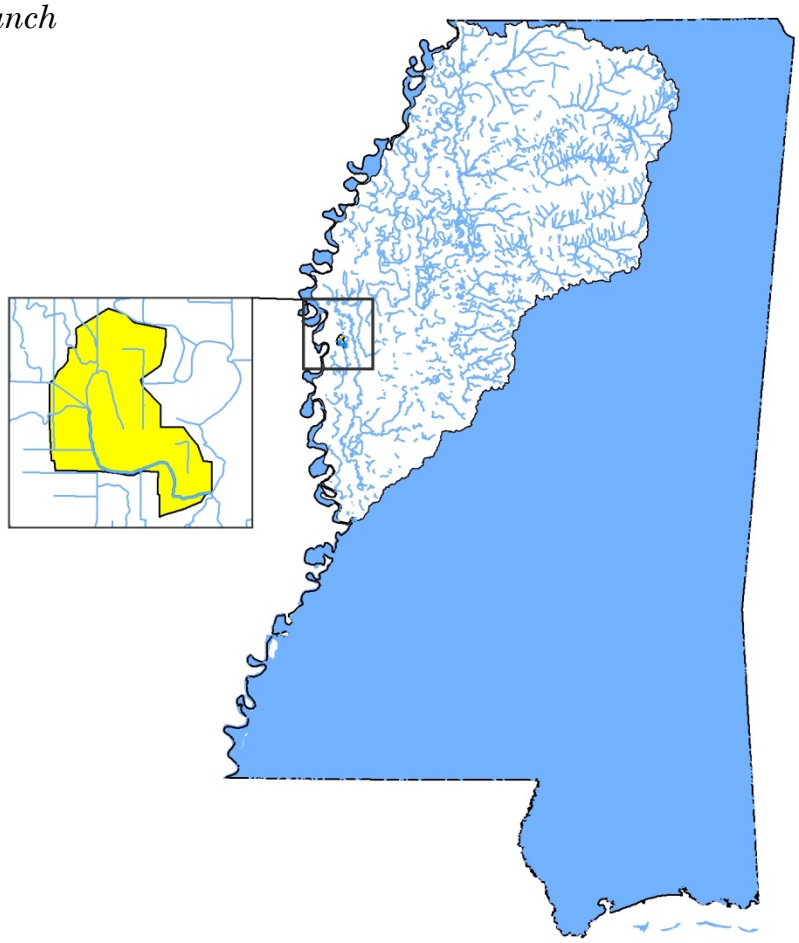
Final REPORT
February 2014

Organic Enrichment / Low DO TMDL for Swiftwater Bayou Watershed

Yazoo River Basin
Washington County, Mississippi

Prepared By

Mississippi Department of Environmental Quality
Office of Pollution Control
Modeling and TMDL Branch



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FOREWORD

This report contains a Total Maximum Daily Loads (TMDL) for a water body segment found on Mississippi's 2012 Section 303(d) List of Impaired Water Bodies. The implementation of the TMDLs contained herein will be prioritized within Mississippi's rotating basin approach.

As additional information becomes available, the TMDL may be updated. Such additional information may include water quality and quantity data, changes in pollutant loadings, modifications to the water quality standards or criteria, or changes in landuse within the watershed. In some cases, additional water quality data may indicate that no impairment exists.

Table 1 Multiplication Factors

From	To	multiply by	From	To	multiply by	From	To	multiply by
mi^2	$feet^2$	27,878,400	$meter^3$	liter	1,000	miles	feet	5,280
km^2	$feet^2$	10,763,911	$Feet^3/sec$	gallons/min	448.8312	km	feet	3,280.84
hectares	$feet^2$	107,639	$meter^3$	gallons	264.1721	miles	meters	1,609.34
acre	$feet^2$	43,560	$meter^3$	$Feet^3$	35.3147	meters	feet	3.2808
mi^2	acre	640	$Feet^3$	Liter	28.3168	km	miles	0.6214
km^2	acre	247.1044	$Yard^3$	$Feet^3$	27	days	seconds	86,400
km^2	hectares	100	$Feet^3$	gallons	7.4805	mg/l * MGD	lbs/day	8.3454
hectares	acre	2.4710	$Yard^3$	$meter^3$	0.7646	µg/l * cfs	gm/day	2.4500
km^2	mi^2	0.3861	$Feet^3/sec$	MGD	0.6463	tonnes	ton	1.1

Table 2 Fractional Prefixes

Fraction	Prefix	Symbol	Multiple	Prefix	Symbol
10^{-1}	deci	d	10	deka	da
10^{-2}	centi	c	10^2	hecto	h
10^{-3}	milli	m	10^3	kilo	k
10^{-6}	micro	µ	10^6	mega	M
10^{-9}	nano	n	10^9	giga	G
10^{-12}	pico	p	10^{12}	tera	T
10^{-15}	femto	f	10^{15}	peta	P
10^{-18}	atto	a	10^{18}	exa	E

The fonts used in this document are ink saving fonts based on Inkfarm.com ink-usage calculator. Century Schoolbook was selected for the body text. Eras Medium ITC was used for subheadings, and Goudy Old Style was used for headings.

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EXECUTIVE SUMMARY

Swiftwater Bayou is a Mississippi Delta stream located southeast of Greenville, Mississippi, west of Arcola on Highway 438 in Washington County, Figure 1. The length of the water body is approximately 7.8 miles with the mouth flowing into Black Bayou. There are no NPDES permitted point sources or MS4s in the watershed. The landuse of the watershed in 2006 was predominantly (59%) agriculture and (24.3%) aquaculture. Most of the aquaculture acreage has reverted to agriculture today.

Table 3 Listing Information

Name	ID	County	Impaired Use	Impairment
Swiftwater Bayou	952811	Washington	Fish and Wildlife	Organic Enrichment / Low Dissolved Oxygen

MDEQ collected water quality monitoring data in 2010 which indicate impairment of the dissolved oxygen water quality standard. More diurnal dissolved oxygen data were collected in 2013 which confirm impairment. This TMDL will provide an allocation for TBODu for the watershed to meet the current water quality standard. According to the data, the TBODu load in the water body exceeds the assimilative capacity of Swiftwater Bayou for organic material at critical conditions. Therefore, either reductions in TBODu are required, or the designated use classification of the stream should be modified.

Table 4 Water Quality Standards

Parameter	Beneficial use	Water Quality Criteria
Dissolved Oxygen	Aquatic Life Support	DO concentrations shall be maintained at a daily average of not less than 5.0 mg/l with an instantaneous minimum of not less than 4.0 mg/l

MDEQ will model this water body with the STREAM model to determine the reductions needed for this Delta stream to meet the water quality standards. MDEQ will further consider modification of the designated use classification of this and similar Delta streams based in part on this analysis in the future.

Changes to water quality standards would require the Mississippi Commission on Environmental Quality approval action, public review, and EPA approval. This document will inform that process should MDEQ proceed toward water quality standards modification in this water body.

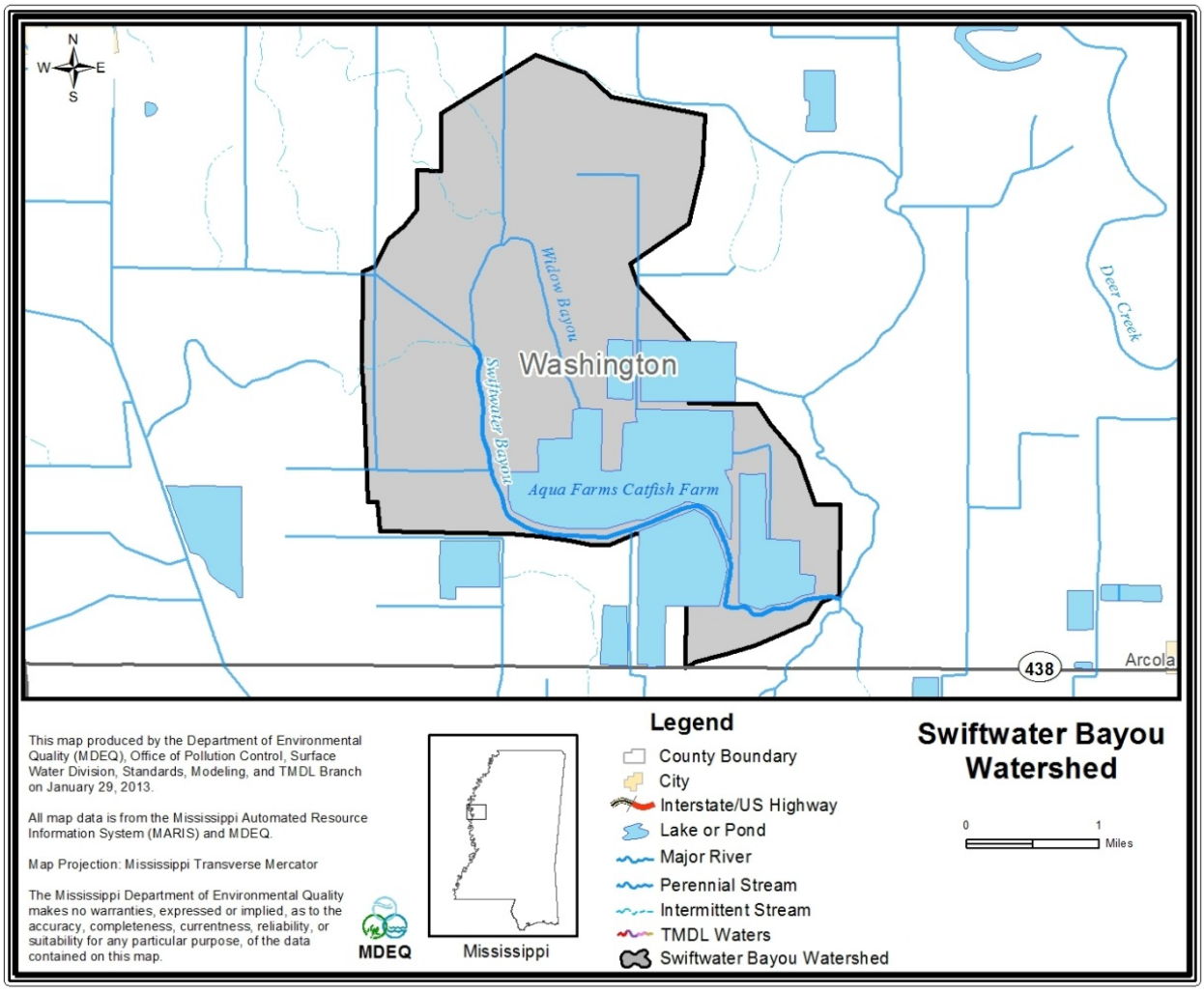

Figure 1 Swiftwater Bayou Watershed

INTRODUCTION

1.1 Background

The identification of water bodies not meeting their designated use and the development of total maximum daily loads (TMDLs) for those water bodies are required by Section 303(d) of the Clean Water Act and the Environmental Protection Agency's (EPA) Water Quality Planning and Management Regulations (40 CFR part 130). The TMDL process is designed to identify impairment and restoration alternatives, and maintain the quality of those impaired water bodies through the establishment of pollutant specific allowable loads. This TMDL is for the 2012 §303(d) listed segment shown in Figure 2. The impaired segment of the stream is shown in green.

