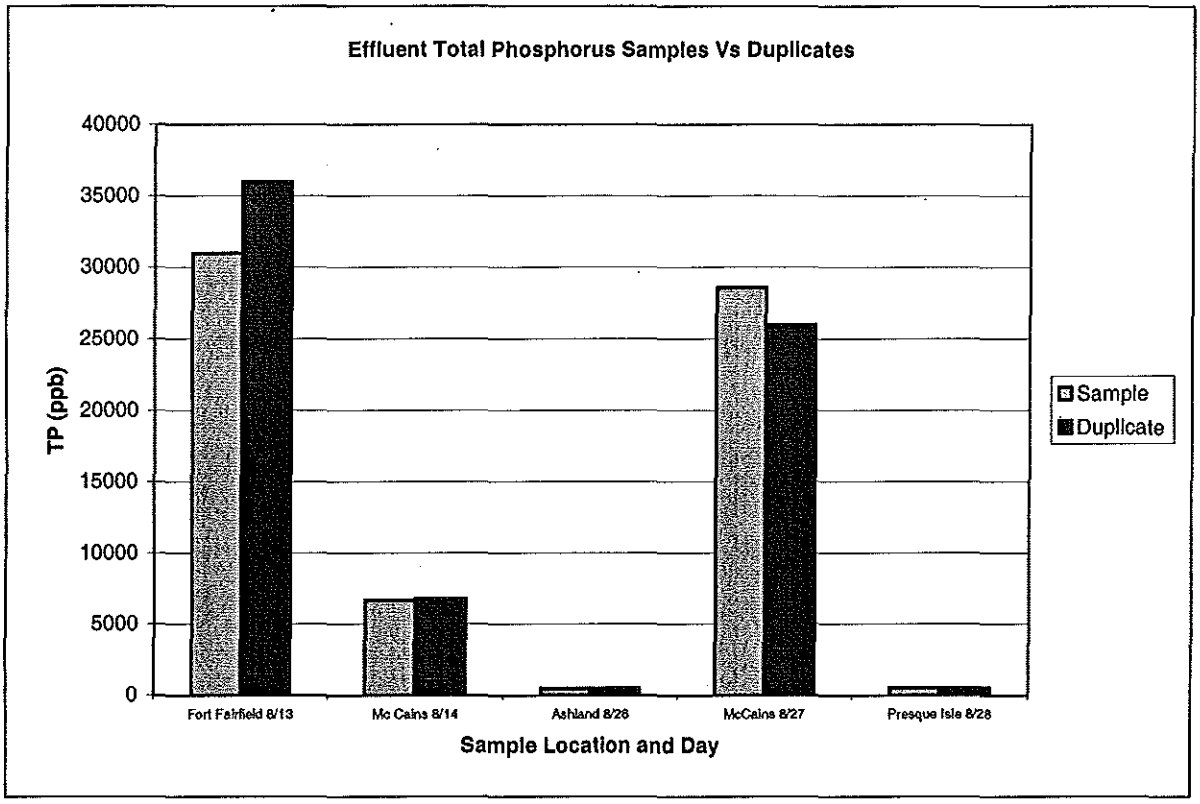


Figure 20f
Ambient Chlorophyll a Samples Vs Duplicates




Effluent Total Phosphorus Samples Vs Duplicates
40000
35000
30000
25000
20000
15000
10000
5000
0
TP (ppb)
Fort Fairfield 8/13
Mc Cains 8/14
Ashland 8/26
McCains 8/27
Presque Isle 8/28
Sample Location and Day
Sample
Duplicate

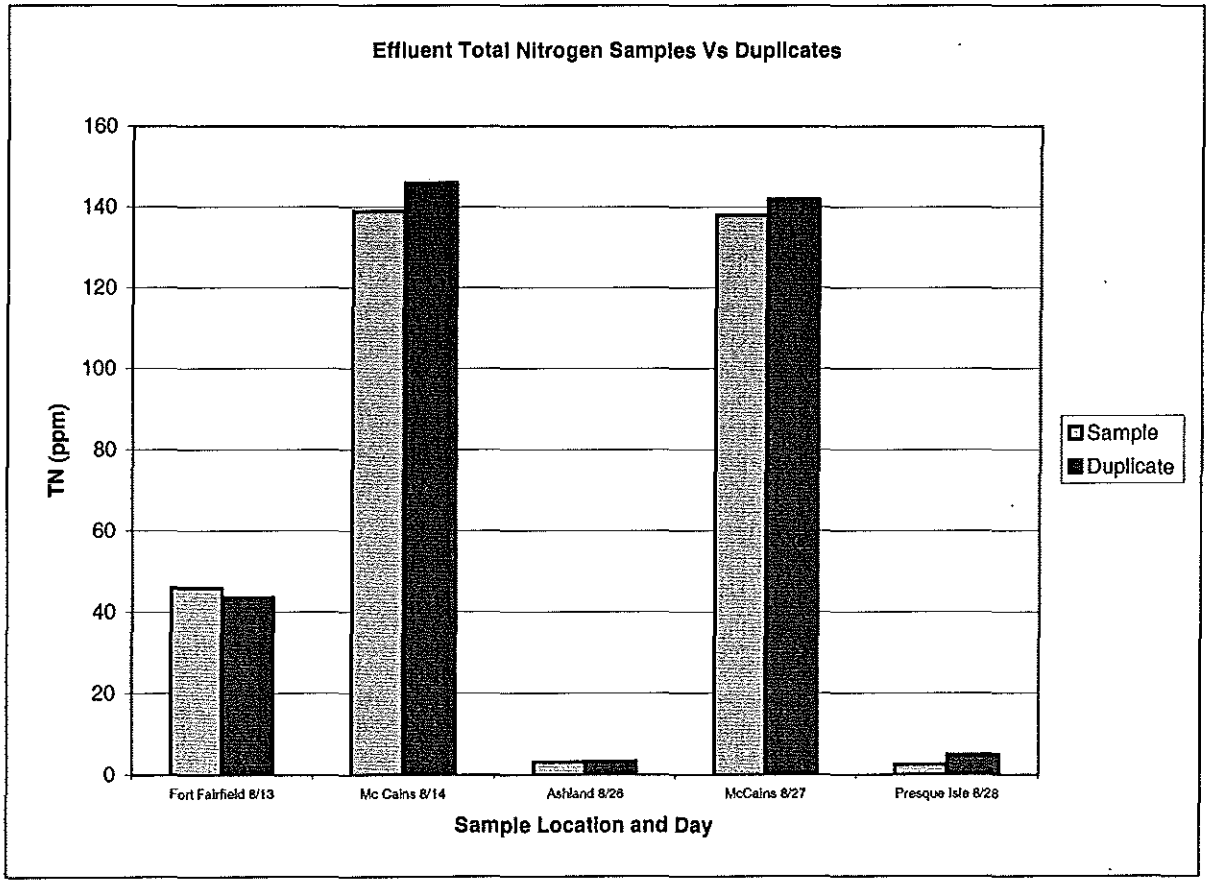

Effluent Total Nitrogen Samples Vs Duplicates
160
140
120
100
80
60
40
20
0
TN (ppm)
Fort Fairfield 8/13
Mc Cains 8/14
Ashland 8/26
McCains 8/27
Presque Isle 8/28
Sample Location and Day
Sample
Duplicate

Figure 21c
Effluent Total Ultimate BOD Samples Vs Duplicates

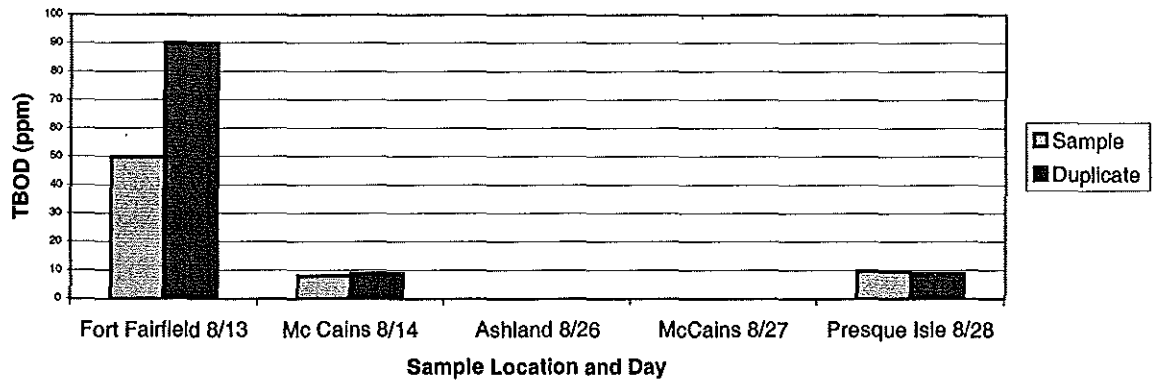


Figure 21d
Effluent Chlorophyll a Samples Vs Duplicates

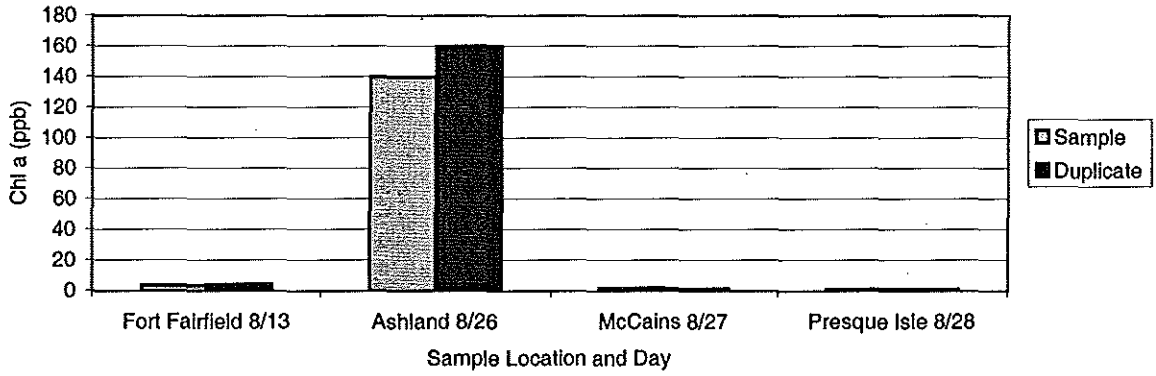
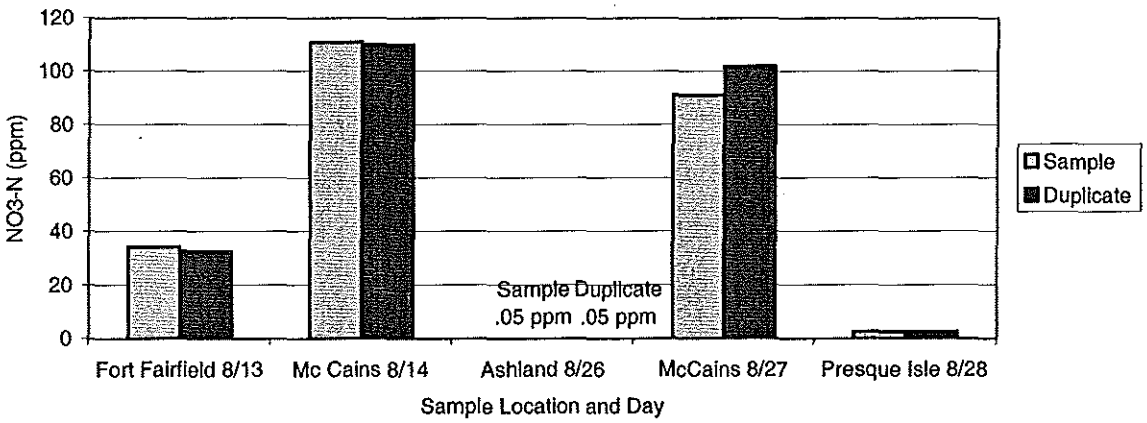
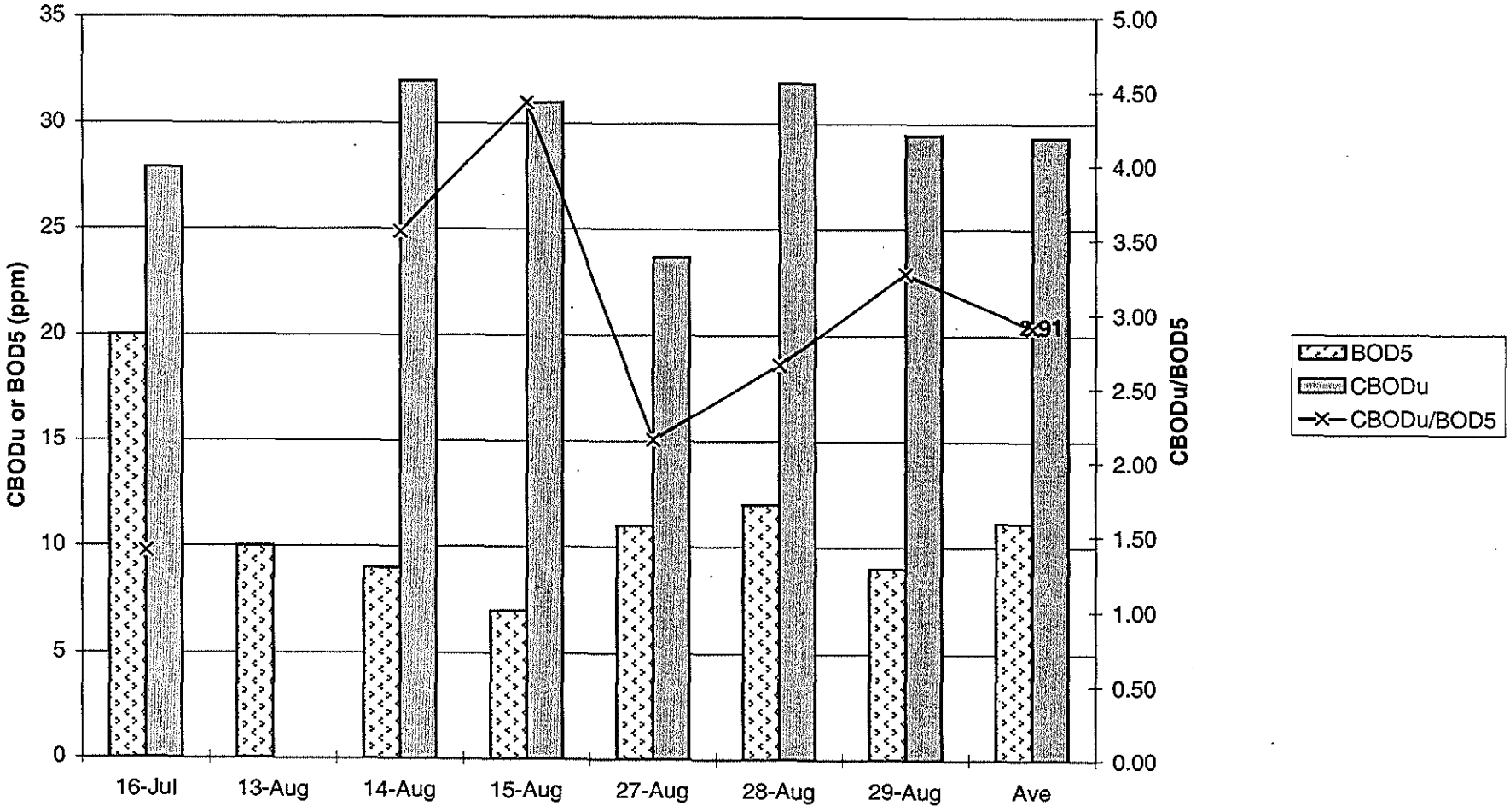


Figure 21e
Effluent NO3-N Samples Vs Duplicates

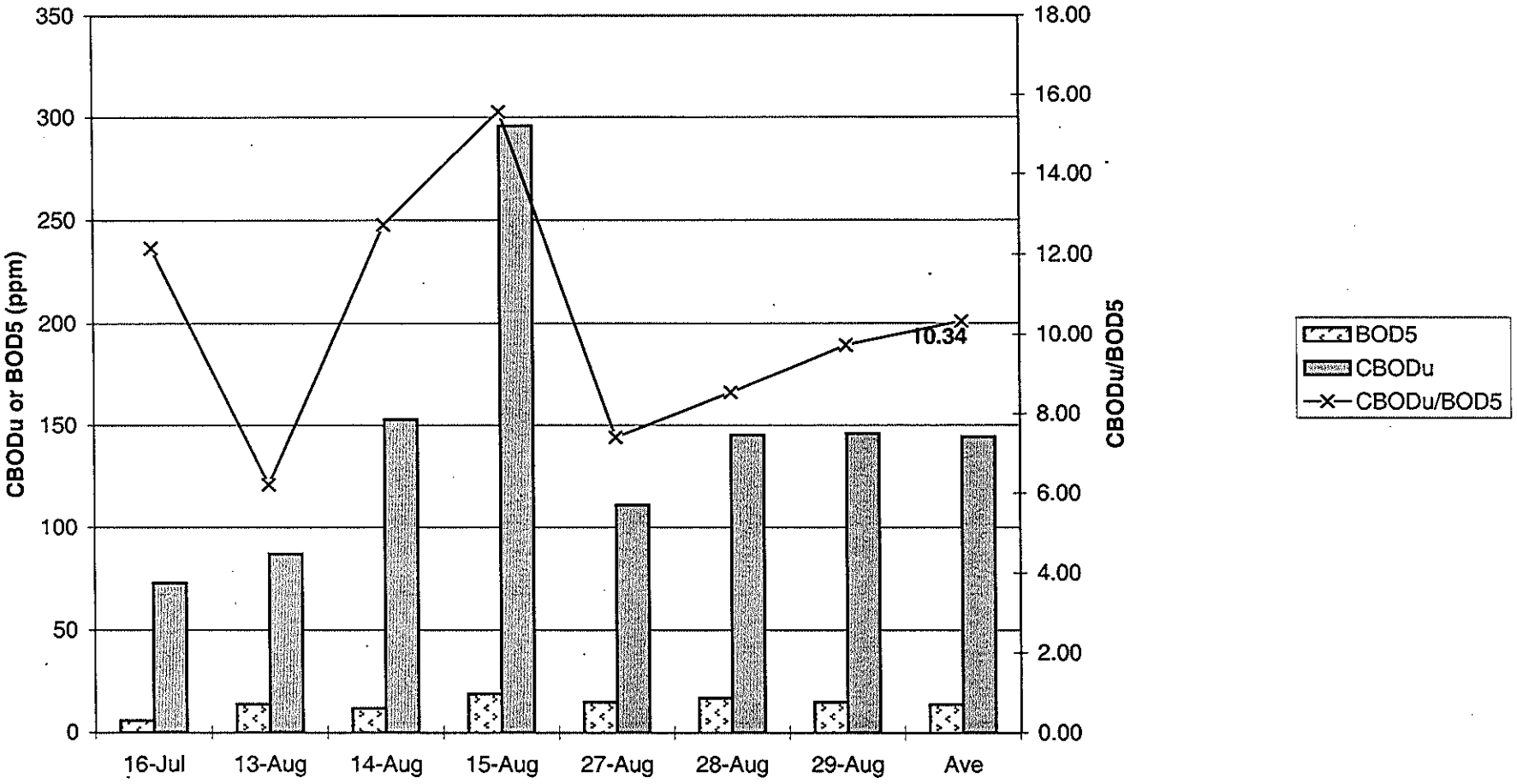


A1 – Effluent CBODU/BOD5 Plots

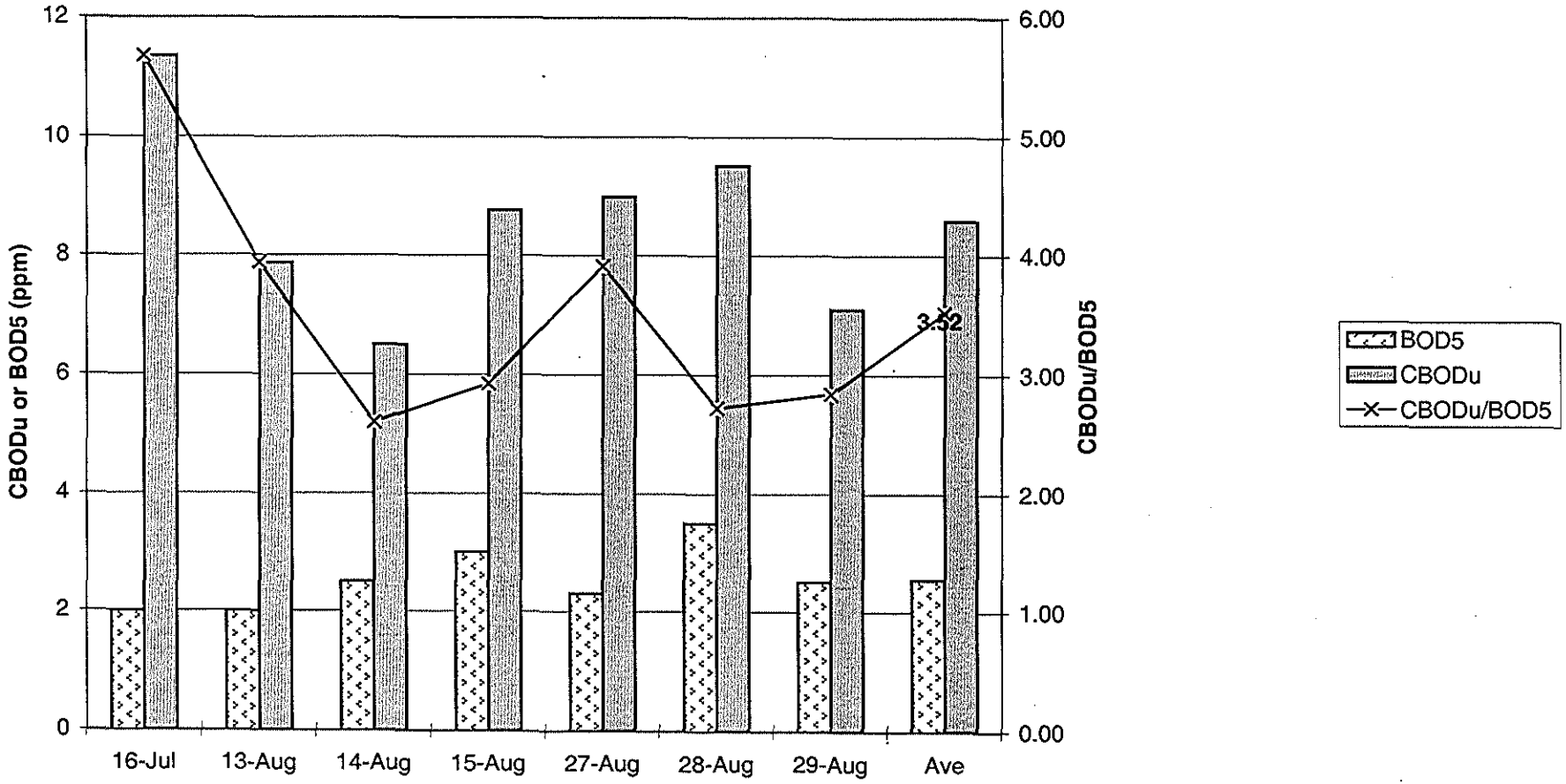
Effluent Ultimate Carbonaceous BOD to BOD5 Ratio
Ashland WWTP



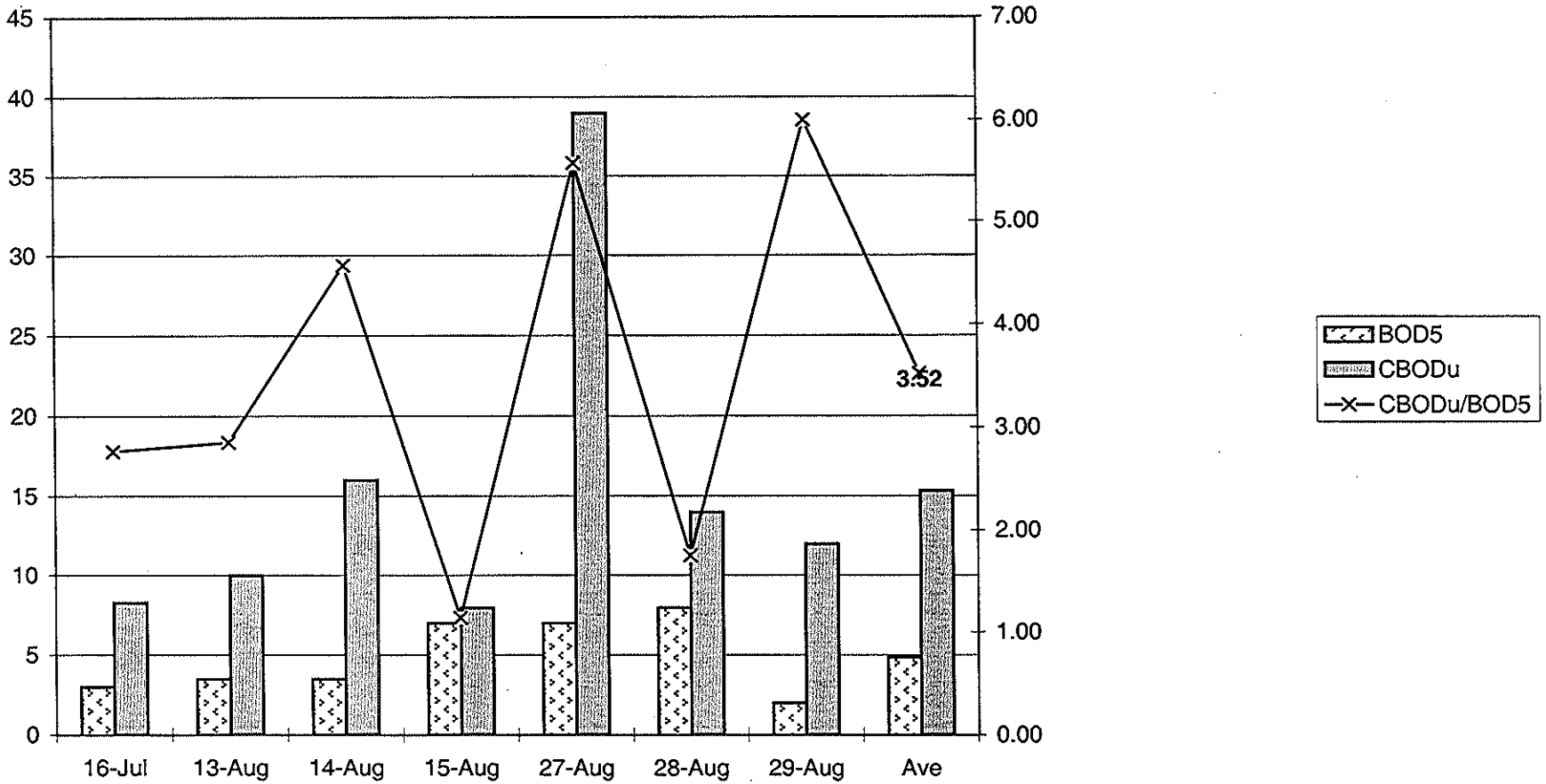
Effluent Ultimate Carbonaceous BOD to BOD5 Ratio
Washburn WWTP



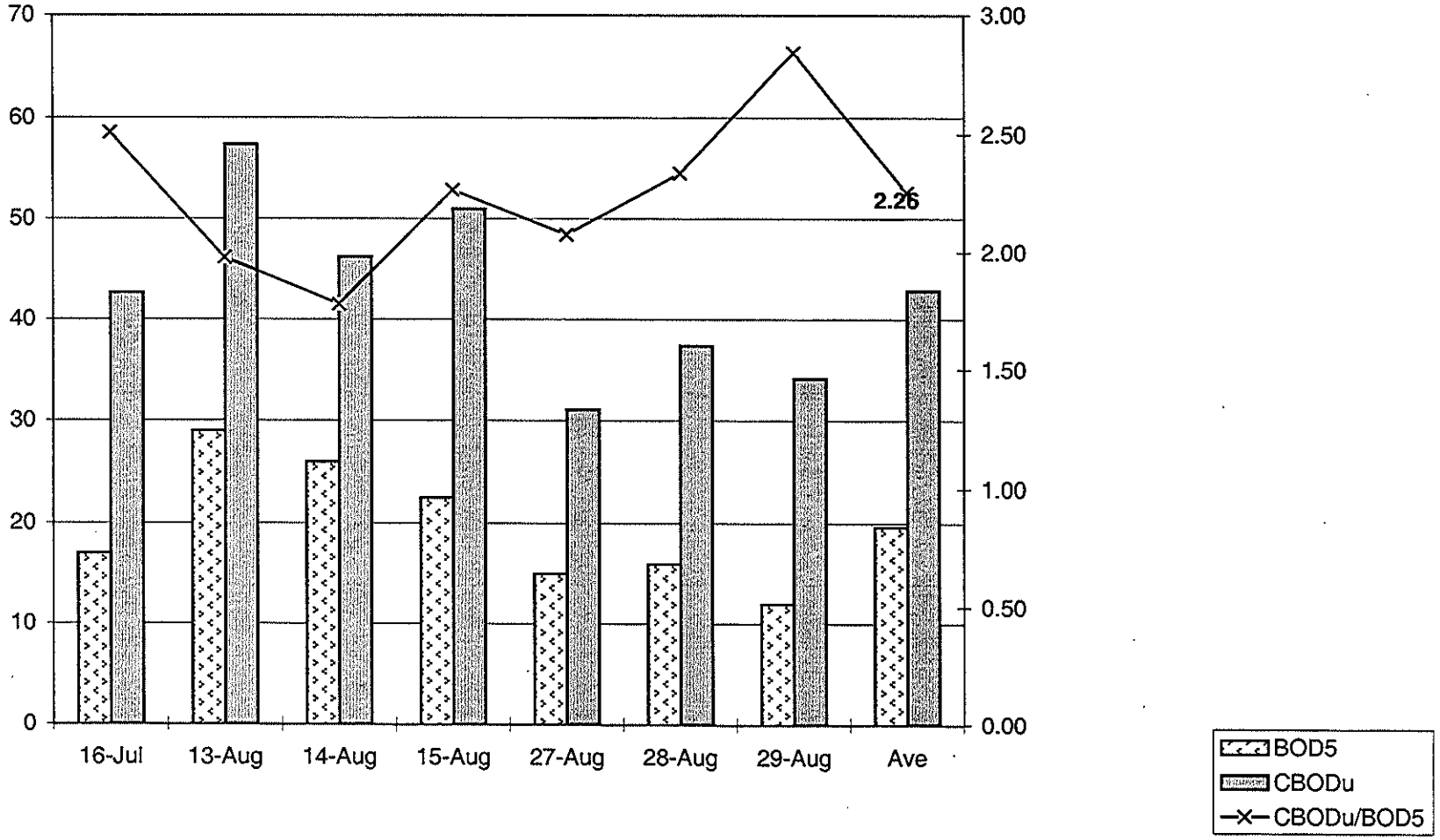
Effluent Ultimate Carbonaceous BOD to BOD5 Ratio
Presque Isle WWTP



