APPENDIX B

EPD WATER QUALITY ASSESSMENT

-----Original Message-----
From: Linda MacGregor [mailto:Linda.MacGregor@dnr.state.ga.us]
Sent: Monday, February 25, 2008 2:12 PM
To: Brandt, Joanne U SAM
Cc: Carol Couch; Elizabeth Booth; Paul Lamarre; Tim Cash; Wei Zeng
Subject: GA-EPD Request for a Temporary Deviation from the currentBuford Water Management Operations - Reduction in Water QualityReleases

This is in response to your e-mail of February 20, 2008 requesting additional information.

Please refer to the attached document for the following:

- Modeling input and results for ammonia toxicity and whole effluent toxicity; and

- Level of flow used as the basis for determining effluent limits for NPDES wastewater permits that might be affected by the proposed reduction in flow.

On Friday, we also uploaded the Chattahoochee River model files used to evaluate reduced minimum streamflows at Peachtree Creek to the ftp.planetwater.com site under username savepdepa and directory 'Files For JMG'. We also notified Jim Greenfield at EPA of the availability of these files on the ftp site.

As you also requested, this is to clarify that the benefits resulting from the proposed reduction in flow would accrue only through April 30, 2008 since we have only asked for the reduction in flow through April 30, 2008. Analysis of the full year 2008 was done for informational purposes only and was not intended to be interpreted that we were requesting a reduction in flow for the entire year 2008.

With respect to an analysis of the proposed impacts and benefits, as demonstrated in the attached and the information attached to our letter of February 11, 2008 to Colonel Jorns, instream water quality, NPDES discharges, and drinking water supplies will not be impacted by the proposed reduction in flow. As stated in our February 11, 2008 letter, benefits accruing from this proposed action will add critically needed storage to Lake Lanier to support future downstream uses during the exceptional drought conditions.

We believe that the information presented adequately demonstrates that all downstream uses will be protected if flows from Buford Dam are reduced as requested. We respectfully request that the Corps and EPA expedite review of this information and proceed without further delay with the proposed reduction in flow. Because the opportunity to retain storage will soon pass, any action to reduce flows needs to be taken immediately.

Thank you for your consideration of this request. If you have any questions or need additional information please do not hesitate to call me at 404-675-1750. If I cannot be reached immediately, please contact Tim Cash at 404-535-6560.

Linda MacGregor, P.E.
Chief, Watershed Protection Branch
Georgia Environmental Protection Branch

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Joanne.U.Brandt@usace.army.mil
>>>2/20/2008 7:18 pm>>>
Carol:

We have received your attached request for a temporary deviation from our current water management operations at Buford Dam/Lake Lanier, for consideration of a reduction in releases to the Chattahoochee River necessary for assimilation of return flows at Atlanta. We are considering this request, but will be coordinating your proposal with the ACF Basin stakeholders and asking for any information that can assist in our review and environmental evaluation of your request. We are asking that all agency and stakeholder comments be provided by Thursday, 28 February. We will also be requesting additional information from GA-EPD that will assist in our review.

We have discussed your proposal with the US Environmental Protection Agency (Region 4) and they have requested that we ask you to provide the following information:

(1) Presentation of modeling input and results for DO as referenced in your 11 Feb 2008 letter. Modeling input and results should also be presented for Ammonia Toxicity and Whole Effluent Toxicity (WET) at the same incremental flows.

(2) Identify what level of flow was used as the basis for determining effluent limits for the City of Atlanta and any other NPDES wastewater permits that might be affected by this proposed reduction in flow. Will the change in flow result in any ambient criterion not being met in the receiving waters?

We also request clarification of the current request in relation to the modeling results presented. It appears that the modeling was conducted to assess impacts of maintaining the reduced minimum flow above Peachtree Creek for all of 2008, but the request in your letter is to temporarily reduce minimum flow for the cooler months through 30 April 2008. It is unclear if the stated benefits to Lake Lanier of the reduced flow only accrue if operated at reduced releases for all of 2008, or what the benefits would be if the reduced releases only occur through 30 April 2008. Impacts and benefits should be presented for the reduced releases occurring only during the temporary period through 30 April. Impacts and benefits should also be displayed for the incremental reductions to 650 cfs and 600 cfs.

We will forward other requests for clarification or additional information as we identify our information needs. If you have any questions, please feel free to contact me.

Joanne Brandt
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Water Quality Assessment of Chattahoochee River Flow Reduction at Peachtree Creek

Water quality modeling using the Georgia Environmental Protection Division's EPDRiv1 hydrodynamic and water quality model for the Chattahoochee River between Buford Dam and West Point Lake was used to assess the water quality effects of reducing minimum flows in the River from 750 to 650, 600, and 550 cubic feet per second (cfs) at Peachtree Creek. These reduced minimum streamflows would be achieved by reducing Buford Dam releases in order to preserve storage in the Lake Sydney Lanier reservoir. The water quality parameters assessed included dissolved oxygen, ammonia toxicity, and whole effluent toxicity.

Dissolved Oxygen

The Division's hydrodynamic and water quality model EPDRiv1 for the Chattahoochee River between Buford Dam and West Point Lake, which has been used to develop waste load allocations for the River, was used for the analysis of dissolved oxygen. A simulation was developed that included municipal wastewater discharges and water supply withdrawals at 2007 annual average operating levels. Table 1 shows that discharges to the River were operating at an 88 percent reduction from their permitted oxygen demand loading. In addition, two scenarios were created, one that used tributary watershed inflows at previously estimated 7Q10 streamflow rates, and a second that assumed a fifty percent reduction from the 7Q10 streamflow rates to assess the effect of a worsening drought (see Figures 1, 2, and3). The model predicted that the water quality standard for dissolved oxygen could be protected under conditions for both scenarios (see Figures 4 and 5).