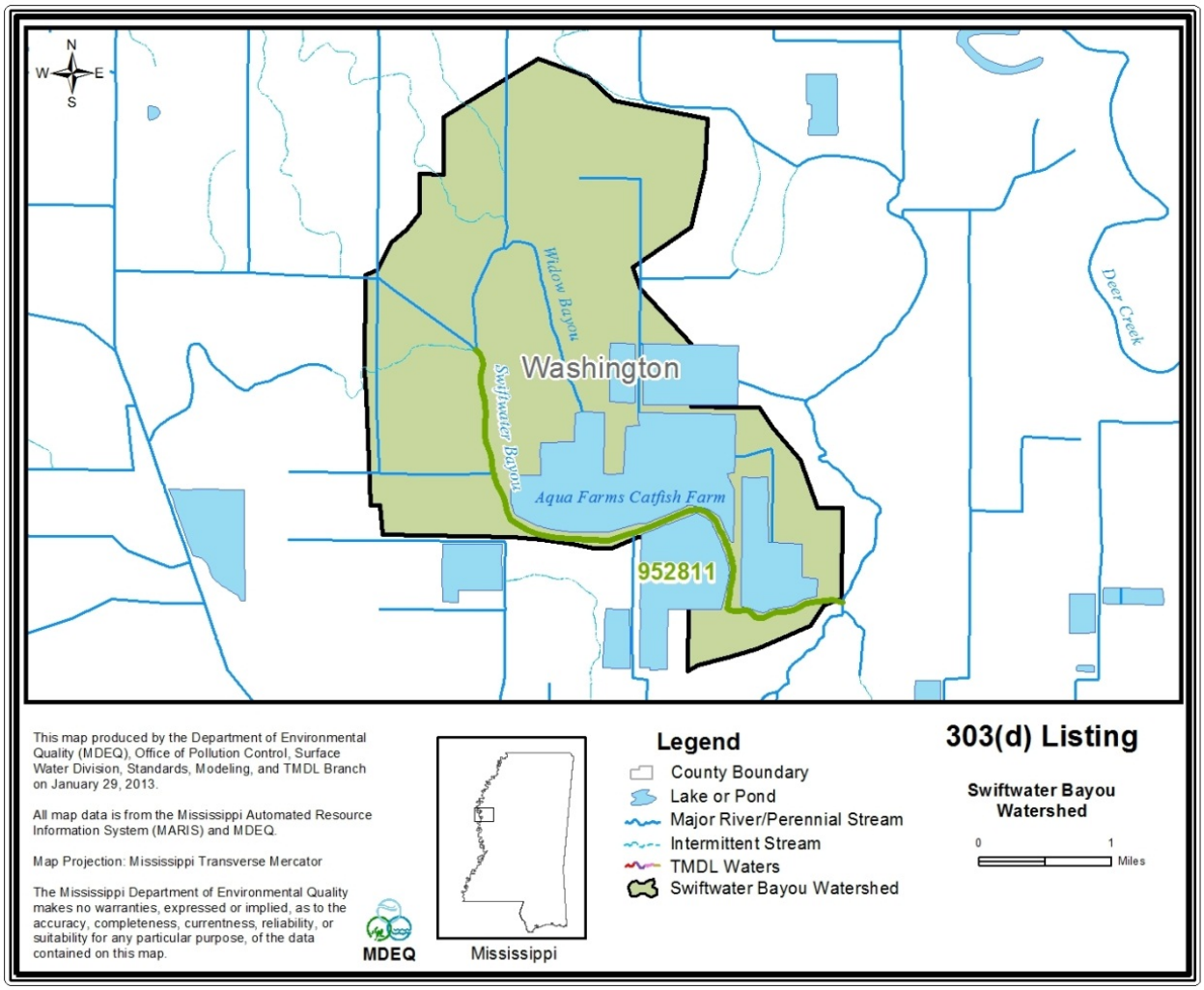

Figure 2 Swiftwater Bayou Impaired Segment

1.2 Listing History

Figure 3 Swiftwater Bayou Instream Crossing near Slago Dairy Road

The impaired segment was first listed on the 2010 Section 303(d) List of Impaired Water Bodies. The organic enrichment / low dissolved oxygen impairment was assessed based on diel DO data collected during a limited biological sample and water quality study on Swiftwater Bayou in 2010. Further monitoring completed in 2013 confirmed the dissolved oxygen impairment in this water body.

1.3 Applicable Water Body Segment Use

The water use classifications are established by the State of Mississippi in the document *State of Mississippi Water Quality Criteria for Intrastate, Interstate, and Coastal Waters WPC-2* (MDEQ, 2012). The designated beneficial use for the listed segment is fish and wildlife.

1.4 Applicable Water Body Segment Standard

The water quality standard applicable to the use of the water body and the pollutant of concern is defined in the *State of Mississippi Water Quality Criteria for Intrastate, Interstate, and Coastal Waters WPC-2* (MDEQ, 2012).

The applicable standard specifies:

"Dissolved Oxygen: Dissolved oxygen concentrations shall be maintained at a daily average of not less than 5.0 mg/l with an instantaneous minimum of not less than 4.0 mg/l. When possible, samples should be taken from ambient sites according to the following guidelines:

For water bodies that are not stratified, samples should be taken: At mid-depth if the total water column depth is 10 feet or less. At 5 feet from the water surface if the total water column depth is greater than 10 feet.

For water bodies that are stratified, samples should be taken: At mid-depth of the epilimnion if the epilimnion depth is 10 feet or less; At 5 feet from the water surface if the epilimnion depth is greater than 10 feet."[1]

This water body is a wide shallow stream heavily incised. It is not stratified nor is it greater than 10 feet in depth at normal low flows. The monitoring was done at mid depth in the center of the channel.

This TMDL will investigate the natural condition clause within WPC-2 to consider the site specific modification of the designated use for this stream. It may be feasible to modify the water quality standards for dissolved oxygen based on the natural dissolved oxygen levels found in this stream. The natural conditions statement says:

"Natural conditions are defined as background water quality conditions due only to non-anthropogenic sources. The criteria herein apply specifically with regard to substances attributed to sources (discharges, nonpoint sources, or instream activities) as opposed to natural phenomena. Waters may naturally have characteristics outside the limits established by these criteria. Therefore, naturally occurring conditions that fail to meet criteria should not be interpreted as violations of these criteria."[2]

Figure 4 Swithwater Bayou at 2010 Monitoring Station in Spring 2013

1 (Mississippi Department of Environmental Quality, June 28, 2012), page 8.
2 Ibid. page 3

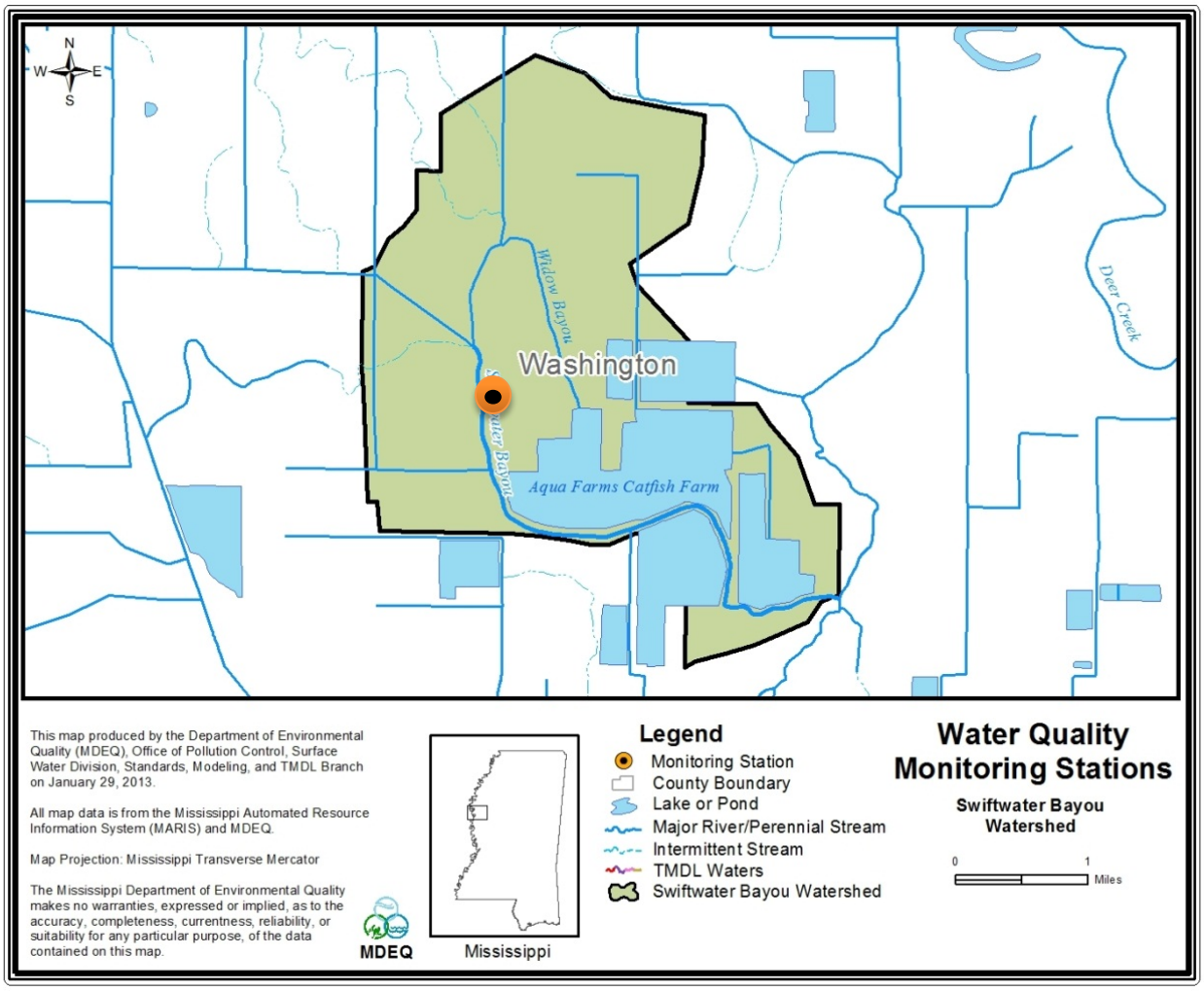

Figure 5 Swiftwater Bayou with 2010 monitoring station

WATER BODY ASSESSMENT

2.1 Swiftwater Bayou Water Quality Data

Water quality data for Swiftwater Bayou were gathered September 16 - 18, 2010. This water body was not supporting the use of aquatic life support and indicates violations of the dissolved oxygen (DO) standard. This conclusion was based on data collected at station 111A47 (Wilmont Road near Wilmont, MS). The data are shown in Appendix A Table 11. Figure 5 shows a map with the location of the monitoring station highlighted. Figure 6 shows a chart of the diurnal dissolved oxygen measured in 2010.

In June, 2013 additional diurnal dissolved oxygen measurements were gathered at three locations in the watershed. Station 1 was just below the instream crossing at Slago Diary Road which is pictured in Figure 3. The middle station was at the same station as in 2010 at Wilmont Road. The lower station was at Green Lake Road near Highway 438 close to the mouth of the watershed. These data are shown in Appendix B Table 12. Figure 7 includes a graph of the dissolved oxygen values, temperature, and depth for each station.

2.2 Assessment of Data

The 2010 data suggest an eutrophic condition where the sunlight and photosynthesis during the day time hours is causing the algae to produce oxygen. The peak generated is around 5.1 mg/l DO. The respiration during the night time hours is depleting almost all of the available oxygen. The was a green slime mass on the water surface present during this study.

The stream was clear of the algae mats during the 2013 diurnal study. The dissolved oxygen was above a 5.0 mg/l daily average for the 5 days of the study. However, the lower water quality standard limit of 4.0 mg/l was violated more than 10% of the time and therefore these data also indicate impairment of the state standard for dissolved oxygen.

2.3 Assessment of Point Sources

The Swiftwater Bayou Watershed has no NPDES permitted point sources. There are no MS4s in this area. This is a rural community and most of the homes are on septic tanks or the area may be close enough to Greenville to utilize the sewer collection system. Therefore the WLA will be set to zero for this TMDL. This WLA may be revised based on new information in the future.