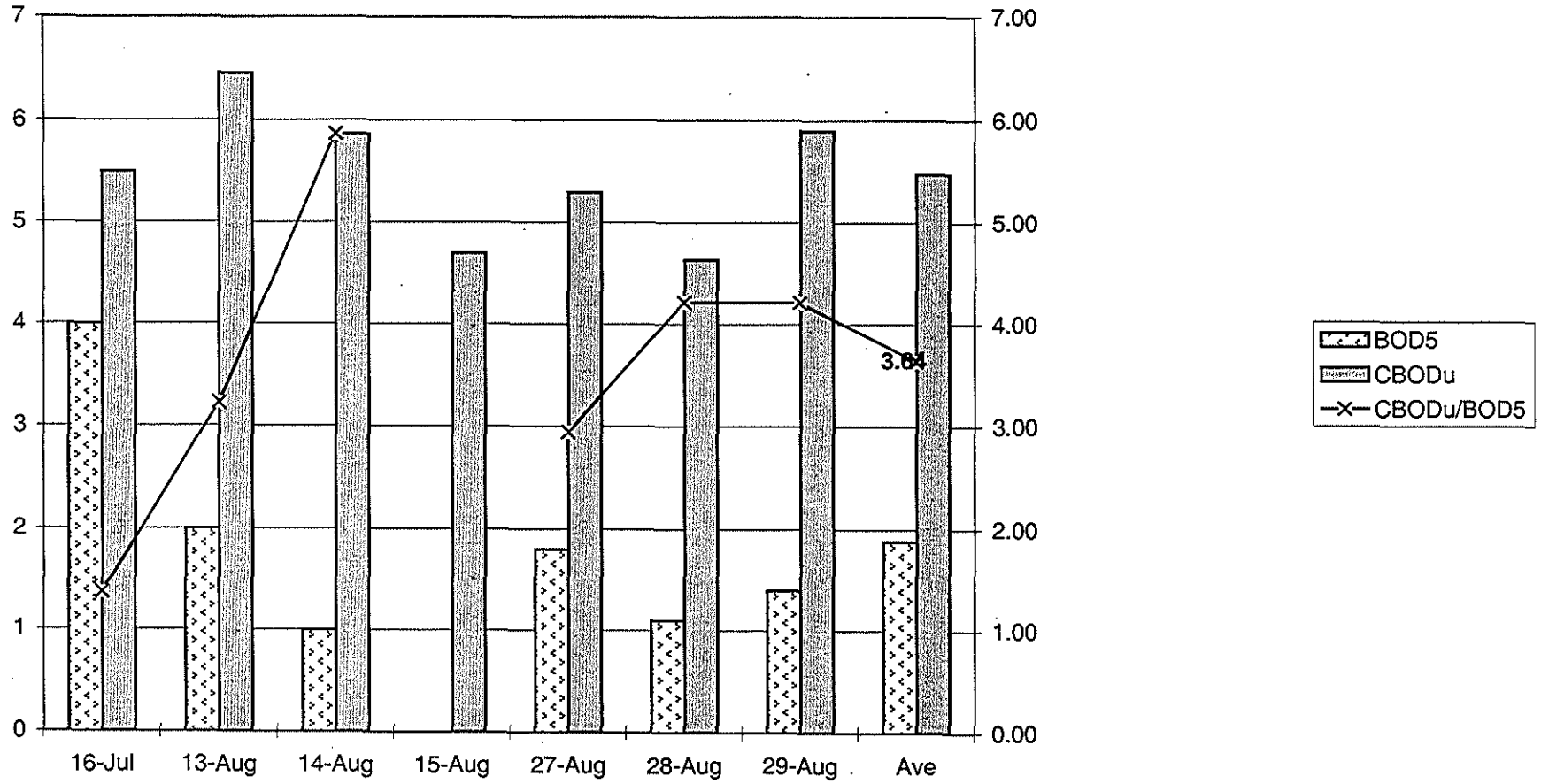
Effluent Ultimate Carbonaceous BOD to BOD5 Ratio
McCain Foods WWTP



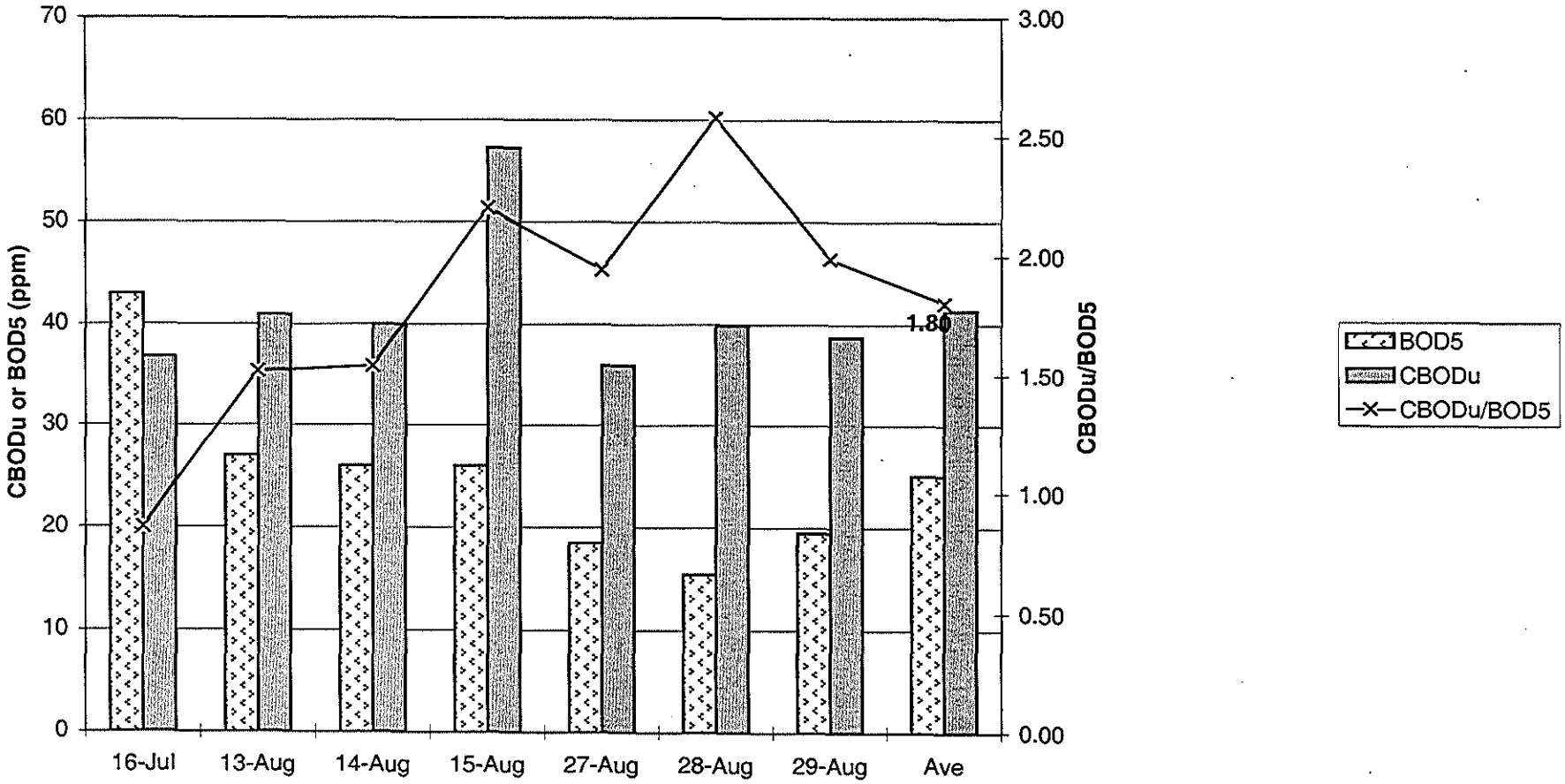
Effluent Ultimate Carbonaceous BOD to BOD5 Ratio
Caribou WWTP



Effluent Ultimate Carbonaceous BOD to BOD5 Ratio
Loring WWTP



Effluent Ultimate Carbonaceous BOD to BOD5 Ratio
Fort Fairfield WWTP



A2- Water Quality Data

Aroostook River Wet Weather Tributary Surveys
May 15, 2001

Rainfall Totals	inches
Presque Isle WWTP	
Caribou	
Ashland	

Station Code	Location	Depth (M)	Time	D. O. (ppm)	D. O. (% Sat.)	Temp °C	TSS ppm	VSS ppm	TP ppb	PO4-P ppb
t-SCS	St Croix Str Rte 11	mid depth	15:15	9.1	82.1%	10.8	2.7	2.3	12	4.3
t-SPS	Squa Pan Str Rte 11	mid depth	15:00	9.2	86.3%	12.5	<1	<1	12	4.8
t-MR	Machias R Garfield Rd	mid depth	14:50	9	80.1%	10.2	2.1	1.2	13	4.1
t-LMR	L Machias R, Rte 11	mid depth	14:35	8.8	77.6%	9.8	6	3.6	18	9.6
t-AB	Alder Brook Ashland	mid depth	14:05	9.4	81.9%	9.3	8.9	3.9	24	8.7
t-GAB	Gardner Brook, Wade	mid depth	13:25	10	83.8%	7.7	3	2.4	13	6.3
t-SB	Salmon Brook Washburn	mid depth	13:05	9.4	81.5%	9.1	5.5	3.4	16	4.7
t-CB	Clayton Brook Washburn	mid depth	12:45	9.7	81.7%	7.9	8.7	6.4	39	17
t-NBP	North Branch P. I. Str In Mapleton	mid depth	15:45	8.8	78.9%	10.5	4.6	3.1	18	9.4
t-MB	Merritt Brook	mid depth	11:50	9.9	85.4%	8.9	14	5	49	13
t-HB	Hardwood Brook Maysville	mid depth	11:00	9.9	84.2%	8.3	5.5	2.5	16	5.2
t-PB	Prestile Brook Caribou	mid depth	10:50	10.3	87.0%	8	18	11	20	11
t-CS	Caribou Str Caribou	mid depth	11:25	9.9	86.3%	9.3	5.2	1.9	11	7.5
t-OB	Otter Brook Caribou	mid depth	10:40	10.3	87.6%	8.3	7.5	3	22	5.8
t-GRB	Gray Brook Fort Fairfield	mid depth	10:25	10.7	90.1%	7.9	7.3	4.6	51	5.9
t-HHB	Hockenhull Bk. Fort Fairfield	mid depth	10:13	10.7	90.6%	8.1	10	3.7	30	11
t-DB	Dug Brook	mid depth	14:15	10.3	86.3%	7.7	3.4	1.3	5.2	1.8

Aroostook River Wet Weather Tributary Surveys

May 31, 2001

Rainfall Totals	inches
Presque Isle WWTP	
Caribou	
Ashland	

Station Code	Location	Depth (M)	Time	D. O. (ppm)	D. O. (% Sat.)	Temp °C	TSS ppm	VSS ppm	TP ppb	PO4-P ppb
t-SB	Salmon Brook Washburn	mid depth	12:47	9.7	88.6%	11.3	6.7	6.3	19	3.5
t-CB	Clayton Brook Washburn	mid depth	12:32	10.2	90.8%	10.2	6.1	5.5	28	4.5
t-NBP	North Branch P. I. Str in Mapleton	mid depth	12:13	9	86.8%	13.7	26	8.2	97	6.7
t-MB	Merritt Brook	mid depth	10:04	10.6	94.1%	10.1	8	5.9		3.8
t-HB	Hardwood Brook Maysville	mid depth	11:30	10.3	93.8%	11.2	11	6.3	35	3.7
t-PB	Prestile Brook Caribou	mid depth	13:18	10.6	95.9%	10.9	37	15	64	5
t-CS	Caribou Str Caribou	mid depth	11:06	10.1	95.2%	12.7	23	5.5	51	8.7
t-OB	Otter Brook Caribou	mid depth	10:58	10.8	96.8%	10.5	9.6	9.4	20	3
t-GRB	Gray Brook Fort Fairfield	mid depth	10:33	11.8	101.8%	8.9	5.3	4.5	16	1.7
t-HHB	Hockenhull Bk. Fort Fairfield	mid depth	10:21	11.2	101.1%	10.8	10	6.3	34	6.4

June 3, 2001

Rainfall Totals	inches
Presque Isle WWTP	
Caribou	
Ashland	

Station Code	Location	Depth (M)	Time	D. O. (ppm)	D. O. (% Sat.)	Temp °C	TSS ppm	VSS ppm	TP ppb	PO4-P ppb
t-SCS	St Croix Str Rte 11	mid depth	9:20	9	84.8%	12.7	4.8	4.4	14	2.6
t-SPS	Squa Pan Str Rte 11	mid depth	9:06	9.9	90.0%	11.1	4.5	3.5	15	2.7
t-MR	Machias R Garfield Rd	mid depth	8:50	9.9	91.7%	11.9	3.8	2.4	8.2	2.1
t-LMR	L Machias R, Rte 11	mid depth	8:35	9.3	87.9%	12.8	5.3	4.4	14	4.4
t-AB	Alder Brook Ashland	mid depth	9:47	10.3	92.1%	10.4	6.1	4.9	19	2.7
t-AB Dupli.	Alder Brook Duplicate	mid depth					6	5.6	17	3.2
t-GAB	Gardner Brook, Wade	mid depth	10:40	10.6	93.5%	9.8	3.7	3.1	8.5	1.9

June 4, 2001

t-LMR	L Machias R, Rte 11	mid depth					35	6.1	62	38

Aroostook River Wet Weather Tributary Surveys
July 16, 2001

Rainfall Totals	inches
Presque Isle WWTP	
Caribou	
Ashland	

Station Code	Location	Depth (M)	Time	D. O. (ppm)	D. O. (% Sat.)	Temp °C	TSS ppm	VSS ppm	TP ppb	PO4-P ppb
t-SCS	St Croix Str Rte 11	mid depth	6:50	7.1	77.8%	19.8	2.1	1.3	12	2.7
t-SPS	Squa Pan Str Rte 11	mid depth	6:36	8	84.7%	18.1	2.6	1.2	10	1.3
t-MR	Machias R Garfield Rd	mid depth	6:20	7.9	85.7%	19.3	3	1.5	8.7	<1
t-LMR	L Machias R, Rte 11	mid depth	6:00	7.5	80.4%	18.7	5.8	3.1	23	1.3
t-AB	Alder Brook Ashland	mid depth	7:32	8.1	82.4%	16.2	3.6	2.3	14	9.1
t-GAB	Gardner Brook, Wade	mid depth	8:30	9.2	90.6%	14.7	1.2	<1	5.9	1.8
t-SB	Salmon Brook Washburn	mid depth	8:55	8.2	84.8%	17	1.8	1	15	5.1
t-SB dup	Salmon Brook Washburn	mid depth	8:55				1.3	1.1	15	5.6
t-CB	Clayton Brook Washburn	mid depth	8:10	8.3	82.8%	15.3	7.1	2.7	15	13
t-NBP	North Branch P. I. Str in Mapleton	mid depth	8:20	6	64.4%	18.8	6.6	2.8	33	4.9
t-MB	Merritt Brook	mid depth	6:26	6.6	64.7%	14.5	19	3.9	50	8.4
t-HB	Hardwood Brook Maysville	mid depth	7:55	8	80.9%	15.9	6.6	2.7	48	17
t-PB	Prestile Brook Caribou	mid depth	7:40	7.9	79.0%	15.4	8.1	2.4	65	23
t-CS	Caribou Str Caribou	mid depth	7:30	7	75.0%	18.7	3.2	1.7	28	3.2
t-OB	Otter Brook Caribou	mid depth	7:20	7.6	76.7%	15.8	1.9	0.8	11	2.3
t-GRB	Gray Brook Fort Fairfield	mid depth	7:05	8.5	79.6%	12.4	4.7	3.1	36	11
t-HHB	Hockenhull Bk. Fort Fairfield	mid depth	6:45	7.6	76.0%	15.4	150	22.8	450	53

Effluents

Numbers in **boldface** indicate treatment facility data

Station Code	Location	TP ppb	PO4-P ppb	TKN ppm	NH3-N ppm	$NO_{2,3}$-N, ppm	$NO_{2,3}$-N_t ppm	Chl a ppb	BOD5 ppm	TBODu ppm	CBODu ppm	NBODu ppm	TSS/VSS ppm
ASH	Ashland	910	630	2.8	0.25	0.01	2.8	122	20	40	27.9	12.1	12 / 10
WAS	Washburn	3000	2600	5	0.46	0.63	4.1	502	6	88	73.0	15.0	45 / 40
PRI	Presque Isle	250	110	1	0.02	2.4	2.5	3.2	2	11.8	11.4	0.4	5 / 5
MCC	McCains	6700	6400	< 1	0.01	130	120	2.8	3	8.3	8.3	0.0	3 / 2
CAR	Caribou	9300	8200	5.2	1.4	23	24	59.3	17	47	42.7	4.3	/ 23
LOR	Loring	380	340	0.4	0.02	2.6	2.9	2.4	4	6.8	5.5	1.3	1 / 1
FTF	Fort Fairfield	3300	2800	5.9	2.4	7.5	17	7.2	43	78	36.9	41.1	12 / 11

Aroostook River Intensive Survey

August 14-16, 2001

Flow (cfs)	USGS Washburn	AR6	PIS0	LM2	CS
14-Aug	155	192	5.5	27.8	4.2
15-Aug	143				
16-Aug	137				

Station Code	Location	Date	TSS ppm	VSS ppm	TP ppb	PO4-P ppb	TN ppm	NH3-N ppm	NO2-N ppm	NO3-N$_i$ ppm	NO3-N$_f$ ppm	Chl a ppb	TBODu ppm	CBODu ppm	NBODu ppm	BOD Kd /day	Secchi* (m)
AR0	Rte 11 Ashland	14-Aug	1	< 1	10	1.2	0.31	< .04	< .01	< .01	0.16	1.4	3.9	3.2	0.7	0.034	
		15-Aug	< 1	< 1	4.2	1.7	0.29	< .04	< .01	< .01	0.15	1.4	4.5	3.9	0.6	0.046	
		16-Aug	< 1	< 1	7.7	1.4	0.31	< .04	< .01	< .01	0.13	< 1	3.8	3.2	0.6	0.043	
AR0a	Ashland below	14-Aug	< 1	< 1	11	1	0.32	< .04	< .01	< 0.01	0.26	2.4	5.4	4.3	1.1	0.047	
		15-Aug	1	1	3.5	1.9	0.29	< .04	< .01	< .01	0.2	1.9	4.4	3.5	0.9	0.038	
		16-Aug	< 1	< 1	3.8	< 1	0.31	< .04	< .01	< .01	0.18	< 1	4.2	3.4	0.8	0.036	
AR1	River Rd Washburn	14-Aug	< 1	< 1	10	< 1	0.3	< .04	< .01	<.01	0.22	< 1	4.7	3.7	1.0	0.031	
		15-Aug	< 1	< 1	3.5	1.7	0.29	< .04	< .01	0.01	0.17	1.6	3.8	3.1	0.7	0.042	
		16-Aug	< 1	< 1	4.3	< 1	0.29	< .04	< .01	< .01	0.18	< 1	4	3.2	0.8	0.042	
AR1a	Crouseville	14-Aug	1	< 1	8.9	1	0.32	< .04	< .01	0.01	0.27	< 1	5.1	4.0	1.1	0.037	
		15-Aug	< 1	< 1	6.5	1.7	0.3	< .04	< .01	0.02	0.21	< 1	4.5	3.7	0.8	0.039	
		16-Aug	< 1	< 1	5.7	< 1	0.32	< .04	< .01	0.02	0.2	1.4	3.7	2.9	0.8	0.051	
AR2	.5 mi above Rte 1, P. I.	14-Aug	< 1	< 1	16	3.9	0.31	< .04	< .01	< .01	0.2	1	4.1	3.2	0.9	0.033	
		15-Aug	1	1	3.8	1.7	0.31	< .04	< .01	0.01	0.19	< 1	4.1	3.3	0.8	0.048	
		16-Aug	< 1	< 1	9	1.9	0.31	< .04	< .01	< .01	0.19	6.1	3.8	3.0	0.8	0.053	
AR3	Maysville	14-Aug	< 1	< 1	23	1	1.43	< .04	0.03	1.09	1.32		8	7.0	1.0	0.061	
		15-Aug	< 1	< 1	20	6.2	1.36	< .04	< .01	0.99	1.12	5.1	4.5	3.9	0.6	0.068	
		16-Aug	< 1	< 1	16	4.6	1.4	< .04	0.01	1.01	1.14	2.9	4.4	3.8	0.6	0.063	
AR4	McGraw	14-Aug	< 1	< 1	26	6.5	1.97	0.04	0.01	1.6	1.35	3.2	5.2	5.2	0.0	0.053	>2.5
		15-Aug	1.9	1.9	23	6.3	2.19	0.05	0.04	1.78	1.61	6.3	5.6	5.6	0.0	0.074	>2.5
		16-Aug	0.8	< 1	25	7.9	1.92	0.04	0.05	1.4	1.37	4.9	5.4	5.4	0.0	0.066	
AR5	Above Caribou Dam	14-Aug	1	< 1	24	1.3	1.75	< .04	0.05	1.3	1.23	12	7.6	7.6	0.0	0.062	2.7
		15-Aug	1.5	1.5	20	1.9	1.81	< .04	< .01	1.35	1.18	10	5.9	5.9	0.0	0.069	2.4
		16-Aug	2.8	< 1	16	2.2	1.8	< .04	0.03	1.3	1.34	21	5.9	5.7	0.2	0.061	
AR6	Below Little Madaw. R	14-Aug	< 1	< 1	78	40	1.33	< .04	0.03	0.93	1.19	9.7	5.5	4.4	1.1	0.066	
		15-Aug	1	1	80	2.1	1.4	< .04	< .01	0.94	1.26	7.5	5.6	4.2	1.4	0.068	
		16-Aug	1.3	< 1	66	40	1.53	< .04	0.03	1.04	1.37	7.5	5.2	3.8	1.4	0.061	
AR7	Goodwin	14-Aug	< 1	< 1	38	9.8	1.22	< .04	0.03	0.82	1.05	7.2	5.4	4.4	1.0	0.061	
		15-Aug	1.1	1.1	27	4.6	1.3	< .04	0.03	0.92	1.19	6.3	6.3	5.1	1.2	0.07	
		16-Aug	1.2	< 1	28	3.8	1.37	< .04	0.03	1.06	1.22	7.1	5.5	4.8	0.7	0.059	
AR8	Stevensville	14-Aug	2.2	1	31	5	1.16	0.04	0.02	0.67	1.12	6.9	9.8	7.9	1.9	0.044	
		15-Aug	2.8	2.6	31	5.5	1.25	0.04	0.03	0.81	1.11	11	5.8	4.5	1.3	0.075	
		16-Aug	4	< 1	35	5.4	1.33	< .04	0.02	0.89	1.14	9.8	5.8	4.7	1.1	0.061	
AR9	Rte 1a Fort Fairfield	14-Aug	< 1	< 1	56	22	0.91	< .04	< .01	0.32	0.73	7.2	9.2	7.4	1.8	0.042	1.8
		15-Aug	1.2	1	52	22	1.31	< .04	0.02	0.57	0.81	8.8	5.7	4.7	1.0	0.078	1.8
		16-Aug	3.6	< 1	42	11	1.2	< .04	0.02	0.66	0.95	8.5	5.9	4.6	1.3	0.072	
AR10	USA - Canada Border	14-Aug	1.8	< 1	31	1.2	0.71	< .04	< .01	0.16	0.47	15	6.7	5.4	1.3	0.069	1.8
		15-Aug	2.4	2.1	27	1.7	0.64	< .04	< .01	0.11	0.45	28	8.1	6.6	1.5	0.072	1.4
		16-Aug	1	< 1	33	1.9	0.64	< .04	< .01	0.06	0.4	10	7.6	6.1	1.5	0.061	
AR1 AR5 AR9	River Duplicate	14-Aug	< 1	< 1	8.4	1	0.3	< .04	< .01	< .01	0.18	< 1	3.8	3.0	0.8	0.036	
		15-Aug	< 1	< 1	18	2.2	1.79	< .04	0.04	1.33	1.22	12	7.4	7.4	0.0	0.046	
		16-Aug	1	< 1	42	12	1.17	< .04	0.02	0.65	0.86	8.7	5.9	5.0	0.9	0.064	

* Secchi depth readings were only taken in impoundments where there was adequate depth.