Ammonia Toxicity

Ammonia concentration results from the water quality model were compared to computed toxicity levels according to predicted River water temperatures and pH. Figure 6 shows a longitudinal profile of ammonia concentrations at the time of the maximum concentration. Figure 7 shows the time series of ammonia concentration at the peak location shown on Figure 6. Ammonia toxicity is computed based on water temperature and pH. Predicted model water temperatures were available from the model results, however, River pH was not. Consequently, to include the effect of pH a series of pH values, 7.0 to 8.0, were assumed since toxicity increases at higher pH, and the resulting toxicity concentrations compared to the predicted ammonia concentrations. Figure 8 shows that the predicted ammonia concentrations are less than the toxic concentrations for pH as high as 8.0, which is not expected in the River.

Whole Effluent Toxicity

Table 2 lists the municipal wastewater treatment facilities included in the analyses along with results of their whole effluent toxicity tests. The table shows that none of the effluents tested toxic (No Observable Effect Concentration [NOEC]) at concentrations less than their critical instream wastewater concentration (IWC). The predicted River flows from the water quality model were used to compute the IWC concentration at each facility in order to verify that it was less than the NOEC concentration. Table 3 shows the predicted IWCs for each discharge are less than the NOEC for that discharge.

Table 1

Wastewater Treatment Facilities Loading Comparison

Facility	2007 Average Flow (MGD)	2007 Average BOD5 (mg/L)	2007 Average NH3 (mg/L)	2007 Average UOD Load (lbs/day)	Permit Limits Flow (MGD)	Permit Limits BOD5 (mg/L)	Permit Limits NH3 (mg/L)	Permit Limits UOD Load (lbs/day)	UOD Percent Reduction
Fulton County - Johns Creek WPCP	4.3	1.4	0.38	320	15	2.9	0.50	2,100	85%
Gwinnett County - Crooked Creek WPCP	29.2	2.1	0.06	2,625	36	2.9	0.77	5,410	51%
Fulton County - Big Creek WPCP	20.2	2.9	0.41	2,758	24	9.1	1.40	10,388	73%
Atlanta - R.M. Clayton WPCP	72.7	3.1	0.32	10,254	100	16.0	20	142,948	93%
Cobb County - R.L. Sutton WPCP	27.2	2.5	0.05	2,891	40	10.0	9.40	31,011	91%
Cobb County - South Cobb WPCP	23.9	13.0	4.38	16,911	40	13.0	1.80	24,428	31%
Atlanta - Utoy Creek WPCP	24.1	2.1	0.06	2,124	40	16.0	20	57,179	96%
Atlanta - South River WPCP	30.2	3.1	0.58	4,551	48	16.0	20	68,615	93%
Douglasville - Sweetwater Creek WPCP	2.2	6.2	1.20	673	3	10.0	2.00	1,480	55%
Fulton County - Camp Creek WPCP	14.7	0.3	0.04	204	24	2.9	0.50	3,360	94%
			Total:	43,311				346,918	88%

Table 2

Toxicity Test Results

Facility	IWC (%)	Ceriodaphnia dubia Survival (NOEC%)	Ceriodaphnia dubia Reproduction (NOEC%)	Fathead Minnow (NOEC%)	Fathead Minnow Reproduction (NOEC%)
Atlanta - R.M. Clayton WPCP	17%	100	100	100	100
Atlanta - Utoy Creek WPCP	8%	100	100	100	100
Atlanta - South River WPCP	9%	100	100	100	100
Fulton County - Johns Creek WPCP	5%	100	100	100	100
Fulton County - Big Creek WPCP	6%	100	100	100	100
Fulton County - Camp Creek WPCP	5%	29	29	29	29
Gwinnett County - Crooked Creek WPCP	15%	44.8	44.8	44.8	44.8
Douglas County - Sweetwater Creek WPCP	<1%	25	N/A	100	N/A
Cobb County - R.L. Sutton WPCP	8%	30	30	30	30
Cobb County - South Cobb WPCP	7%	29.6	29.6	29.6	29.6

Chronic tests were performed if the IWC was above 1%. Therefore, all facilities except Douglas County Sweetwater performed chronic tests. None of the WET tests failed because NOEC values were greater than the IWC value.

Table 3

Instream Wastewater Concentrations

	Atlanta - R.M. Clayton WPCP	Atlanta - Utoy Creek WPCP	Atlanta - South River WPCP	Fulton County - Johns Creek WPCP	Fulton County - Big Creek WPCP	Fulton County - Camp Creek WPCP	Gwinnett County - Crooked Creek WPCP	Douglas County - Sweetwater Creek WPCP	Cobb County - R.L. Sutton WPCP	Cobb County - South Cobb WPCP
	17%	8%	9%	5%	6%	5%	15%	<1%	8%	7%
7Q10										
February	9.5%	2.7%	3.2%	0.7%	2.7%	1.2%	4.9%	0.2%	4.1%	2.8%
March	9.5%	2.7%	3.2%	0.8%	2.8%	1.2%	4.9%	0.2%	4.1%	2.8%
April	9.5%	2.7%	3.2%	0.8%	2.7%	1.3%	4.9%	0.2%	4.1%	2.8%
50% 7Q10										
February	10.0%	2.9%	3.4%	0.6%	2.6%	1.4%	4.3%	0.2%	4.3%	3.0%
March	9.9%	2.9%	3.4%	0.6%	2.6%	1.4%	4.4%	0.2%	4.3%	3.0%
April	9.9%	2.9%	3.4%	0.6%	2.6%	1.5%	4.4%	0.2%	4.3%	3.0%