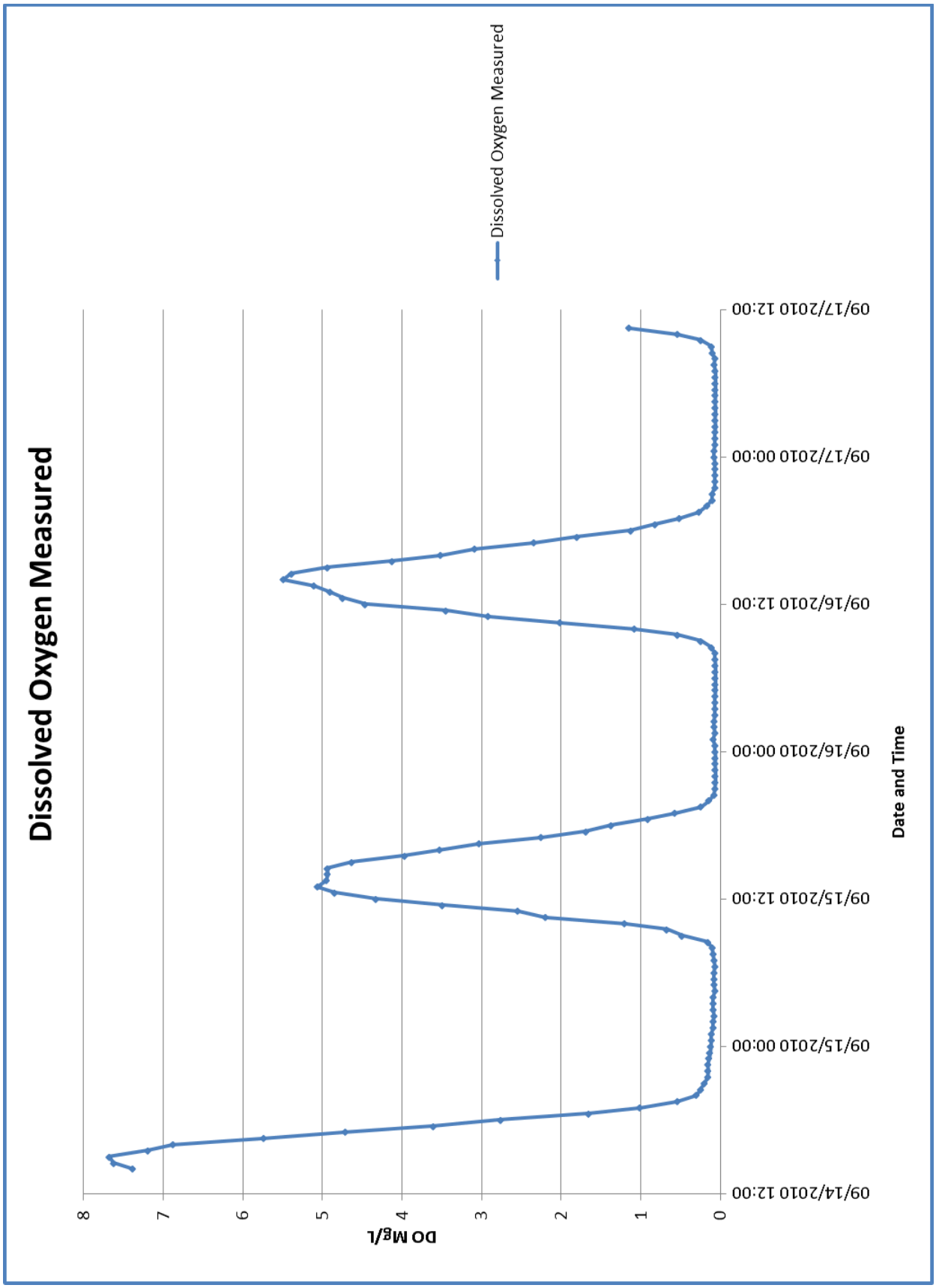

Figure 6 Diel DO Data

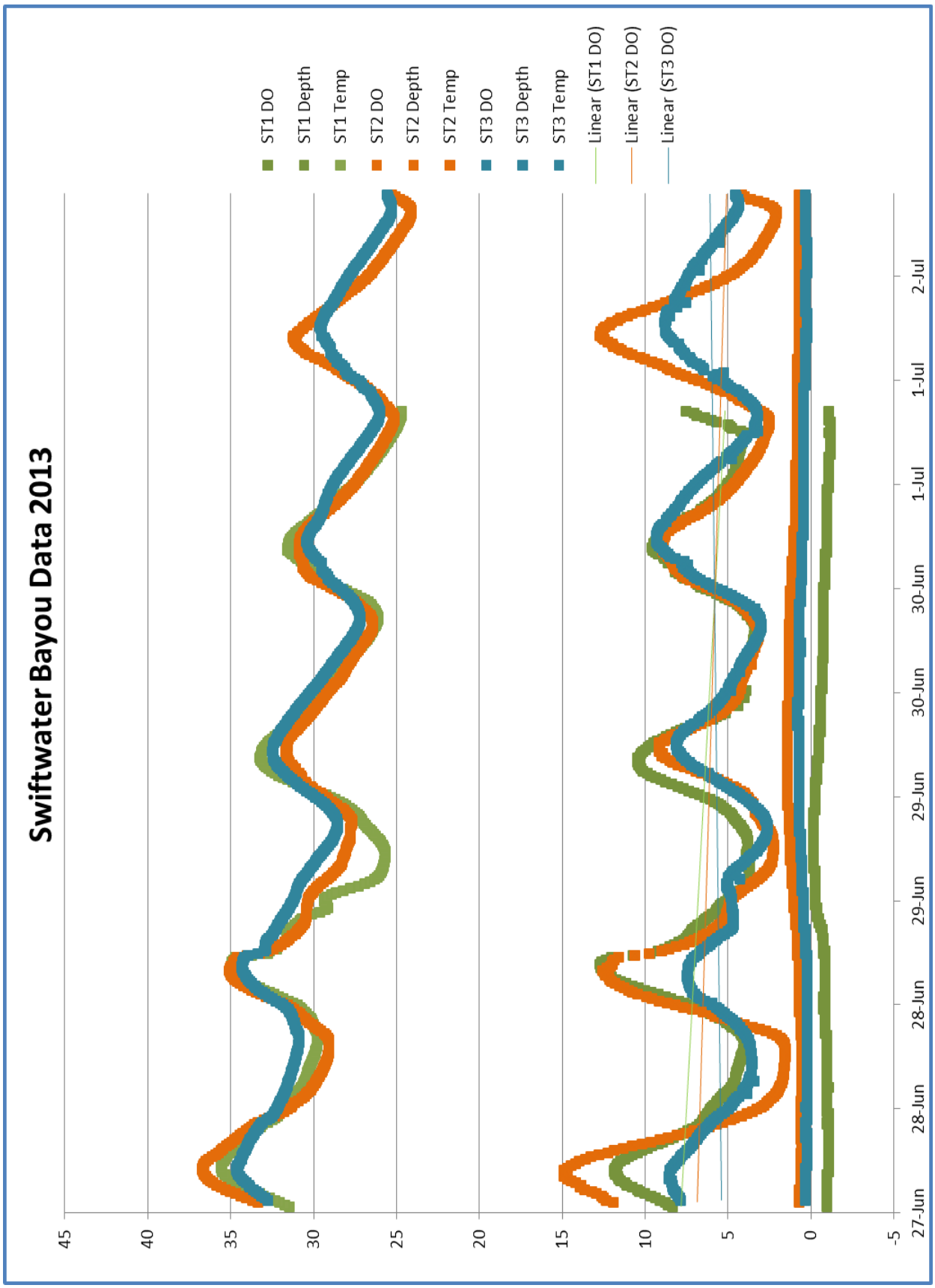

Figure 7 Temperature, DO, and Depth Data

2.4 Assessment of Nonpoint Sources

Nonpoint loading of organic material in a water body results from the transport of the pollutants into receiving waters by overland surface runoff, groundwater infiltration, and atmospheric deposition.

The Swiftwater Bayou watershed landuse is primarily agricultural on the north side of the watershed. The southern portion was almost completely covered with aquaculture ponds as shown in the map in Figure 5. The land use information for the watershed is based on the 2006 National Land Cover Database (NLCD). Figure 8 shows the satellite image of the watershed. The catfish ponds identified in 2006 are no longer in production. Most of these ponds were drained and now produce corn or soybeans. The landuse distribution for the Swiftwater Bayou Watershed is shown in Table 5 and Figure 9.

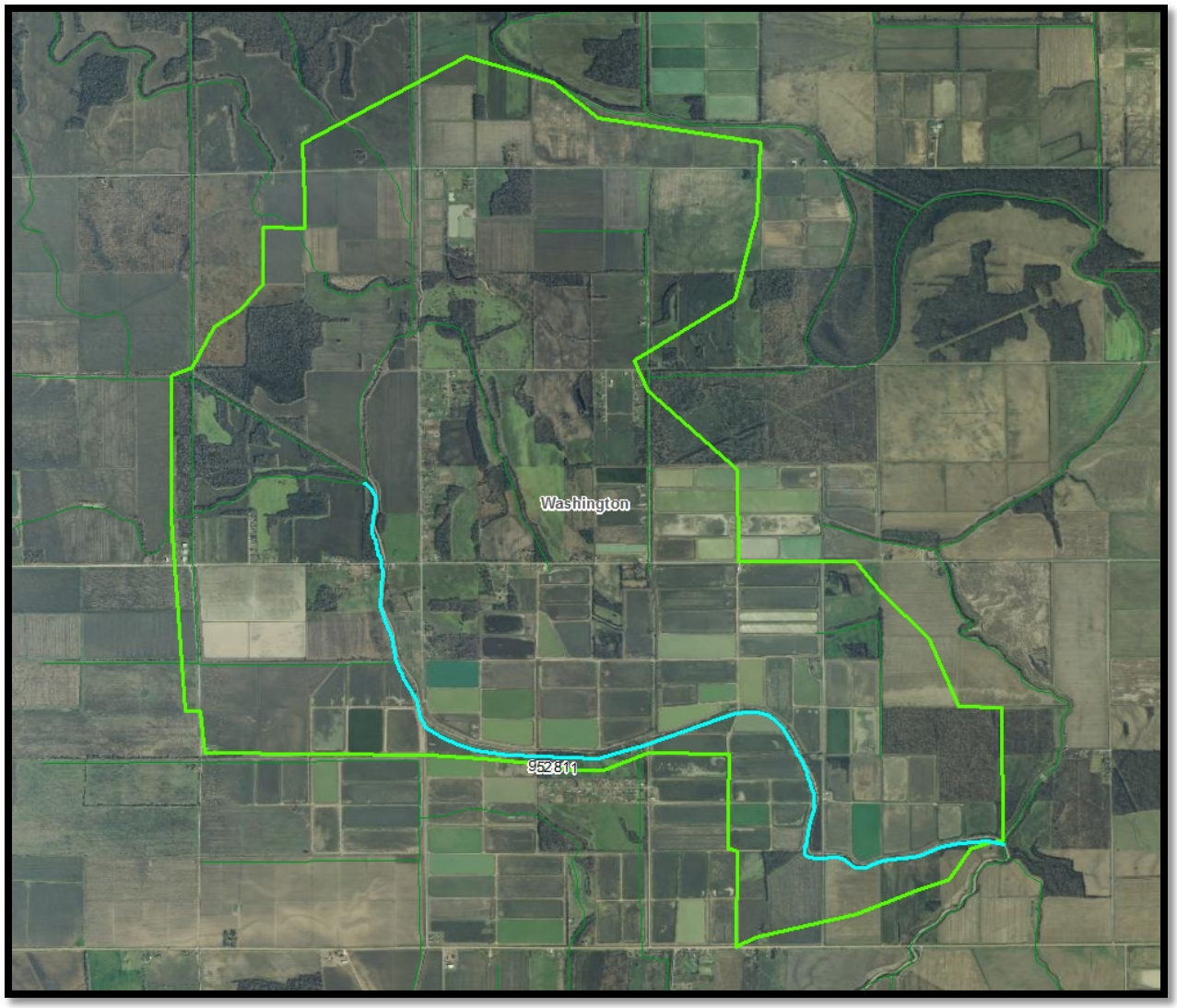

Figure 8 Satellite Image

Table 5 2006 Landuse Data

Area	Water	Urban	Forest	Pasture	Cropland	Wetland	Total
Acres	1,454	215	2	57	3,526	722	5,976
Percentage	24.3%	3.6%	0.04%	1.0%	59.0%	12.1%	100%