NO3-N$_i$ = Nitrate-N reading at start of BOD test

NO3-N$_f$ = Nitrate-N reading at end of BOD test

Aroostook River Intensive Survey

August 14-16, 2001

Major Tributaries

Station Code	Location	Date	TSS ppm	VSS ppm	TP ppb	PO4-P ppb	TN ppm	NH3-N ppm	NO2-N ppm	$NO3\text{-}N_i$ ppm	$NO3\text{-}N_f$ ppm	Chl a ppb	TBODu ppm	CBODu ppm	NBODu ppm	BOD Kd /day	Flow (cfs)
Presque Isle Stream																	
PIS0	Park St	14-Aug	3.5	1.4	23	1.3	0.55	< .04	< .01	0.04	0.3	2.9	7.7	6.6	1.1	0.046	5.5
		15-Aug	2.3	1.7	23	2.1	0.59	< .04	< .01	0.08	0.37	5.1	10.9	9.6	1.3	0.061	
		16-Aug	2.4	< 1	16	< 1	0.52	< .04	< .01	0.05	0.35	5.8	9.2	7.9	1.3	0.042	
PIS8	Parson St Connector	14-Aug	5	2.5	49	10	1.27	0.04	< .01	0.68	0.94	4.6	8.9	7.8	1.1	0.054	
		15-Aug	22	2.2	41	15	1.41	0.05	< .01	0.98	1.27	4.3	7.6	6.3	1.3	0.051	
		16-Aug	3.4	< 1	49	24	2.04	0.05	0.01	1.49	1.57	2.6	8.8	8.5	0.3	0.051	
PIS13	Railroad Trestle	14-Aug	6.2	2.1	52	11	1.56	0.04	0.01	0.94	1.26	4.1	9.8	8.4	1.4	0.054	
		15-Aug	4.4	4.2	81	7	1.8	0.05	< .01	1.11	1.2	3.2	25.1	24.7	0.4	0.07	
		16-Aug	< 1	< 1	43	18	1.7	0.05	0.01	1.71	1.67	5.1	8	8.0	0.0	0.05	
Little Madawaska River																	
LM1	Bowles Rd	14-Aug	< 1	< 1	13	1	0.65	< .04	< .01	0.41	0.56	2.5	4.1	3.5	0.6	0.046	
		15-Aug	< 1	< 1	7.9	1.7	0.63	< .04	< .01	0.36	0.56	2	4.7	3.8	0.9	0.081	
		16-Aug	0.4	< 1	7.3	< 1	0.66	< .04	< .01	0.38	0.53	1.3	3.9	3.3	0.6	0.059	
LM2	Grimes Rd	14-Aug	< 1	< 1	12	1.2	0.95	< .04	< .01	0.68	0.86	2.5	3.5	2.7	0.8	0.068	27.8
		15-Aug	< 1	< 1	4.9	1.7	0.99	< .04	< .01	0.71	0.85	2.1	4.3	3.7	0.6	0.104	
		16-Aug	0.7	< 1	7	< 1	1.01	< .04	< .01	0.71	0.85	2.7	3.5	2.9	0.6	0.065	
CS	Caribou Stream	14-Aug	< 1	< 1	14	1.2	0.61	< .04	< .01	0.32	0.49	3.2	4.1	3.4	0.7	0.071	4.2
		15-Aug	1.2	1.2	8.6	1.6	0.63	< .04	< .01	0.31	0.5	2.1	5.3	4.5	0.8	0.099	
		16-Aug	1.8	< 1	12	2	0.63	< .04	< .01	0.31	0.52	2.9	5.4	4.5	0.9	0.073	
PIS0 PIS8 LM2	Tributary Duplicate	14-Aug	5.6	2.4	23	1.7	0.54	< .04	< .01	0.04	0.29	4.4	9.6	8.5	1.1	0.048	
		15-Aug	2.6	2.2	44	12	1.45	0.05	< .01	0.98	1.18	5.4	9.1	8.2	0.9	0.056	
		16-Aug	0.2	< 1	4.9	< 1	0.99	< .04	< .01	0.74	0.88	6.3	3.7	3.1	0.6	0.055	

$NO3\text{-}N_i$ = Nitrate-N reading at start of BOD test

$NO3\text{-}N_f$ = Nitrate-N reading at end of BOD test

Aroostook River Intensive Survey

August 12-16, 2001 (Sun - Thurs)

Numbers in **boldface** indicate treatment facility data

Effluents

Station Code	Location	Date	TSS ppm	VSS ppm	TP ppb	PO4-P ppb	TN ppm	NH3-N ppm	NO2-N ppm	NO3-N_i ppm	NO3-N_f ppm	Chl a ppb	BOD5 ppm	TBODu ppm	CBODu ppm	NBODu ppm	Flow (mgd)
ASH	Ashland	12-Aug	11	10.6	800	410	2.48	0.12	< .01	0.015		89	10				**0.052**
		13-Aug	6.9	6	860	410	2.73	0.12	< .01	0.01	<.01	82	9	32	32	0	**0.042**
		14-Aug	5.2	5.2	1300	430	0.29	0.19	< .01	0.01	0.01	52	7	31	31	0	**0.048**
		15-Aug															**0.051**
		16-Aug											**8**				**0.037**
WAS	Washburn	12-Aug	33	31.5	4200	3000	7.46	2.4	0.224	0.7	0.69	170	14	87	87	0	**0.041**
		13-Aug	67	64.6	5900	3200	11	2.3	0.3	0.73	0.74	560	12	153	153	0	**0.049**
		14-Aug	100	98	6200	3100	20.8	2.1	0.26	0.75	0.76	1100	19	296	296	0	**0.057**
		15-Aug															**0.032**
		16-Aug															**0.038**
PRI	Presque Isle	12-Aug	6.7	5.6	420	170 **140**	7.47	**0.05** 0.06	< .01	6.78	6.9	8.1	**2 / 2**	8.4	7.9	0.5	**0.89**
		13-Aug	4.3	3.7	440	150 **160**	7.05	**0.05** 0.11	< .01	6.2	6.5	6	**2 / 3**	7.8	6.5	1.3	**1.08**
		14-Aug	3.1	2.7	490	150 **140**	6.96	**0.04** 0.08	< .01	6.27	6.3	3.8	**2 / 4**	8.9	8.8	0.1	**1.00**
		15-Aug											**2**				**0.98**
		16-Aug															**1.00**
MCC	McCain Foods	12-Aug	10	6.4	4200	3000	134	0.05	0.24	118	120	11	**5 / 2**	10	10.0	0.0	**2.16**
		13-Aug	3.3	3.3	4800 **3250**	3300	128	0.16	< .01	111	120	<1	**3 / 4**	16	16.0	0.0	**2.12**
		14-Aug	< 1	< 1	6700	4200	139	0.05	0.77	111	120	2	**1 / 13**	8	8.0	0.0	**2.09**
		15-Aug											**5**				**1.64**
		16-Aug											**5**				**1.43**
CAR	Caribou	12-Aug	41	27.7	18000	9400	19.2	1	0.68	13.4	14	30	29	60	57.4	2.6	**0.667**
		13-Aug	31	20.1	15000	9600	32.5	0.3	0.55	14.6	15	27	26	48	46.3	1.7	**0.638**
		14-Aug	34	25.3	20000	9700	19.7	0.2	0.43	14.3	14	58	**19 / 26**	51	51.0	0.0	**0.61**
		15-Aug											**26 / 24**				**0.60**
		16-Aug											**24 / 14**				**0.592**
LOR	Loring	12-Aug	3.6	2.9	660	460	3.68	< .04	0.06	3.15	3.3	< 1	2	7.1	6.5	0.6	**0.319**
		13-Aug	< 1	< 1	860	490	3.5	< .04	0.04	3.1	3.2	< 1	1	6.3	5.9	0.4	**0.329**
		14-Aug	5.4	2.2	860	490	1.54	0.04	0.05	1.68	3.4	< 1		5.2	4.7	0.5	**0.347**
		15-Aug											**2.3**				**0.337**
		16-Aug											**1.1**				**0.339**
FTF	Fort Fairfield	12-Aug	21	16.3	22000	17000	41.1	1.9	0.7	34.3	35	1.4	**19 / 35**	44	41.0	3.0	**0.279**
		13-Aug	24	16.8	31000 **18000**	18000 **18000**	46	4	0.71	32.7	35	3.8	**17 / 35**	50	40.0	10.0	**0.303**
		14-Aug	23	18.9	10000 **18000**	18000 **18000**	37	3	0.72	27.6	28	1.9	**22 / 30**	59	57.3	1.7	**0.295**
		15-Aug			**18000**	**18000**							**25**				**0.299**
		16-Aug											**27**				**0.303**
FTF MCC	Effluent Duplicate	12-Aug															
		13-Aug	43	32.5	36000	18000	43.6	4	0.71	32.6	34	4.3	26	90	83.9	6.1	
		14-Aug	1.8	1.6	6800	4400	146	0.05	0.76	110	120		2	9			
		15-Aug															
		16-Aug															

NO3-N_i = Nitrate-N reading at start of BOD test

NO3-N_f = Nitrate-N reading at end of BOD test

Aroostook River Dry Weather Tributary Survey
August 13, 2001

Station Code	Location	Depth (M)	Time	D. O. (ppm)	D. O. (% Sat.)	Temp °C	TSS ppm	VSS ppm	TP ppb	PO4-P ppb
t-SCS	St Croix Str Rte 11	mid depth			0.0%		2.3	1.9	19	< 1
t-SPS	Squa Pan Str Rte 11	mid depth			0.0%		2.4	2.2	13	< 1
t-MR	Machias R Garfield Rd	mid depth			0.0%		2.2	1.2	13	< 1
t-LMR	L Machias R. Rte 11	mid depth			0.0%		1.7	1.7	15	< 1
t-LMR dup	L Machias R. Rte 11	mid depth					2.5	2.5	10	1.1
t-AB	Alder Brook Ashland	mid depth			0.0%		3.9	1.4	26	< 1
t-GAB	Gardner Brook, Wade	mid depth			0.0%		< 1	< 1	7.5	1.6
t-SB	Salmon Brook Washburn	mid depth			0.0%		3.5	2.4	14	< 1
t-CB	Clayton Brook Washburn	mid depth			0.0%		2.5	1.7	18	3.3
t-NBP	North Branch P. I. Str in Mapleton	mid depth			0.0%		16	6.6	51	1.1
t-MB	Merritt Brook	mid depth			0.0%		5.7	3.7	24	6.4
t-HB	Hardwood Brook Maysville	mid depth			0.0%		3.1	2.7	16	< 1
t-PB	Prestile Brook Caribou	mid depth			0.0%		3.7	2.8	27	9.9
t-CS	Caribou Str Caribou	mid depth			0.0%		1.4	1.4	18	< 1
t-OB	Otter Brook Caribou	mid depth			0.0%		< 1	< 1	10	1.2
t-GRB	Gray Brook Fort Fairfield	mid depth			0.0%		1.8	1.6	59	34
t-HHB	Hockenhull Bk. Fort Fairfield	mid depth			0.0%		3.2	2.9	20	4.7

Aroostook River Low Flow Survey

August 14, 2001

Station Code	Location	Depth (M)	Morning Sampling Run				Afternoon Sampling Run			
			Time	D. O. (ppm)	D. O. (% Sat.)	Temp °C	Time	D. O. (ppm)	D. O. (% Sat.)	Temp °C
AR0	Rte 11 Ashland	mid depth	7:20	7.4	82.8%	20.9	14:20	8.4	100.0%	24.1
AR0a	Ashland below	mid depth	7:30	7.3	81.7%	20.9	14:32	8.6	102.4%	24.1
AR1	River Rd Washburn	mid depth	6:30	7	77.6%	20.4	13:45	8.5	101.5%	24.3
AR1a	Crouseville	mid depth	8:35	7.3	82.0%	21.1	13:30	8.5	102.3%	24.7
AR2	.5 mi above Rte 1, P. I.	mid depth	6:58	7.5	84.1%	21	14:30	9	110.9%	26
AR3	Maysville	mid depth	7:32	7.2	81.6%	21.5	14:01	13.4	162.2%	25
AR4	McGraw	0	9:05	10.6	124.0%	23.2	15:50	11.6	139.6%	24.7
		1		10.4	121.7%	23.2		11.6	139.1%	24.5
		2		10.3	120.1%	23		11.7	139.0%	24
AR5	Above Caribou Dam	0	8:44	9.2	108.9%	23.8	15:40	10	119.9%	24.5
		1		9.2	109.3%	24		10	119.9%	24.5
		2		9.2	109.3%	24		10	118.8%	24
		3		9.1	108.1%	24		9.5	112.4%	23.8
		4		9	106.5%	23.8		9.3	109.6%	23.6
AR6	Below Little Madaw. R	mid depth	7:37	8.9	97.9%	20	14:45	15.4	187.7%	25.4
AR7	Goodwin	mid depth	8:01	8.7	98.5%	21.5	15:03	16.5	202.3%	25.7
AR8	Stevensville	0	7:50	8.9	103.6%	22.9	9:36	11.3	135.2%	24.4
		1		8.9	103.6%	22.9		11.4	136.4%	24.4
AR9	Rte 1a Fort Fairfield	0	7:35	9.4	109.2%	22.8	14:45	11.9	143.7%	24.9
		1		9.5	110.3%	22.8		12	144.1%	24.6
		2		9.6	111.3%	22.7		12.5	147.9%	23.8
AR10	USA - Canada Border	0	7:15	9.2	108.7%	23.7	14:55	10.7	130.2%	25.3
		1		9.2	108.7%	23.7		11	133.6%	25.2
		2		9.3	110.1%	23.8		10.5	124.3%	23.8
		3		9.2	108.9%	23.8		10	118.1%	23.7
DUP-R (AR-1)	River Duplicate	mid depth	6:15	7.2	80.0%	20.5				

Major Tributaries

Presque Isle Stream

PIS0	Park St	mid depth	6:02	6.6	75.5%	22	14:55	8.7	106.3%	25.5
PIS8	Parson St Connector	mid depth	6:26	5.3	57.1%	19	14:50	12.6	155.3%	26
PIS13	Railroad Trestle	mid depth	6:38	5.1	55.0%	19	14:36	12.2	150.4%	26

Little Madawaska River

LM1	Bowles Rd	mid depth	7:01	8.8	92.8%	17.9	14:22	9.4	110.2%	23.3
LM2	Grimes Rd	mid depth	7:24	9	94.1%	17.5	14:37	10.9	128.5%	23.6

CS	Caribou Stream	mid depth	6:39	8.4	85.6%	16.3	14:08	9.8	116.8%	24.2
DUP-T (PIS0)	Tributary Duplicate	mid depth	6:10	6.6	75.5%	22				

Aroostook River Low Flow Survey

August 15, 2001

Station Code	Location	Depth (M)	Morning Sampling Run				Afternoon Sampling Run			
			Time	D. O. (ppm)	D. O. (% Sat.)	Temp °C	Time	D. O. (ppm)	D. O. (% Sat.)	Temp °C
AR0	Rte 11 Ashland	mid depth	7:30	7.5	82.0%	19.7	14:25	8.5	101.7%	24.4
AR0a	Ashland below	mid depth	7:40	7.3	79.8%	19.7	14:35	8.8	103.4%	23.4
AR1	River Rd Washburn	mid depth	6:17	7.3	78.7%	19	13:50	8.3	97.3%	23.3
AR1a	Crouseville	mid depth	6:40	6.9	75.6%	19.8	13:26	8.5	101.2%	24.1
AR2	.5 mi above Rte 1, P. I.	mid depth	7:11	8	88.0%	20	14:37	8.7	107.2%	26
AR3	Maysville	mid depth	7:43	8.2	90.2%	20	15:06	14.2	173.4%	25.5
AR4	McGraw	0	8:15	9.6	110.4%	22.3	15:08	12.4	149.8%	24.9
		1		9.6	110.4%	22.3		12.3	144.7%	23.5
		2		10	115.0%	22.3		11.5	134.1%	23
AR5	Above Caribou Dam	0	7:50	8.6	100.4%	23.1	14:55	10.9	132.1%	25.1
		1		8.6	100.6%	23.2		11	133.1%	25
		2		8.5	99.5%	23.2		10.8	128.3%	24
		3		8.6	100.6%	23.2		10.3	121.4%	23.6
		4		8.6	100.6%	23.2		9.8	115.1%	23.4
AR6	Below Little Madaw. R	mid depth	7:15	7.3	78.7%	19	14:25	15.4	185.7%	24.8
AR7	Goodwin	mid depth	7:47	7.7	84.3%	19.8	15:00	17.3	210.5%	25.3
AR8	Stevensville	0	6:57	9.1	103.3%	21.6	14:36	11.7	138.2%	23.7
		1		9.1	103.3%	21.6		11.8	139.6%	23.8
AR9	Rte 1a Fort Fairfield	0	6:45	9.4	108.3%	22.4	14:25	12.9	157.0%	25.3
		1		9.5	109.7%	22.5		13.7	161.8%	23.7
		2		9.5	109.7%	22.5		13.5	158.6%	23.4
AR10	USA - Canada Border	0	6:25	9.7	113.7%	23.3	14:08	13.5	162.8%	24.8
		1		9.7	113.7%	23.3		13.1	156.5%	24.3
		2		9.7	113.7%	23.3		11.8	139.1%	23.6
		3		9.7	113.7%	23.3				
DUP-R (AR5)	River Duplicate	0	8:03	8.9	104.1%	23.2				
		1		8.9	104.3%	23.3				
		2		8.8	103.2%	23.3				
		3		8.8	103.0%	23.2				
		4		8.7	101.8%	23.2				

Major Tributaries

Presque Isle Stream

PIS0	Park St	mid depth	6:04	6.9	76.6%	20.5	14:06	9	110.9%	26
PIS8	Parson St Connector	mid depth	6:30	5.8	61.3%	18	14:16	12.4	152.8%	26
PIS13	Railroad Trestle	mid depth	6:50	6	62.7%	17.5	14:26	12.2	150.4%	26

Little Madawaska River

LM1	Bowles Rd	mid depth	6:40	7.8	80.0%	16.6	13:58	9.9	113.9%	22.3
LM2	Grimes Rd	mid depth	7:00	8	81.4%	16.2	14:15	10.8	123.8%	22.1
CS	Caribou Stream	mid depth	6:18	7.4	78.2%	18	13:40	10.2	119.6%	23.3
DUP-T (PIS8)	Tributary Duplicate	mid depth	6:32	5.8	61.3%	18				

Aroostook River Low Flow Survey

August 16, 2001

Station Code	Location	Depth (M)	Morning Sampling Run				Afternoon Sampling Run			
			Time	D. O. (ppm)	D. O. (% Sat.)	Temp °C	Time	D. O. (ppm)	D. O. (% Sat.)	Temp °C
AR0	Rte 11 Ashland	mid depth	6:05	7.3	80.4%	20.1	14:10	8.6	100.6%	23.2
AR0a	Ashland below	mid depth	5:55	7.3	80.6%	20.2	14:20	8.8	103.4%	23.4
AR1	River Rd Washburn	mid depth	6:50	7.5	80.4%	18.7	13:40	8.6	101.2%	23.5
AR1a	Crouseville	mid depth	7:15	7	76.1%	19.4	13:30	8.8	103.6%	23.5
AR2	.5 mi above Rte 1, P. I.	mid depth	6:52	8.1	89.1%	20	14:31	8.7	105.3%	25
AR3	Maysville	mid depth	7:24	7.9	88.6%	21	14:08	14	169.4%	25
AR4	McGraw	0	8:15	10.5	120.8%	22.3	15:00	12.3	148.0%	24.7
		1		10.5	120.8%	22.3		11.7	138.7%	23.9
		2		10.4	119.4%	22.2		10.9	126.6%	22.8
AR5	Above Caribou Dam	0	7:55	9.9	116.1%	23.3	14:28	11.6	139.9%	24.8
		1		10	117.5%	23.4		11.4	136.7%	24.5
		2		10	117.5%	23.4		11	131.4%	24.3
		3		10	117.5%	23.4		10.9	130.0%	24.2
		4		8.1	94.8%	23.2				
AR6	Below Little Madaw. R	mid depth	7:22	7.5	82.2%	19.8	14:12	14.3	172.7%	24.9
AR7	Goodwin	mid depth	7:57	8.4	93.3%	20.5	14:21	19.2	234.9%	25.6
AR8	Stevensville	0	7:10	8.7	98.7%	21.6	15:11	13.1	155.6%	24
		1		8.6	97.8%	21.7		13.1	155.3%	23.9
AR9	Rte 1a Fort Fairfield	0	6:50	10.7	122.6%	22.1	15:00	14.1	169.4%	24.6
		1		10.7	122.6%	22.1		14	166.0%	23.9
		2		10.7	122.6%	22.1		14.3	168.6%	23.6
AR10	USA - Canada Border	0	6:25	10.2	118.7%	22.9	14:42	12.7	152.3%	24.5
		1		10.3	120.1%	23		13	155.3%	24.3
		2		10.3	120.1%	23		12.9	153.5%	24.1
		3		10.2	118.9%	23		12.6	149.4%	23.9
DUP-R (AR9)	River Duplicate	0	6:56	10.9	124.9%	22.1				
		1		10.9	125.1%	22.2				
		2		11	126.3%	22.2				

Major Tributaries

Presque Isle Stream

PIS0	Park St	mid depth	5:57	6.9	77.4%	21		9.3	115.7%	26.5
PIS8	Parson St Connector	mid depth	6:15	5.6	59.2%	18	14:51	13.1	161.5%	26
PIS13	Railroad Trestle	mid depth	6:30	5.9	62.3%	18	14:41	12	146.6%	25.5

Little Madawaska River

LM1	Bowles Rd	mid depth	6:40	7.8	81.2%	17.3	13:54	9.6	112.1%	23.1
LM2	Grimes Rd	mid depth	7:05	8.3	85.0%	16.5	14:04	11.2	129.3%	22.5
CS	Caribou Stream	mid depth	6:20	7.4	78.6%	18.3	13:40	10	117.7%	23.5
DUP-T (LM2)	Tributary Duplicate	mid depth	7:10	8.4	86.2%	16.6				

Aroostook River Intensive Survey

August 28-30, 2001

Flow (cfs)

	USGS Washburn	AR6	PIS0	LM2	CS
28-Aug	117	177	3.8	29.3	3.9
29-Aug	130				
30-Aug	134				

Station Code	Location	Date	TSS ppm	VSS ppm	TP ppb	PO4-P ppb	TN ppm	NH3-N ppm	NO2-N ppm	NO3-N ppm	$NO3\text{-}N_i$ ppm	Chl a ppb	TBODu ppm	CBODu ppm	NBODu ppm	BOD Kd /day	Secchi* (m)
AR0	Rte 11 Ashland	28-Aug	< 1	< 1	3.7	< 1	0.27	< .04	< .01	0.01	0.17	< 1	4.3	3.6	0.7	0.039	
		29-Aug	< 1	< 1	3.7	< 1	0.25	< .04	< .01	0.01	0.14	< 1	3.7	3.1	0.6	0.036	
		30-Aug	< 1	< 1	3.8	< 1	0.28	< .04	< .01	0.01	0.1	< 1	3.3	2.9	0.4	0.059	
AR0a	Ashland below	28-Aug	< 1	< 1	2.9	< 1	0.26	< .04	< .01	0.01	0.12	< 1	3.4	2.9	0.5	0.048	
		29-Aug	< 1	< 1	5.6	< 1	0.26	< .04	< .01	0.01	0.15	1.1	3.7	3.1	0.6	0.036	
		30-Aug	2	1.8	5.2	< 1	0.26	< .04	< .01	0.01	0.14	< 1	3.4	2.8	0.6	0.059	
AR1	River Rd Washburn	28-Aug	< 1	< 1	9.9	2.6	0.27	< .04	< .01	0.02	0.14	< 1	3.1	2.6	0.5	0.05	
		29-Aug	< 1	< 1	4.7	< 1	0.25	< .04	< .01	0.02	0.15	52	3.6	3.0	0.6	0.035	
		30-Aug	1.2	1	3.1	< 1	0.27	< .04	< .01	0.01	0.11	< 1	3.3	2.9	0.4	0.06	
AR1a	Crouseville	28-Aug	1.6	1.2	3.8	< 1	0.26	< .04	< .01	0.03	0.15	1.2	3	2.5	0.5	0.047	
		29-Aug	< 1	< 1	5.6	< 1	0.28	< .04	< .01	0.02	0.19	1.2	4.1	3.4	0.7	0.03	
		30-Aug	1	< 1	4	< 1	0.29	< .04	< .01	0.02	0.14	< 1	3.4	2.9	0.5	0.066	
AR2	.5 mi above Rte 1, P. I.	28-Aug	1	< 1	4.6	< 1	0.29	< .04	< .01	0.03	0.19	< 1	4.7	4.0	0.7	0.037	
		29-Aug	< 1	< 1	6.1	< 1	0.28	< .04	< .01	0.03	0.2	2.2	3.7	3.0	0.7	0.043	
		30-Aug	< 1	< 1	4.5	< 1	0.26	< .04	< .01	0.02	0.14	5.5	3.2	2.7	0.5	0.064	
AR3	Maysville	28-Aug	1.6	1.4	18	7.7	1.55	< .04	< .01	1.17	1.34	2.4	4	3.3	0.7	0.063	
		29-Aug	1.7	2.5	21	10	1.46	< .04	0.01	1.19	1.34	3.5	4.4	3.8	0.6	0.05	
		30-Aug	1	< 1	18	6.4	1.22	< .04	< .01	0.91	1.07	3.2	3.6	2.9	0.7	0.079	
AR4	McGraw	28-Aug	2.5	1.9	11	1.2	1.79	0.05	0.03	1.41	1.58	1	5	4.3	0.7	0.066	
		29-Aug	1	< 1	19	1.1	2.08	0.05	0.02	1.68	1.92	5	5.6	4.6	1.0	0.051	
		30-Aug	2.6	2.2	17	4.4	2.08	< .05	0.02	1.65	1.83	5.1	4.8	4.0	0.8	0.073	
AR5	Above Caribou Dam	28-Aug	2.3	1.9	14	< 1	1.01	< .04	0.01	0.6	0.85	4.8	4.9	3.8	1.1	0.06	2.5
		29-Aug	< 1	< 1	17	< 1	1.02	0.04	0.01	0.65	0.87	7.5	5	4.0	1.0	0.053	2.3
		30-Aug	1.6	1.2	17	< 1	1.09	< .04	0.01	0.66	0.97	9	5.8	4.5	1.3	0.061	
AR6	Below Little Madaw. R	28-Aug	2.9	2.1	87	57	1.05	< .04	0.01	0.76	0.98	6.9	4.4	3.4	1.0	0.064	
		29-Aug	1.8	1.6	74	48	1	< .04	0.01	0.67	0.95	6.6	4.8	3.6	1.2	0.063	
		30-Aug	1.6	1.4	68	43	1	< .04	< .01	0.61	0.81	7.5	4.3	3.4	0.9	0.077	
AR7	Goodwin	28-Aug	1.4	1.2	19	4	0.97	< .04	0.01	0.64	0.82	9.5	4.3	3.5	0.8	0.065	
		29-Aug	< 1	< 1	28	7.9	0.94	< .04	0.01	0.53	0.74	7	5	4.1	0.9	0.054	
		30-Aug	1.9	1.7	25	7.4	0.79	< .04	< .01	0.44	0.64	8.2	4.6	3.7	0.9	0.078	
AR8	Stevensville	28-Aug	1.9	1.7	20	4.5	0.97	< .04	0.01	0.62	0.84	8.6	4.7	3.7	1.0	0.058	
		29-Aug	1.2	1	25	5.8	0.96	< .04	0.01	0.55	0.79	6.1	5.1	4.1	1.0	0.059	
		30-Aug	1.4	1.2	22	6.1	0.83	< .04	< .01	0.45	0.62	8.2	4.5	3.8	0.7	0.077	
AR9	Rte 1a Fort Fairfield	28-Aug	1	< 1	58	43	0.84	< .04	0.01	0.48	0.71	5.2	4.4	3.4	1.0	0.064	
		29-Aug	1.2	< 1	23	11	0.88	< .04	0.01	0.45	0.66	6.1	5.1	4.2	0.9	0.054	
		30-Aug	1.4	1	31	15	0.73	< .04	< .01	0.35	0.54	6.1	4.8	4.0	0.8	0.075	
AR10	USA - Canada Border	28-Aug	2.8	1.9	28	15	1.06	0.04	0.02	0.66	0.94	3.6	5.2	4.0	1.2	0.054	>2.1
		29-Aug	1	< 1	46	16	1.03	0.04	0.01	0.55	0.88	5.3	5.8	4.4	1.4	0.056	>2.4
		30-Aug	2.4	2.2	39	19	0.77	< .04	0.01	0.37	0.59	3.9	4.9	3.9	1.0	0.075	
PIS8 AR10 AR9	River Duplicate	28-Aug	2.8	2.1	88	34	1.36	0.09	0.01	0.89	1.16	4.1	8	6.8	1.2	0.049	
		29-Aug	1.2	1	43	17	1.02	0.04	0.02	0.54	0.81	5.5	5.6	4.4	1.2	0.049	
		30-Aug	< 1	< 1	33	12	0.73	< .04	0.01	0.35	0.62	5.5	6.2	5.0	1.2	0.057	

* Secchi depth readings were only taken in impoundments where there was adequate depth.

$NO3\text{-}N_i$ = Nitrate-N reading at start of BOD test

$NO3\text{-}N_f$ = Nitrate-N reading at end of BOD test

Aroostook River Intensive Survey

August 28-30, 2001

Major Tributaries

Station Code	Location	Date	TSS ppm	VSS ppm	TP ppb	PO4-P ppb	TN ppm	NH3-N ppm	NO2-N ppm	NO3-N_i ppm	NO3-N_f ppm	Chl a ppb	TBODu ppm	CBODu ppm	NBODu ppm	BOD Kd /day	Flow (cfs)
Presque Isle Stream																	
PIS0	Park St	28-Aug	13	3.1	13	< 1	0.53	0.04	< .01	0.09	0.32	3	7.8	6.8	1.0	0.037	3.8
		29-Aug	1.9	1.7	40	1.3	0.69	0.04	< .01	0.17	0.46	5	8.4	7.1	1.3	0.054	
		30-Aug	6.5	3.3	34	2.7	0.7	0.04	< .01	0.2	0.43	5.2	6.5	5.5	1.0	0.063	
PIS8	Parson St Connector	28-Aug	4.4	1.9	120	35	1.38	0.09	0.01	0.87	1.12	4.1	7.8	6.7	1.1	0.047	
		29-Aug	7.2	4	93	6.6	0.72	< .04	< .01	0.18	0.5	3.6	11.3	9.9	1.4	0.078	
		30-Aug	6	2.8	36	4.4	0.69	< .04	< .01	0.23	0.43	5.3	5.4	4.5	0.9	0.065	
PIS13	Railroad Trestle	28-Aug	5.1	2.9	61	5.1	1.61	0.08	0.02	1.22	1.41	2.4	16.3	15.5	0.8	0.075	
		29-Aug	9.8	3.1	67	17	0.63	< .04	< .01	0.19	0.44	7	8.1	7.0	1.1	0.043	
		30-Aug	7.4	2.4	41	7.7	0.66	< .04	< .01	0.21	0.41	5	5.3	4.4	0.9	0.063	
Little Madawaska River																	
LM1	Bowles Rd	28-Aug	1.6	1.4	4.8	< 1	0.63	< .04	< .01	0.43	0.58	1.4	3.3	2.7	0.6	0.059	
		29-Aug	< 1	< 1	6.5	< 1	0.67	< .04	< .01	0.4	0.55	3.9	4	3.4	0.6	0.048	
		30-Aug	< 1	< 1	5.7	< 1	0.62	< .04	< .01	0.36	0.46	2.2	2.4	2.0	0.4	0.038	
LM2	Grimes Rd	28-Aug	1.5	1.5	6.4	< 1	0.99	< .04	< .01	0.82	0.96	4.8	2.9	2.3	0.6	0.063	29.3
		29-Aug	1.4	1	6.8	< 1	0.96	< .04	< .01	0.71	0.84	3.2	3.5	2.9	0.6	0.067	
		30-Aug	< 1	< 1	9.6	1.3	0.9	< .04	< .01	0.63	0.77	3.3	3	2.4	0.6	0.083	
CS	Caribou Stream	28-Aug	1.9	1.6	9.4	< 1	0.85	0.06	0.01	0.47	0.76	1.6	4.4	3.1	1.3	0.072	3.9
		29-Aug	< 1	< 1	11	< 1	0.76	< .04	0.01	0.48	0.81	2.9	5.3	3.9	1.4	0.046	
		30-Aug	< 1	< 1	10	< 1	0.78	< .04	0.01	0.46	0.65	2.8	5.6	4.8	0.8	0.114	
LM1 AR3 CS	Tributary Duplicate	28-Aug	< 1	< 1	3.6	< 1	0.65	< .04	< .01	0.42	0.58	1.4	3	2.3	0.7	0.055	
		29-Aug	< 1	< 1	20	9	1.49	< .04	0.01	1.22	1.34	< 1	4.7	4.2	0.5	0.059	
		30-Aug									0.62		4.1	1.4	2.7	0.093	

NO3-N_i = Nitrate-N reading at start of BOD test

NO3-N_f = Nitrate-N reading at end of BOD test

Aroostook River Intensive Survey

August 26-30, 2001 (Sun - Thurs)