Figure 1

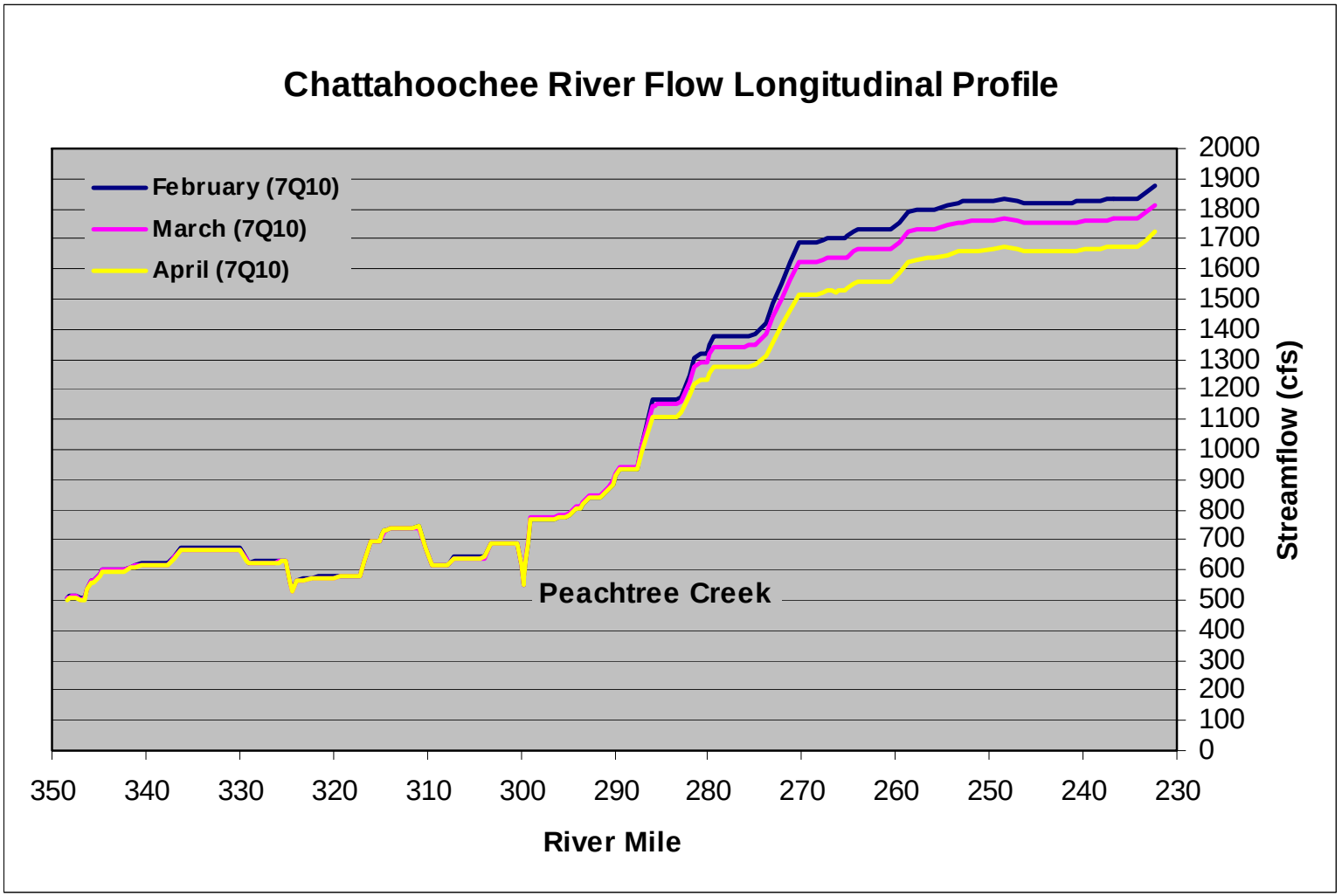

Chattahoochee River Flow Longitudinal Profile
February (7Q10)
March (7Q10)
April (7Q10)
Peachtree Creek
2000
1900
1800
1700
1600
1500
1400
1300
1200
1100
1000
900
800
700
600
500
400
300
200
100
0
Streamflow (cfs)
350
340
330
320
310
300
290
280
270
260
250
240
230
River Mile