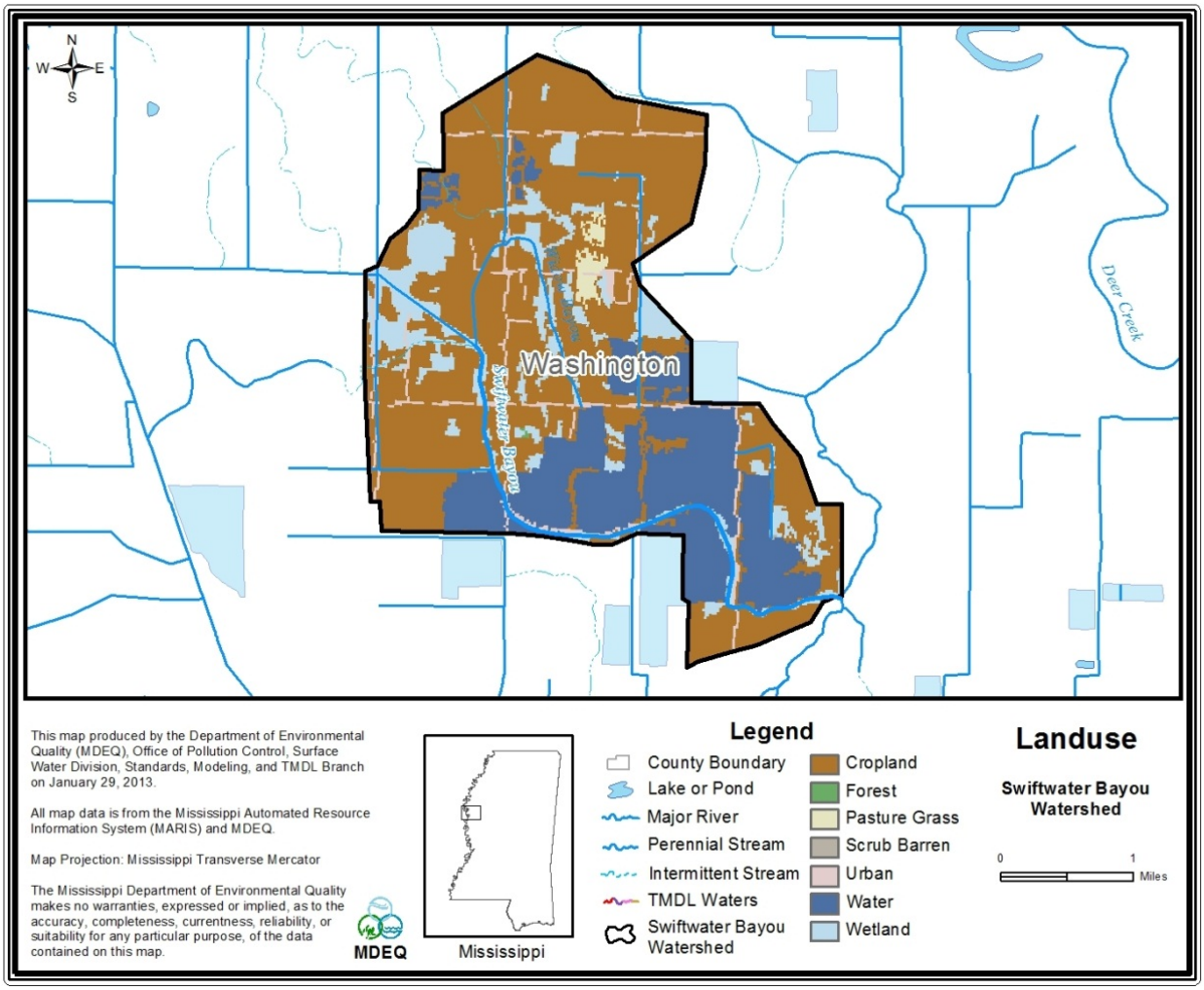

Figure 9 2006 Landuse in Swiftwater Bayou Watershed

MODELING PROCEDURE: LINKING THE SOURCES TO THE ENDPOINT

Establishing the relationship between the instream water quality target and the source loading is a critical component of TMDL development. It allows for the evaluation of management options that will achieve the desired source load reductions. The link can be established through a range of techniques, from qualitative assumptions based on sound scientific principles to sophisticated modeling techniques. Ideally, the linkage will be supported by monitoring data that allow the TMDL developer to associate certain water body responses to flow and loading conditions. In this section, the selection of the modeling tools, setup, and model application are discussed.

3.1 Modeling Framework Selection

MDEQ's steady state water quality model, STeady Riverine Environmental Assessment Model (STREAM), for DO distribution in freshwater streams was used for developing the TMDL. The use of STREAM is promulgated in the *Wastewater Regulations for National Pollutant Discharge Elimination System (NPDES) Permits, Underground Injection Control (UIC) Permits, State Permits, Water Quality Based Effluent Limitations and Water Quality Certification WPC-1* (MDEQ, 2013). This model is approved by EPA and used extensively at MDEQ. A key reason for using the STREAM model in TMDL development is its ability to assess instream water quality conditions in response to point and nonpoint source loadings.

3.2 Model Setup

The STREAM model for this TMDL was created with 7 stream segments based on the NHDplus stream coverage and the LIDAR imagery. Two models were created for this TMDL based on the 2010 data. The first model was to study the peak values of DO during the noon time and the second model was to study the early morning values of DO after respiration depleted the available oxygen. A diagram showing the model segment setup is shown in Figure 10 below provides the model inputs used.

Segment divisions were made at locations where there is a change in hydrological and water quality characteristics, such as the confluence of a tributary or change in slope. The modeled segments were divided into computational elements of 0.1 mile. The simulated hydrological and water quality characteristics were calculated and output by the model for each computational element.

3.2.1 Base Equations

STREAM is a steady-state, daily average computer model that solves the partial differential modified Streeter-Phelps DO sag equation. Instream processes

simulated by the model include CBODu decay, nitrification (NBODu load expresses as oxygen), reaeration, sediment oxygen demand, and respiration and photosynthesis of algae. Figure 10 shows how these processes are related in a typical DO model. Reaction rates for the instream processes are input by the user and corrected for temperature by the model. The model output includes water quality conditions in each computational element for DO, CBODu, and NH_3-N concentrations. The hydrological processes simulated by the model include stream velocity and flow from point sources and spatially distributed inputs.

3.2.2 Reaeration

The model calculates reaeration within each reach using the Tsivoglou formulation. The Tsivoglou formulation calculates the reaeration rate, K_a (day^{-1} base *e*), within each reach according to Equation 1.

$$K_a = C*S*U \qquad \textbf{(Eq. 1)}$$

C is the escape coefficient, U is the reach velocity in mile/day, and S is the average reach slope in feet per mile. The value of the Tsivoglou escape coefficient is assumed to be 0.11 for streams with flows less than 10 cfs and 0.0597 for stream flows equal to or greater than 10 cfs.

Reach velocities were calculated using an empirical equation based on stream slope and flow. The slope of each reach was measured with 2010 LIDAR coverage and input into the model in units of feet per mile.

3.2.3 Temperature and Flow

The STREAM model simulates the critical flow and temperature conditions, which were determined to be the critical condition for this TMDL. MDEQ Regulations state that when the flow in a water body is less than 50 cfs, the temperature used in the model is 26°C. However, to estimate noon time and midnight temperatures, 29 and 22 °C were used respectively based on monitoring. The instream CBODu decay rate at K_d at 20°C was input as 0.15 day^{-1} (base e) as specified in MDEQ regulations. The model adjusts the K_d rate based on temperature, according to Equation 2.

$$K_{d(T)} = K_{d(20°C)}(1.047)^{T-20} \qquad \textbf{(Eq. 2)}$$

Where K_d is the CBODu decay rate and T is the assumed instream temperature.

The assumptions regarding the instream temperatures, background DO saturation, and CBODu decay rate are required by the *Wastewater Regulations for National Pollutant Discharge Elimination System (NPDES) Permits, Underground Injection Control (UIC) Permits, State Permits, Water Quality Based Effluent Limitations and Water Quality Certification WPC-1* (MDEQ, 2013). Also based on MDEQ Regulations, the rates for photosynthesis, respiration, and sediment oxygen demand

were set to zero for the noon time model because data for these model parameters are not available. The respiration value was adjusted for the midnight model to provide for the removal of dissolved oxygen from the stream as seen in the 2010 data set.

There are no USGS gages located on Swiftwater Bayou. The flow for the model was taken from average flow estimates for incremental flow in the NHDplus database.

3.2.4 Organic Enrichment Loading

Organic enrichment sources were represented in the model by adding CBODu and NBODu loads. The spatially distributed loads were distributed evenly into each computational element of the modeled water body. The dissolved oxygen level was initiated at 5.2 mg/l and was calibrated to the 5.03 mg/L measured in the stream at river mile 5.1 to correspond with the monitoring station measurements during a steady state noon time condition.

Direct measurements of background concentrations of CBODu were not available for the Swiftwater Bayou Watershed. Because there were no background data available, the background concentrations of CBODu and NH_3-N were estimated based on the measured data.

3.2.5 Nitrogen Loading

In order to convert the ammonia nitrogen (NH_3-N) loads to an oxygen demand, a factor of 4.57 pounds of oxygen per pound of ammonia nitrogen (NH_3-N) oxidized to nitrate nitrogen (NO_3-N) was used. Using this factor is a conservative modeling assumption because it assumes that all of the ammonia is converted to nitrate through nitrification. The oxygen demand caused by nitrification of ammonia is equal to the NBODu load. The sum of CBODu and NBODu is equal to the load of TBODu. The loads of TBODu from the calibrated STREAM model are given in Table 8 Calibrated Model Loads .

$$TBODu = CBODu + NBODu \quad \text{(Eq. 3)}$$

3.2.6 STREAM Model Identification

There are two STREAM models in this study. The first is the calibrated noon time model. The noon time calibrated model setup was based on the critical condition measured on 9/15/2010. The dissolved oxygen value of 5.03 was matched with the data output of the model at river mile 5.1 where the monitoring station is located.

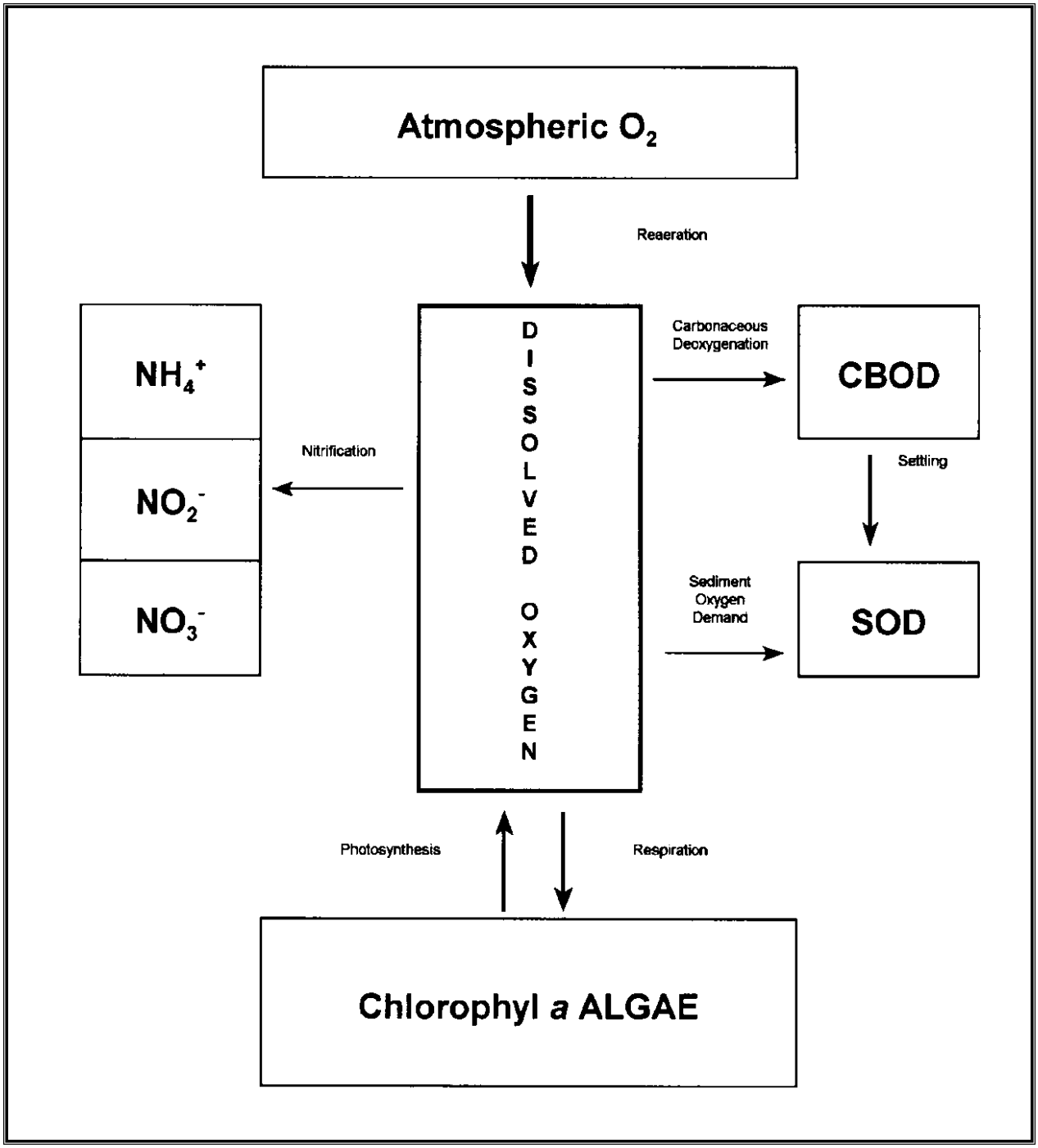

Figure 10 Instream Processes in a Typical DO Model

The second model takes the conditions established in the calibrated model and adjusts the loads to meet the early morning time measurement at river mile 5.1.