Numbers in **boldface** indicate treatment facility data

Effluents

Station Code	Location	Date	TSS ppm	VSS ppm	TP ppb	PO4-P ppb	TN ppm	NH3-N ppm	NO2-N ppm	NO3-N ppm	$NO3\text{-}N_i$ ppm	Chl a ppb	BOD5 ppm	TBODu ppm	CBODu ppm	NBODu ppm	Flow (mgd)
ASH	Ashland	26-Aug	5.1	4.9	1500	492	3.18	0.4	0.03	0.05	2.2	140	11	33	24	9	**0.047**
		27-Aug	5.2	5	4100	513	3.39	0.63	0.03	0.04	2.6	160	12	43	32	11	**0.045**
		28-Aug	3.8	3.6	1400	526	3.78	0.53	0.05	0.07	2.5	1.1	9	40	29	11	**0.086**
		29-Aug															**0.082**
		30-Aug											**11**				**0.070**
WAS	Washburn	26-Aug	64	63.6	6500	2975	3.33	0.64	0.73	1.4	4.6		15	125	111	14	**0.036**
		27-Aug	94	93.3	6800	2980	11.9	0.35	0.99	1.61	6.4	730	17	166	145	21	**0.029**
		28-Aug	86	82.6	7000	2895	10.6	0.34	0.88	1.44	5.6	470	15	164	146	18	**0.046**
		29-Aug															**0.042**
		30-Aug															**0.031**
PRI	Presque Isle	26-Aug	2.7	2.5	480	126 **160**	8.59	0.07	< .01	7.2	6.9	1	1.6 **3**	9	9.0	0.0	**0.948**
		27-Aug	4.7	2.9	420	122 **150**	3.77	**0.04** 0.24	< .01	4.76	5.1	< 1	3 **4**	11	9.5	1.5	**1.218**
		28-Aug	4.6	3.3	550	**170** 123	2.49	**0.05** 0.25	< .01	2.5	3.1	1.1	3 **2**	9.7	7.1	2.6	**1.614**
		29-Aug						**0.05**					3				**1.174**
		30-Aug											**3**				**1.263**
MCC	McCain Foods	26-Aug	100	49	28000	4875	133	< .04	< .01	106	100	5.2	11 / **3**	39	39	0.0	**1.567**
		27-Aug	11	6.8	28600	4065	138	0.04	0.03	91.1	96	1.8	3 / **13**	14	14.0	0.0	**1.662**
		28-Aug	4.5	4.1	6400	3150	113	0.06	0.02	94.8	94	12	2 / **2**	12	12.0	0.0	**1.898**
		29-Aug											**3**				**2.152**
		30-Aug											**4**				**2.140**
CAR	Caribou	26-Aug	23	19.7	18000	9480	13.8	0.05	0.03	11.8	12	160	15	32	31	1	**0.56**
		27-Aug	22	19.5	27000	9480	15.2	0.08	0.05	12.4	13	140	16	40	37	3	**0.579**
		28-Aug	18	13.5	26000	10000	14.9	0.07	0.04	11.8	12	210	12 / **18**	35	34	1	**0.621**
		29-Aug											**21**				**0.611**
		30-Aug											**16**				**0.595**
LOR	Loring	26-Aug	< 1	< 1	1800	678	6.04	0.04	0.07	4.62	4.4	2.6	1.8	5.3	5.3	0.0	**0.278**
		27-Aug	< 1	< 1	2300	661	5.18	0.05	0.06	4.27	4.4	< 1	1.1	5.2	4.6	0.6	**0.348**
		28-Aug	1.2	< 1	1900	595	5.09	0.05	0.06	4.41	2.8	< 1	1.4	5.9	5.9	0.0	**0.412**
		29-Aug											1.6				**0.365**
		30-Aug											**1.9**				**0.327**
FTF	Fort Fairfield	26-Aug	13	12.5	9500	4800	25.6	0.44	0.41	20.4	23	2.4	17 / **20**	36	25	11	**0.376**
		27-Aug	12	10	3800 **18000**	17000 1685	19.8	0.78	0.53	18.2	18	2	16 **15**	40	40	0	**0.369**
		28-Aug	12	9.8	44000 **17000**	16000 24050	20.6	1.71	0.58	15.8	20	3.6	19 **20**	57	39	18	**0.379**
		29-Aug			**17000**	**16000**							15				**0.399**
		30-Aug											**26**				**0.358**
ASH MCC PRI	Effluent Duplicate	26-Aug	4.7	4.7	1500	494	3.3	0.4	0.03	0.05		160					
		27-Aug	20	10.6	26000	4010	142	0.04	0.03	102		1.4					
		28-Aug	4.4	4	530	124	4.88	0.23	< .01	2.52	3	< 1		9	6.9	2.1	
		29-Aug															
		30-Aug															

$NO3\text{-}N_i$ = Nitrate-N reading at start of BOD test

$NO3\text{-}N_f$ = Nitrate-N reading at end of BOD test

Aroostook River Dry Weather Tributary Survey
August 27, 2001

Station Code	Location	Depth (M)	Time	D. O. (ppm)	D. O. (% Sat.)	Temp °C	TSS ppm	VSS ppm	TP ppb	PO4-P ppb
t-SCS	St Croix Str Rte 11	mid depth	7:02	7.4	79.8%	19	< 1	< 1	7.2	< 1
t-SPS	Squa Pan Str Rte 11	mid depth	6:45	8.1	85.4%	17.9	< 1	< 1	5.6	< 1
t-MR	Machias R Garfield Rd	mid depth	6:25	7.1	75.2%	18.1	< 1	< 1	4.9	< 1
t-LMR	L Machias R, Rte 11	mid depth	6:15	7.8	81.4%	17.4	< 1	< 1	10	< 1
t-AB	Alder Brook Ashland	mid depth	7:45	6.1	60.8%	15.2	1.8	1.6	17	< 1
t-GAB	Gardner Brook, Wade	mid depth	8:50	8.7	85.7%	14.7	< 1	< 1	2.7	< 1
t-SB	Salmon Brook Washburn	mid depth	8:27	8.3	83.2%	15.5	2.2	1.7	8.6	1.7
t-CB	Clayton Brook Washburn	mid depth	8:10	6.6	65.0%	14.7	2.1	1.9	19	3.3
t-NBP	North Branch P. I. Str in Mapleton	mid depth	8:19	7.8	78.5%	15.7	7.1	4.7	40	< 1
t-MB	Merritt Brook	mid depth	6:06	9.9	95.6%	13.8	2.2	1.5	15	4.9
t-HB	Hardwood Brook Maysville	mid depth	7:42	9.4	92.4%	14.6	1	< 1	6.9	< 1
t-PB	Prestile Brook Caribou	mid depth	7:29	9.5	93.8%	14.8	3	2.6	30	18
t-CS	Caribou Str Caribou	mid depth	7:16	7.4	78.0%	17.9	1.8	1.8	16	< 1
t-OB	Otter Brook Caribou	mid depth	7:07	9	88.5%	14.6	1	< 1	7.3	2.2
t-GRB	Gray Brook Fort Fairfield	mid depth	6:46	10.2	92.9%	11.2	< 1	< 1	21	12
t-HHB	Hockenhull Bk. Fort Fairfield	mid depth	6:32	8.2	81.8%	15.3	4.5	3.2	28	6.1

Aroostook River Low Flow Survey

August 28, 2001

Station Code	Location	Depth (M)	Morning Sampling Run				Afternoon Sampling Run			
			Time	D. O. (ppm)	D. O. (% Sat.)	Temp °C	Time	D. O. (ppm)	D. O. (% Sat.)	Temp °C
AR0	Rte 11 Ashland	mid depth	6:50	8.1	87.1%	18.9	14:15	8.9	103.0%	22.6
AR0a	Ashland below	mid depth		8.1	86.8%	18.7	14:25	9.4	107.7%	22.1
AR1	River Rd Washburn	mid depth	6:03	8.3	88.0%	18.2	13:45	9.2	104.8%	21.8
AR1a	Crouseville	mid depth	6:15	8	85.4%	18.5	13:30	9.8	111.0%	21.5
AR2	.5 mi above Rte 1, P. I.	mid depth	6:56	8	85.4%	18.5	14:38	9.5	112.9%	24
AR3	Maysville	mid depth	7:24	7.5	79.2%	18	14:14	13.4	153.3%	22
AR4	McGraw	0	8:27	8.5	92.2%	19.3	14:54	9.7	107.7%	20.5
		1		8	86.6%	19.2		9.5	105.1%	20.3
		2		7.9	85.5%	19.2		9	98.4%	19.7
AR5	Above Caribou Dam	0	8:10	9.1	100.9%	20.4	14:40	10	113.3%	21.5
		1		9.1	100.9%	20.4		10	113.3%	21.5
		2		9.1	101.1%	20.5		10	113.0%	21.4
		3		9.1	101.1%	20.5		10	112.2%	21
		4		9.1	100.9%	20.4		9.8	109.1%	20.6
AR6	Below Little Madaw. R	mid depth	6:42	7.6	80.6%	18.2	14:13	13.3	154.7%	22.9
AR7	Goodwin	mid depth	8:08	8.4	88.7%	18	14:57	19.2	224.7%	23.2
AR8*	Stevensville	0	7:15	7.5	79.5%	18.2	14:42	14	159.5%	21.8
		1		7.4	78.5%	18.2				
AR9*	Rte 1a Fort Fairfield	0	6:42	8.7	93.2%	18.7	14:15	12.6	141.9%	21.2
		1		8.3	88.9%	18.7		13.6	152.0%	20.8
		2								
AR10*	USA - Canada Border	0	6:30	10.2	111.7%	19.8	14:02	10.7	119.8%	20.9
		1		10.2	111.7%	19.8		10.7	119.6%	20.8
		2		10.2	111.7%	19.8		10.5	116.2%	20.3
		3								

* Tinker Dam Impoundment drawn down 3-4 feet at these sites

Major Tributaries

Presque Isle Stream

PIS0	Park St	mid depth	6:03	6.9	75.1%	19.5	15:03	9.6	114.0%	24
PIS8	Parson St Connector	mid depth	6:18	5.8	61.3%	18	14:57	13.4	162.2%	25
PIS13	Railroad Trestle	mid depth	6:33	5.7	60.2%	18	14:49	12.6	152.5%	25

Little Madawaska River

LM1	Bowles Rd	mid depth	7:15	8.4	86.0%	16.5	13:45	10.5	117.1%	20.7
LM2	Grimes Rd	mid depth	6:53	8.6	87.7%	16.3	14:05	11.8	132.4%	21

CS	Caribou Stream	mid depth	7:46	8.1	84.7%	17.5	13:56	10.4	117.8%	21.5
DUP-T (PIS8)	Tributary Duplicate	mid depth	6:24	5.9	62.3%	18				
DUP-T (LM1)	Tributary Duplicate	mid depth	7:22	8.5	87.0%	16.5				

Aroostook River Low Flow Survey

August 29, 2001

Station Code	Location	Depth (M)	Morning Sampling Run				Afternoon Sampling Run			
			Time	D. O. (ppm)	D. O. (% Sat.)	Temp °C	Time	D. O. (ppm)	D. O. (% Sat.)	Temp °C
AR0	Rte 11 Ashland	mid depth	7:15	8.3	89.7%	19.1	14:20	9	101.9%	21.5
AR0a	Ashland below	mid depth	7:35	8.1	88.4%	19.6	14:30	9.2	103.8%	21.3
AR1	River Rd Washburn	mid depth	6:35	7.9	86.4%	19.7	13:43	8.8	99.5%	21.4
AR1a	Crouseville	mid depth	6:00	7.6	83.8%	20.1	13:30	9.3	105.3%	21.5
AR2	.5 mi above Rte 1, P. I.	mid depth	7:05	8.3	89.5%	19	14:10	9.4	107.5%	22
AR3	Maysville	mid depth	7:34	7.7	84.7%	20	13:47	12.8	143.6%	21
AR4	McGraw	0	8:20	9.3	101.7%	19.7	14:53	10.6	118.0%	20.6
		1		9.3	101.7%	19.7		10.6	118.0%	20.6
		2		9.2	100.6%	19.7		10.6	118.0%	20.6
AR5	Above Caribou Dam	0	7:50	8.8	97.7%	20.5	14:30	9.6	107.3%	20.8
		1		8.8	97.9%	20.6		9.6	107.3%	20.8
		2		8.8	97.9%	20.6		9.6	107.3%	20.8
		3		8.8	97.9%	20.6		9.6	107.1%	20.7
		4		8.4	93.3%	20.5		9.5	105.9%	20.7
AR6	Below Little Madaw. R	mid depth	6:25	6.8	73.7%	19.3	15:37	16.2	182.4%	21.2
AR7	Goodwin	mid depth	6:56	6.9	74.7%	19.2	15:20	16.2	182.1%	21.1
AR8*	Stevensville	0	7:30	7.5	82.2%	19.8	15:00	13.8	154.8%	21
		1								
AR9*	Rte 1a Fort Fairfield	0	6:31	10.9	120.1%	20.1	14:20	14.3	161.3%	21.3
		1		10.4	114.2%	19.9		14.6	164.7%	21.3
		2								
AR10*	USA - Canada Border	0	6:12	10.4	114.6%	20.1	14:05	10.6	117.3%	20.3
		1		10.4	114.8%	20.2		10.7	118.4%	20.3
		2		10.4	114.8%	20.2		10.8	119.3%	20.2
		3								
DUP-R (AR3)	River Duplicate	mid depth		7.7	84.7%	20				
DUP-R (AR10)	River Duplicate	0	6:19	10.4	114.8%	20.2				
		1		10.4	114.8%	20.2				
		2		10.4	114.8%	20.2				

* Tinker Dam Impoundment drawn down 2-3 feet at these sites

Major Tributaries

Presque Isle Stream

PIS0	Park St	mid depth	6:05	7.7	84.7%	20	14:35	8.6	97.4%	21.5
PIS8	Parson St Connector	mid depth	6:23	6.8	73.3%	19	14:28	10.8	123.5%	22
PIS13	Railroad Trestle	mid depth	6:48	6.9	74.4%	19	14:21	10.8	123.5%	22

Little Madawaska River

LM1	Bowles Rd	mid depth	7:03	7.8	81.7%	17.6	14:00	10	108.9%	19.5
LM2	Grimes Rd	mid depth	6:45	7.9	82.8%	17.6	15:49	11.8	130.0%	20.1
CS	Caribou Stream	mid depth	8:04	8.5	89.8%	18	13:25	10.2	112.2%	20

Aroostook River Low Flow Survey

August 30, 2001

Station Code	Location	Depth (M)	Morning Sampling Run Time	D. O. (ppm)	D. O. (% Sat.)	Temp °C	Afternoon Sampling Run Time	D. O. (ppm)	D. O. (% Sat.)	Temp °C
AR0	Rte 11 Ashland	mid depth	6:30	8.1	85.6%	18	14:10	8.2	92.5%	21.3
AR0a	Ashland below	mid depth	6:10	8.8	92.4%	17.7	14:20	9	101.0%	21
AR1	River Rd Washburn	mid depth	7:00	8.3	84.3%	16.1	13:43	8.8	96.8%	20
AR1a	Crouseville	mid depth	7:15	7.7	79.7%	17	13:30	8.8	97.7%	20.5
AR2	.5 mi above Rte 1, P. I.	mid depth	6:45	8.8	90.1%	16.5	14:00	9.5	108.6%	22
AR3	Maysville	mid depth	7:17	8.4	86.9%	17	13:38	13.8	153.3%	20.5
AR4	McGraw	0	7:49	9.8	106.7%	19.5	14:55	10.8	119.7%	20.4
		1		9.6	104.3%	19.4		11.6	128.6%	20.4
		2		9.7	105.4%	19.4		12.1	133.3%	20.1
AR5	Above Caribou Dam	0	7:30	8.9	97.9%	20	14:45	9	100.6%	20.8
		1		9	99.0%	20		10.5	117.1%	20.7
		2		9	99.2%	20.1		12.6	140.2%	20.6
		3		8.9	98.1%	20.1		13.2	146.0%	20.3
		4		9	99.2%	20.1		12.1	133.3%	20.1
AR6	Below Little Madaw. R	mid depth	6:20	7.8	78.5%	15.7	13:48	14.7	164.9%	21
AR7	Goodwin	mid depth	7:57	9.4	96.7%	16.7	15:02	15	169.6%	21.4
AR8*	Stevensville	0	7:31	9.1	94.5%	17.2	14:25	14.1	156.0%	20.3
		1								
AR9*	Rte 1a Fort Fairfield	0	6:43	12.2	130.2%	18.5	14:12	14.9	166.8%	20.9
		1		12	127.8%	18.4		15.6	174.3%	20.8
		2								
AR10*	USA - Canada Border	0	6:23	10.3	111.0%	19	13:42	10	110.6%	20.3
		1		10.3	111.0%	19		10	110.6%	20.3
		2		10.3	111.0%	19		10	110.2%	20.1
		3		10.2	110.0%	19				
DUP-R (AR9)	River Duplicate	0	7:40	12.1	128.9%	18.4				
		1		12	127.8%	18.4				

* Tinker Dam Impoundment drawn down 3-4 feet at these sites

Major Tributaries

Presque Isle Stream

PIS0	Park St	mid depth	6:00	7.4	78.2%	18	14:35	8.7	98.5%	21.5
PIS8	Parson St Connector	mid depth	6:16	7.5	77.6%	17	14:22	10.9	127.1%	23
PIS13	Railroad Trestle	mid depth	6:26	7.7	78.8%	16.5	14:10	11	128.2%	23

Little Madawaska River

LM1	Bowles Rd	mid depth	7:00	8.7	83.9%	13.7	14:08	12.4	133.4%	18.9
LM2	Grimes Rd	mid depth	6:40	9	86.4%	13.5	13:55	11.2	120.0%	18.7

CS	Caribou Stream	mid depth	7:46	8.9	90.2%	16	13:17	10.4	114.4%	20
DUP-T (CS)	Tributary Duplicate	mid depth	7:47	8.9	90.2%	16				

Aroostook River Single Day Surveys

Station Code	Location	Depth (M)	26-Jun				3-Jul				12-Jul				8-Aug to 9-Aug			
			Time	D. O. (ppm)	D. O. (% Sat.)	Temp °C	Time	D. O. (ppm)	D. O. (% Sat.)	Temp °C	Time	D. O. (ppm)	D. O. (% Sat.)	Temp °C	Date-Time	D. O. (ppm)	D. O. (% Sat.)	Temp °C
AR0	Rte 11 Ashland	Surface	5:45	8.9	95.9%	19.1	11:45	9	95.5%	18.2	6:06	8.8	95.4%	19.3	8-5:20	6.7	71.8%	18.7
AR0a	Ashland below	Surface	6:00	8.8	94.7%	18.9	11:30	9.1	96.1%	18	6:14	8.8	95.6%	19.4	8-5:30	5.7	65.1%	21.9
AR1	River Rd Washburn	Surface	6:45	8.9	95.9%	19	11:00	8.8	90.7%	16.8	7:20	7.5	82.3%	19.9	8-6:10	6.9	72.1%	17.5
AR1a	Crouseville	Surface	8:26	8	90.8%	21.6	9:45	9.5	98.3%	17	7:45	7.8	86.6%	20.5	8-6:32	6.1	65.6%	18.9
AR2	.5 mi above Rte 1, P. I.	Surface	8:38	7.6	87.8%	22.5	9:18	9.6	99.3%	17	7:55	7.8	86.3%	20.3	8-6:47	5.5	62.9%	22
AR3	Maysville	Surface	9:10	8.6	102%	23.9	8:30	9.4	95.2%	16	8:40	8.9	98.5%	20.3	9-7:45	7	80.4%	22.2
AR4	McGraw	Surface	9:27	8.6	103%	24.3	8:06	8.9	95.9%	19	8:55	8.4	93.1%	20.4	9-7:28	7.6	85.2%	21
AR5	Above Caribou Dam	Surface	9:43	8.7	105%	25	7:49	8	86.9%	19.4	9:35	7.8	87.0%	20.7	9-7:16	7	82.2%	23.4
AR6	Below Little Madaw. R	Surface	10:15	10.8	125%	22.6	6:48	9	92.7%	16.8	10:38	9.6	105%	19.6	9-6:58	8	88.3%	20.2
AR7	Goodwin	Surface	10:38	11	128%	23	6:29	8.8	89.9%	16.4	10:59	10	112%	20.7	9-6:43	7.5	85.0%	21.5
AR8	Stevensville	Surface	10:50	10.9	126%	22.6	6:10	8.9	91.1%	16.5	11:38	9.8	109%	20.5				
AR9	Rte 1a Fort Fairfield	Surface	11:15	9.7	114%	23.2	5:58	9.6	98.3%	16.5	11:09	8.8	98.9%	21.1	9-6:30	7	80.2%	22.1
AR10	USA - Canada Border	Surface	12:00	7.8	92.1%	23.7	5:30	9.2	95.4%	17.1	11:20	9.6	109%	21.6	9-6:18	7.3	83.5%	22
Major Tributaries																		
Presque Isle Stream																		
PIS0	Park St	Surface	8:30	7.9	91.6%	22.7	12:40	9.5	106%	20.9	8:09	7.9	87.4%	20.3				
PIS8	Parson St Connector	Surface	8:20	7.8	89.2%	22	12:30	10.3	114%	20.5	8:02	9	99.2%	20.1	8-7:10	6.5	72.3%	20.6
PIS13	Railroad Trestle	Surface	8:40	7.9	90.7%	22.2	12:40	8.1	89.3%	20.1	7:55	9.2	101%	19.9				
Little Madawaska River																		
LM1	Bowles Rd	Surface	10:40	8.8	96.4%	19.8	6:20	9.5	92.6%	14.2	10:25	9.6	102%	18.4	9-6:52	7.2	78.1%	19.3
LM2	Grimes Rd	Surface	10:59	8.6	92.7%	19	6:48	9.6	96.2%	15.5	10:10	9.8	104%	18.2				
CS	Caribou Stream	mid depth			0.0%				0.0%				0.0%		9-7:10	6.8	76.0%	20.8

Aroostook River Single Day Surveys
Minor Tributaries

Station Code	Location	Depth (M)	26-Jun				3-Jul				12-Jul				8-Aug to 9-Aug			
			Time	D. O. (ppm)	D. O. (% Sat.)	Temp °C	Time	D. O. (ppm)	D. O. (% Sat.)	Temp °C	Time	D. O. (ppm)	D. O. (% Sat.)	Temp °C	Date-Time	D. O. (ppm)	D. O. (% Sat.)	Temp °C
t-SCS	St Croix Str Rte 11	mid depth	6:00	6.1	65.0%	18.4	11:38	9.6	98.3%	16.5	5:20	7.6	79.9%	17.8				
t-SPS	Squa Pan Str Rte 11	mid depth	6:20	8.2	85.2%	17.2	11:20	10	108%	19.1	5:37	8.7	90.8%	17.4				
t-MR	Machias R Garfield Rd	mid depth	6:39	7.9	85.9%	19.4	11:05	10	101%	16	5:53	8.4	88.9%	18.1				
t-LMR	L Machias R. Rte 11	mid depth	6:50	7.8	83.7%	18.8	10:49	9.5	98.3%	17	5:59	7.9	83.8%	18.2				
t-AB	Alder Brook Ashland	mid depth	7:30	8	81.9%	16.5	10:28	8.1	78.3%	13.8	6:23	8.6	86.2%	15.5				
t-GAB	Gardner Brook, Wade	mid depth	8:10	8.2	84%	16.4	9:36	8.6	86.8%	15.8	7:40	8.5	85.8%	15.8				
t-SB	Salmon Brook Washburn	mid depth	7:50	7.8	84%	18.8	9:15	8.8	89.0%	15.9	7:31	7.8	82.6%	18.1	8-:620	4.6	50.4%	19.8
t-CB	Clayton Brook Washburn	mid depth	8:10	7.1	72%	16.1	12:26	7.6	19.8%	15.2	7:15	9	90.2%	15.5				
t-NBP	North Branch P. I. Str in Mapleton	mid depth	5:16	5.9	65%	20.1	12:10	8.4	85.1%	16	6:43	7.1	75%	17.7				
t-MB	Merritt Brook	mid depth	5:00	6.5	69%	18.1	12:48	8.7	88.7%	16.3	4:40	8	76%	13.2	9-5:40	8.1	80.7%	15.2
t-HB	Hardwood Brook Maysville	mid depth	10:09	8.9	94%	18	8:15	9	86.4%	13.5	8:30	10.5	107%	16.2	9-7:41	7.6	77.8%	16.5
t-PB	Prestile Brook Caribou	mid depth	10:29	9.1	96%	17.9	7:55	10.1	96.7%	13.4	9:20	9.5	96.9%	16.3				
t-CS	Caribou Str Caribou	mid depth	10:48	8.2	94.5%	22.4	7:20	9	90.4%	15.6	9:45	8.6	93%	19.3	9-7:10	6.8	76.0%	20.8
t-OB	Otter Brook Caribou	mid depth	11:12	7.6	82.6%	19.4	6:35	9.5	89.0%	12.4	9:54	9.2	94%	16.6				
t-GRB	Gray Brook Fort Fairfield	mid depth	11:48	10.4	99.6%	13.4	6:00	11.2	98%	9.5	10:48	11.1	105%	13	9-6:41	9	82.0%	11.2
t-HHB	Hockenhull Bk. Fort Fairfield	mid depth	12:10	10.8	117%	19.2	5:45	10.8	112%	17.3	11:10	10.2	102%	15.2				

A3- BOD Analysis

Ultimate BOD Aroostook River

16-Jul

Indicates reaeration of sample occurred

Location	Effl Vol (ml)	Seed Vol (ml)	Date / Day	17-Jul 0	20-Jul 3	23-Jul 6	26-Jul 9	30-Jul 13	2-Aug 16	6-Aug 20	13-Aug 27	20-Aug 34	27-Aug 41	4-Sep 49	10-Sep 55	17-Sep 62
Unseeded Blanks	0	0	DO 1	7.33	7.35	7.33	7.41	7.31	7.21	7.28	7.21	7.15	7.2	7.15	7.29	7.09
	0	0	DO 2	7.4	7.45	7.43	7.49	7.46	7.35	7.45	7.41	7.41	7.34	7.3	7.56	7.33
	0	0	DO 3	7.3	7.35	7.28	7.32	7.24	7.14	7.2	7.15	7.12	7.11	7.02	7.23	7.04
Average Blank Depletion				**0**	**-0.04**	**0.00**	**-0.06**	**0.01**	**0.11**	**0.03**	**0.09**	**0.12**	**0.13**	**0.19**	**-0.02**	**0.19**
Seeded Blanks	0	3	D.O.	7.41	7.45	7.38	7.34	7.28	7.19	7.24	6.88	6.7	6.67	6.52	6.68	6.45
			BOD	0	-0.04	0.03	0.07	0.13	0.22	0.17	0.53	0.71	0.74	0.89	0.73	0.96
	0	3	D.O.	7.37	7.42	7.33	7.32	7.23	7.14	7.22	6.77	6.65	6.68	6.55	6.76	6.54
			BOD	0	-0.05	0.04	0.05	0.14	0.23	0.15	0.6	0.72	0.69	0.82	0.61	0.83
	0	3	D.O.	7.33	7.45	7.29	7.41	7.45	7.33	7.38	7.09	6.87	6.9	6.76	6.91	6.69
			BOD	0	-0.12	0.04	-0.08	-0.12	0	-0.05	0.24	0.46	0.43	0.57	0.42	0.64
Ave Seeded Blank Depletion				**0.00**	**-0.07**	**0.04**	**0.01**	**0.05**	**0.15**	**0.09**	**0.46**	**0.63**	**0.62**	**0.76**	**0.59**	**0.81**

			Day	0	3	6	9	13	16	20	27	34	41	49	55	62	Reaer 1	Reaer 2	Reaer 3	Reaer 4	Bottle Kd	TBOD	TBOD Final
Ashland	30	3	D.O.	7.55	6.66	5.85	5.40	4.32	4.05	3.86	3.59	3.28	3.13	3.13	3.27	3					0.110	38.4	40
			BOD	0	10	17	21	32	34	36	35	37	39	37	38	38							
	100	3	D.O.	7.67	4.68	4.45	5.69	3.28	5.71	5.07	4.20	3.68	3.04	6.02	5.92	5.36	7.08	7.55	6.83	6.3	0.092	41.1	
			BOD	0	9	17	22	30	33	35	37	38	40	40	41	42							
Washburn	30	0	D.O.	7.89	7.69	7.25	6.79	5.92	5.2	4.36	3.47	2.71	6.56	6.07	6.03	5.68	6.95				0.023	88.4	88
			BOD	0	2	6	11	20	27	35	44	52	56	61	61	65							
	10	0	D.O.	8.33	8.21	8.04	7.93	7.6	7.3	7.15	6.77	6.42	6.31	6.16	6.27	6.03					0.026	88.4	
			BOD	0	4	9	12	22	31	35	47	57	61	65	62	69							
Presque Isle	100	0	D.O.	7.76	7.65	7.28	7.15	6.83	6.51	6.35	5.83	5.47	5.21	4.97	5.1	4.8					0.023	11.8	11.8
			BOD	0.0	0.3	1.4	1.8	2.8	3.8	4.2	5.8	6.9	7.7	8.4	8.0	8.9							
	200	0	D.O.																				
			BOD																				
McCains	200	3	D.O.	8.09	7.21	6.32	5.97	5.46	4.95	4.35	3.54	3.27	3.23	2.98	3.05	2.76					0.061	7.7	8.3
			BOD	0	1.4	2.6	3.2	3.9	4.6	5.6	6.6	6.9	7.0	7.3	7.3	7.6							
	100	3	D.O.	7.74	7.2	6.65	6.52	6.25	5.9	5.49	4.93	4.76	4.62	4.44	4.59	4.33					0.063	8.8	
			BOD	0.0	1.8	3.2	3.6	4.4	5.2	6.6	7.5	7.7	8.1	8.4	8.3	8.6							
Caribou	30	0	D.O.	7.68	7.37	6.91	6.38	5.93	5.62	5.39	4.89	4.6	4.35	4.03	4.08	3.78					0.041	41.6	47
			BOD	0	3	8	13	18	21	23	28	31	33	37	36	39							
	100	0	D.O.	7.68	4.71	1.76	4.33	2.88	2.04	5.77	3.46	4.89	3.89	6.17	5.86	5.16	6.66	6.8	6.25	6.54	0.061	52.9	
			BOD	0	9	18	25	29	32	35	42	46	49	50	51	53							
Loring	100	3	D.O.	7.74	6.92	6.35	5.8	5.55	5.4	5.33	4.98	4.98	4.88	4.74	4.9	4.67					0.151	7.4	6.8
			BOD	0.0	2.6	4.1	5.8	6.5	6.7	7.0	7.4	7.0	7.3	7.5	7.3	7.6							
	200	3	D.O.	7.94	6.68	5.93	5.15	4.74	4.5	4.36	3.9	3.73	3.72	3.55	3.66	3.35					0.115	6.2	
			BOD	0.0	1.9	3.0	4.2	4.8	5.1	5.3	5.8	6.0	6.0	6.2	6.1	6.5							
Fort Fairfield	30	3	D.O.	7.51	5.53	4.22	3.4	2.76	1.86	6.49	5.62	5.2	4.93	4.61	4.75	4.42	6.96				0.088	73.3	78
			BOD	0	20	33	41	47	55	60	66	68	71	73	73	75							
	10	3	D.O.	7.66	6.81	6.12	5.9	5.69	5.45	5.27	4.56	4.38	4.3	4.18	4.33	4.17					0.110	81.7	
			BOD	0	28	45	52	58	62	69	80	80	83	82	83	81							
Effluent DUP (Washburn)	30	0	D.O.	8.34	7.98	7.53	7.21	6.17	5.13	4.37	3.2	5.49	5.06	4.66	4.66	4.29	6.21				0.026	91.8	90
			BOD	0	4	8	11	22	32	40	51	59	63	67	67	71							
	10	0	D.O.	8.33	8.21	8.04	7.93	7.6	7.3	7.15	6.77	6.42	6.31	6.16	6.27	6.03					0.026	88.4	
			BOD	0	4	9	12	22	31	35	47	57	61	65	62	69							