Figure 2

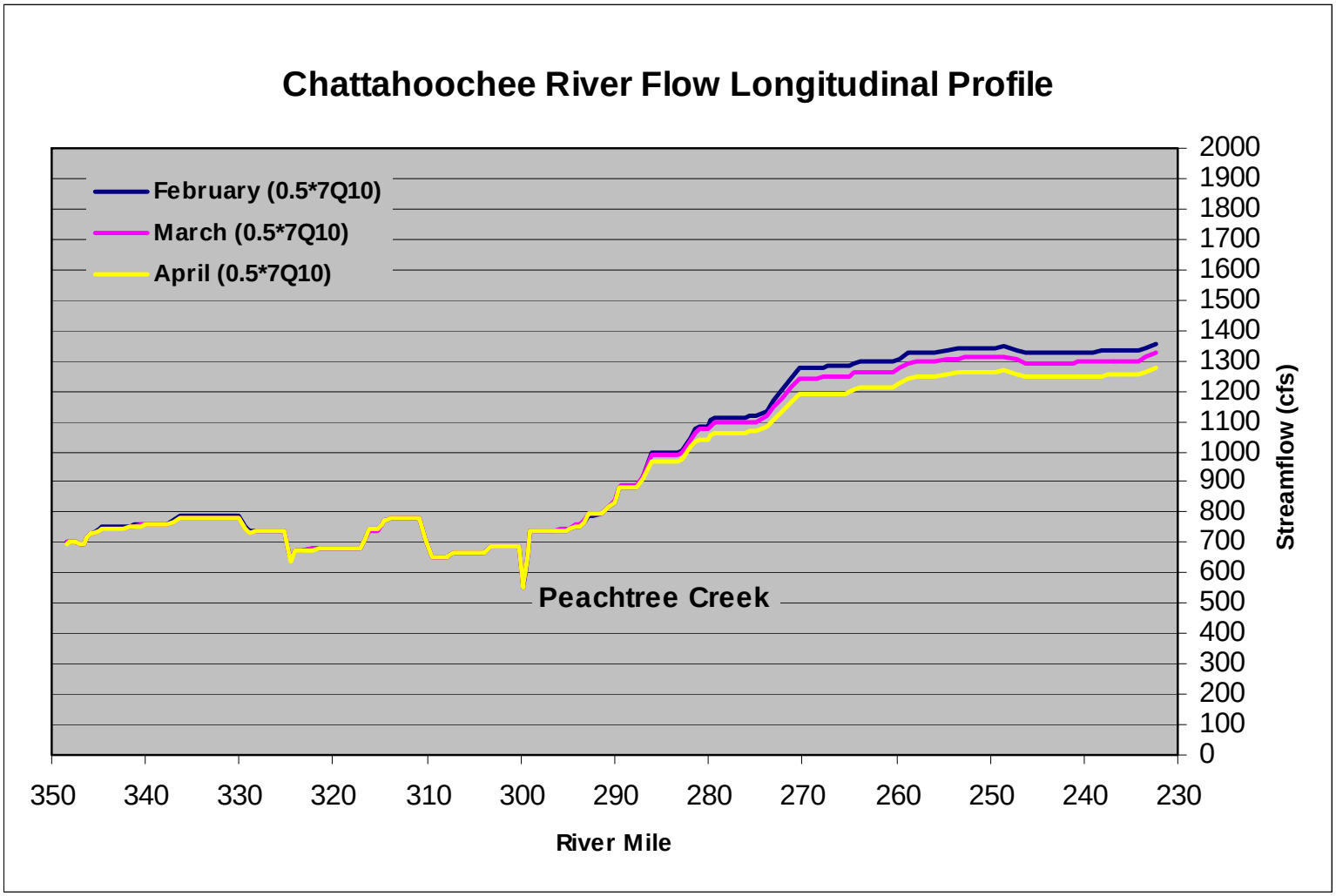

Chattahoochee River Flow Longitudinal Profile
February (0.5*7Q10)
March (0.5*7Q10)
April (0.5*7Q10)
Peachtree Creek
2000
1900
1800
1700
1600
1500
1400
1300
1200
1100
1000
900
800
700
600
500
400
300
200
100
0
Streamflow (cfs)
350
340
330
320
310
300
290
280
270
260
250
240
230
River Mile