Table 6 STREAM Model Noon Variables

River Mile	Temp °C	Slope Ft/mile	Kr Day^{-1}	Kd Day^{-1}	Kn Day^{-1}	Escape Coeff	Velocity fps
7.8	29	1.04	0.15	0.15	0.3	0.11	0.04
6.1	29	0.04	0.15	0.15	0.3	0.11	0.04
5.7	29	0.04	0.15	0.15	0.3	0.11	0.04
5.5	29	4.64	0.15	0.15	0.3	0.11	0.05
4.6	29	1.17	0.15	0.15	0.3	0.11	0.08
3.6	29	0.64	0.15	0.15	0.3	0.11	0.09
2.3	29	0.46	0.15	0.15	0.3	0.11	0.05

Table 7 STREAM Model Midnight Variables

River Mile	Temp °C	Slope Ft/mile	Kr Day^{-1}	Kd Day^{-1}	Kn Day^{-1}	Respire Mg/L	Velocity fps
7.8	22	1.04	0.15	0.15	0.3	5.0	0.04
6.1	22	0.04	0.15	0.15	0.3	6.0	0.04
5.7	22	0.04	0.15	0.15	0.3	7.0	0.04
5.5	22	4.64	0.15	0.15	0.3	7.0	0.05
4.6	22	1.17	0.15	0.15	0.3	6.0	0.08
3.6	22	0.64	0.15	0.15	0.3	6.0	0.09
2.3	22	0.46	0.15	0.15	0.3	5.0	0.05

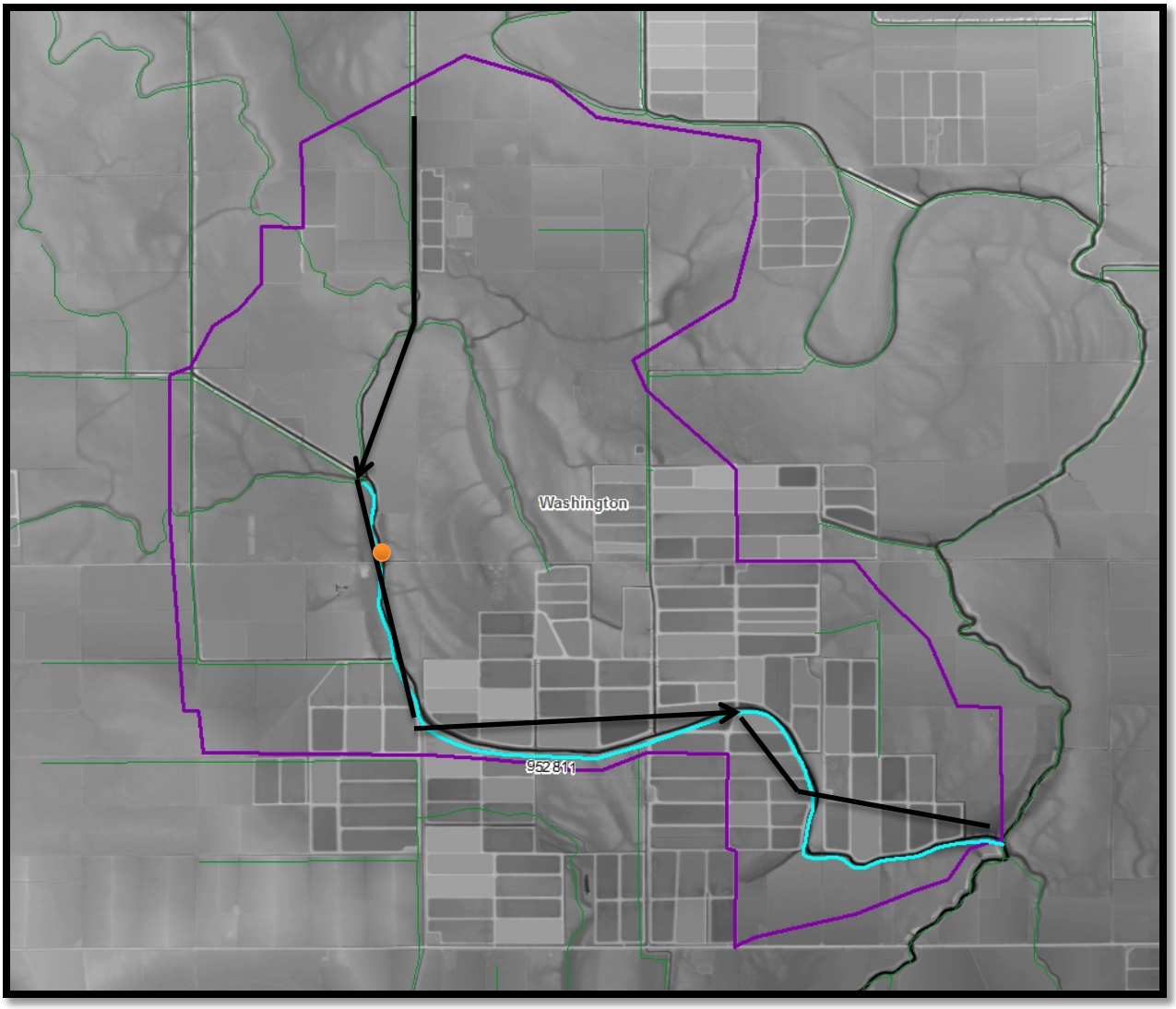

Figure 11 Model Segments and 2010 Monitoring Station shown with LIDAR

3.3 Source Representation

The background concentration used in modeling for $CBOD_5$ is 1.33 mg/l and for NH_3-N is 0.1 mg/l. These concentrations are used as estimates for the $CBOD_5$ and NH_3-N levels of water entering the water bodies through nonpoint source flow and tributaries. It is noted that because there were DO violations indicated, higher values of $CBOD_5$ and NH_3-N for the nonpoint source concentrations were used to reflect the measured instream average DO value. This was done to calibrate the model to the data.

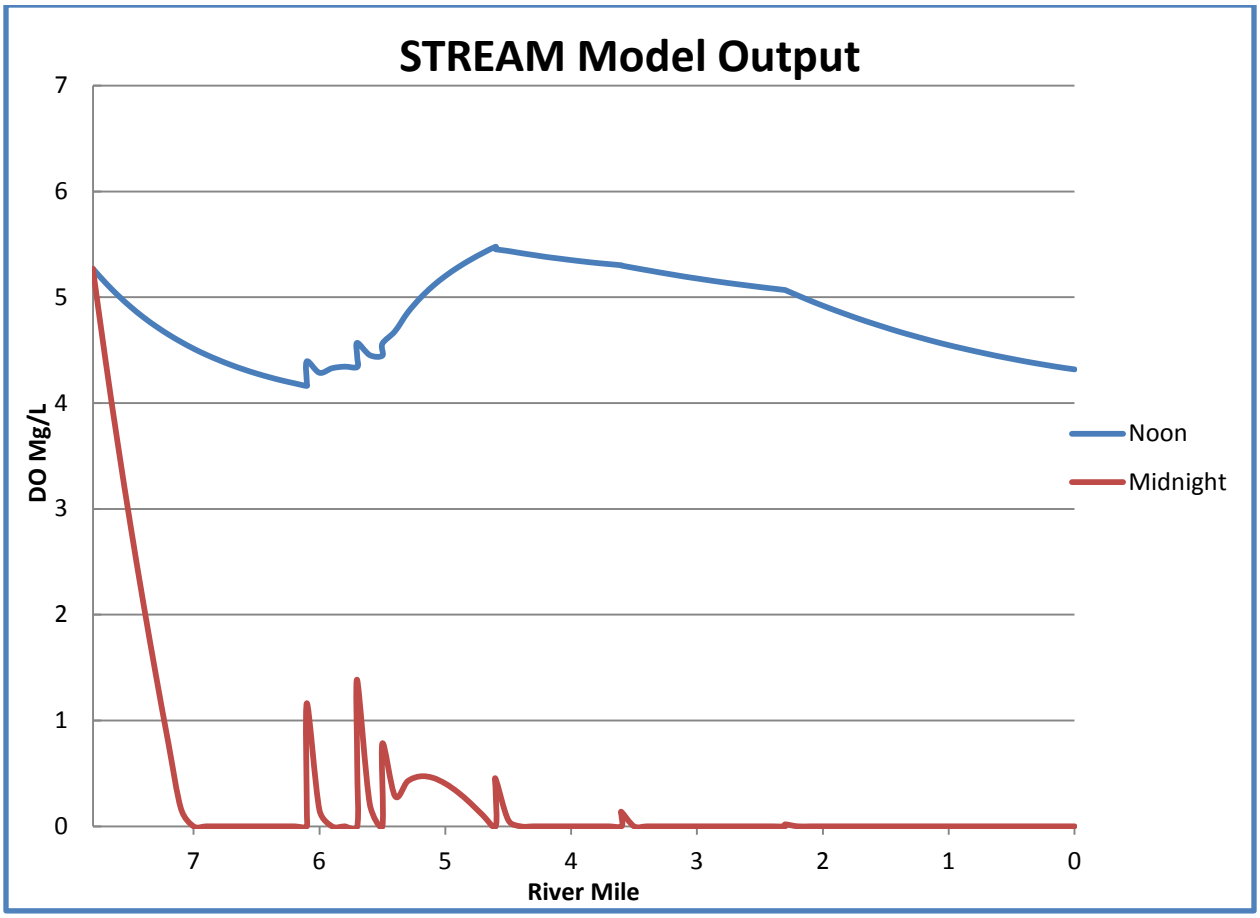

Figure 12 Model Output

Nonpoint source flows were included in the model to account for water entering due to groundwater infiltration, overland flow, and small, unmeasured tributaries. The nonpoint source loads were assumed to be distributed evenly on a river mile basis throughout the modeled reaches.

3.4 Model Results

As shown in Figure 12 above the noon calibrated model was above the water quality standard target of 5.0 mg/l of dissolved oxygen. The second model was constructed to match the midnight data by adding load and respiration to the model. The TBODu shown in Table 8 is the TMDL for this stream, 71.43 lbs. per day. Table 9 shows the loads used in the midnight model.

CBODu is calculated by multiplying the concentration in mg/L by the flow in cfs and a conversion factor of 5.39.

$$\text{CBODu (lbs/day)} = \text{CBODu mg/L} * \text{Flow (cfs)} * 5.39 \qquad \text{(Eq. 4)}$$

NBODu is similarly calculated with the addition of a multiplier of 4.57 which

converts the equivalent oxygen load.

NBODu (lbs/day) = NBODu mg/L * Flow (cfs) * 5.39 * 4.57 lbs O_2 (Eq. 5)

Table 8 Calibrated Model Loads

Segment	Flow (cfs)	CBODu (lbs/day)	NH3-N (lbs/day)	NBODu (lbs/day)	TBODu (lbs/day)
7.8	.10	5.24	0.1	0.46	5.70
6.1	.27	5.76	0.14	0.64	6.40
5.7	.30	6.47	0.16	0.73	7.20
5.5	1.20	25.87	0.65	2.97	28.84
4.6	0.50	10.78	0.27	1.23	12.01
3.6	0.24	5.20	0.13	0.13	5.79
2.3	0.23	4.94	0.12	0.12	5.49
	2.84	64.26	1.57	7.17	71.43

Table 9 Midnight Respiration Loads

Segment	Flow (cfs)	TBODu (lbs/day)	Respiration (mg/L)	Respiration (lbs/day)
7.8	.10	5.70	5.0	2.70
6.1	.27	6.40	6.0	8.73
5.7	.30	7.20	7.0	11.32
5.5	1.20	28.84	7.0	45.28
4.6	0.50	12.01	6.0	16.17
3.6	0.24	5.79	6.0	7.76
2.3	0.23	5.49	5.0	6.20
	2.84	71.43		98.15

ALLOCATION

The allocation for this TMDL involves the load reduction necessary for attainment of water quality standards in the Swiftwater Bayou Watershed.

4.1 Calculation of the TMDL

The TMDL is calculated based on the following equation.

$$\mathbf{TMDL = WLA + WLAsw + LA + MOS} \qquad \mathbf{(Eq.\ 6)}$$

where WLA is the Wasteload Allocation, WLAsw is Wasteload Allocation from stormwater activities, LA is the Load Allocation, and MOS is the Margin of Safety.