Ultimate BOD Aroostook River

13-Aug

Indicates reaeration of sample occurred

Location	Effl Vol (ml)	Seed Vol (ml)	Date	13-Aug	15-Aug	17-Aug	20-Aug	23-Aug	29-Aug	30-Aug	5-Sep	17-Sep	28-Sep	5-Oct	15-Oct
			Day	0	2	4	7	10	16	17	23	35	46	53	63
Unseeded Blanks	0	0	DO 1	8.32	8.42	8.35	8.33	8.29		8.2	8.22	8.32	8.27	8.18	8.13
	0	0	DO 2	8.28	8.44	8.41	8.32	8.33		8.26	8.21	8.39	8.31	8.25	8.16
	0	0	DO 3	8.29	8.44	8.38	8.32	8.31		8.25	8.26	8.39	8.32	8.25	8.19
Average Blank Depletion				**0**	**-0.14**	**-0.08**	**-0.03**	**-0.01**		**0.06**	**0.07**	**-0.07**	**0.00**	**0.07**	**0.14**
Seeded Blanks	0	3	D.O.	8.22	8.16	8.01	7.84	7.66		7.29	7.16	6.39	6.06	5.93	5.81
			BOD	0	0.06	0.21	0.38	0.56		0.93	1.06	1.83	2.16	2.29	2.41
	0	3	D.O.	8.33	8.32	8.23	8.14	7.99		7.87	7.82	7.61	6.96	6.77	6.74
			BOD	0	0.01	0.1	0.19	0.34		0.46	0.51	0.72	1.37	1.56	1.59
	0	3	D.O.	8.3	8.34	8.28	8.14	8.01		7.83	7.81	7.64	6.99	6.89	6.84
			BOD	0	-0.04	0.02	0.16	0.29		0.47	0.49	0.66	1.31	1.41	1.46
Ave Seeded Blank Depletion				**0**	**0.01**	**0.11**	**0.24**	**0.40**		**0.62**	**0.69**	**1.07**	**1.61**	**1.75**	**1.82**

															Reaer 1	Reaer 2	Reaer 5	Bottle	TBOD	TBOD
			Day	0	2	4	7	10	16	17	23	35	46	53	63	Reaer 3	Reaer 4	Reaer 6	Kd		Final
Washburn	30	0	D.O.	8.26	8.14	7.86	7.38	6.9		5.36	4.52	3.34	2.79	5.91	5.56	6.41			0.023	84.9	87
			BOD	0	1	4	9	14		29	37	49	55	60	63						
	10	0	D.O.	8.28	8.32	8.21	8.03	7.91		7.53	6.95	6.71	6.53	6.38	6.2				0.02	89.2	
			BOD	0	-1	2	8	11		23	40	47	53	57	62						
Presque Isle	200	0	D.O.	8.18	7.7	7.26	6.64	6.16		5.27	4.79	4.06	3.51	3.26	3				0.044	8.1	8.4
			BOD	0.0	0.7	1.4	2.3	3.0		4.4	5.1	6.2	7.0	7.4	7.8						
	100	0	D.O.	8.26	8.1	7.84	7.52	7.32		6.84	6.61	6.29	5.87	5.74	5.61				0.038	8.7	
			BOD	0.0	0.5	1.3	2.2	2.8		4.3	5.0	5.9	7.2	7.6	8.0						
McCains	200	3	D.O.	8.05	7.24	6.3	5.31	4.76		3.81	3.29	2.36	6.41	5.95	5.54	7.3			0.058	10	10
			BOD	0.0	1.2	2.6	4.0	4.7		6.1	6.8	8.0	8.5	10.0	10.5						
	100	3	D.O.	8.12	7.66	6.99	6.17	5.8		5.23	4.88	4.45	4.08	3.91	3.77				0.111	9.1	
			BOD	0.0	1.4	3.2	5.4	6.2		7.4	8.3	8.9	8.9	9.1	9.4						
	30	3	D.O.	8.19	8.1	7.74	6.98	6.63		6.28	6.16	6.05	5.87	5.76	5.65				0.197	11.2	
			BOD	0.0	0.8	3.5	9.9	12.0		13.5	14.1	11.8	8.7	8.5	9.0						
Caribou	30	0	D.O.	8.2	7.15	6.36	5.56	4.94		4.02	3.75	3.38	2.91	6.67	6.31	6.98			0.086	55.3	60
			BOD	0	11	18	26	33		42	45	48	53	56	60						
	10	0	D.O.	8.27	7.93	7.67	7.28	7.2		6.89	6.59	6.39	6.05	6.07	5.91				0.06	69.1	
			BOD	0	10	18	30	32		41	50	56	67	66	71						
	100	0	D.O.	7.91	3.87	3.66	3.39	4.66		2.7	5.73	4.2	3.05	6.42	5.67	6.65	7.54	6.92	0.108	56.9	
			BOD	0	12	21	34	38		44	49	53	57	58	61	6.2	7.32				
Loring	200	3	D.O.	8.33	7.51	7.14	6.5	5.62		4.48	4.07	3.66	3.33	3.31	3.25				0.083	6.9	7.1
			BOD	0.0	1.2	1.7	2.6	3.9		5.5	6.1	6.5	6.7	6.7	6.7						
	100	3	D.O.	8.28	7.89	7.63	7.22	6.62		5.55	5.35	5.12	4.83	4.85	4.78				0.094	7.3	
			BOD	0.0	1.1	1.7	2.7	4.2		6.9	7.4	7.3	7.1	6.8	6.8						
Fort Fairfield	30	3	D.O.	8.22	7.77	7.31	6.5	5.64		4.25	3.85	3.45	3.18	6.73	6.4	7.03			0.084	39.8	44
			BOD	0	4	8	15	22		34	38	38	36	38	40						
	100	3	D.O.	8.23	5.8	3.47	3.52	4.74	2.67	6.49	5	3.32	6.7	5.53	5.02	7.02	6.65		0.09	48.3	
			BOD	0	7	14	24	30	37	37	41	45	46	49	50	6.94	7.17				

Ultimate BOD Aroostook River

14-Aug

Indicates reaeration of sample occurred

Location	Sta Code	Date	14-Aug	20-Aug	23-Aug	27-Aug	29-Aug	31-Aug	4-Sep	10-Sep	18-Sep	24-Sep	1-Oct	9-Oct	17-Oct	Reaer 1	Bottle Kd	TBOD
		Day	0	6	9	13	15	17	21	27	35	41	48	56	64			
Rte 11, Ashland	AR0	D.O.	8.32	7.04	7.15	7.1	6.99	6.61	6.45	6.03	5.66	5.4	5.31	4.92	4.89		0.034	3.87
		BOD	0	1.28	1.17	1.22	1.33	1.71	1.87	2.29	2.66	2.92	3.01	3.4	3.43			
Ashland Below	AR0a	D.O.	8.39	6.25	6.23	5.98	5.81	5.42	5.22	4.75	4.2	3.86	3.62	3.33	2.93		0.047	5.41
		BOD	0	2.14	2.16	2.41	2.58	2.97	3.17	3.64	4.19	4.53	4.77	5.06	5.46			
River Rd, Washburn	AR1	D.O.	8.3	7.01	7.13	6.84	6.69	6.27	6.13	5.62	5.24	4.82	4.68	4.31	4.27		0.031	4.7
		BOD	0	1.29	1.17	1.46	1.61	2.03	2.17	2.68	3.06	3.48	3.62	3.99	4.03			
Crouseville	AR1a	D.O.	8.1	6.69	6.74	6.2	6.07	5.67	5.59	4.86	4.43	4.06	3.93	3.62	3.57		0.037	5.06
		BOD	0	1.41	1.36	1.9	2.03	2.43	2.51	3.24	3.67	4.04	4.17	4.48	4.53			
1/2 Mi Up from Rte 1, Presque Isle	AR2	D.O.	8.03	6.78	6.8	6.74	6.65	6.24	6.11	5.64	5.19	4.93	4.84	4.5	4.46		0.033	4.07
		BOD	0	1.25	1.23	1.29	1.38	1.79	1.92	2.39	2.84	3.1	3.19	3.53	3.57			
Maysville	AR3	D.O.	7.94	6	4.45	7.04	6.82	6.28	5.97	5.13	4.52	4.26	4.17	3.84	3.8	8.12	0.061	7.98
		BOD	0	1.94	3.49	4.57	4.79	5.33	5.64	6.48	7.09	7.35	7.44	7.77	7.81			
McGraw	AR4	D.O.	9.66	7.73	7.6	7.32	6.97	6.45	6.26	5.79	5.37	5.08	4.96	4.61	4.56		0.053	5.2
		BOD	0	1.93	2.06	2.34	2.69	3.21	3.4	3.87	4.29	4.58	4.7	5.05	5.1			
Above Caribou Dam	AR5	D.O.	8.82	6.64	5.24	7.6	7.2	6.53	6.3	5.68	5.19	4.87	4.61	4.25	4.13	8.21	0.062	7.64
		BOD	0	2.18	3.58	4.19	4.59	5.26	5.49	6.11	6.6	6.92	7.18	7.54	7.66			
Adjacent Grimes Mill Rd, Caribou	AR6	D.O.	8.59	6.33	6.14	5.52	5.2	4.75	4.43	4	3.7	3.49	3.34	3.03	3.01		0.066	5.54
		BOD	0	2.26	2.45	3.07	3.39	3.84	4.16	4.59	4.89	5.1	5.25	5.56	5.58			
Goodwin	AR7	D.O.	8.76	6.57	6.4	6.11	5.75	5.25	4.88	4.36	4.06	3.89	3.79	3.45	3.35		0.061	5.39
		BOD	0	2.19	2.36	2.65	3.01	3.51	3.88	4.4	4.7	4.87	4.97	5.31	5.41			
Stevensville	AR8	D.O.	9.27	6.37	6.3	5.35	4.91	4.52	3.07	6.46	5.85	5.51	5.37	4.93	4.81	7.66	0.044	9.82
		BOD	0	2.9	2.97	3.92	4.36	4.75	6.2	7.4	8.01	8.35	8.49	8.93	9.05			
Rte 1A, Fort Fairfield	AR9	D.O.	9.6	6.42	6.2	5.76	5.23	5.06	4.35	3.7	3.06	6.28	5.97	5.25	5.06	7.34	0.042	9.17
		BOD	0	3.18	3.4	3.84	4.37	4.54	5.25	5.9	6.54	7.6	7.91	8.63	8.82			
USA / Canada Border	AR10	D.O.	9.5	6.44	6.26	5.59	5.3	5.16	4.46	4.05	3.6	3.32	3.11	2.78	2.66		0.069	6.66
		BOD	0	3.06	3.24	3.91	4.2	4.34	5.04	5.45	5.9	6.18	6.39	6.72	6.84			
Park St Bridge	T-PIS0	D.O.	7.92	5.54	5.17	4.6	4.24	3.98	3.31	6.74	6.2	5.83	5.62	5.13	4.98	7.7	0.046	7.68
		BOD	0	2.38	2.75	3.32	3.68	3.94	4.61	5.57	6.11	6.48	6.69	7.18	7.33			
Bypass Bridge	T-PIS8	D.O.	7.74	4.77	4.42	3.47	3.1	7.01	6.39	5.61	5.01	4.76	4.52	3.99	3.78	7.94	0.054	8.93
		BOD	0	2.97	3.32	4.27	4.64	5.57	6.19	6.97	7.57	7.82	8.06	8.59	8.8			
Railroad Trestle	T-PIS13	D.O.	7.67	4.58	4.2	3.13	6.93	6.15	5.45	4.68	4.06	3.69	3.37	2.91	2.71	7.77	0.054	9.82
		BOD	0	3.09	3.47	4.54	5.38	6.16	6.86	7.63	8.25	8.62	8.94	9.4	9.6			
Grimes Mill Rd	T-LM1	D.O.	9.1	7.37	7.48	7.48	7.35	6.86	6.6	6.14	5.88	5.59	5.51	5.16	5.14		0.046	4.12
		BOD	0	1.73	1.62	1.62	1.75	2.24	2.5	2.96	3.22	3.51	3.59	3.94	3.96			
Above Greenlaw Brook Confluence	T-LM2	D.O.	8.82	7.13	7.13	7.09	6.9	6.39	6.19	5.83	5.57	5.63	5.61	5.31	5.35		0.068	3.47
		BOD	0	1.69	1.69	1.73	1.92	2.43	2.63	2.99	3.25	3.19	3.21	3.51	3.47			
Caribou Stream	T-CS	D.O.	8.62	6.54	6.49	6.36	6.2	5.76	5.51	5.14	4.92	4.74	4.7	4.41	4.43		0.071	4.12
		BOD	0	2.08	2.13	2.26	2.42	2.86	3.11	3.48	3.7	3.88	3.92	4.21	4.19			
River Duplicate	DUPR	D.O.	8.32	6.99	7.1	7.08	7	6.52	6.4	5.96	5.58	5.31	5.24	4.91	4.89		0.036	3.84
		BOD	0	1.33	1.22	1.24	1.32	1.8	1.92	2.36	2.74	3.01	3.08	3.41	3.43			
Tributary Duplicate	DUPT	D.O.	7.7	4.83	4.21	3.54	3.2	6.38	5.69	4.78	4.1	3.62	3.27	2.85	2.63	7.33	0.048	9.6
		BOD	0	2.87	3.49	4.16	4.5	5.45	6.14	7.05	7.73	8.21	8.56	8.98	9.2			

BOD Bottles - 72 came from EMRO (Augusta's); 48 came from HETL (Augusta's); and 48 came from SMRO.

Ultimate BOD Aroostook River

14-Aug

Indicates reaeration of sample occurred

Location	Effl Vol (ml)	Seed Vol (ml)	Date	14-Aug	17-Aug	20-Aug	23-Aug	29-Aug	30-Aug	5-Sep	17-Sep	28-Sep	5-Oct	15-Oct
			Day	0	3	6	9	15	16	22	34	45	52	62
Unseeded Blanks	0	0	DO 1	8.22	8.14	8.01	7.91		7.85	7.83	7.93	7.68	7.74	7.59
	0	0	DO 2	8.24	8.25	8.15	8.06		8.11	8.09	8.25	8.01	8.09	7.98
	0	0	DO 3	8.24	8.29	8.23	8.14		8.19	8.19	8.33	8.1	8.18	8.05
Average Blank Depletion				**0**	**0.01**	**0.10**	**0.20**		**0.18**	**0.20**	**0.06**	**0.30**	**0.23**	**0.36**
Seeded Blanks	0	3	D.O.	8.23	8.31	8.17	8.02		7.98	7.88	7.47	7.1	7.1	6.94
			BOD	0	-0.08	0.06	0.21	0.23	0.25	0.35	0.76	1.13	1.13	1.29
	0	3	D.O.	8.28	8.34	8.16	7.97		7.89	7.75	7.29	6.92	6.96	6.83
			BOD	0	-0.06	0.12	0.31	0.35	0.39	0.53	0.99	1.36	1.32	1.45
	0	3	D.O.	8.24	8.32	8.21	8.05		7.98	7.75	7.24	6.9	6.94	6.76
			BOD	0	-0.08	0.03	0.19	0.23	0.26	0.49	1	1.34	1.3	1.48
Ave Seeded Blank Depletion				**0**	**-0.07**	**0.07**	**0.24**	**0.27**	**0.30**	**0.46**	**0.92**	**1.28**	**1.25**	**1.41**

			Day	0	3	6	9	15	16	22	34	45	52	62	Reaer 1	Reaer 2	Reaer 3	Reaer 4	Reaer 5	Bottle Kd	TBOD	TBOD Final
Ashland	30	3	D.O.	8.26	7.69	7.45	7.09		5.83	5.27	4.85	4.45	4.45	4.26						0.072	28.4	32
			BOD	0	6	7	10		22	26	26	27	27	27								
	100	3	D.O.	8.27	6.17	5.11	4.14	1.3	6.37	5	3.35	2.37	6.47	5.85	6.71	6.92				0.053	35	
			BOD	0	6	9	12	20	21	25	29	31	33	34								
Washburn	30	0	D.O.	8.25	7.79	7.2	6.55		5.18	4.34	2.81	5.9	5.27	4.45	7.54					0.014	150	153
			BOD	0	5	11	17		31	39	54	71	77	85								
	10	0	D.O.	8.26	8.09	7.97	7.56		6.91	6.23	5.54	5.08	4.94	4.67						0.02	155	
			BOD	0	5	9	21		41	61	82	95	100	108								
Presque Isle	200	0	D.O.	7.88	7.13	6.53	6.01		5.23	4.78	4.07	3.52	3.37	3.09						0.048	7.4	7.8
			BOD	0.0	1.1	2.0	2.8		4.0	4.7	5.7	6.5	6.8	7.2								
	100	0	D.O.	8.06	7.76	7.51	7.2		6.88	6.64	6.32	5.92	5.88	5.64						0.033	8.1	
			BOD	0.0	0.9	1.7	2.6			4.3	5.2	6.4	6.5	7.3								
McCains	200	3	D.O.	7.95	6.96	5.44	4.39	0.84	6.61	5.74	4.82	4.04	3.73	3.23	6.93					0.057	15.9	16
			BOD	0.0	1.5	3.7	5.2	10.5	11.0	12.2	13.4	14.4	14.8	15.5								
	100	3	D.O.	8.04	7.57	6.48	5.71		3.8	6.14	5.64	5.17	5.05	4.76	6.64					0.07	15.7	
			BOD	0.0	1.6	4.5	6.5		12.1	13.3	13.9	14.6	15.0	15.5								
Caribou	30	0	D.O.	8.19	7.02	6.17	5.53		4.79	4.51	4.07	3.73	3.66	3.47						0.093	45	48
			BOD	0	12	20	27		34	37	41	45	45	47								
	100	0	D.O.	7.95	3.23	3.96	4.7	2.9	6.75	5.4	3.69	2.54	6.78	6.08	7.3	7.15	7.09	7.31		0.095	51	
			BOD	0	14	24	32	37	38	42	47	51	52	54								
Loring	200	3	D.O.	8.31	7.75	7.37	6.39		5.33	4.94	4.57	4.25	4.17	4.02						0.07	5.8	6.3
			BOD	0.0	0.9	1.4	2.8		4.3	4.8	5.2	5.5	5.6	5.7								
	100	3	D.O.	8.3	7.97	7.76	7.24		6.21	5.88	5.67	5.38	5.38	5.15						0.061	6.8	
			BOD	0.0	1.1	1.5	2.7			6.3	6.0	6.2	6.2	6.6								
Fort Fairfield	30	3	D.O.	8.19	7.68	7.26	6.44		4.18	3.91	2.84	6.85	6.81	6.47	7.41					0.054	53	50
			BOD	0	6	9	15		37	39	45	48	48	50								
	100	3	D.O.	8.05	6.09	3.85	2.22		3.6	5.84	4.69	4.02	3.78	3.33	6.63	7.29	7.13			0.079	46	
			BOD	0	6	12	25		36	40	42	44	44	45								
Duplicate Fort Fairfield	30	0	D.O.	8.2	6.8	5.25	4.02	2.37	6.01	5.29	4.51	3.95	3.8	3.6	6.27					0.074	85	90
			BOD	0	14	30	42	58	61	68	76	82	83	85								
	10	0	D.O.	8.26	7.99	7.54	7.07		6.65	6.16	5.76	5.43	5.42	5.3						0.047	94	
			BOD	0	8	22	36		48	63	75	85	85	89								

Ultimate BOD Aroostook River

15-Aug

Indicates reaeration of sample occurred

Sample Location	Sta Code	Date	15-Aug	20-Aug	23-Aug	27-Aug	29-Aug	31-Aug	4-Sep	10-Sep	18-Sep	24-Sep	1-Oct	9-Oct	17-Oct	Reaer 1	Reaer 2	Reaer 3	Bottle Kd	TBOD
		Day	0	5	8	12	14	16	20	26	34	40	47	55	63					
Rte 11, Ashland	AR0	D.O.	8.83	7.11	7.13	7.04	6.94	6.44	6.3	5.78	5.33	5.02	4.89	4.56	4.49				0.046	4.5
		BOD	0	1.72	1.7	1.79	1.89	2.39	2.53	3.05	3.5	3.81	3.94	4.27	4.34					
Ashland Below	AR0a	D.O.	8.84	7.27	7.35	7.33	7.25	6.76	6.71	6.26	5.92	5.49	5.21	4.85	4.81				0.038	4.35
		BOD	0	1.57	1.49	1.51	1.59	2.08	2.13	2.58	2.92	3.35	3.63	3.99	4.03					
River Rd, Washburn	AR1	D.O.	8.56	7.06	7.18	7.18	7.13	6.65	6.59	6.15	5.79	5.44	5.33	5	4.97				0.042	3.81
		BOD	0	1.5	1.38	1.38	1.43	1.91	1.97	2.41	2.77	3.12	3.23	3.56	3.59					
Crouseville	AR1a	D.O.	8.42	6.79	6.86	6.88	6.81	6.27	6.17	5.61	5.18	4.84	4.68	4.31	4.21				0.039	4.53
		BOD	0	1.63	1.56	1.54	1.61	2.15	2.25	2.81	3.24	3.58	3.74	4.11	4.21					
1/2 Mi Up from Rte 1, Presque Isle	AR2	D.O.	9.17	7.43	7.49	7.56	7.46	6.93	6.84	6.3	5.92	5.67	5.55	5.17	5.15				0.048	4.14
		BOD	0	1.74	1.68	1.61	1.71	2.24	2.33	2.87	3.25	3.5	3.62	4	4.02					
Maysville	AR3	D.O.	8.84	6.73	6.63	6.58	6.43	5.88	5.69	5.28	4.93	4.71	4.61	4.31	4.26				0.068	4.46
		BOD	0	2.11	2.21	2.26	2.41	2.96	3.15	3.56	3.91	4.13	4.23	4.53	4.58					
McGraw	AR4	D.O.	10.06	7.63	7.39	6.96	6.74	6.17	5.92	5.49	5.09	4.9	4.77	4.4	4.32				0.074	5.55
		BOD	0	2.43	2.67	3.1	3.32	3.89	4.14	4.57	4.97	5.16	5.29	5.66	5.74					
Above Caribou Dam	AR5	D.O.	9.56	6.99	6.75	6.49	6.12	5.51	5.28	4.8	4.35	4.08	3.91	3.57	3.46				0.069	5.93
		BOD	0	2.57	2.81	3.07	3.44	4.05	4.28	4.76	5.21	5.48	5.65	5.99	6.1					
Adjacent Grimes Mill Rd, Caribou	AR6	D.O.	9.46	7.09	6.83	6.57	6.28	5.72	5.43	4.91	4.5	4.29	4.17	3.83	3.72				0.068	5.61
		BOD	0	2.37	2.63	2.89	3.18	3.74	4.03	4.55	4.96	5.17	5.29	5.63	5.74					
Goodwin	AR7	D.O.	8.85	6.12	5.81	5.52	5.13	4.6	4.34	3.8	3.3	3.05	2.84	2.5	2.34				0.07	6.29
		BOD	0	2.73	3.04	3.33	3.72	4.25	4.51	5.05	5.55	5.8	6.01	6.35	6.51					
Stevensville	AR8	D.O.	9.4	6.82	6.61	6.11	5.84	5.33	4.99	4.42	4.14	3.91	3.81	3.5	3.36				0.075	5.85
		BOD	0	2.58	2.79	3.29	3.56	4.07	4.41	4.98	5.26	5.49	5.59	5.9	6.04					
Rte 1A, Fort Fairfield	AR9	D.O.	9.98	7.26	7.1	6.8	6.4	5.9	5.66	5.11	4.65	4.58	4.46	4.12	4.13				0.078	5.73
		BOD	0	2.72	2.88	3.18	3.58	4.08	4.32	4.87	5.33	5.4	5.52	5.86	5.85					
USA / Canada Border	AR10	D.O.	10.09	6.56	6.25	5.6	5.09	4.6	4.2	3.51	3.02	2.72	6.47	5.98	5.95	6.94			0.072	8.1
		BOD	0	3.53	3.84	4.49	5	5.49	5.89	6.58	7.07	7.37	7.84	8.33	8.36					
Park St Bridge	T-PIS0	D.O.	8.13	5.16	3.74	2.78	7.05	6.15	5.42	4.43	3.73	3.33	3.04	2.62	2.4	7.82			0.061	10.87
		BOD	0	2.97	4.39	5.35	6.12	7.02	7.75	8.74	9.44	9.84	10.13	10.55	10.77					
Bypass Bridge	T-PIS8	D.O.	8.6	6.19	5.84	5.21	4.79	4.19	3.74	3.14	2.64	6.89	6.63	5.99	5.87	7.47			0.051	7.63
		BOD	0	2.41	2.76	3.39	3.81	4.41	4.86	5.46	5.96	6.54	6.8	7.44	7.56					
Railroad Trestle	T-PIS13	D.O.	7.95	0.59	3.99	0.56	6.52	5.14	3.35	1.43	5.94	5.24	4.61	3.83	3.42	7.45	8.12	7.62	0.07	25.09
		BOD	0	7.36	10.82	14.25	15.85	17.23	19.02	20.94	22.62	23.32	23.95	24.73	25.14					
Grimes Mill Rd	T-LM1	D.O.	10.68	8	8.06	8.07	8	7.43	7.16	6.78	6.41	6.19	6.15	5.81	5.82				0.081	4.67
		BOD	0	2.68	2.62	2.61	2.68	3.25	3.52	3.9	4.27	4.49	4.53	4.87	4.86					
Above Greenlaw Brook Confluence	T-LM2	D.O.	10.5	7.71	7.74	7.78	7.67	7.05	7	6.62	6.37	6.19	6.21	5.86	5.9				0.104	4.34
		BOD	0	2.79	2.76	2.72	2.83	3.45	3.5	3.88	4.13	4.31	4.29	4.64	4.6					
Caribou Stream	T-CS	D.O.	10.2	7.26	7.06	6.83	6.66	6.04	5.81	5.39	5.18	5.04	4.99	4.69	4.65				0.099	5.3
		BOD	0	2.94	3.14	3.37	3.54	4.16	4.39	4.81	5.02	5.16	5.21	5.51	5.55					
River Duplicate	DUPR	D.O.	9.53	7.26	7.08	6.7	6.31	5.57	5.18	4.41	3.65	3.36	3.04	2.68	2.46				0.046	7.4
		BOD	0	2.27	2.45	2.83	3.22	3.96	4.35	5.12	5.88	6.17	6.49	6.85	7.07					
Tributary Duplicate	DUPT	D.O.	7.27	4.49	3.73	3.09	7	6.17	5.71	5.03	4.42	4.03	3.73	2.99	2.58	7.69			0.056	9.08
		BOD	0	2.78	3.54	4.18	4.87	5.7	6.16	6.84	7.45	7.84	8.14	8.88	9.29					

BOD Bottles - 72 came from EMRO (Augusta's); 48 came from HETL (Augusta's); and 48 came from SMRO.