Figure 3

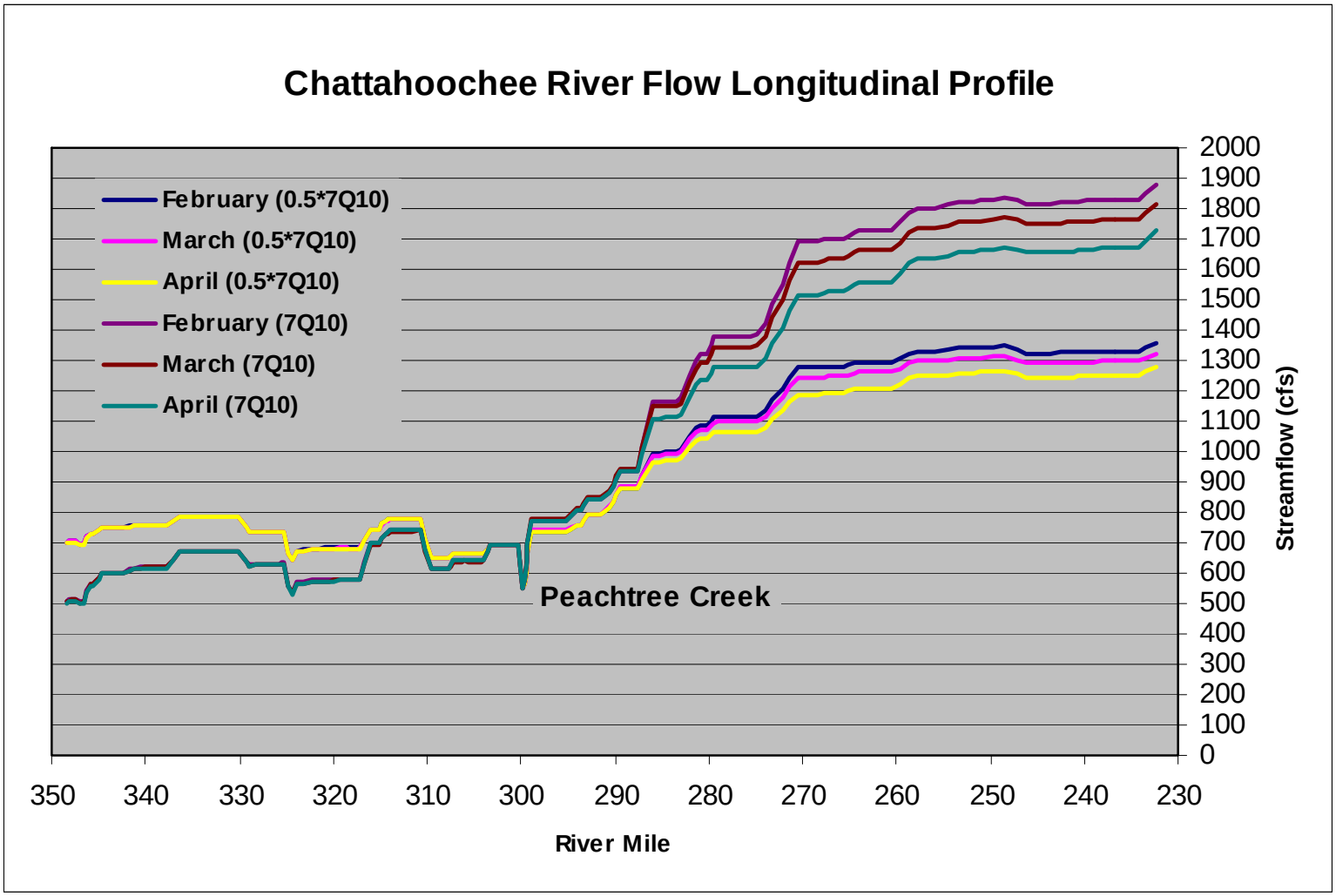

Chattahoochee River Flow Longitudinal Profile
February (0.5*7Q10)
March (0.5*7Q10)
April (0.5*7Q10)
February (7Q10)
March (7Q10)
April (7Q10)
Peachtree Creek
2000
1900
1800
1700
1600
1500
1400
1300
1200
1100
1000
900
800
700
600
500
400
300
200
100
0
Streamflow (cfs)
350
340
330
320
310
300
290
280
270
260
250
240
230
River Mile

Figure 4

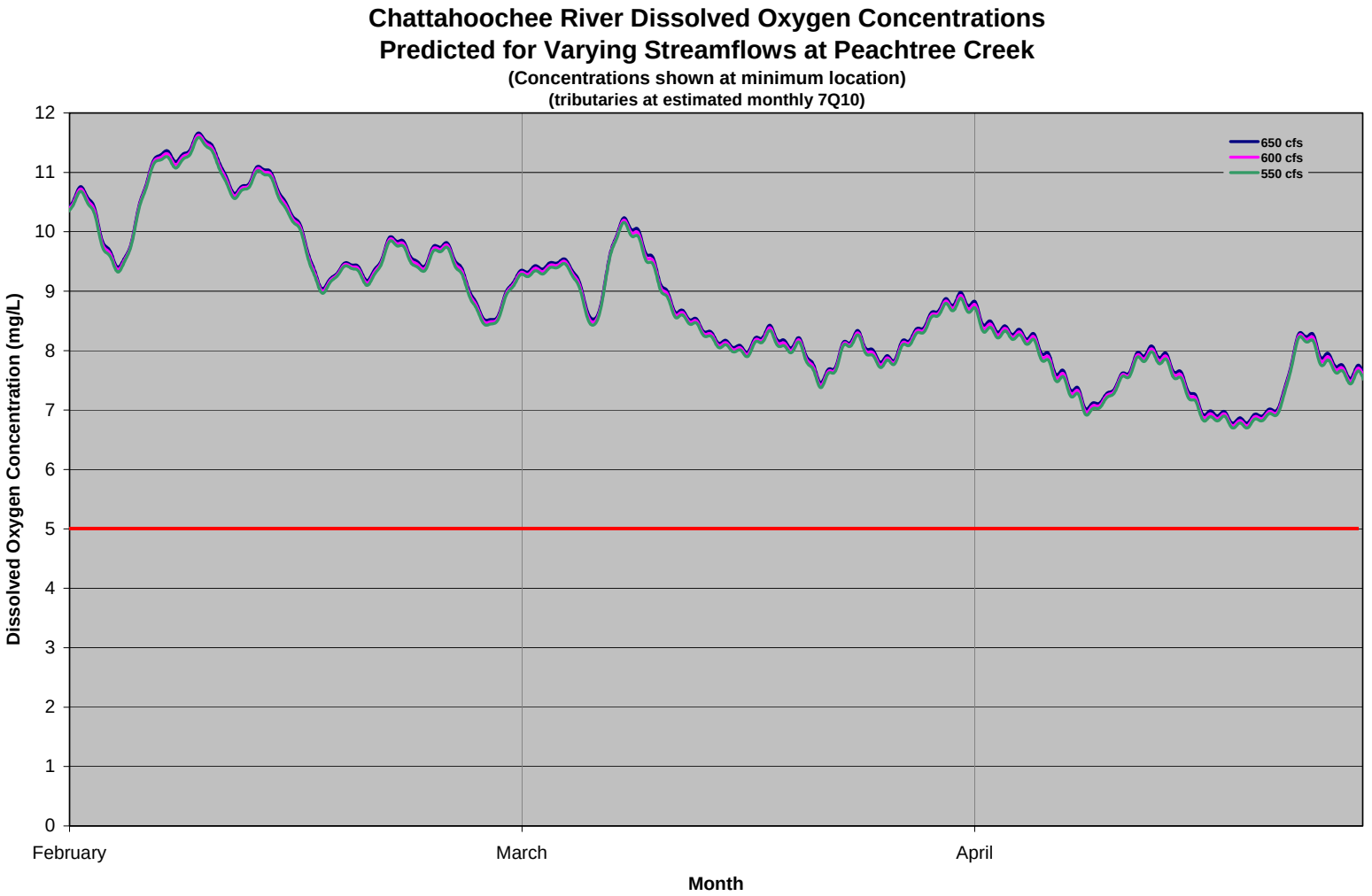

Chattahoochee River Dissolved Oxygen Concentrations
Predicted for Varying Streamflows at Peachtree Creek
(Concentrations shown at minimum location)
(tributaries at estimated monthly 7Q10)
650 cfs
600 cfs
550 cfs
Dissolved Oxygen Concentration (mg/L)
0
1
2
3
4
5
6
7
8
9
10
11
12
February
March
April
Month