Table 10 TBODu TMDL

	WLA (lbs/day)	WLAsw (lbs/day)	LA (lbs/day)	MOS (lbs/day)
CBODu	0	0	64.26	Implicit
NBODu	0	0	7.17	Implicit
TBODu	0	0	71.43	Implicit

4.2 Wasteload Allocation

There is no point source included in the model for the Swiftwater Bayou Watershed. The WLA is therefore zero.

4.3 Wasteload Allocation Stormwater

There is no MS4 designation in this watershed. Stormwater NPDES permits require the establishment of controls or BMPs to reduce the pollutants entering the environment. The WLA for stormwater is zero.

4.4 Load Allocation

Because the water body indicates eutrophication and diurnal oxygen swings, the load shown on the noon model is considered the TMDL for the water body. The load allocation for the TBODu TMDL is 71.43 lbs. per day.

4.5 Incorporation of a Margin of Safety

The margin of safety is a required component of a TMDL and accounts for the uncertainty about the relationship between pollutant loads and the quality of the receiving water body. The two types of MOS development are to implicitly incorporate the MOS using conservative model assumptions or to explicitly specify a

portion of the total TMDL as the MOS. The MOS selected for this TMDL is implicit.

4.6 Seasonality and Critical Condition

This TMDL accounts for seasonal variability by requiring allocations that ensure year-round protection of water quality standards, including during critical conditions.

CONCLUSION

A reduction from organic enrichment loading was not estimated for this water body due to the diurnal dissolved oxygen swing shown in the data. The depletion of oxygen by respiration exceeds the reaeration potential in this segment of the stream. A limit of organics would not control this situation.

A reduction in nutrient load may better serve this water body. The eutrophication is either due to excess nutrient loads or a restriction on flow which reduces the potential for reaeration due to the physical movement of the water through the system. This may be the natural condition of this stream segment.

The natural condition of this watershed may be better defined in the future with a modified designated use for this stream. Due to MDEQ's water quality standard, the stream will be unable to ever meet a minimum of 4.0 mg/l of dissolved oxygen during the hot summer conditions. Recognition of this fact and a more appropriate designation of this stream as an agricultural drainage stream may return this stream to a fully supporting designation.

5.1 Next Steps

MDEQ has adopted the Basin Approach to Water Quality Management, a plan that divides Mississippi's major drainage basins into five groups. During each yearlong cycle, MDEQ resources for water quality monitoring will be focused on one of the basin groups. During the next monitoring phase in the Tombigbee River Basin, these watersheds may receive additional monitoring to identify any changes or improvements in water quality.

For land disturbing activities related to silviculture, construction, and agriculture, it is recommended that practices, as outlined in "Mississippi's BMPs: Best Management Practices for Forestry in Mississippi" (MFC, 2008), "NPS Field Manual For Erosion And Sediment Control Version 2." (MDEQ, et. al, 2011), and "Field Office Technical Guide" (NRCS, 2012), be followed, respectively.

5.2 Public Participation

This TMDL will be published for a 30-day public notice. During this time, the public will be notified by publication in the statewide newspaper. The public will be given an opportunity to review the TMDLs and submit comments. MDEQ also distributes all TMDLs at the beginning of the public notice to those members of the public who have requested to be included on a TMDL emailing list. Anyone wishing to become a member of the TMDL mailing list should contact Greg Jackson at Greg_Jackson@deq.state.ms.us.

All comments should be directed to Greg_Jackson@deq.state.ms.us or Greg Jackson, MDEQ, PO Box 2261, Jackson, MS 39225. All comments received during the public notice period and at any public hearings become a part of the record of this TMDL and will be considered in the submission of this TMDL to EPA Region 4 for final approval.

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Appendix A - 2010 Water Quality Data

Table 11 2010 Diurnal Disolved Oxygen Data

Measurement Date and Time	Dissolved Oxygen % Saturation	Dissolved Oxygen Mg/L
09/16/2010 12:30	89.9	7.38
09/16/2010 13:00	93.7	7.62
09/16/2010 13:30	94.5	7.68
09/16/2010 14:00	88.1	7.19
09/16/2010 14:30	84	6.88
09/16/2010 15:00	69.4	5.74
09/16/2010 15:30	56.6	4.71
09/16/2010 16:00	42.9	3.6
09/16/2010 16:30	32.7	2.76
09/16/2010 17:00	19.2	1.65
09/16/2010 17:30	11.7	1.01
09/16/2010 18:00	6.3	0.54
09/16/2010 18:30	3.4	0.3
09/16/2010 19:00	2.8	0.25
09/16/2010 19:30	2.2	0.2
09/16/2010 20:00	1.8	0.16
09/16/2010 20:30	1.7	0.15
09/16/2010 21:00	1.8	0.16
09/16/2010 21:30	1.6	0.14
09/16/2010 22:00	1.5	0.13
09/16/2010 22:30	1.3	0.12
09/16/2010 23:00	1.3	0.11
09/16/2010 23:30	1.2	0.11
09/17/2010 00:00	1.1	0.09
09/17/2010 00:30	1.1	0.09
09/17/2010 01:00	1	0.08
09/17/2010 01:30	1	0.09
09/17/2010 02:00	1	0.09
09/17/2010 02:30	1	0.09
09/17/2010 03:00	0.9	0.07
09/17/2010 03:30	0.9	0.08
09/17/2010 04:00	0.9	0.08
09/17/2010 04:30	0.9	0.08
09/17/2010 05:00	0.8	0.07
09/17/2010 05:30	0.9	0.08
09/17/2010 06:00	1.1	0.09
09/17/2010 06:30	1.1	0.1
09/17/2010 07:00	1.8	0.16
09/17/2010 07:30	5.5	0.48
09/17/2010 08:00	7.7	0.67
09/17/2010 08:30	13.9	1.2
09/17/2010 09:00	25.6	2.2
09/17/2010 09:30	29.8	2.54
09/17/2010 10:00	41.2	3.49
09/17/2010 10:30	51.5	4.33
09/16/2010 12:30	57.8	4.85

09/16/2010 13:00	60.5	5.06
09/16/2010 13:30	59.4	4.95
09/16/2010 14:00	59.1	4.93
09/16/2010 14:30	59.4	4.94
09/16/2010 15:00	55.5	4.63
09/16/2010 15:30	47.4	3.97
09/16/2010 16:00	42.2	3.53
09/16/2010 16:30	36.1	3.03
09/16/2010 17:00	26.7	2.25
09/16/2010 17:30	20.1	1.69
09/16/2010 18:00	16.3	1.37
09/16/2010 18:30	10.7	0.91
09/16/2010 19:00	6.7	0.57
09/16/2010 19:30	2.9	0.24
09/16/2010 20:00	1.6	0.14
09/16/2010 20:30	1	0.08
09/16/2010 21:00	0.8	0.07
09/16/2010 21:30	0.8	0.06
09/16/2010 22:00	0.7	0.06
09/16/2010 22:30	0.7	0.06
09/16/2010 23:00	0.8	0.07
09/16/2010 23:30	0.7	0.06
09/17/2010 00:00	0.8	0.07
09/17/2010 00:30	0.8	0.07
09/17/2010 01:00	1.1	0.09
09/17/2010 01:30	0.8	0.07
09/17/2010 02:00	0.9	0.08
09/17/2010 02:30	0.9	0.08
09/17/2010 03:00	0.8	0.07
09/17/2010 03:30	0.9	0.07
09/17/2010 04:00	0.8	0.07
09/17/2010 04:30	0.8	0.07
09/17/2010 05:00	0.7	0.06
09/17/2010 05:30	0.7	0.06
09/17/2010 06:00	0.7	0.06
09/17/2010 06:30	0.7	0.06
09/17/2010 07:00	0.7	0.06
09/17/2010 07:30	0.8	0.07
09/17/2010 08:00	0.8	0.07
09/17/2010 08:30	1.3	0.11
09/17/2010 09:00	2.9	0.24
09/17/2010 09:30	6.4	0.54
09/17/2010 10:00	12.8	1.08
09/17/2010 10:30	24.3	2.02
09/16/2010 12:30	35.4	2.92
09/16/2010 13:00	41.9	3.45
09/16/2010 13:30	54.5	4.46
09/16/2010 14:00	58.1	4.74
09/16/2010 14:30	60.2	4.9
09/16/2010 15:00	62.9	5.1
09/16/2010 15:30	67.9	5.49

09/16/2010 16:00	66.6	5.39
09/16/2010 16:30	60.9	4.93
09/16/2010 17:00	50.5	4.12
09/16/2010 17:30	42.9	3.51
09/16/2010 18:00	37.8	3.09
09/16/2010 18:30	28.5	2.34
09/16/2010 19:00	21.8	1.8
09/16/2010 19:30	13.6	1.13
09/16/2010 20:00	9.9	0.82
09/16/2010 20:30	6.2	0.52
09/16/2010 21:00	3.2	0.27
09/16/2010 21:30	2	0.17
09/16/2010 22:00	1.3	0.1
09/16/2010 22:30	1.2	0.1
09/16/2010 23:00	0.9	0.07
09/16/2010 23:30	0.9	0.07
09/17/2010 00:00	0.8	0.07
09/17/2010 00:30	0.8	0.07
09/17/2010 01:00	0.8	0.07
09/17/2010 01:30	0.9	0.08
09/17/2010 02:00	0.9	0.08
09/17/2010 02:30	0.8	0.07
09/17/2010 03:00	0.8	0.07
09/17/2010 03:30	0.8	0.07
09/17/2010 04:00	0.8	0.06
09/17/2010 04:30	0.9	0.07
09/17/2010 05:00	0.8	0.06
09/17/2010 05:30	0.8	0.06
09/17/2010 06:00	0.8	0.07
09/17/2010 06:30	0.7	0.06
09/17/2010 07:00	0.8	0.06
09/17/2010 07:30	0.7	0.06
09/17/2010 08:00	0.7	0.06
09/17/2010 08:30	0.8	0.06
09/17/2010 09:00	0.9	0.08
09/17/2010 09:30	0.8	0.07
09/17/2010 10:00	1.1	0.1
09/17/2010 10:30	1.3	0.11
09/16/2010 12:30	3	0.25
09/16/2010 13:00	6.6	0.54
09/16/2010 13:30	14.1	1.15

Appendix B - 2013 Water Quality Data

Table 12 2013 Water Quality Data

Date & Time	DO % Sat	DO mg/l	Temp C	pH	DO % Sat	DO mg/l	Temp C	pH	DO % Sat	DO mg/l	Temp C
	Station 1				Station 2				Station 3		
6/27/13 12:45	112.6	8.3	31.43	7.73							
6/27/13 13:00	117.2	8.6	31.71	7.75							
6/27/13 13:15	120.2	8.77	32.03	7.77	167	11.87	33.34	8.36			
6/27/13 13:30	125.3	9.1	32.32	7.79	174.2	12.32	33.68	8.39	108.7	7.84	32.74
6/27/13 13:45	129.7	9.37	32.63	7.81	177.9	12.5	34.04	8.41	109.8	7.89	32.91
6/27/13 14:00	134	9.62	33	7.83	180	12.58	34.36	8.42	111.4	7.98	33.09
6/27/13 14:15	139.9	10.01	33.21	7.86	186.1	12.94	34.69	8.43	113.2	8.09	33.26
6/27/13 14:30	144.9	10.33	33.45	7.87	190.9	13.21	34.99	8.42	114.6	8.17	33.44
6/27/13 14:45	146.9	10.42	33.74	7.9	198	13.63	35.3	8.44	116.2	8.25	33.61
6/27/13 15:00	152.4	10.75	34.08	7.92	202.6	13.89	35.57	8.45	117.4	8.31	33.79
6/27/13 15:15	157.6	11.06	34.4	7.95	202.7	13.84	35.81	8.46	117.8	8.33	33.89
6/27/13 15:30	160.3	11.21	34.62	7.97	208.4	14.18	36.02	8.48	118.8	8.38	34.04
6/27/13 15:45	164.6	11.46	34.82	7.99	213.1	14.46	36.2	8.5	119.1	8.38	34.17
6/27/13 16:00	166.7	11.57	35.04	8.01	216.6	14.66	36.36	8.51	121.2	8.51	34.3
6/27/13 16:15	167.9	11.64	35.15	8.03	220	14.86	36.49	8.53	121.5	8.51	34.43
6/27/13 16:30	170.6	11.79	35.31	8.05	220	14.84	36.59	8.54	121.6	8.5	34.53
6/27/13 16:45	171.7	11.84	35.48	8.06	220.8	14.87	36.65	8.55	121.3	8.48	34.6
6/27/13 17:00	171.6	11.82	35.52	8.07	220.5	14.85	36.69	8.56	121.1	8.46	34.65
6/27/13 17:15	170.8	11.76	35.54	8.08	217.6	14.66	36.68	8.55	119.9	8.37	34.61
6/27/13 17:30	169.9	11.7	35.53	8.09	214.4	14.45	36.62	8.55	118.3	8.27	34.55
6/27/13 17:45	168.5	11.61	35.53	8.09	209.9	14.17	36.56	8.55	116.5	8.16	34.49
6/27/13 18:00	165.9	11.45	35.41	8.09	206.2	13.94	36.46	8.54	115	8.06	34.42
6/27/13 18:15	162.1	11.2	35.34	8.09	200.1	13.56	36.29	8.53	112.6	7.9	34.32
6/27/13 18:30	158.7	10.98	35.25	8.08	194.4	13.22	36.09	8.51	111.3	7.82	34.28
6/27/13 18:45	155.6	10.78	35.16	8.07	187.1	12.76	35.9	8.48	110.1	7.74	34.23
6/27/13 19:00	150.6	10.45	35.02	8.06	178.5	12.21	35.72	8.46	107.3	7.55	34.17
6/27/13 19:15	146.2	10.17	34.9	8.04	172.7	11.84	35.56	8.43	105.6	7.44	34.09
6/27/13 19:30	140.9	9.82	34.77	8.02	164.7	11.32	35.42	8.4	103.2	7.28	34.03
6/27/13 19:45	136.5	9.54	34.63	8	156.4	10.78	35.25	8.37	101.9	7.19	33.99
6/27/13 20:00	131.4	9.21	34.46	7.99	147.3	10.18	35.08	8.33	100.3	7.09	33.94
6/27/13 20:15	126.5	8.89	34.29	7.96	139	9.63	34.91	8.29	99.1	7.01	33.87
6/27/13 20:30	121.3	8.55	34.14	7.94	130.8	9.1	34.72	8.25	96.9	6.86	33.79
6/27/13 20:45	116.9	8.26	33.96	7.92	123.5	8.61	34.56	8.22	96	6.8	33.72
6/27/13 21:00	111.8	7.92	33.79	7.9	115.1	8.05	34.4	8.18	94.2	6.69	33.62
6/27/13 21:15	107.6	7.65	33.63	7.88	107	7.5	34.23	8.15	93	6.61	33.53
6/27/13 21:30	103.6	7.38	33.48	7.86	99.8	7.01	34.05	8.11	90.6	6.46	33.44