Ultimate BOD Aroostook River

15-Aug

Indicates reaeration of sample occurred

Location	Effl Vol (ml)	Seed Vol (ml)	Date	15-Aug	17-Aug	20-Aug	24-Aug	30-Aug	6-Sep	17-Sep	28-Sep	5-Oct	15-Oct
			Day	0	2	5	9	15	22	33	44	51	61
Unseeded Blanks	0	0	DO 1	8.2	8.35	8.31	8.27	8.21	8.3	8.3	8.05	8.13	7.92
	0	0	DO 2	8.24	8.38	8.27	8.27	8.24	8.38	8.32	8.16	8.19	7.94
	0	0	DO 3	8.08	8.28	8.32	8.28	8.23	8.38	8.42	8.23	8.24	7.98
Average Blank Depletion				**0**	**-0.16**	**-0.13**	**-0.10**	**-0.05**	**-0.18**	**-0.17**	**0.03**	**-0.01**	**0.23**
Seeded Blanks	0	1	D.O.	8.24	8.12	8.12	8.1	7.81	8.06	7.96	7.63	7.7	7.47
			BOD	0	0.12	0.12	0.14	0.43	0.18	0.28	0.61	0.54	0.77
	0	1	D.O.	8.19	8.19	8.04	7.97	7.77	7.89	7.8	7.41	7.29	7.03
			BOD	0	0	0.15	0.22	0.42	0.3	0.39	0.78	0.9	1.16
	0	1	D.O.	8.27	8.33	8.29	8.28	8.18	8.27	8.28	8	8.08	7.84
			BOD	0	-0.06	-0.02	-0.01	0.09	0	-0.01	0.27	0.19	0.43
Ave Seeded Blank Depletion				**0.00**	**0.02**	**0.08**	**0.12**	**0.31**	**0.16**	**0.22**	**0.55**	**0.54**	**0.79**

			Day	0	2	5	9	15	22	33	44	51	61	Reaer 1	Reaer 2	Reaer 3	Reaer 4	Reaer 5	Bottle Kd	TBOD	TBOD Final
Ashland	30	1	D.O.	8.14	8.03	7.64	7.25	6.69	6.08	5.61	5.14	5.06	4.75						0.037	31	31
			BOD	0.0	0.9	4.3	7.9	11.7	19.2	23.3	25.0	25.9	26.8								
	100	1	D.O.	8.18	7.24	6.27	5.26	3.18	5.10	3.76	2.79	6.42	5.55	6.62	7.01				0.039	31	
			BOD	0.0	2.8	5.6	8.5	14.4	19.2	23.1	25.4	27.2	29.3								
Washburn	30	0	D.O.																		296
			BOD																		
	10	0	D.O.	8.12	8.17	7.89	7.43	6.48	4.93	3.52	2.79	6.5	5.83	7.08					0.018	296	
			BOD	0	-2	7	21	49	96	138	160	177	197								
Presque Isle	200	0	D.O.	8.11	7.84	7.17	6.61	5.78	5.29	4.53	3.94	3.8	3.35						0.037	7.8	8.9
			BOD	0.0	0.4	1.4	2.3	3.5	4.2	5.4	6.3	6.5	7.1								
	100	0	D.O.	8.14	8.17	7.87	7.55	7.12	7	6.62	6.21	6.13	5.72						0.02	9.9	
			BOD	0.0	-0.1	0.8	1.8	3.1	3.4	4.6	5.8	6.0	7.3								
McCains	200	1	D.O.	8.06	7.9	7.31	6.8	5.71	5.13	4.44	3.83	3.62	3.21						0.034	7.8	8
			BOD	0.0	0.2	1.1	1.8	3.4	4.3	5.3	6.1	6.4	6.9								
	100	1	D.O.	8.08	8.14	7.8	7.41	6.88	6.68	6.32	5.86	5.77	5.42						0.032	7.4	
			BOD	0.0	-0.2	0.7	1.8	3.0	3.9	4.8	5.5	5.8	6.4								
Caribou	30	0	D.O.	8.15	7.27	6.05	5.17	4.23	4.01	3.61	3.15	2.95	2.66						0.091	51	51
			BOD	0	9	21	30	39	41	45	50	52	55								
	100	0	D.O.	8.08	4.93	2.64	3.85	5.18	3.71	5.16	4.06	3.42	2.57	6.47	6.97	7.25	6.78		0.091	51	
			BOD	0	9	21	30	37	41	46	49	51	54								
Loring	200	1	D.O.	8.26	8.2	7.8	7.31	6.54	6.19	5.69	5.3	5.24	4.96						0.038	5.1	5.2
			BOD	0.0	0.1	0.6	1.4	2.4	3.0	3.7	4.2	4.3	4.6								
	100	1	D.O.	8.05	8.02	7.81	7.54	7.06	6.89	6.56	6.26	6.23	6						0.038	5.2	
			BOD	0.0	0.0	0.6	1.3	2.3	3.2	4.0	4.3	4.4	4.6								
Fort Fairfield	30	1	D.O.	8.05	7.49	6.32	4.98	3.51	6	5.49	4.99	4.88	4.55	6.65					0.077	60	59
			BOD	0	5	17	30	43	50	55	57	58	59								
	100	1	D.O.	7.97	5.28	2.01	2.09	4.14	2.36	5.33	4.23	3.8	3.23	6.82	6.2	7.16	6.93		0.093	58	
			BOD	0	8	22	35	43	49	54	56	58	59								
Effluent DUP (McCains)	200	1	D.O.	8.3	8.21	7.69	7.12	6.19	5.74	4.95	4.2	3.88	3.35						0.023	9.7	9
			BOD	0.0	0.1	0.9	1.8	3.2	3.8	5.0	6.2	6.6	7.4								
	100	1	D.O.	8.05	8.02	7.81	7.54	7.06	6.89	6.56	6.26	6.23	6						0.029	7.4	
			BOD	0.0	0.1	0.7	1.5	3.0	3.5	4.5	5.4	5.5	6.2								

Ultimate BOD Aroostook River

16-Aug

Indicates reaeration of sample occurred

Sample Location	Sta Code	Date	16-Aug	20-Aug	23-Aug	27-Aug	29-Aug	31-Aug	4-Sep	10-Sep	18-Sep	24-Sep	1-Oct	9-Oct	17-Oct	Reaer 1	Bottle Kd	TBOD
		Day	0	4	7	11	13	15	19	25	33	39	46	54	62			
Rte 11, Ashland	AR0	D.O.	9.29	7.73	7.91	7.94	7.84	7.26	7.25	6.79	6.39	6.11	6.04	5.67	5.66		0.043	3.84
		BOD	0	1.56	1.38	1.35	1.45	2.03	2.04	2.5	2.9	3.18	3.25	3.62	3.63			
Ashland Below	AR0a	D.O.	8.63	7.72	7.31	7.27	7.17	6.63	6.58	6.04	5.69	5.38	5.28	4.91	4.83		0.036	4.22
		BOD	0	0.91	1.32	1.36	1.46	2	2.05	2.59	2.94	3.25	3.35	3.72	3.8			
River Rd, Washburn	AR1	D.O.	8.78	7.26	7.34	7.33	7.23	6.7	6.68	6.12	5.78	5.46	5.38	5	4.94		0.042	4.05
		BOD	0	1.52	1.44	1.45	1.55	2.08	2.1	2.66	3	3.32	3.4	3.78	3.84			
Crouseville	AR1a	D.O.	8.45	6.9	6.97	6.94	6.86	6.32	6.2	5.63	5.39	5.25	5.17	4.81	4.77		0.051	3.74
		BOD	0	1.55	1.48	1.51	1.59	2.13	2.25	2.82	3.06	3.2	3.28	3.64	3.68			
1/2 Mi Up from Rte 1, Presque Isle	AR2	D.O.	8.8	7.19	7.23	7.24	7.14	6.58	6.39	5.93	5.49	5.46	5.37	5.05	5.05		0.053	3.85
		BOD	0	1.61	1.57	1.56	1.66	2.22	2.41	2.87	3.31	3.34	3.43	3.75	3.75			
Maysville	AR3	D.O.	8.31	6.36	6.31	6.19	6.01	5.41	5.25	4.82	4.42	4.24	4.16	3.86	3.82		0.063	4.45
		BOD	0	1.95	2	2.12	2.3	2.9	3.06	3.49	3.89	4.07	4.15	4.45	4.49			
McGraw	AR4	D.O.	9.96	7.75	7.64	7.24	6.96	6.33	6.17	5.71	5.33	5.07	4.95	4.58	4.49		0.066	5.35
		BOD	0	2.21	2.32	2.72	3	3.63	3.79	4.25	4.63	4.89	5.01	5.38	5.47			
Above Caribou Dam	AR5	D.O.	9.61	7.12	6.95	6.72	6.54	5.95	5.64	5.02	4.52	4.29	4.14	3.68	3.57		0.061	5.93
		BOD	0	2.49	2.66	2.89	3.07	3.66	3.97	4.59	5.09	5.32	5.47	5.93	6.04			
Adjacent Grimes Mill Rd, Caribou	AR6	D.O.	8.86	6.78	6.69	6.45	6.14	5.48	5.23	4.75	4.36	4.17	4.05	3.71	3.65		0.061	5.2
		BOD	0	2.08	2.17	2.41	2.72	3.38	3.63	4.11	4.5	4.69	4.81	5.15	5.21			
Goodwin	AR7	D.O.	9.11	6.99	6.84	6.59	6.35	5.65	5.44	4.89	4.47	4.24	4.1	3.73	3.63		0.059	5.46
		BOD	0	2.12	2.27	2.52	2.76	3.46	3.67	4.22	4.64	4.87	5.01	5.38	5.48			
Stevensville	AR8	D.O.	8.99	6.71	6.54	6.26	5.88	5.32	5.03	4.46	4.13	3.83	3.67	3.31	3.11		0.061	5.75
		BOD	0	2.28	2.45	2.73	3.11	3.67	3.96	4.53	4.86	5.16	5.32	5.68	5.88			
Rte 1A, Fort Fairfield	AR9	D.O.	10.62	7.98	7.8	7.58	7.23	6.47	6.28	5.65	5.22	5.16	5	4.7	4.59		0.072	5.9
		BOD	0	2.64	2.82	3.04	3.39	4.15	4.34	4.97	5.4	5.46	5.62	5.92	6.03			
USA / Canada Border	AR10	D.O.	9.94	6.99	6.66	6.34	5.87	5.11	4.82	4.08	3.45	3.11	2.85	2.49	2.33		0.061	7.56
		BOD	0	2.95	3.28	3.6	4.07	4.83	5.12	5.86	6.49	6.83	7.09	7.45	7.61			
Park St Bridge	T-PIS0	D.O.	8.27	6.28	5.81	4.81	4.25	3.59	3.04	6.49	5.8	5.37	5.06	4.56	4.45	7.73	0.042	9.25
		BOD	0	1.99	2.46	3.46	4.02	4.68	5.23	6.47	7.16	7.59	7.9	8.4	8.51			
Bypass Bridge	T-PIS8	D.O.	7.01	4.87	4.13	3.32	2.85	6.03	5.37	4.52	3.91	3.64	3.4	2.98	2.77	7.07	0.051	8.78
		BOD	0	2.14	2.88	3.69	4.16	5.2	5.86	6.71	7.32	7.59	7.83	8.25	8.46			
Railroad Trestle	T-PIS13	D.O.	7.98	5.6	5.12	4.5	4.18	3.62	3.14	6.78	6.09	5.71	5.47	4.99	4.87	7.74	0.05	7.98
		BOD	0	2.38	2.86	3.48	3.8	4.36	4.84	5.8	6.49	6.87	7.11	7.59	7.71			
Grimes Mill Rd	T-LM1	D.O.	9.62	7.73	7.83	7.89	7.78	7.19	7.13	6.62	6.25	6.05	6.02	5.7	5.74		0.059	3.91
		BOD	0	1.89	1.79	1.73	1.84	2.43	2.49	3	3.37	3.57	3.6	3.92	3.88			
Above Greenlaw Brook Confluence	T-LM2	D.O.	9.46	7.72	7.78	7.82	7.74	7.12	7.03	6.71	6.37	6.21	6.22	5.9	5.93		0.065	3.5
		BOD	0	1.74	1.68	1.64	1.72	2.34	2.43	2.75	3.09	3.25	3.24	3.56	3.53			
Caribou Stream	T-CS	D.O.	9.48	7.15	6.89	6.66	6.41	5.76	5.46	4.86	4.6	4.43	4.4	4.1	4.08		0.073	5.35
		BOD	0	2.33	2.59	2.82	3.07	3.72	4.02	4.62	4.88	5.05	5.08	5.38	5.4			
River Duplicate	DUPR	D.O.	10.36	7.87	7.75	7.41	7.11	6.44	6.25	5.7	5.23	4.95	4.8	4.43	4.32		0.064	5.92
		BOD	0	2.49	2.61	2.95	3.25	3.92	4.11	4.66	5.13	5.41	5.56	5.93	6.04			
Tributary Duplicate	DUPT	D.O.	9.57	7.85	7.99	8.07	7.98	7.29	7.24	6.85	6.5	6.35	6.32	5.89	5.9		0.055	3.67
		BOD	0	1.72	1.58	1.5	1.59	2.28	2.33	2.72	3.07	3.22	3.25	3.68	3.67			

BOD Bottles - 72 came from EMRO (Augusta's); 48 came from HETL (Augusta's); and 48 came from SMRO.

Ultimate BOD Aroostook River

27-Aug

Indicates reaeration of sample occurred

Location	Effl Vol (ml)	Seed Vol (ml)	Date	27-Aug	29-Aug	31-Aug	4-Sep	12-Sep	17-Sep	24-Sep	28-Sep	5-Oct	17-Oct	29-Oct
			Day	0	2	4	8	16	21	28	32	39	51	63
Unseeded Blanks	0	0	DO 1	8.38	8.45	8.4	8.24	8.1	7.9	8.01	7.88	7.82	7.76	7.63
	0	0	DO 2	8.46	8.53	8.45	8.24	8.24	8.13	8.3	8.16	8.19	8.21	8.16
	0	0	DO 3	8.43	8.53	8.45	8.35	8.3	8.21	8.44	8.33	8.39	8.4	8.21
Average Blank Depletion				**0**	**-0.08**	**-0.01**	**0.15**	**0.21**	**0.34**	**0.17**	**0.30**	**0.29**	**0.30**	**0.42**
Seeded Blanks	0	3	D.O.	8.35	8.37	8.17	7.81	7.54	7.25	6.93	6.71	6.53	6.44	6.41
			BOD	0	-0.02	0.18	0.54	0.81	1.1	1.42	1.64	1.82	1.91	1.94
	0	3	D.O.	8.36	8.39	8.19	7.73	7.42	7.1	6.64	6.5	6.31	6.3	6.27
			BOD	0	-0.03	0.17	0.63	0.94	1.26	1.72	1.86	2.05	2.06	2.09
	0	3	D.O.	8.4	8.38	8.2	7.76	7.43	7.07	6.7	6.59	6.41	6.41	6.37
			BOD	0	0.02	0.2	0.64	0.97	1.33	1.7	1.81	1.99	1.99	2.03
Ave Seeded Blank Depletion				**0.00**	**-0.01**	**0.18**	**0.60**	**0.91**	**1.23**	**1.61**	**1.77**	**1.95**	**1.99**	**2.02**

			Day	0	2	4	8	16	21	28	32	39	51	63	Reaer 1	Reaer 2	Reaer 3	Reaer 4	Reaer 5	Bottle Kd	TBOD	TBOD Final
Ashland	30	0	D.O.	8.22	8.03	7.67	7.05	6.64	5.96	5.79	5.64	5.53	5.29	5.05						0.05	32	33
			BOD	0.0	1.9	5.5	11.7	15.8	22.6	24.3	25.8	26.9	29.3	31.7								
	60	0	D.O.	8.10	7.50	6.85	5.75	3.79	6.18	5.92	5.65	5.32	4.80	4.40	6.91					0.057	34	
			BOD	0.0	3.0	6.3	11.8	21.6	25.2	26.5	27.9	29.5	32.1	34.1								
Washburn	30	0	D.O.	8.3	8.22	7.88	7.15	6.19	5.63	5.11	4.64	4.01	3.14	2.33						0.014	103	125
			BOD	0.0	0.8	4.2	11.5	21.1	26.7	31.9	36.6	42.9	51.6	59.7								
	60	0	D.O.	8.3	7.7	6.96	5.51	3.75	5.95	4.53	3.55	2.33	3.47	4.25	7.22	6.02	6.44			0.01	147	
			BOD	0.0	3.0	6.7	14.0	22.8	29.1	36.2	41.1	47.2	60.0	70.9								
Presque Isle	200	0	D.O.	7.87	6.56	5.81	4.85	3.77	6.85	6.5	6.16	5.77	5.32	4.89	7.56					0.074	9.4	9.0
			BOD	0.0	2.0	3.1	4.5	6.2	7.2	7.7	8.3	8.8	9.5	10.2								
	100	0	D.O.	8.09	7.62	7.23	6.73	6.22	5.92	5.88	5.72	5.51	5.27	5.1						0.069	8.5	
			BOD	0.0	1.4	2.6	4.1	5.6	6.5	6.6	7.1	7.7	8.5	9.0								
McCains	100	0	D.O.	8.07	7.29	6.29	4.53	2.2	4.55	3.16	6.54	5.5	4.27	3.44	5.87	7.56				0.034	44	39
			BOD	0	2	5	11	18	22	26	29	32	36	38								
	60	0	D.O.	8.19	7.83	7.2	6.1	4.68	4.02	3.47	3.08	2.48	2.02	5.66	6.17					0.047	33	
			BOD	0.0	1.8	5.0	10.5	17.6	20.9	23.6	25.6	28.6	30.9	31.4								
Caribou	60	0	D.O.	8.32	7.95	7.36	6.11	4.77	4.27	3.87	3.59	3.33	2.74	5.97	6.91					0.053	30	32
			BOD	0	2	5	11	18	20	22	24	25	28	29								
	30	0	D.O.																			
			BOD																			
	100	0	D.O.	8.2	7.44	6.49	4.5	2.42	6.23	5.45	4.84	4.04	2.95	5.84	7.15	6.85				0.043	33	
			BOD	0	2	5	11	17	20	22	24	27	30	31								
Loring	300	0	D.O.	7.64	7.11	6.51	5.54	4.13	3.63	3.33	3.12	2.92	2.62	5.97	6.77					0.057	5.5	5.3
			BOD	0.0	0.5	1.1	2.1	3.5	4.0	4.3	4.5	4.7	5.0	5.8								
	200	0	D.O.	7.81	7.57	7.18	6.52	5.73	5.33	5.16	4.99	4.86	4.65	4.49						0.058	5	
			BOD	0.0	0.4	0.9	1.9	3.1	3.7	4.0	4.2	4.4	4.7	5.0								
Fort Fairfield	30	3	D.O.	8.31	7.63	6.95	5.75	4.19	3.8	3.59	3.46	3.26	2.98	2.77						0.117	35	36
			BOD	0	7	12	20	33	34	33	33	33	35	37								
	60	3	D.O.	8.27	6.93	5.75	3.7	5.07	4.38	3.91	3.63	3.28	2.8	6.26	7.01	6.85				0.097	36	
			BOD	0	7	12	20	29	31	32	33	34	36	39								
Effluent DUP	200	0	D.O.																			
			BOD																			
	100	0	D.O.																			
			BOD																			

Ultimate BOD Aroostook River

28-Aug

Indicates reaeration of sample occurred

Sample Location	Sta Code	Date	28-Aug	31-Aug	4-Sep	7-Sep	10-Sep	13-Sep	18-Sep	24-Sep	1-Oct	9-Oct	19-Oct	25-Oct	29-Oct	Reaer 1	Reaer 2	Reaer 3	Bottle Kd	TBOD
		Day	0	3	7	10	13	16	21	27	34	42	52	58	62					
Rte 11, Ashland	AR0	D.O.	8.79	8.48	7.62	7.4	7.09	7.16	6.29	5.88	5.66	4.94	5.24	5	4.95				0.039	4.28
		BOD	0	0.31	1.17	1.39	1.7	1.63	2.5	2.91	3.13	3.85	3.55	3.79	3.84					
Ashland Below	AR0a	D.O.	8.82	8.48	7.64	7.44	7.15	7.15	6.71	6.4	6.21	5.75	5.84	5.59	5.53				0.048	3.38
		BOD	0	0.34	1.18	1.38	1.67	1.67	2.11	2.42	2.61	3.07	2.98	3.23	3.29					
River Rd, Washburn	AR1	D.O.	9.27	8.92	8.08	7.91	7.68	7.71	7.33	7.01	6.97	6.45	6.53	6.25	6.18				0.05	3.1
		BOD	0	0.35	1.19	1.36	1.59	1.56	1.94	2.26	2.3	2.82	2.74	3.02	3.09					
Crouseville	AR1a	D.O.	9.11	8.77	8.01	7.84	7.66	7.66	7.26	6.96	6.83	6.36	6.49	6.19	6.12				0.047	3.05
		BOD	0	0.34	1.1	1.27	1.45	1.45	1.85	2.15	2.28	2.75	2.62	2.92	2.99					
1/2 Mi Up from Rte 1, Presque Isle	AR2	D.O.	8.68	8.29	7.33	7.03	6.77	6.6	6.15	5.88	5.46	4.82	4.68	4.44	4.33				0.037	4.73
		BOD	0	0.39	1.35	1.65	1.91	2.08	2.53	2.8	3.22	3.86	4	4.24	4.35					
Maysville	AR3	D.O.	8.63	7.93	6.98	6.69	6.35	6.17	5.77	5.42	5.22	4.84	4.87	4.66	4.6				0.063	4
		BOD	0	0.7	1.65	1.94	2.28	2.46	2.86	3.21	3.41	3.79	3.76	3.97	4.03					
McGraw	AR4	D.O.	8.98	8.07	7.02	6.47	6.04	5.86	5.33	4.95	4.72	4.29	4.23	4.05	4				0.066	4.96
		BOD	0	0.91	1.96	2.51	2.94	3.12	3.65	4.03	4.26	4.69	4.75	4.93	4.98					
Above Caribou Dam	AR5	D.O.	9.34	8.4	7.32	7.05	6.63	6.37	5.88	5.57	5.32	4.77	4.7	4.43	4.35				0.06	4.93
		BOD	0	0.94	2.02	2.29	2.71	2.97	3.46	3.77	4.02	4.57	4.64	4.91	4.99					
Adjacent Grimes Mill Rd, Caribou	AR6	D.O.	9.43	8.59	7.63	7.27	6.83	6.71	6.2	5.84	5.65	5.24	5.22	5.01	4.97				0.064	4.43
		BOD	0	0.84	1.8	2.16	2.6	2.72	3.23	3.59	3.78	4.19	4.21	4.42	4.46					
Goodwin	AR7	D.O.	9.06	8.28	7.26	6.93	6.48	6.32	5.93	5.59	5.38	4.95	4.92	4.73	4.7				0.065	4.33
		BOD	0	0.78	1.8	2.13	2.58	2.74	3.13	3.47	3.68	4.11	4.14	4.33	4.36					
Stevensville	AR8	D.O.	8.75	8.04	7.04	6.68	6.18	6.04	5.52	5.14	4.86	4.45	4.37	4.19	4.16				0.058	4.66
		BOD	0	0.71	1.71	2.07	2.57	2.71	3.23	3.61	3.89	4.3	4.38	4.56	4.59					
Rte 1A, Fort Fairfield	AR9	D.O.	9.05	8.3	7.25	6.88	6.41	6.27	5.92	5.59	5.37	4.89	4.84	4.63	4.58				0.064	4.41
		BOD	0	0.75	1.8	2.17	2.64	2.78	3.13	3.46	3.68	4.16	4.21	4.42	4.47					
USA / Canada Border	AR10	D.O.	9.92	8.87	7.9	7.62	7.25	7.13	6.49	6.12	5.91	5.47	5.32	4.72	4.6				0.054	5.16
		BOD	0	1.05	2.02	2.3	2.67	2.79	3.43	3.8	4.01	4.45	4.6	5.2	5.32					
Park St Bridge	T-PIS0	D.O.	8.12	7.41	5.95	5.35	4.85	4.54	3.85	3.31	2.87	2.38	2.21	6.46	6.27	7.99			0.037	7.79
		BOD	0	0.71	2.17	2.77	3.27	3.58	4.27	4.81	5.25	5.74	5.91	7.44	7.63					
Bypass Bridge	T-PIS8	D.O.	7.46	6.44	5.13	4.45	3.85	3.47	2.75	6.77	6.3	5.65	5.46	5.01	4.87	7.63			0.047	7.75
		BOD	0	1.02	2.33	3.01	3.61	3.99	4.71	5.57	6.04	6.69	6.88	7.33	7.47					
Railroad Trestle	T-PIS13	D.O.	8.01	3.65	4.92	3.45	5.9	4.99	3.69	2.79	6.43	5.58	5.32	4.88	4.74	7.46	7.89	7.73	0.075	16.26
		BOD	0	4.36	6.9	8.37	10.36	11.27	12.57	13.47	14.77	15.62	15.88	16.32	16.46					
Grimes Mill Rd	T-LM1	D.O.	9.56	9.06	8.2	8.03	7.76	7.76	7.25	7.01	6.85	6.45	6.61	6.3	6.27				0.059	3.27
		BOD	0	0.5	1.36	1.53	1.8	1.8	2.31	2.55	2.71	3.11	2.95	3.26	3.29					
Above Greenlaw Brook Confluence	T-LM2	D.O.	9.11	8.62	7.89	7.7	7.5	7.47	7.06	6.71	6.66	6.3	6.53	6.21	6.22				0.063	2.88
		BOD	0	0.49	1.22	1.41	1.61	1.64	2.05	2.4	2.45	2.81	2.58	2.9	2.89					
Caribou Stream	T-CS	D.O.	8.82	7.98	6.96	6.44	6.05	5.88	5.36	5.04	4.91	4.55	4.57	4.35	4.33				0.072	4.44
		BOD	0	0.84	1.86	2.38	2.77	2.94	3.46	3.78	3.91	4.27	4.25	4.47	4.49					
Trib Dup PIS8	DUPT	D.O.	7.31	6.23	4.7	4.08	3.49	3.08	2.35	6.6	6.16	5.5	5.27	4.74	4.64	7.47			0.049	8
		BOD	0	1.08	2.61	3.23	3.82	4.23	4.96	5.83	6.27	6.93	7.16	7.69	7.79					
Tributary Dup CS	DUPT	D.O.	9.34	8.97	8.17	7.99	7.78	7.73	7.27	6.93	6.83	6.46	6.63	6.35	6.35				0.055	3.05
		BOD	0	0.37	1.17	1.35	1.56	1.61	2.07	2.41	2.51	2.88	2.71	2.99	2.99					

BOD Bottles - 72 came from EMRO (Augusta's); 48 came from HETL (Augusta's); and 48 came from SMRO.

Ultimate BOD Aroostock River

28-Aug

Indicates reaeration of sample occurred

Location	Effl Vol (ml)	Seed Vol (ml)	Date	28-Aug	30-Aug	4-Sep	17-Sep	24-Sep	28-Sep	17-Oct	29-Oct
			Day	0	2	7	20	27	31	50	62
Unseeded Blanks	0	0	DO 1	8.23	8.16	8.16	8.12	8.2	8.01	8.18	8.11
	0	0	DO 2	8.24	8.19	8.2	8.09	8.19	8.01	8.14	8.13
	0	0	DO 3	8.21	8.16	8.19	8.11	8.14	8.03	8.1	8.06
Average Blank Depletion				**0**	**0.06**	**0.04**	**0.12**	**0.05**	**0.21**	**0.09**	**0.13**
Seeded Blanks	0	2	D.O.	8.15	8.03	7.82	7.28	7.25	6.89	6.58	6.51
			BOD	0	0.12	0.33	0.87	0.9	1.26	1.57	1.64
	0	2	D.O.	8.22	8.12	8.03	7.53	7.52	7.2	6.97	6.89
			BOD	0	0.1	0.19	0.69	0.7	1.02	1.25	1.33
	0	2	D.O.	8.2	8.12	8.05	7.62	7.68	7.41	7.12	7.1
			BOD	0	0.08	0.15	0.58	0.52	0.79	1.08	1.1
Ave Seeded Blank Depletion				**0.00**	**0.10**	**0.22**	**0.71**	**0.71**	**1.02**	**1.30**	**1.36**

			Day	0	2	7	20	27	31	50	62	Reaer 1	Reaer 2	Reaer 3	Reaer 4	Reaer 5	Bottle Kd	TBOD	TBOD Final
Ashland	30	0	D.O.	8.16	7.59	6.74	5.32	4.79	4.66	4.20	3.95						0.056	43	43
			BOD	0	6	14	28	34	35	40	42								
	60	0	D.O.	8.19	7.04	5.40	2.17	6.54	6.15	5.20	4.82	7.19					0.058	43	
			BOD	0	6	14	30	33	35	40	42								
Washburn	30	0	D.O.	8.29	7.87	7.1	5.51	4.63	3.95	2.01	5.61	6.69					0.01	166	166
			BOD	0	4	12	28	37	43	63	74								
	60	0	D.O.																
			BOD																
Presque Isle	300	0	D.O.	7.98	6.37	3.74	4.06	3.11	6.7	5.02	4.25	7.15	7.39				0.052	11.6	11.0
			BOD	0.0	1.6	4.2	7.3	8.3	9.0	10.7	11.4								
	200	0	D.O.	8.44	7.4	5.79	3.85	3.25	2.96	2	5.35	5.9					0.056	10.4	
			BOD	0.0	1.6	4.0	6.9	7.8	8.2	9.7	10.5								
McCains	200	0	D.O.	8.15	7.34	5.8	3.24	5.72	5.2	3.93	3.24	6.75					0.04	13.6	14
			BOD	0.0	1.2	3.5	7.4	8.9	9.7	11.6	12.6								
	100	0	D.O.	8.38	7.97	7.27	5.9	5.56	5.25	4.42	4.04						0.034	14.7	
			BOD	0.0	1.2	3.3	7.4	8.5	9.4	11.9	13.0								
Caribou	10	0	D.O.	8.26		7.97	7.47	7.53	7.44	7.18	7.03						0.036	40	40
			BOD	0		9	24	22	25	32	37								
	30	0	D.O.	8.3	7.92	7.29	6.09	5.86	5.67	5.04	4.72						0.038	39	
			BOD	0	4	10	22	24	26	33	36								
	100	0	D.O.																
			BOD	0															
Loring	300	0	D.O.	8.41	7.84	6.93	4.91	4.48	4.24	3.54	3.28						0.051	5.3	5.2
			BOD	0.0	0.6	1.5	3.5	3.9	4.2	4.9	5.1								
	200	0	D.O.	8.38	8.05	7.57	6.3	6.1	5.9	5.46	5.24						0.044	5	
			BOD	0.0	0.5	1.2	3.1	3.4	3.7	4.4	4.7								
Fort Fairfield	30	2	D.O.	8.26	7.64	6.37	4	3.68	3.51	2.92	2.65						0.075	44	40
			BOD	0	5	17	36	39	38	42	44								
	60	2	D.O.	8.3	7.14	4.78	2.43	6.1	5.77	4.82	4.42	6.76					0.078	35	
			BOD	0	5	17	26	30	30	34	36								