Figure 5

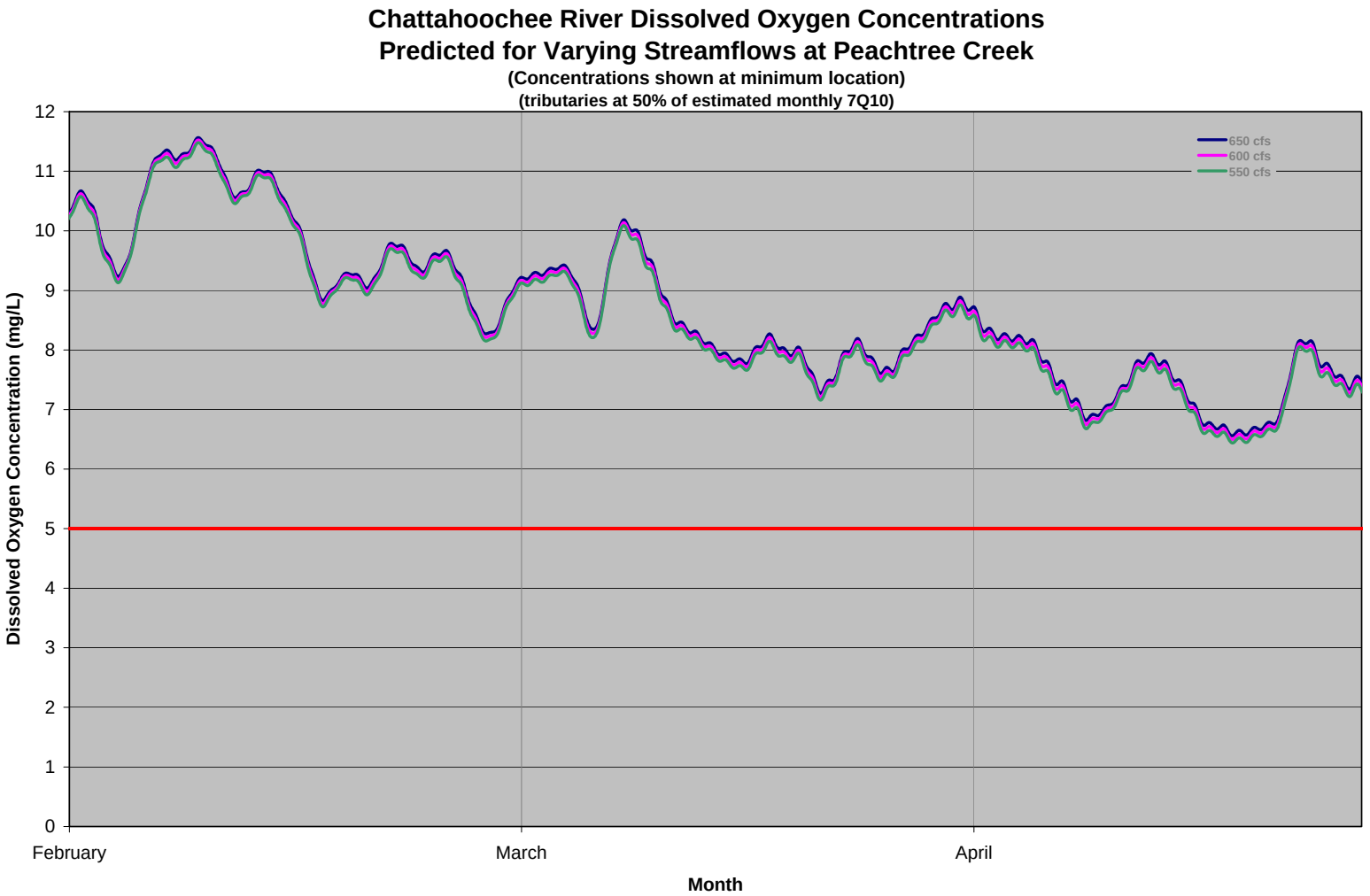

Chattahoochee River Dissolved Oxygen Concentrations
Predicted for Varying Streamflows at Peachtree Creek
(Concentrations shown at minimum location)
(tributaries at 50% of estimated monthly 7Q10)
650 cfs
600 cfs
550 cfs
Dissolved Oxygen Concentration (mg/L)
0
1
2
3
4
5
6
7
8
9
10
11
12
February
March
April
Month