6/27/13 21:45	99.7	7.12	33.33	7.83	92.6	6.53	33.88	8.08	89.5	6.38	33.35
6/27/13 22:00	96.2	6.88	33.19	7.81	86	6.08	33.71	8.05	87.3	6.23	33.27
6/27/13 22:15	93.5	6.7	33.07	7.79	80.3	5.69	33.54	8.02	85.3	6.1	33.17
6/27/13 22:30	90.8	6.54	32.75	7.79	74.4	5.29	33.34	7.99	83.3	5.97	33.07
6/27/13 22:45	89.5	6.48	32.48	7.79	67.4	4.82	32.94	7.97	80.6	5.81	32.78
6/27/13 23:00	87.9	6.38	32.3	7.78	63.8	4.58	32.68	7.95	78.5	5.66	32.62
6/27/13 23:15	86.5	6.3	32.12	7.77	57.3	4.15	32.28	7.92	76.4	5.53	32.46
6/27/13 23:30	85.3	6.23	32.02	7.76	52.4	3.81	32.02	7.9	73.7	5.34	32.36
6/27/13 23:45	83.6	6.11	31.91	7.74	48.2	3.52	31.77	7.87	71.2	5.17	32.29
6/28/13 0:00	82.2	6.03	31.79	7.74	44.1	3.23	31.52	7.86	68.5	4.98	32.2
6/28/13 0:15	80.6	5.92	31.67	7.72	40.3	2.96	31.35	7.84	67.1	4.89	32.13
6/28/13 0:30	79.5	5.84	31.59	7.71	38.3	2.82	31.26	7.83	65.3	4.76	32.08
6/28/13 0:45	77.1	5.68	31.52	7.7	35.8	2.64	31.09	7.82	64.1	4.68	32.02
6/28/13 1:00	75.8	5.59	31.45	7.69	33.9	2.51	30.91	7.81	62.7	4.58	31.96
6/28/13 1:15	73.7	5.44	31.35	7.68	31.5	2.34	30.7	7.8	61	4.46	31.89
6/28/13 1:30	72.1	5.33	31.23	7.66	29.5	2.2	30.52	7.79	58.9	4.31	31.84
6/28/13 1:45	70.3	5.21	31.1	7.65	28	2.09	30.4	7.77	52.4	3.83	31.78
6/28/13 2:00	67.7	5.03	30.96	7.64	26.6	1.99	30.31	7.77	56	4.11	31.71
6/28/13 2:15	65.9	4.91	30.82	7.63	25.4	1.91	30.16	7.76	54.9	4.03	31.66
6/28/13 2:30	64.1	4.78	30.71	7.61	24.6	1.85	30.07	7.74	53.5	3.93	31.62
6/28/13 2:45	62.7	4.68	30.63	7.6	23.9	1.8	29.97	7.72	52.3	3.85	31.56
6/28/13 3:00	61.6	4.61	30.56	7.59	23.1	1.74	29.88	7.72	50.9	3.75	31.52
6/28/13 3:15	60.8	4.55	30.5	7.59	22.6	1.7	29.79	7.71	46	3.39	31.48
6/28/13 3:30	60.4	4.53	30.45	7.58	22.1	1.67	29.75	7.71	50.3	3.7	31.44
6/28/13 3:45	60.1	4.51	30.4	7.57	21.6	1.64	29.63	7.7	49.8	3.67	31.39
6/28/13 4:00	59.7	4.48	30.36	7.57	21.5	1.63	29.59	7.7	48.6	3.58	31.34
6/28/13 4:15	59.2	4.45	30.33	7.57	21.1	1.6	29.51	7.7	48.5	3.58	31.3
6/28/13 4:30	58.6	4.41	30.28	7.56	21.1	1.6	29.44	7.7	47.9	3.54	31.27
6/28/13 4:45	58.3	4.39	30.24	7.55	20.7	1.58	29.39	7.7	47.9	3.54	31.24
6/28/13 5:00	57.6	4.33	30.19	7.56	20.7	1.57	29.33	7.76	47.7	3.53	31.19
6/28/13 5:15	57.1	4.3	30.15	7.54	20.4	1.56	29.26	7.76	47.6	3.52	31.15
6/28/13 5:30	56.7	4.28	30.08	7.55	20.3	1.55	29.2	7.76	47.6	3.52	31.11
6/28/13 5:45	55.8	4.21	30.03	7.54	20	1.53	29.16	7.75	47.6	3.53	31.08
6/28/13 6:00	55.6	4.2	29.99	7.54	19.9	1.52	29.11	7.75	47.9	3.56	31.05
6/28/13 6:15	55	4.16	29.93	7.54	20	1.53	29.1	7.75	48	3.56	31.01
6/28/13 6:30	54	4.09	29.89	7.54	19.7	1.51	29.07	7.75	48.3	3.58	30.98
6/28/13 6:45	53.5	4.05	29.85	7.53	19.7	1.51	29.05	7.75	48.3	3.59	30.94
6/28/13 7:00	53.1	4.03	29.81	7.53	19.8	1.51	29.04	7.75	48.3	3.59	30.91
6/28/13 7:15	52.8	4	29.78	7.53	20.1	1.54	29.03	7.75	48.8	3.63	30.89
6/28/13 7:30	52.9	4.01	29.75	7.53	20.5	1.57	29.05	7.75	49.2	3.66	30.87
6/28/13 7:45	52.6	3.99	29.73	7.52	21.3	1.63	29.06	7.76	49.8	3.71	30.85

6/28/13 8:00	52.6	4	29.71	7.52	22.2	1.7	29.07	7.76	50.2	3.73	30.82
6/28/13 8:15	53.5	4.06	29.7	7.52	24	1.83	29.13	7.76	51.3	3.82	30.82
6/28/13 8:30	54.5	4.14	29.73	7.53	26.9	2.05	29.23	7.77	51.9	3.86	30.84
6/28/13 8:45	55.5	4.21	29.76	7.53	30.5	2.32	29.35	7.78	53.8	4	30.91
6/28/13 9:00	57.4	4.35	29.83	7.53	35.4	2.68	29.53	7.8	55.4	4.11	30.95
6/28/13 9:15	59.2	4.49	29.85	7.54	40.8	3.09	29.69	7.81	57.2	4.24	31.03
6/28/13 9:30	62.4	4.72	29.94	7.56	46.3	3.49	29.86	7.83	57.6	4.27	31.04
6/28/13 9:45	64	4.84	29.95	7.56	52.9	3.98	30.04	7.86	59.6	4.42	31.1
6/28/13 10:00	67.2	5.08	30.02	7.57	59.2	4.44	30.23	7.88	61.1	4.53	31.12
6/28/13 10:15	69	5.2	30.07	7.58	64.9	4.85	30.4	7.91	63.4	4.69	31.2
6/28/13 10:30	73	5.5	30.16	7.59	71.8	5.35	30.53	7.94	65.6	4.85	31.23
6/28/13 10:45	76.7	5.77	30.26	7.6	77.8	5.79	30.69	7.96	68.1	5.03	31.29
6/28/13 11:00	80.8	6.06	30.38	7.63	79.6	5.91	30.8	7.98	69.9	5.16	31.35
6/28/13 11:15	84.6	6.34	30.49	7.64	87.8	6.5	30.95	8.02	72.4	5.33	31.42
6/28/13 11:30	88.7	6.62	30.66	7.66	96.9	7.15	31.14	8.06	74.5	5.48	31.51
6/28/13 11:45	92.9	6.93	30.8	7.68	104.5	7.68	31.34	8.09	77.3	5.67	31.67
6/28/13 12:00	97.1	7.22	30.96	7.7	111.6	8.18	31.56	8.12	80.7	5.91	31.82
6/28/13 12:15	102.9	7.61	31.22	7.73	118.2	8.62	31.85	8.15	81.5	5.95	32
6/28/13 12:30	107.8	7.93	31.5	7.75	125.7	9.12	32.17	8.18	87.5	6.36	32.23
6/28/13 12:45	114.8	8.41	31.79	7.78	132.9	9.58	32.51	8.2	91.7	6.64	32.44
6/28/13 13:00	119.9	8.74	32.08	7.81	138.1	9.91	32.84	8.22	94.6	6.83	32.68
6/28/13 13:15	126.7	9.2	32.34	7.86	146.5	10.45	33.17	8.24	96.9	6.97	32.9
6/28/13 13:30	133	9.61	32.63	7.9	151.6	10.77	33.42	8.26	99.3	7.12	33.08
6/28/13 13:45	138.8	9.98	32.93	7.92	155.5	10.99	33.69	8.27	100.1	7.15	33.25
6/28/13 14:00	145	10.37	33.24	7.95	159.5	11.23	33.95	8.28	101.7	7.24	33.42
6/28/13 14:15	151.3	10.77	33.51	8	164	11.5	34.19	8.3	102.7	7.3	33.55
6/28/13 14:30	157.3	11.15	33.78	8.03	168.6	11.78	34.39	8.3	103.3	7.33	33.69
6/28/13 14:45	162.4	11.47	34.02	8.07	171.9	11.98	34.55	8.31	103.9	7.36	33.81
6/28/13 15:00	167	11.75	34.26	8.1	173.9	12.09	34.72	8.32	104.6	7.39	33.93
6/28/13 15:15	171.4	12.02	34.44	8.12	175.3	12.16	34.87	8.33	105.5	7.44	34.02
6/28/13 15:30	174.5	12.2	34.6	8.14	178.9	12.39	34.96	8.34	105.8	7.45	34.11
6/28/13 15:45	178.3	12.44	34.75	8.16	177.6	12.28	35.02	8.35	105.4	7.42	34.2
6/28/13 16:00	179.6	12.51	34.83	8.17	181.7	12.56	35.08	8.35	105.6	7.42	34.24
6/28/13 16:15	181.7	12.65	34.89	8.19	177.5	12.28	35.02	8.36	105.3	7.4	34.28
6/28/13 16:30	181.9	12.65	34.93	8.19	174.2	12.07	34.96	8.36	104.8	7.36	34.3
6/28/13 16:45	182.6	12.7	34.91	8.2	172.5	11.97	34.8	8.36	103.6	7.28	34.25
6/28/13 17:00	180.7	12.57	34.91	8.19	171.6	11.92	34.78	8.35	102.2	7.19	34.24
6/28/13 17:15	176.5	12.3	34.81	8.19	170.4	11.85	34.71	8.35	101.9	7.17	34.22
6/28/13 17:30	171.6	11.98	34.68	8.18	165.7	11.55	34.57	8.35	99.8	7.03	34.14
6/28/13 17:45	150.9	10.7	33.72	8.15	150.7	10.61	33.98	8.34	97	6.85	33.92
6/28/13 18:00	133.9	9.66	32.72	8.09	136.1	9.71	33.22	8.33	93.7	6.68	33.34