Ultimate BOD Aroostook River

29-Aug

Indicates reaeration of sample occurred

Sample Location	Sta Code	Date	29-Aug	31-Aug	4-Sep	7-Sep	10-Sep	13-Sep	18-Sep	24-Sep	1-Oct	9-Oct	19-Oct	25-Oct	29-Oct	Reaer 1	Reaer 2	Bottle Kd	TBOD
		Day	0	2	6	9	12	15	20	26	33	41	51	57	61				
Rte 11, Ashland	AR0	D.O.	8.53	8.34	7.58	7.32	7.08	7.08	6.73	6.34	6.17	5.57	5.56	5.22	5.16			0.036	3.7
		BOD	0	0.19	0.95	1.21	1.45	1.45	1.8	2.19	2.36	2.96	2.97	3.31	3.37				
Ashland Below	AR0a	D.O.	8.2	8	7.24	7	6.79	6.74	6.38	6.01	5.76	5.22	5.21	4.93	4.84			0.036	3.69
		BOD	0	0.2	0.96	1.2	1.41	1.46	1.82	2.19	2.44	2.98	2.99	3.27	3.36				
River Rd, Washburn	AR1	D.O.	8.59	8.39	7.64	7.41	7.22	7.2	6.85	6.5	6.29	5.71	5.68	5.38	5.3			0.035	3.65
		BOD	0	0.2	0.95	1.18	1.37	1.39	1.74	2.09	2.3	2.88	2.91	3.21	3.29				
Crouseville	AR1a	D.O.	8.45	8.25	7.53	7.34	7.09	7.04	6.66	6.25	6	5.34	5.3	5.04	4.96			0.03	4.1
		BOD	0	0.2	0.92	1.11	1.36	1.41	1.79	2.2	2.45	3.11	3.15	3.41	3.49				
1/2 MI Up from Rte 1, Presque Isle	AR2	D.O.	8.55	8.22	7.43	7.19	6.95	6.92	6.5	6.15	5.95	5.45	5.4	5.13	5.04			0.043	3.66
		BOD	0	0.33	1.12	1.36	1.6	1.63	2.05	2.4	2.6	3.1	3.15	3.42	3.51				
Maysville	AR3	D.O.	8.28	7.77	6.84	6.53	6.2	5.99	5.55	5.17	4.84	4.37	4.33	4.04	3.94			0.05	4.41
		BOD	0	0.51	1.44	1.75	2.08	2.29	2.73	3.11	3.44	3.91	3.95	4.24	4.34				
McGraw	AR4	D.O.	9.62	8.95	7.84	7.45	6.91	6.68	6.14	5.61	5.27	4.74	4.58	4.25	4.11			0.051	5.58
		BOD	0	0.67	1.78	2.17	2.71	2.94	3.48	4.01	4.35	4.88	5.04	5.37	5.51				
Above Caribou Dam	AR5	D.O.	9.39	8.77	7.65	7.32	7	6.85	6.17	5.77	5.54	4.99	4.84	4.56	4.47			0.053	4.97
		BOD	0	0.62	1.74	2.07	2.39	2.54	3.22	3.62	3.85	4.4	4.55	4.83	4.92				
Adjacent Grimes Mill Rd, Caribou	AR6	D.O.	9.37	8.79	7.6	7.17	6.73	6.55	5.99	5.59	5.36	4.93	4.88	4.64	4.57			0.063	4.78
		BOD	0	0.58	1.77	2.2	2.64	2.82	3.38	3.78	4.01	4.44	4.49	4.73	4.8				
Goodwin	AR7	D.O.	8.43	7.77	6.69	6.31	5.92	5.69	5.25	4.87	4.52	4	3.8	3.57	3.5			0.054	4.96
		BOD	0	0.66	1.74	2.12	2.51	2.74	3.18	3.56	3.91	4.43	4.63	4.86	4.93				
Stevensville	AR8	D.O.	8.64	8	6.89	6.46	5.99	5.73	5.18	4.79	4.45	3.97	3.88	3.69	3.63			0.059	5.07
		BOD	0	0.64	1.75	2.18	2.65	2.91	3.46	3.85	4.19	4.67	4.76	4.95	5.01				
Rte 1A, Fort Fairfield	AR9	D.O.	9.89	9.18	8.11	7.72	7.39	7.24	6.55	6.09	5.89	5.29	5.23	4.95	4.79			0.054	5.1
		BOD	0	0.71	1.78	2.17	2.5	2.65	3.34	3.8	4	4.6	4.66	4.94	5.1				
USA / Canada Border	AR10	D.O.	9.78	8.82	7.64	7.29	6.92	6.48	6.07	5.57	5.32	4.7	4.42	4.07	3.95			0.056	5.75
		BOD	0	0.96	2.14	2.49	2.86	3.3	3.71	4.21	4.46	5.08	5.36	5.71	5.83				
Park St Bridge	T-PIS0	D.O.	8.44	7.53	5.65	4.97	4.32	3.87	3.05	2.37	6.69	6	5.85	5.46	5.37	7.51		0.054	8.4
		BOD	0	0.91	2.79	3.47	4.12	4.57	5.39	6.07	6.89	7.58	7.73	8.12	8.21				
Bypass Bridge	T-PIS8	D.O.	7.95	6.49	3.17	6.2	5.19	4.5	3.43	2.66	7.11	6.36	6.25	5.87	5.78	7.5	7.67	0.078	11.34
		BOD	0	1.46	4.78	6.08	7.09	7.78	8.85	9.62	10.18	10.93	11.04	11.42	11.51				
Railroad Trestle	T-PIS13	D.O.	8.3	7.46	6.1	5.39	4.67	4.31	3.63	3.06	2.65	2.11	6.44	6	5.92	7.52		0.043	8.09
		BOD	0	0.84	2.2	2.91	3.63	3.99	4.67	5.24	5.65	6.19	7.27	7.71	7.79				
Grimes Mill Rd	T-LM1	D.O.	9.24	8.94	7.99	7.77	7.37	7.3	6.83	6.44	6.15	5.69	5.73	5.44	5.42			0.048	3.99
		BOD	0	0.3	1.25	1.47	1.87	1.94	2.41	2.8	3.09	3.55	3.51	3.8	3.82				
Above Greenlaw Brook Confluence	T-LM2	D.O.	9.45	9.07	8.04	7.75	7.44	7.38	6.89	6.56	6.52	6.08	6.18	5.92	5.92			0.067	3.51
		BOD	0	0.38	1.41	1.7	2.01	2.07	2.56	2.89	2.93	3.37	3.27	3.53	3.53				
Caribou Stream	T-CS	D.O.	8.74	8.19	7.12	6.78	6.37	6.21	5.63	5.08	4.74	4.14	4.03	3.75	3.68			0.046	5.29
		BOD	0	0.55	1.62	1.96	2.37	2.53	3.11	3.66	4	4.6	4.71	4.99	5.06				
River Dup AR3	DUPR	D.O.	8.37	7.77	6.66	6.31	5.89	5.62	5.18	4.73	4.44	4.02	3.96	3.69	3.65			0.059	4.74
		BOD	0	0.6	1.71	2.06	2.48	2.75	3.19	3.64	3.93	4.35	4.41	4.68	4.72				
River Dup AR10	DUPR	D.O.	9.67	9.01	7.81	7.52	7.12	6.83	6.2	5.8	5.4	4.79	4.61	4.3	4.22			0.049	5.6
		BOD	0	0.66	1.86	2.15	2.55	2.84	3.47	3.87	4.27	4.88	5.06	5.37	5.45				

BOD Bottles - 72 came from EMRO (Augusta's); 48 came from HETL (Augusta's); and 48 came from SMRO.

Ultimate BOD Aroostook River

29-Aug

Indicates reaeration of sample occurred

Location	Effl Vol (ml)	Seed Vol (ml)	Date	29-Aug	31-Aug	4-Sep	17-Sep	25-Sep	28-Sep	17-Oct	29-Oct
			Day	0	2	6	19	27	30	49	61
Unseeded Blanks	0	0	DO 1	8.26	8.24	8.24	7.95	8.24	8.12	8.1	8.15
	0	0	DO 2	8.22	8.32	8.3	8.05	8.36	8.19	8.23	8.28
	0	0	DO 3	8.2	8.29	8.29	8.01	8.39	8.18	8.24	8.23
Average Blank Depletion				**0**	**-0.06**	**-0.05**	**0.22**	**-0.10**	**0.06**	**0.04**	**0.01**
Seeded Blanks	0	2	D.O.	8.16	8.09	7.93	7.57	7.42	7.08	6.8	
			BOD	0	0.07	0.23	0.59	0.74	1.08	1.36	
	0	2	D.O.	8.22	8.03	7.92	7.38	7.19	6.83	6.57	6.54
			BOD	0	0.19	0.3	0.84	1.03	1.39	1.65	1.68
	0	2	D.O.	8.16	8.07	7.87	7.48	7.25	6.94	6.68	6.63
			BOD	0	0.09	0.29	0.68	0.91	1.22	1.48	1.53
Ave Seeded Blank Depletion				**0.00**	**0.12**	**0.27**	**0.70**	**0.89**	**1.23**	**1.50**	**1.61**

			Day	0	2	6	19	27	30	49	61	Reaer 1	Reaer 2	Reaer 3	Reaer 4	Reaer 5	Bottle Kd	TBOD	TBOD Final
Ashland	30	0	D.O.	8.23	7.91	7.18	5.63	5.26	5.01	4.53	4.26						0.05	41	40
			BOD	0	3	11	26	30	32	37	40								
	60	0	D.O.	8.17	7.43	6.16	2.94	6.46	6.13	5.09	4.63	7.05					0.053	39	
			BOD	0	4	10	26	29	31	36	38								
Washburn	30	0	D.O.	8.3	8.02	7.25	5.19	3.45	5.94	2.17	5.97	7.72	6.48				0.018	164	164
			BOD	0	3	11	31	49	66	104	109								
	60	0	D.O.																
			BOD																
Presque Isle	100	0	D.O.	8.25	8.01	7.34	6.38	6.22	6.01	5.49	5.31						0.046	9.2	9.7
			BOD	0.0	0.7	2.7	5.6	6.1	6.7	8.3	8.8								
	200	0	D.O.	8.21	7.5	6.06	4.13	3.51	3.28	2.22	5.98	6.65					0.048	10.2	
			BOD	0.0	1.1	3.2	6.1	7.1	7.4	9.0	10.0								
McCains	200	0	D.O.	8.46	8.02	6.81	4.55	3.74	3.4	2.02	5.56	6.24					0.034	12.1	12
			BOD	0.0	0.7	2.5	5.9	7.1	7.6	9.7	10.7								
	100	0	D.O.	8.41	8.24	7.72	6.56	6.28	5.99	5.26	5.02						0.03	12.1	
			BOD	0.0	0.5	2.1	5.6	6.4	7.3	9.5	10.2								
Caribou	60	0	D.O.	8.45	7.95	7.04	4.95	4.4	4.11	3.03	2.48						0.039	32	35
			BOD	0	3	7	18	20	22	27	30								
	30	0	D.O.	8.39	8.16	7.8	6.63	6.58	6.3	5.56	5.16						0.027	39	
			BOD	0	2	6	18	18	21	28	32								
	100	0	D.O.	8.58	7.66	5.91	2.38	5.55	5.06	3.12	2.32	6.51					0.041	33	
			BOD	0	3	8	19	21	23	29	31								
Loring	300	0	D.O.	8.87	8.37	7.47	5.07	4.56	4.28	3.45	3.2						0.049	6	5.9
			BOD	0.0	0.5	1.4	3.8	4.3	4.6	5.4	5.7								
	200	0	D.O.	8.77	8.48	7.92	6.41	6.1	5.85	5.34	5.13						0.045	5.8	
			BOD	0.0	0.4	1.3	3.5	4.0	4.4	5.1	5.5								
Fort Fairfield	30	2	D.O.	8.36	7.49	6.06	3.16	6.75	6.45	5.58	5.2	7.22					0.077	57	57
			BOD	0	8	21	46	49	49	55	58								
	60	2	D.O.																
			BOD																
Duplicate	100	0	D.O.	8.17	7.97	7.27	6.31	6.15	5.88	5.47	5.3						0.05	8.9	9
			BOD	0.0	0.6	2.7	5.6	6.1	6.9	8.1	8.6								
	200	0	D.O.	8.1	7.43	6.05	4.13	3.6	3.36	2.35	6.04	6.68					0.049	9.7	
			BOD	0.0	1.0	3.1	6.0	6.8	7.1	8.6	9.6								

Ultimate BOD Aroostook River

30-Aug

Indicates reaeration of sample o

Sample Location	Sta Code	Date	30-Aug	4-Sep	7-Sep	10-Sep	13-Sep	18-Sep	24-Sep	1-Oct	9-Oct	19-Oct	25-Oct	29-Oct	Reaer 1	Reaer 2	Reaer 3	Bottle Kd	TBOD
		Day	0	5	8	11	14	19	25	32	40	50	56	60					
Rte 11, Ashland	AR0	D.O.	9.36	8.19	7.91	7.68	7.69	7.24	6.94	6.83	6.29	6.34	6.06	6.05				0.059	3.28
		BOD	0	1.17	1.45	1.68	1.67	2.12	2.42	2.53	3.07	3.02	3.3	3.31					
Ashland Below	AR0a	D.O.	9.34	8.09	7.84	7.6	7.58	7.16	6.81	6.65	6.12	6.19	5.9	5.86				0.059	3.44
		BOD	0	1.25	1.5	1.74	1.76	2.18	2.53	2.69	3.22	3.15	3.44	3.48					
River Rd, Washburn	AR1	D.O.	9.09	7.89	7.65	7.4	7.38	6.98	6.66	6.5	6.07	6.1	5.8	5.74				0.06	3.27
		BOD	0	1.2	1.44	1.69	1.71	2.11	2.43	2.59	3.02	2.99	3.29	3.35					
Crouseville	AR1a	D.O.	9.12	7.78	7.51	7.26	7.27	6.88	6.53	6.38	5.86	5.94	5.69	5.67				0.066	3.38
		BOD	0	1.34	1.61	1.86	1.85	2.24	2.59	2.74	3.26	3.18	3.43	3.45					
1/2 Mi Up from Rte 1, Presque Isle	AR2	D.O.	9.17	8.01	7.71	7.46	7.45	7.04	6.69	6.54	6.03	6.15	5.96	5.95				0.064	3.23
		BOD	0	1.16	1.46	1.71	1.72	2.13	2.48	2.63	3.14	3.02	3.21	3.22					
Maysville	AR3	D.O.	9.03	7.56	7.18	6.89	6.76	6.34	6	5.87	5.47	5.52	5.34	5.32				0.079	3.63
		BOD	0	1.47	1.85	2.14	2.27	2.69	3.03	3.16	3.56	3.51	3.69	3.71					
McGraw	AR4	D.O.	9.9	8.14	7.61	7.21	6.94	6.4	5.97	5.74	5.26	5.23	5.04	5.03				0.073	4.83
		BOD	0	1.76	2.29	2.69	2.96	3.5	3.93	4.16	4.64	4.67	4.86	4.87					
Above Caribou Dam	AR5	D.O.	9.59	7.72	7.19	6.8	6.41	5.7	5.18	4.86	4.29	4.12	3.94	3.87				0.061	5.76
		BOD	0	1.87	2.4	2.79	3.18	3.89	4.41	4.73	5.3	5.47	5.65	5.72					
Adjacent Grimes Mill Rd, Caribou	AR6	D.O.	9.94	8.29	7.85	7.41	7.26	6.72	6.31	6.17	5.7	5.78	5.6	5.58				0.077	4.31
		BOD	0	1.65	2.09	2.53	2.68	3.22	3.63	3.77	4.24	4.16	4.34	4.36					
Goodwin	AR7	D.O.	9.69	7.88	7.41	6.99	6.78	6.26	5.88	5.64	5.2	5.22	5.05	5.03				0.078	4.59
		BOD	0	1.81	2.28	2.7	2.91	3.43	3.81	4.05	4.49	4.47	4.64	4.66					
Stevensville	AR8	D.O.	9.2	7.46	6.99	6.56	6.35	5.85	5.43	5.23	4.82	4.79	4.64	4.61				0.077	4.52
		BOD	0	1.74	2.21	2.64	2.85	3.35	3.77	3.97	4.38	4.41	4.56	4.59					
Rte 1A, Fort Fairfield	AR9	D.O.	10.67	8.78	8.31	7.94	7.82	7.1	6.68	6.48	6.03	6.02	5.84	5.82				0.075	4.79
		BOD	0	1.89	2.36	2.73	2.85	3.57	3.99	4.19	4.64	4.65	4.83	4.85					
USA / Canada Border	AR10	D.O.	9.89	7.93	7.51	7.12	6.85	6.33	5.85	5.61	5.1	5.12	4.94	4.89				0.075	4.93
		BOD	0	1.96	2.38	2.77	3.04	3.56	4.04	4.28	4.79	4.77	4.95	5					
Park St Bridge	T-PIS0	D.O.	8.45	6.28	5.59	5.01	4.73	4.11	3.59	3.24	2.74	2.51	6.94	6.84	7.64			0.063	6.47
		BOD	0	2.17	2.86	3.44	3.72	4.34	4.86	5.21	5.71	5.94	6.64	6.74					
Bypass Bridge	T-PIS8	D.O.	8.42	6.6	6.03	5.56	5.32	4.76	4.29	3.95	3.44	3.21	3.03	3.03				0.065	5.39
		BOD	0	1.82	2.39	2.86	3.1	3.66	4.13	4.47	4.98	5.21	5.39	5.39					
Railroad Trestle	T-PIS13	D.O.	8.43	6.72	6.19	5.65	5.38	4.84	4.41	4.09	3.57	3.38	3.19	3.13				0.063	5.27
		BOD	0	1.71	2.24	2.78	3.05	3.59	4.02	4.34	4.86	5.05	5.24	5.3					
Grimes Mill Rd	T-LM1	D.O.	8.47	8.18	7.86	7.62	7.62	7.15	6.82	6.75	6.36	6.44	6.31	6.35				0.038	2.45
		BOD	0	0.29	0.61	0.85	0.85	1.32	1.65	1.72	2.11	2.03	2.16	2.12					
Above Greenlaw Brook Confluence	T-LM2	D.O.	9.81	8.57	8.27	7.99	7.92	7.46	7.17	7.12	6.76	6.91	6.77	6.77				0.083	3.02
		BOD	0	1.24	1.54	1.82	1.89	2.35	2.64	2.69	3.05	2.9	3.04	3.04					
Caribou Stream	T-CS	D.O.	10.43	7.54	6.9	6.55	6.25	5.64	5.31	5.15	4.78	4.8	4.67	4.67				0.114	5.6
		BOD	0	2.89	3.53	3.88	4.18	4.79	5.12	5.28	5.65	5.63	5.76	5.76					
Trib Dup	DUPT	D.O.	9.39	7.63	7.11	6.72	6.56	6.02	5.73	5.6	5.25	5.35	5.17	5.18				0.093	4.14
		BOD	0	1.76	2.28	2.67	2.83	3.37	3.66	3.79	4.14	4.04	4.22	4.21					
River Dup	DUPT	D.O.	10.79	8.79	8.18	7.81	7.54	6.9	6.23	5.75	5.14	4.96	4.69	4.63				0.057	6.24
		BOD	0	2	2.61	2.98	3.25	3.89	4.56	5.04	5.65	5.83	6.1	6.16					

BOD Bottles - 72 came from EMRO (Augusta's); 48 came from HETL (Augusta's); and 48 came from SMRO.

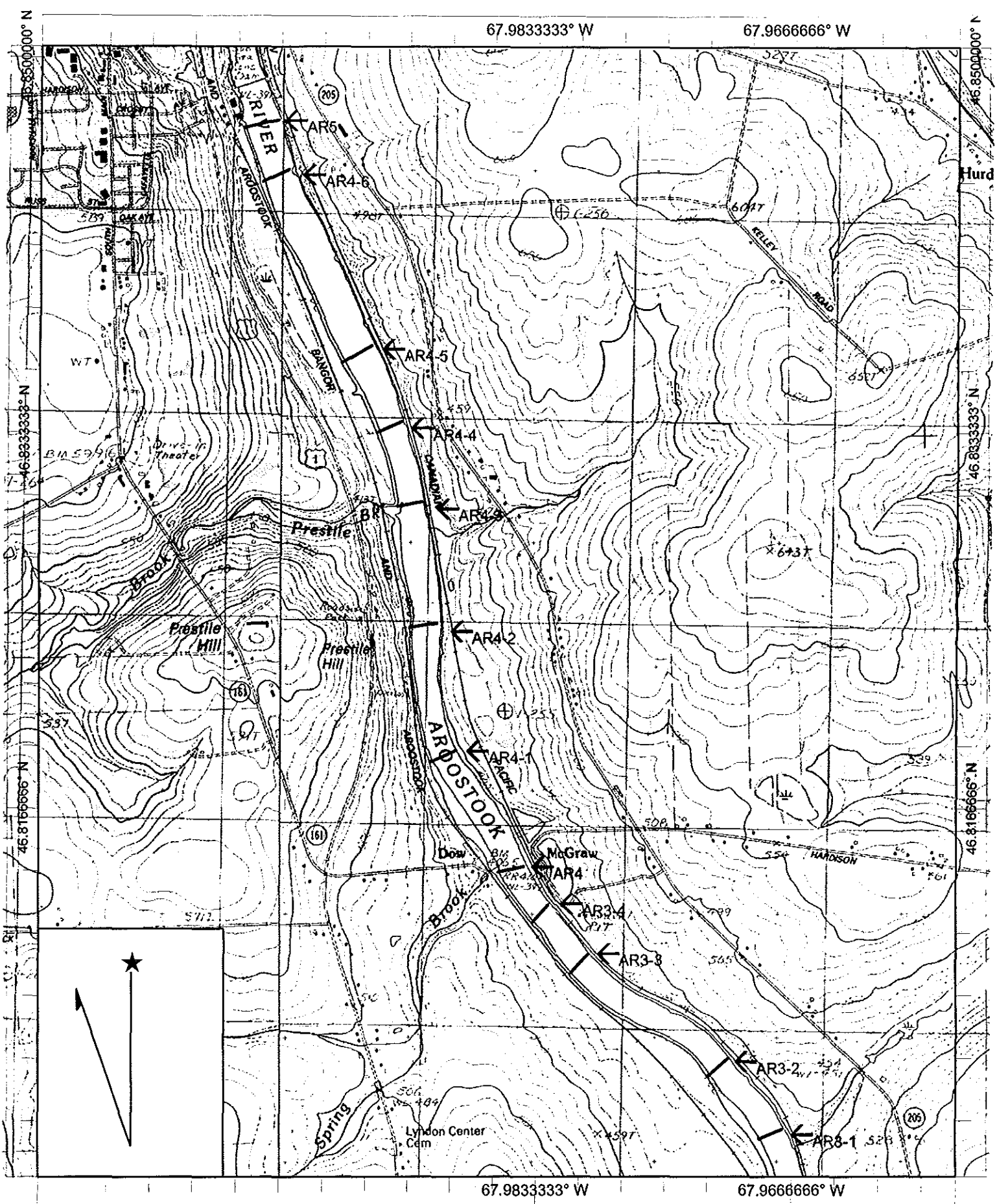
A4- Flow Data

Provisional USGS Data for River Flow in CFS for Summer 2001

Note: All flows provided by USGS are provisional data subject to revision.

	Washburn Gage	Masardis Gage
11-May	3800	2140
12-May	3360	1910
13-May	2980	1739
14-May	2700	1580
15-May	2630	1580
16-May	2940	1810
17-May	2930	1790
18-May	2670	1610
19-May	2340	1409
20-May	2100	1280
21-May	1900	1160
22-May	1700	1050
23-May	1520	932
24-May	1340	817
25-May	1180	722
26-May	1050	642
27-May	938	569
28-May	845	514
29-May	805	504
30-May	813	538
31-May	912	573
1-Jun	1050	687
2-Jun	1120	739
3-Jun	1570	1130
4-Jun	3830	2240
5-Jun	5540	2900
6-Jun	6520	3640
7-Jun	7200	3570
8-Jun	6470	2859
9-Jun	5110	2150
10-Jun	3880	1670
11-Jun	2990	1340
12-Jun	2440	1150
13-Jun	2180	1040
14-Jun	1900	916
15-Jun	1600	780
16-Jun	1360	671
17-Jun	1200	628
18-Jun	1660	803
19-Jun	1840	845
20-Jun	1590	762
21-Jun	1330	655
22-Jun	1100	540
23-Jun	943	470
24-Jun	875	444
25-Jun	893	436
26-Jun	839	406
27-Jun	736	365
28-Jun	640	328
29-Jun	569	286
30-Jun	520	256
1-Jul	479	241
2-Jul	452	231
3-Jul	427	222
4-Jul	406	205
5-Jul	409	194
6-Jul	441	220
7-Jul	444	216
8-Jul	412	223
9-Jul	415	225
10-Jul	455	250
11-Jul	478	249
12-Jul	469	273
13-Jul	488	317
14-Jul	519	335
15-Jul	526	332
16-Jul	566	391
17-Jul	909	624
18-Jul	1470	989
19-Jul	1850	1060
20-Jul	1530	811
21-Jul	1150	595
22-Jul	905	457
23-Jul	881	428
24-Jul	842	441
25-Jul	814	558
26-Jul	974	729
27-Jul	1010	638
28-Jul	853	502
29-Jul	709	408
30-Jul	597	339
31-Jul	514	284
1-Aug	448	240
2-Aug	396	204
3-Aug	350	178
4-Aug	312	159
5-Aug	285	141
6-Aug	257	129
7-Aug	231	122
8-Aug	216	108
9-Aug	201	99
10-Aug	191	97
11-Aug	175	95
12-Aug	169	95
13-Aug	166	87
14-Aug	155	81
15-Aug	143	79
16-Aug	137	75
17-Aug	135	74
18-Aug	133	82
19-Aug	132	77
20-Aug	130	71
21-Aug	140	73
22-Aug	143	72
23-Aug	133	73
24-Aug	122	71
25-Aug	112	64
26-Aug	108	57
27-Aug	107	63
28-Aug	117	75
29-Aug	130	86
30-Aug	134	80
31-Aug	133	84

A5- Transects



Name: GOODWIN
Date: 9/18/2001
Scale: 1 inch equals 2000 feet

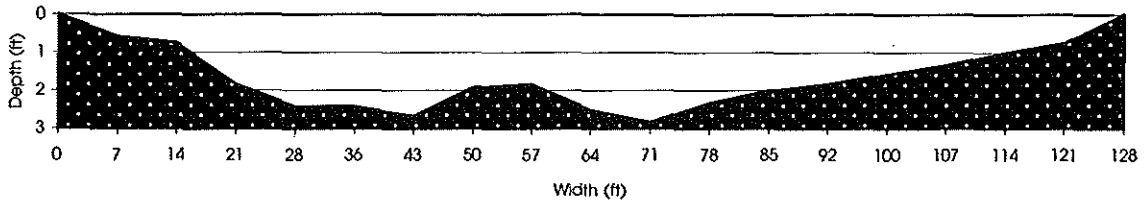
Location: 046.8254372° N 067.9858569° W
Caption: Aroostook River Project, August 2001

Site Number	Distance	Bearing	West Edge Coordinates	East Edge Coordinates
AR3-1	435.75ft	71°42'06"T	46.801947735°N 67.968760670°W	46.802324604°N 67.967101295°W
AR3-2	352.45ft	39°37'37"T	46.8047479334°N 67.971553463°W	46.805493644°N 67.970655874°W
AR3-3	446.13ft	49°18'43"T	46.809326177°N 67.980854805°W	46.810123892°N 67.979503842°W
AR3-4	423.19ft	69°02'17"T	46.818726316°N 67.983415440°W	46.812349547°N 67.982177214°W
AR4	477.03ft	75°08'36"T	46.813774288°N 67.985852207°W	46.814109604°N 67.983993808°W
AR4-1	458.91ft	69°02'17"T	46.818726316°N 67.990276108°W	46.819176188°N 67.988564708°W
AR4-2	486.79ft	80°57'50"T	46.824644963°N 67.991693592°W	46.824854612°N 67.989773251°W
AR4-3	417.00ft	79°19'37"T	46.830108620°N 67.992480060°W	46.830320491°N 67.990842977°W
AR4-4	461.31ft	69°47'51"T	46.833420231°N 67.993816342°W	46.833856971°N 67.992086810°W
AR4-5	590.44ft	62°37'45"T	46.836506907°N 67.996059120°W	46.837251418°N 67.993963746°W
AR4-6	550.07ft	71°35'42"T	46.844485335°N 68.001325890°W	46.844961472°N 67.999240214°W
AR5	568.35ft	74°01'23"T	46.846693951°N 68.002421578°W	46.847123350°N 68.000238621°W