Figure 6

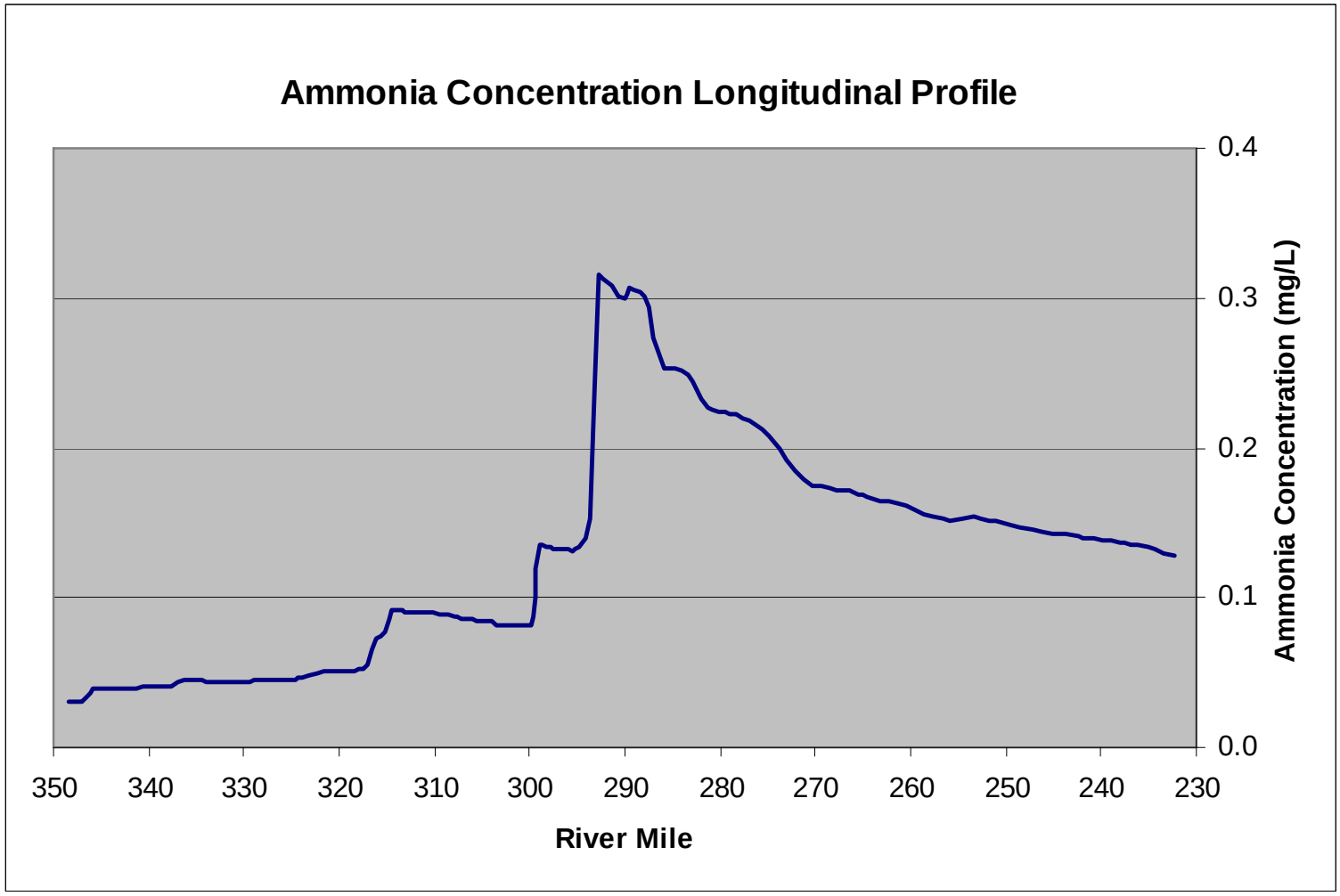

Ammonia Concentration Longitudinal Profile
0.4
0.3
0.2
0.1
0.0
Ammonia Concentration (mg/L)
350
340
330
320
310
300
290
280
270
260
250
240
230
River Mile

Figure 7

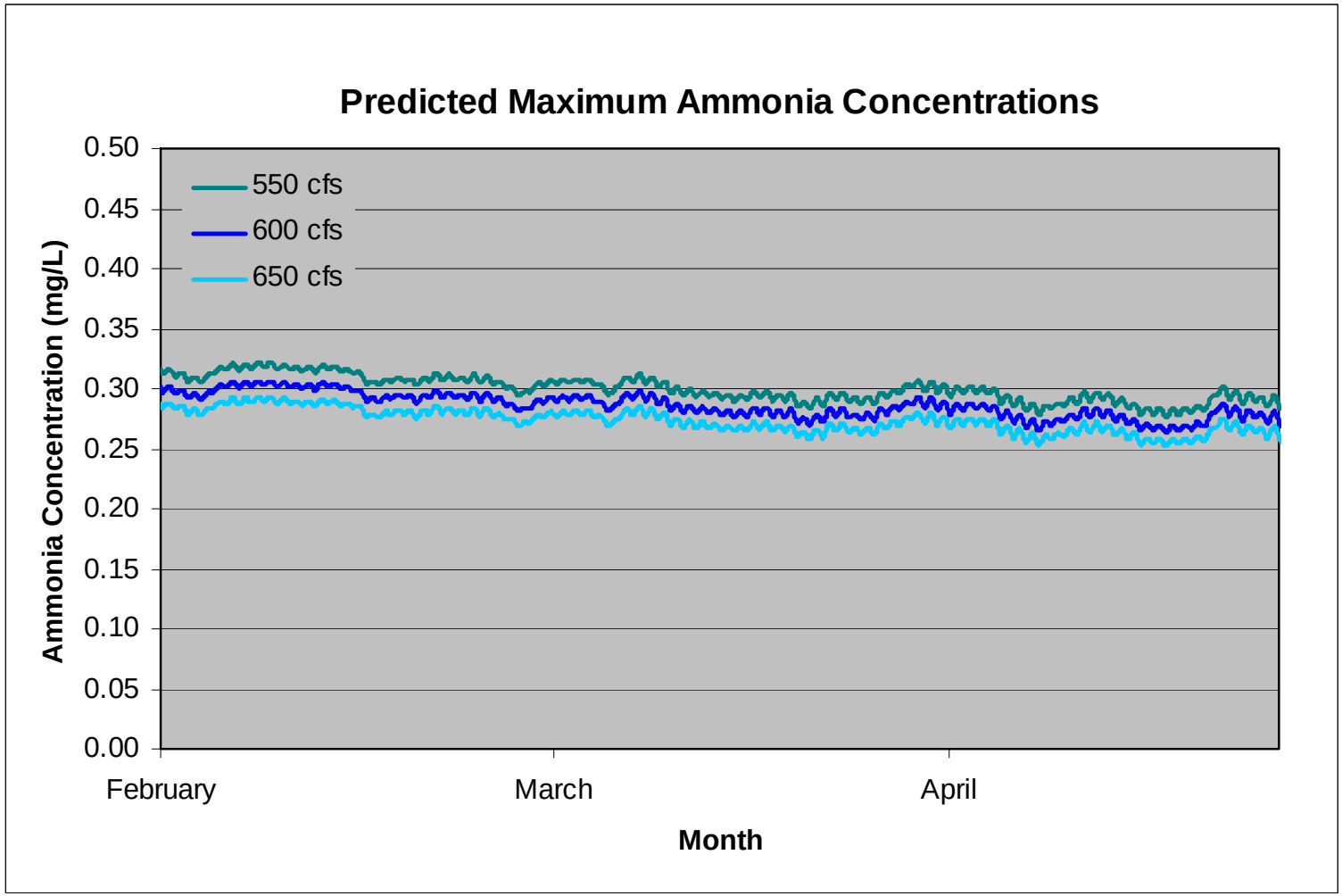
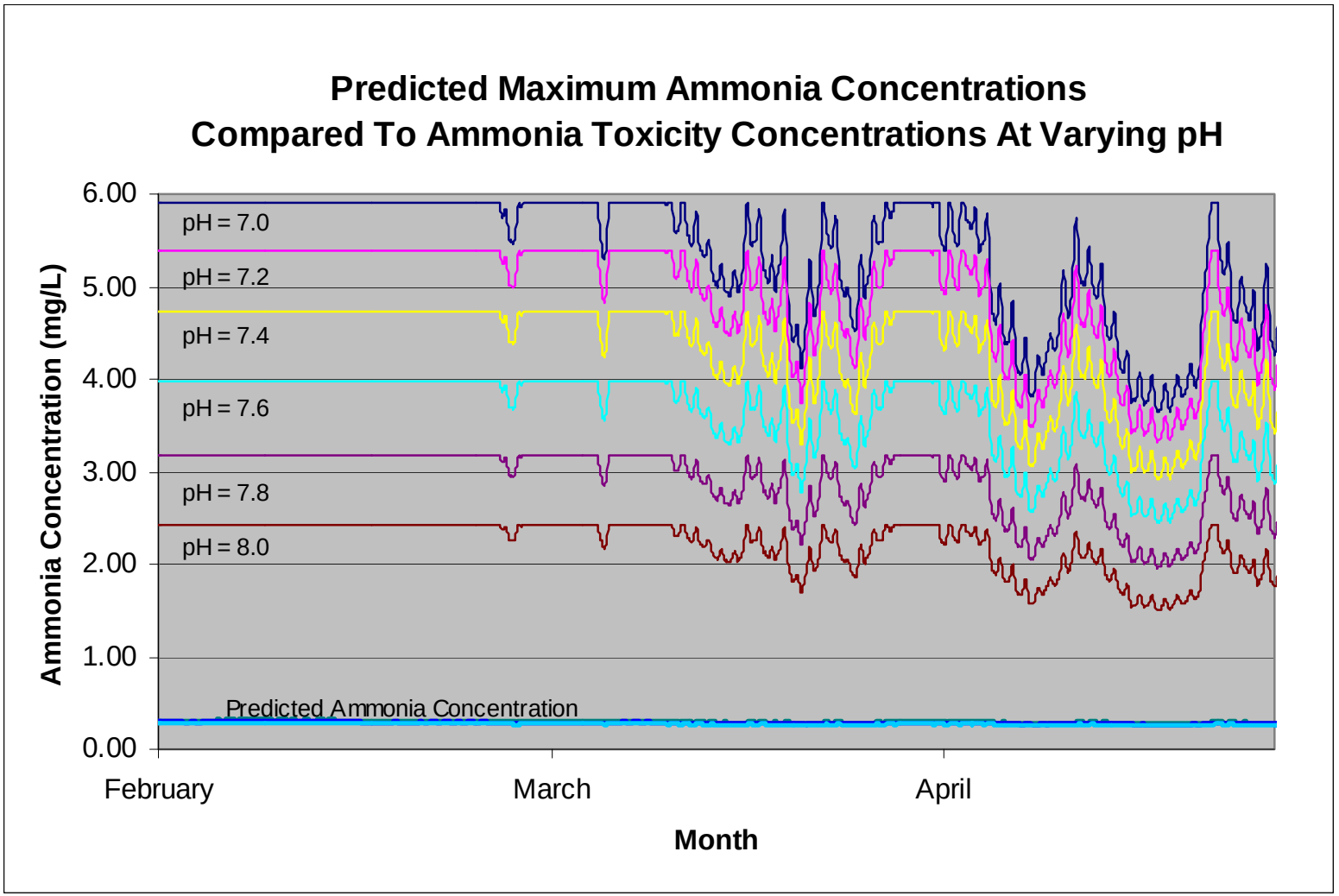

Predicted Maximum Ammonia Concentrations
0.50
0.45
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
550 cfs
600 cfs
650 cfs
Ammonia Concentration (mg/L)
February
March
April
Month

Figure 8


Predicted Maximum Ammonia Concentrations
Compared To Ammonia Toxicity Concentrations At Varying pH
Ammonia Concentration (mg/L)
6.00
5.00
4.00
3.00
2.00
1.00
0.00
pH = 7.0
pH = 7.2
pH = 7.4
pH = 7.6
pH = 7.8
pH = 8.0
Predicted Ammonia Concentration
February
March
April
Month