Aroostook River Transects 8/22/01 - Flow at Washburn USGS Gage = 151 cfs

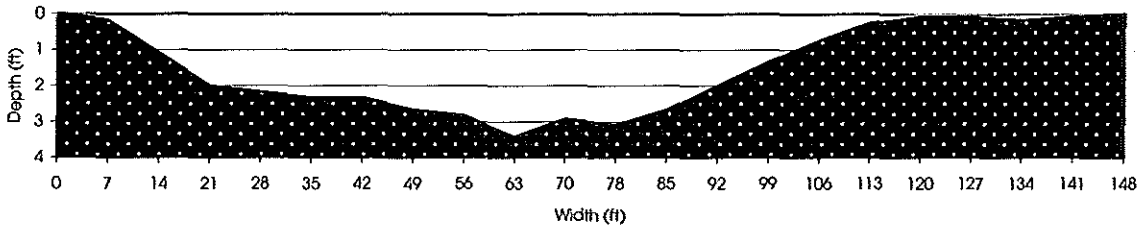
ARO Rte 11 Ashland

Area 217 ft²
Width 128 ft
Ave Depth 1.70 ft



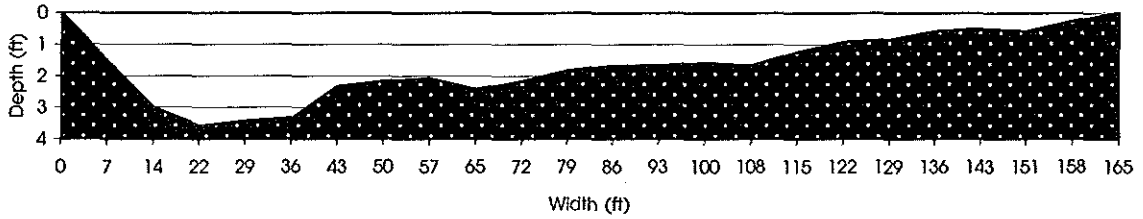
AROa Below Ashland

Area 228 ft²
Width 148 ft
Ave Depth 1.54 ft



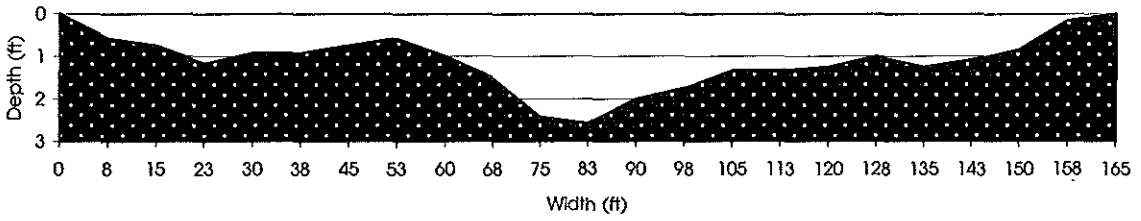
AROb Sheridan East

Area 214 ft²
Width 165 ft
Ave Depth 1.30 ft



AR0c Upstream Gardner Brook

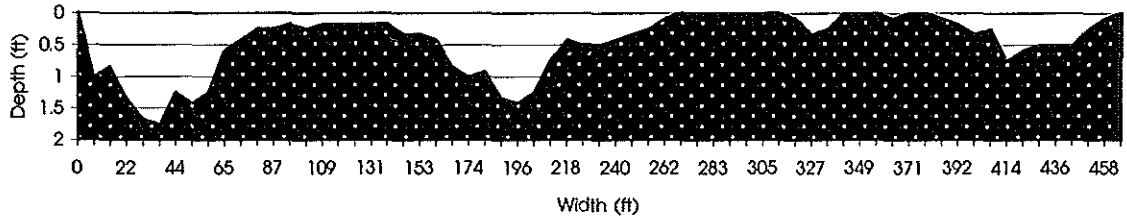
Area 189 ft²
Width 165 ft
Ave Depth 1.14 ft



Aroostook River Transects 8/22/01 - Flow at Washburn USGS Gage = 151 cfs

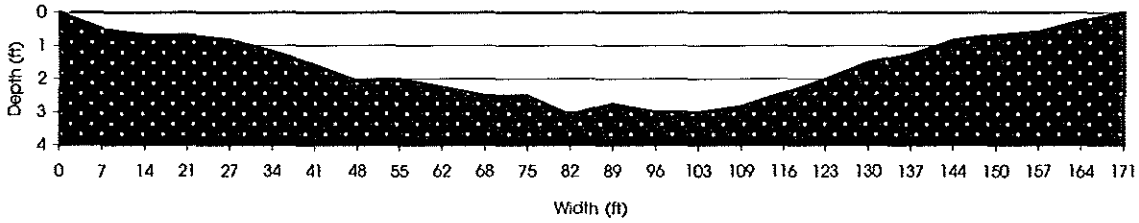
AROd Below Donnelly Island

Area 160 ft²
Width 400 ft
Ave Depth 0.40 ft



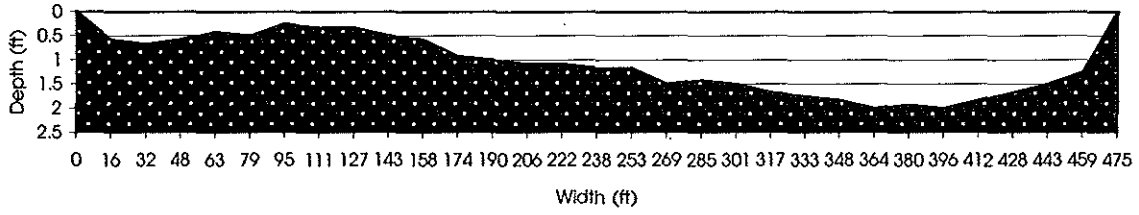
AR1 River Rd Washburn

Area 280 ft²
Width 171 ft
Ave Depth 1.64 ft



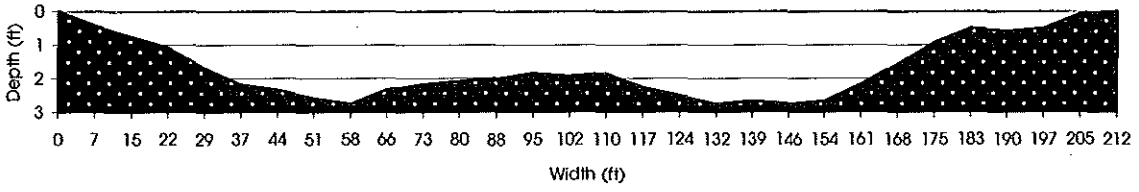
AR1a Crouseville

Area 523 ft²
Width 475 ft
Ave Depth 1.10 ft



AR2 0.5 Miles Up From Rte 1, Presque Isle

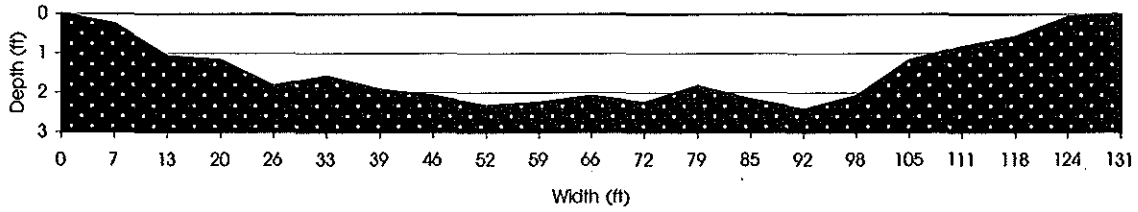
Area 364 ft²
Width 212 ft
Ave Depth 1.72 ft



Aroostook River Transects 8/22/01 - Flow at Washburn USGS Gage = 151 cfs

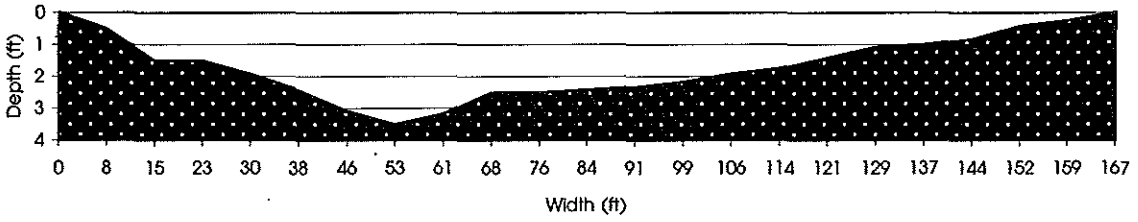
AR3 Maysville

Area 196 ft^2
Width 131 ft
Ave Depth 1.50 ft



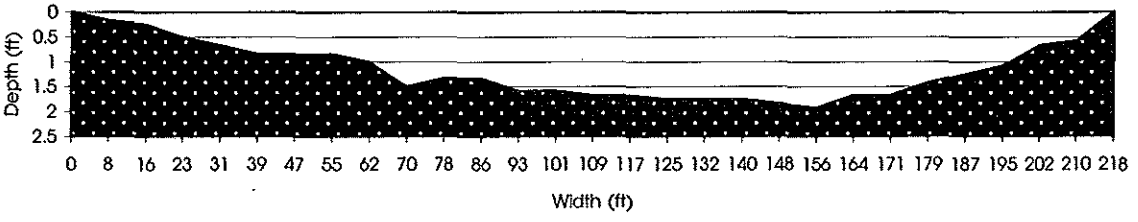
AR6 Adjacent Grimes Rd

Area 280 ft^2
Width 167 ft
Ave Depth 1.68 ft



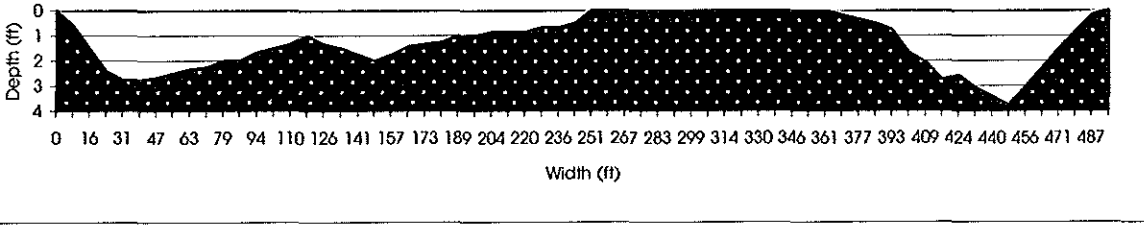
AR7 Goodwin

Area 258 ft^2
Width 218 ft
Ave Depth 1.18 ft



AR8 Stevensville

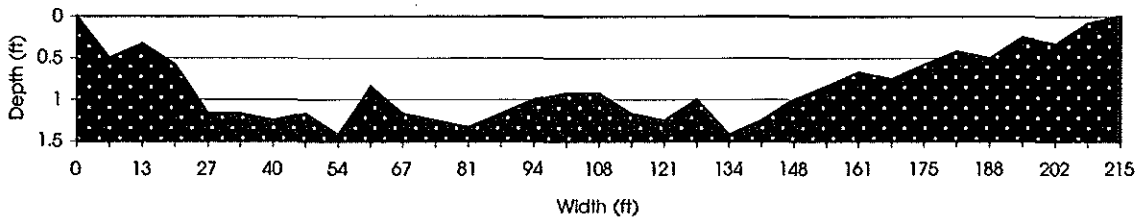
Area 227 ft^2
Width 395 ft
Ave Depth 0.57 ft



Aroostook River Transects 8/22/01 - Flow at Washburn USGS Gage = 151 cfs

AR1b Railroad Trestle below Crouseville

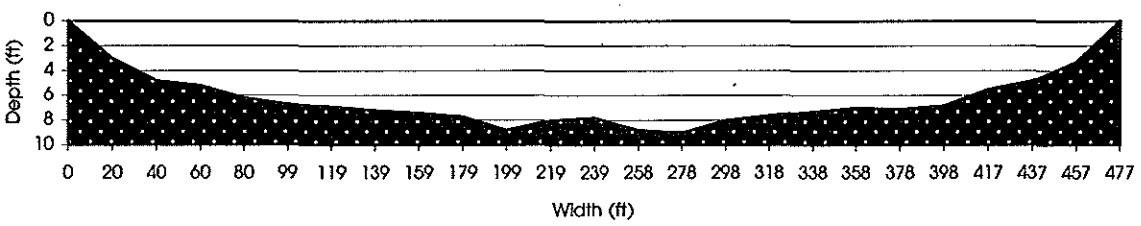
Area 186 ft^2
Width 215 ft
Ave Depth 0.87 ft



Aroostook River - Caribou Dam Impoundment 8/28/01 - Flow at Washburn USGS Gage = 124 cfs

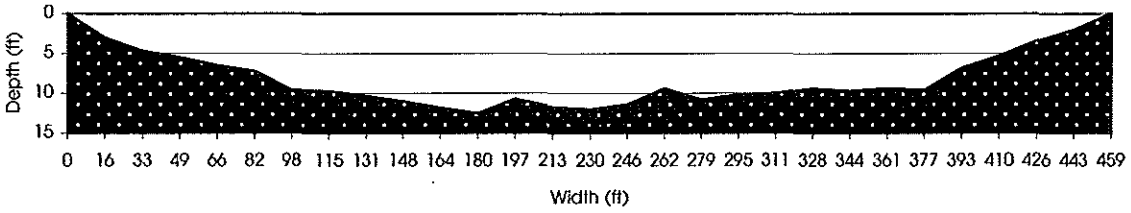
AR4 McGraw

Area 3079 ft^2
Width 477 ft
Ave Depth 6.45 ft



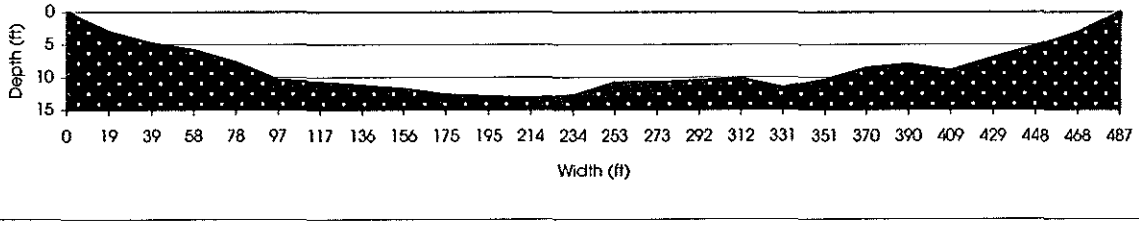
AR4-1 Powerlines

Area 3829 ft^2
Width 459 ft
Ave Depth 8.34 ft



AR4-2

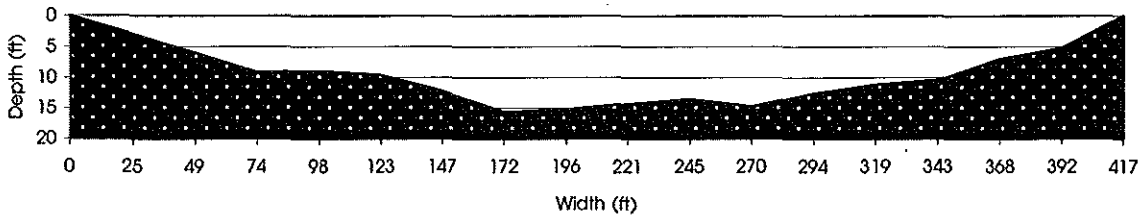
Area 4334 ft^2
Width 487 ft
Ave Depth 8.90 ft



Aroostook River - Caribou Dam Impoundment 8/28/01 - Flow at Washburn USGS Gage = 124 cfs

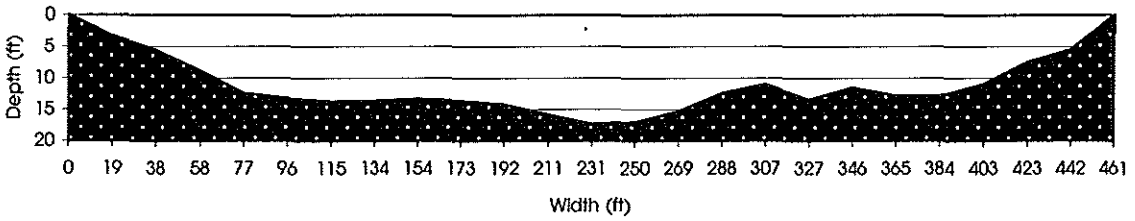
AR4-3

Area 4138 ft^2
Width 417 ft
Ave Depth 9.92 ft



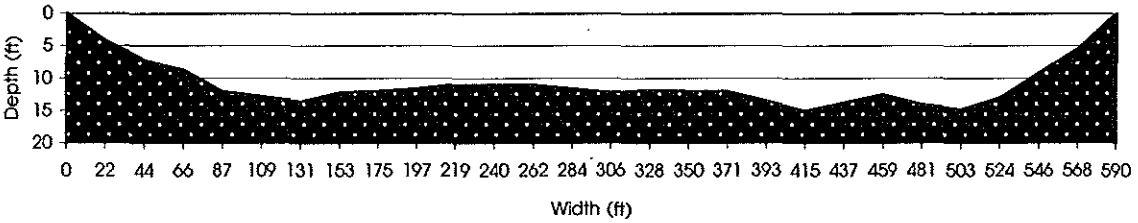
AR4-4

Area 5280 ft^2
Width 461 ft
Ave Depth 11.45 ft



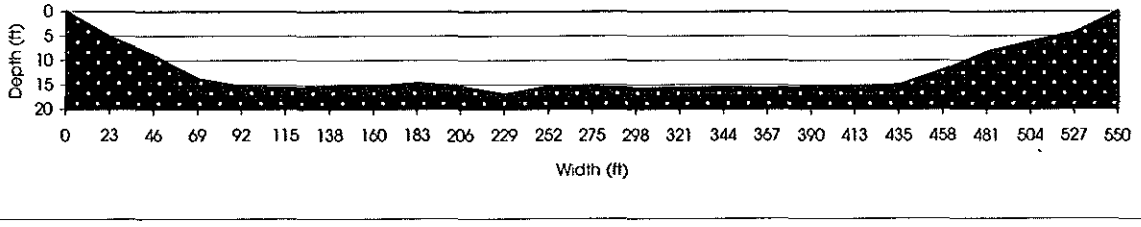
AR4-5

Area 6514 ft^2
Width 590 ft
Ave Depth 11.04 ft



AR4-6 Boat Launch

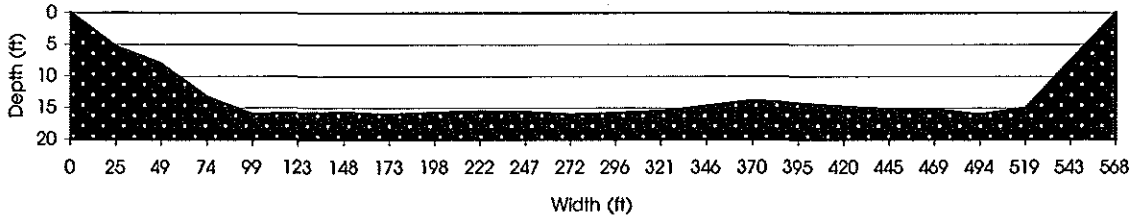
Area 7031 ft^2
Width 550 ft
Ave Depth 12.78 ft



Aroostook River - Caribou Dam Impoundment 8/28/01 - Flow at Washburn USGS Gage = 124 cfs

AR5 Above Caribou Dam

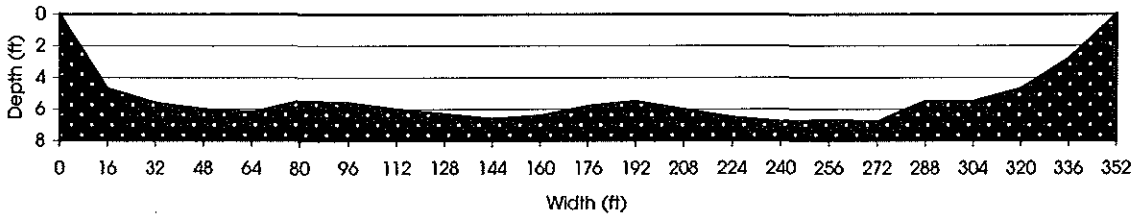
Area 7670 ft^2
Width 568 ft
Ave Depth 13.5 ft



Aroostook River - Caribou Dam Impoundment 8/29/01 - Flow at Washburn USGS Gage = 137 cfs

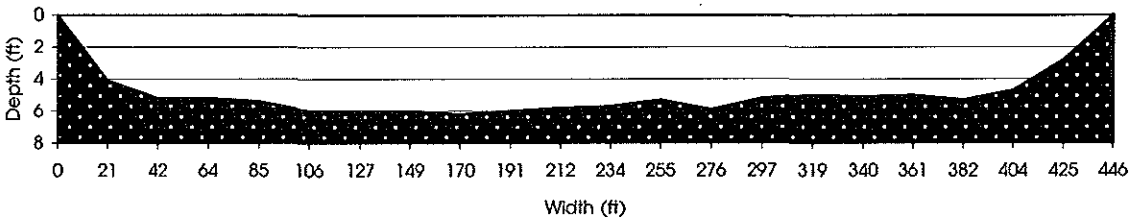
AR3-2

Area 1944 ft^2
Width 352 ft
Ave Depth 5.52 ft



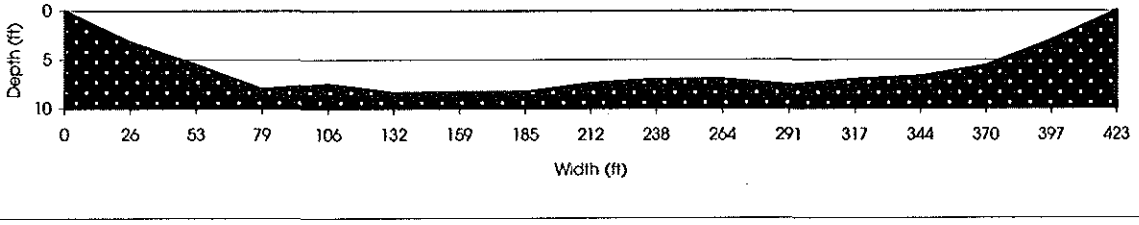
AR3-3

Area 2249 ft^2
Width 446 ft
Ave Depth 5.04 ft



AR3-4

Area 2657 ft^2
Width 423 ft
Ave Depth 6.28 ft

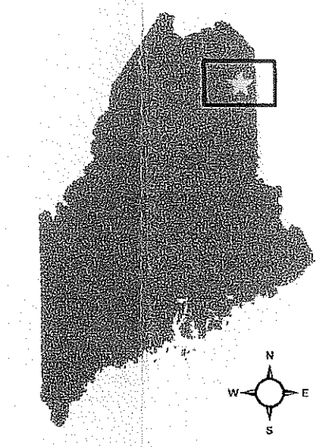


A6 – Map of Sample Locations

Aroostook River and Tributary Sampling Sites

- DEP Sampling Points
- Political Boundries
- Streams
- Lakes, Ponds, and Rivers

Site Location



2 1 0 2 4 Miles

This map is for display and reference purposes only and was created by the Maine Dept. of Environmental Protection, Bureau of Land and Water Quality.

t-OB
T-LM2
T-CS
AR6
AR5
T-LM1
t-PB
AR4
t-GRB
AR7
AR8
AR10
t-HHB
AR9
t-HB
AR3
t-SB
AR1
t-GAB
t-CB
AR1a
AR2
T-PIS3
t-MB
T-PIS8
T-PIS0
t-NBP
t-AB
t-LMR
AR0a
t-MR
AR0
t-SPS
t-SCS

A7 – Responses to Comments

Presque Isle Sewer District

Appendix 2 – Water Quality Data

1. Comment: The boldface entries for TP indicating data from PISD's facility on 8/28 is in error, since they did not provide any TP information on that day.
   Response: This data is actually data provided by the intensive survey and should not be boldface. This correction will be made in the final data report.

2. Comment: The PO4-P value of 5.1 ppb for station PIS13 on 8/28/01 is inconsistent with PISD's sampling results (35 ppb) at that location for the same date and also inconsistent with the result obtained in the intensive survey at PIS8 on 8/28/01.
   Response: DEP agrees that the 5.1 ppb result for PO4-P is inconsistent with other sampling results for that day. However phosphorus data is often variable, in particular, below a wastewater treatment plant and there is no reason to reject this data. This data point will be relied on less in the modeling effort.

McCain Foods (Woodard and Curran)

Comment: Page 1, para. 4 – McCain flow rate in error, no reference made to whether flows cited for treatment plants are actual flows or licensed flows.
Response: Text will be added in the Introduction section to explain that the flows cited are licensed flows and the McCains flow will be corrected.

Comment: Page 4 – Hydrologic Data – Absence of time-of travel data will make velocity determinations difficult. Include old USGS time of flow study in report.
Response: There is adequate transect data to determine velocity, which can be directly calculated at each transect by dividing flow by cross sectional area. An old time of flow dye study undertaken by DEP will provide additional information. The data report is limited to data collected in 2001. Information pertaining to the dye study could be summarized in the modeling report.

Comment: Page 8, Para. 3 – Diurnal DO also affected by diurnal temperature changes.
Response: This may be true, but the data report was not intended to interpret the data in detail. The statement that diurnal DO changes are primarily due to algae is correct.

Comment: Page 8 – Use of word major to define point sources ambiguous.
Response: The following text will be added to the Introduction section:
"The influence upon downstream water quality from the first two point sources is minor due to their low flow volume. The last four point sources have more flow volume and result in a noticeable difference in downstream water quality. Hence throughout the report, references to major point source discharges includes Presque Isle, McCain Foods, Caribou, and Fort Fairfield."

Comment: The data report provides no review of ammonia or organic nitrogen. There is not sufficient ammonia to reflect the NBOD estimates in the BOD test. The total nitrogen observed below McCain's are due to nitrate nitrogen.
Response: Once again it should be realized that the data report was not intended to interpret the data in detail. Nutrient assessments were limited to total nitrogen and phosphorus and do not include the various components of total nutrients. Ammonia nitrogen should not be used as a check on available nitrogen for NBOD estimates in the BOD test. TKN, which includes both organic nitrogen and ammonia, should be used, since over a period of 60 days, hydrolosis of organic nitrogen to ammonia should occur. A check of the total oxidizable nitrogen available (TKN) should be multiplied by 4.33 and this product should not exceed the reported NBOD value. All NBOD values passed this check.

The following text will be added to the Nutrients section of the data report:
"The majority of the nitrogen increase observed here is nitrate nitrogen, and hence most of the ammonia nitrogen has already been oxidized within McCain's treatment plant before being discharged to the Aroostook River."

Comment: Were chlorophyll a values corrected for dead algae cells?
Response: Yes. There wasn't much difference between corrected and uncorrected chlorophyll a.

Comment: Page 20 – Why did the North Branch of Presque Isle Stream have high TSS and TP in both the dry and wet weather sampling.
Response: The intent of the data report is to report the trends and not necessarily interpret that data in detail and find reasons for trends, except in situations with an obvious answer.

Comment: Appendix 2 – DO % saturation value (19.8%) reported for AR5 on 7/3 for the Single Days Surveys table appears to be in error.
Response: Agreed. This will be corrected.

Comment: Appendix 4 Flow Rates – Some flow rates are different from the ones listed on USGS's website.
Response: The flow rates are provisional data subject to change. The flow reported may have been reported last summer on USGS's website. This information will be rechecked and updated and will be flagged as provisional data. The text within the Flow section of the report will also be updated as necessary.

To: Paul Mitnik, MDEP
From: Stephen Freeman, PISD Steve Freeman
Subject: Aroostook River Draft Data Report
Date: March 25, 2002

Comments on the Aroostook River Draft Data Report are listed below:

1. Concerning the effluent data for the Presque Isle STP shown as part of the Aroostook River intensive survey for August 26-30, 2001:

   The Presque Isle Sewer District did not provide any facility data for TP as indicated in boldface numbers for August 26-28, 2001.

2. Concerning the Presque Isle Stream data shown as part of the Aroostook River intensive survey for August 26-30, 2001.

   The PO4-P value of 5.1 ppb for station PIS13 on 08/28/01 is very inconsistent with the PO4-P value of 35 ppb for station PIS8 on the same day. The PO4-P value of 5.1 ppb is also very inconsistent with the PISD sampling result of 36 ppb for the same day.

March 29, 2002

Mr. Paul Mitnik, P.E.
Maine Department of Environmental Protection
17 State House Station
Augusta, ME 04333-0017

RE: McCain Foods, Easton, Maine
Aroostook River Draft Data Report comments

Dear Mr. Mitnik:

The content of your *Aroostook River Draft Data Report* is clear proof that a tremendous effort by many individuals went into preparation and execution of the water quality data collection. The Maine Department of Environmental Protection (MDEP) has done an outstanding job of organizing this huge quantity of information into presentation form. Overall, we are encouraged to have high quality data to engage the next step of water quality model development. The successive comments are not to detract from the great work completed so far, but are intended to further improve upon the content of the report.

McCain Foods and Woodard & Curran as their consultant offers the following comments referenced to locations in the draft Report:

Page 1, para. 4 – Point source discharge flow rates are presented. The reader is not informed if these flows are licensed daily maximum, a licensed monthly average, or a historic mean. I would speculate that none of these facilities actually discharge at the flow rates cited. Similarly, McCain Foods has been licensed for a monthly average flow of 2.5mgd, not 3.0 mgd, and is in process of relicensing the allowable discharge to 4.0 mgd. Perhaps other flows are in error too.

Page 4 Hydrologic Data – A general comment is the absence of time-of-travel data. We have flow rates and cross sections, however without water surface slopes or dye study information it will be difficult to estimate how fast or slow pollutants move down river. There was rumor of an old USGS time-of-travel study. If this study exists, incorporating it into the data report would be valuable.

Page 8, para. 3 – A statement is made that the observed dissolved oxygen diurnal fluctuations are due to significant growth of both bottom attached and floating algae. Missing here is the correlation to diurnal water temperature changes. Diurnal temperature changes as large as 5°C referenced in the preceding paragraph effect oxygen solubility. Temperature changes are a factor working opposite the diurnal DO effect caused by plants. This temperature change effect would be most apparent if comparing percent saturation changes.

Page 8 – the phrase "major point source" appears at least five times on this page. There is no numeric standard nor common definition of "major". Suggestions to improve clarity of this esoteric term: name the sources; define major; or delete the word.

Page 8-15 Nutrients – No review of ammonia nitrogen or organic nitrogen is provided. Although there are point sources of ammonia nitrogen, the in-stream concentrations are almost always below the detection limits. Also, there does not appear to be sufficient ammonia to reflect the difference between initial and final nitrate measurements made in the BOD bottle. This may be the hydrolysis of organic nitrogen in the BOD bottle. Lastly, the total nitrogen increases observed down stream of the McCain's discharge are primarily in the form of nitrate nitrogen, not ammonia or organic nitrogen.

Page 15, Chlorophyll a – Have the reported chlorophyll a values been corrected to account for the possible presence of pheophorbide a and pheophytin a?

Page 20, Wet and Dry Weather Tributary Sampling – What conditions exist to explain why the North Branch of Presque Isle Stream is not expected to have lower TSS and TP in dry weather?

Table, Aroostook River Single Day Surveys –For station AR5, on July 3, D.O. percent saturation is shown as 19.8%. This appears to be an error in typing or calculation.

Appendix 4 Flow Rates – Some flow rates listed are slightly different than the preliminary information available from the USGS via the internet. Are these final USGS flow rates from the yet unpublished report, or another form of preliminary data?

Again, thank you for the opportunity to comment. If you have questions about the above comments, please do not hesitate to call.

Very truly yours,

WOODARD & CURRAN, INC.

Paul Porada, P.E.
Senior Project Engineer

PJP/
203049.10

cc: Dick Haines, McCain Foods
Doug Hahn, McCain Foods
Sarah Nicholson, W&C