6/28/13 18:15	127.2	9.2	32.6	8.12	124.7	8.96	32.75	8.33	91.9	6.6	32.93
6/28/13 18:30	120.6	8.78	32.19	8.1	117.7	8.51	32.39	8.31	88.9	6.4	32.86
6/28/13 18:45	116.4	8.48	32.17	8.07	111.6	8.1	32.16	8.29	86.3	6.2	32.87
6/28/13 19:00	112.6	8.23	31.93	8.06	104.8	7.64	31.92	8.27	84.1	6.04	32.89
6/28/13 19:15	107.9	7.92	31.71	8.04	100	7.31	31.73	8.24	82.4	5.92	32.85
6/28/13 19:30	104.5	7.69	31.56	8.01	96	7.04	31.56	8.22	79.5	5.73	32.77
6/28/13 19:45	102	7.51	31.55	7.97	91.6	6.73	31.41	8.21	77.6	5.6	32.66
6/28/13 20:00	100.6	7.4	31.58	7.95	88	6.48	31.25	8.2	74.5	5.39	32.53
6/28/13 20:15	99.3	7.3	31.58	7.93	84.5	6.25	31.08	8.18	71.3	5.16	32.41
6/28/13 20:30	97.8	7.2	31.5	7.92	80.3	5.95	30.94	8.17	68.3	4.95	32.34
6/28/13 20:45	96.2	7.1	31.41	7.9	78.6	5.83	30.86	8.16	66.1	4.8	32.25
6/28/13 21:00	94.3	6.97	31.26	7.89	76.3	5.67	30.73	8.14	64.4	4.69	32.19
6/28/13 21:15	91.8	6.81	31.09	7.87	74	5.51	30.62	8.13	63.7	4.64	32.12
6/28/13 21:30	88.7	6.59	30.94	7.85	71.5	5.33	30.54	8.12	63.4	4.62	32.04
6/28/13 21:45	86.6	6.45	30.81	7.84	69.8	5.21	30.47	8.1	64	4.67	31.97
6/28/13 22:00	84.6	6.32	30.66	7.83	68.2	5.1	30.44	8.09	63.9	4.67	31.88
6/28/13 22:15	81.7	6.13	30.43	7.81	67.5	5.05	30.41	8.08	63.6	4.66	31.81
6/28/13 22:30	78.4	5.92	30.1	7.78	67.6	5.05	30.4	8.07	63.3	4.64	31.7
6/28/13 22:45	75.1	5.71	29.61	7.73	66.9	5	30.39	8.06	63.9	4.69	31.61
6/28/13 23:00	74	5.66	29.25	7.72	66.6	4.98	30.39	8.06	64	4.71	31.53
6/28/13 23:15	72.5	5.56	29.11	7.7	65.9	4.93	30.38	8.06	64.5	4.75	31.46
6/28/13 23:30	71.1	5.46	29.14	7.69	65.4	4.89	30.36	8.05	64.1	4.73	31.39
6/28/13 23:45	69.5	5.32	29.26	7.69	65	4.86	30.36	8.05	64.2	4.74	31.32
6/29/13 0:00	67.2	5.14	29.33	7.68	64.1	4.8	30.32	8.05	64.2	4.74	31.24
6/29/13 0:15	64.8	4.96	29.3	7.68	63.3	4.74	30.29	8.05	64.3	4.76	31.17
6/29/13 0:30	63	4.83	29.15	7.66	61.5	4.61	30.22	8.05	64.5	4.78	31.12
6/29/13 0:45	60.6	4.66	28.91	7.64	59.4	4.46	30.14	8.04	65.1	4.82	31.07
6/29/13 1:00	57.6	4.46	28.6	7.61	57.2	4.3	30.05	8.04	65.2	4.83	31.02
6/29/13 1:15	54.9	4.28	28.21	7.57	55	4.14	29.96	8.04	66	4.9	30.98
6/29/13 1:30	51.9	4.08	27.76	7.53	52.6	3.97	29.82	8.03	67.3	5	30.93
6/29/13 1:45	49.3	3.91	27.29	7.49	50	3.78	29.68	8.03	68.1	5.06	30.88
6/29/13 2:00	47.7	3.81	26.87	7.44	47.2	3.58	29.53	8.02	68.4	5.09	30.83
6/29/13 2:15	46.1	3.71	26.54	7.42	44.7	3.4	29.37	8.01	66.3	4.94	30.75
6/29/13 2:30	45.4	3.67	26.3	7.4	41.6	3.17	29.18	8	56.9	4.24	30.67
6/29/13 2:45	45.4	3.68	26.12	7.39	39.9	3.06	29.05	7.99	66.5	4.97	30.57
6/29/13 3:00	44.9	3.65	26	7.38	37.5	2.88	28.88	7.98	65.1	4.87	30.48
6/29/13 3:15	44.9	3.65	25.91	7.37	36	2.77	28.77	7.97	63.4	4.76	30.37
6/29/13 3:30	44.9	3.66	25.85	7.37	34.2	2.64	28.61	7.96	62	4.66	30.27
6/29/13 3:45	45.3	3.69	25.8	7.38	32.9	2.54	28.49	7.94	59.6	4.48	30.17
6/29/13 4:00	45.1	3.68	25.76	7.38	31.8	2.46	28.41	7.93	57.2	4.31	30.06
6/29/13 4:15	45	3.67	25.74	7.38	30.9	2.4	28.32	7.92	54.9	4.15	29.97

6/29/13 4:30	44.9	3.66	25.71	7.38	30.1	2.33	28.26	7.91	52.9	4	29.88
6/29/13 4:45	45.2	3.69	25.69	7.38	29.7	2.3	28.22	7.91	50.9	3.86	29.79
6/29/13 5:00	47.1	3.84	25.65	7.38	29.5	2.29	28.17	7.89	48.8	3.7	29.69
6/29/13 5:15	47.1	3.85	25.63	7.38	29.2	2.27	28.13	7.88	47.7	3.63	29.57
6/29/13 5:30	47.2	3.86	25.63	7.39	28.8	2.24	28.1	7.87	45.1	3.43	29.47
6/29/13 5:45	46.7	3.81	25.65	7.38	28.7	2.23	28.05	7.86	42.6	3.25	29.37
6/29/13 6:00	46.1	3.77	25.67	7.39	28.5	2.22	28	7.85	41.2	3.15	29.26
6/29/13 6:15	46.1	3.76	25.73	7.39	28.5	2.22	27.96	7.85	40	3.06	29.15
6/29/13 6:30	46.1	3.75	25.8	7.39	28.5	2.22	27.91	7.84	38.7	2.97	29.05
6/29/13 6:45	46.5	3.78	25.89	7.38	28.6	2.23	27.86	7.83	37.4	2.88	28.96
6/29/13 7:00	46.5	3.78	25.98	7.38	28.8	2.25	27.81	7.82	36.2	2.79	28.86
6/29/13 7:15	47	3.81	26.1	7.38	28.9	2.26	27.78	7.82	35.3	2.72	28.78
6/29/13 7:30	47.6	3.85	26.22	7.39	29.5	2.31	27.77	7.81	34.7	2.68	28.71
6/29/13 7:45	48.4	3.9	26.34	7.4	30	2.35	27.76	7.81	34.2	2.64	28.66
6/29/13 8:00	49.3	3.97	26.46	7.4	30.7	2.4	27.77	7.81	33.9	2.62	28.6
6/29/13 8:15	50.2	4.03	26.58	7.4	32	2.51	27.77	7.8	33.5	2.59	28.55
6/29/13 8:30	51.8	4.15	26.7	7.4	33.3	2.6	27.75	7.8	33.4	2.59	28.53
6/29/13 8:45	53	4.23	26.81	7.41	35.5	2.78	27.7	7.8	33.4	2.59	28.51
6/29/13 9:00	55	4.39	26.92	7.41	37.4	2.93	27.65	7.8	33.8	2.62	28.51
6/29/13 9:15	56.2	4.47	27.03	7.42	37.8	2.97	27.66	7.8	34.5	2.67	28.54
6/29/13 9:30	57.6	4.58	27.12	7.42	38.6	3.02	27.69	7.79	35.5	2.75	28.58
6/29/13 9:45	59	4.68	27.23	7.43	39.9	3.12	27.81	7.79	36.5	2.82	28.66
6/29/13 10:00	59.7	4.73	27.3	7.43	41.6	3.24	27.9	7.79	37.6	2.91	28.72
6/29/13 10:15	61.8	4.88	27.47	7.43	42.6	3.32	28.04	7.78	39.1	3.01	28.83
6/29/13 10:30	64.1	5.05	27.64	7.44	40.9	3.18	28.13	7.78	40.7	3.13	28.96
6/29/13 10:45	66.6	5.23	27.81	7.43	42.6	3.3	28.31	7.77	42.7	3.27	29.07
6/29/13 11:00	69	5.39	28	7.44	44.3	3.42	28.54	7.77	44.9	3.44	29.21
6/29/13 11:15	71.5	5.58	28.21	7.44	45.1	3.47	28.71	7.77	46.8	3.57	29.35
6/29/13 11:30	74.5	5.79	28.4	7.45	46.1	3.54	28.88	7.78	48.7	3.71	29.49
6/29/13 11:45	78.1	6.04	28.65	7.45	49	3.74	29.13	7.77	50.9	3.86	29.65
6/29/13 12:00	82.5	6.35	28.92	7.45	49.5	3.78	29.2	7.78	53.7	4.07	29.84
6/29/13 12:15	87.5	6.7	29.24	7.45	51.5	3.91	29.44	7.78	56.7	4.28	30.02
6/29/13 12:30	91.9	7	29.54	7.45	52.4	3.98	29.53	7.79	58.6	4.41	30.2
6/29/13 12:45	96.8	7.33	29.87	7.45	55.9	4.22	29.82	7.79	61.8	4.64	30.39
6/29/13 13:00	101.7	7.66	30.18	7.45	59.5	4.48	30.01	7.82	64.8	4.84	30.59
6/29/13 13:15	106.9	8.01	30.51	7.46	61.9	4.65	30.15	7.82	68	5.06	30.77
6/29/13 13:30	112.5	8.37	30.87	7.46	66.7	4.99	30.38	7.84	71.1	5.28	30.95
6/29/13 13:45	118.2	8.75	31.21	7.46	69.8	5.21	30.47	7.85	74	5.48	31.08
6/29/13 14:00	122.8	9.04	31.52	7.46	74.7	5.56	30.65	7.87	76.6	5.66	31.27
6/29/13 14:15	127.3	9.32	31.83	7.47	78.1	5.81	30.66	7.88	80.2	5.91	31.43
6/29/13 14:30	131.9	9.62	32.09	7.46	82.9	6.16	30.71	7.91	83	6.1	31.57

6/29/13 14:45	135.2	9.82	32.31	7.46	88.4	6.56	30.85	7.94	83.6	6.13	31.72
6/29/13 15:00	139.3	10.08	32.54	7.46	93.9	6.93	31.13	7.96	89.6	6.55	31.84
6/29/13 15:15	141.1	10.19	32.69	7.47	98.3	7.26	31.06	7.98	92.4	6.74	31.99
6/29/13 15:30	142.5	10.26	32.83	7.47	103.4	7.63	31.2	8.01	95.4	6.95	32.1
6/29/13 15:45	144.2	10.36	32.97	7.48	108.5	7.99	31.28	8.03	98.6	7.17	32.21
6/29/13 16:00	145.5	10.43	33.08	7.48	113.3	8.32	31.41	8.05	100.2	7.27	32.27
6/29/13 16:15	145.8	10.44	33.16	7.48	115.8	8.49	31.5	8.08	103.6	7.51	32.34
6/29/13 16:30	145.9	10.44	33.2	7.48	119.7	8.77	31.57	8.1	105.3	7.63	32.39
6/29/13 16:45	143.2	10.25	33.17	7.49	122.5	8.97	31.64	8.12	107.1	7.76	32.41
6/29/13 17:00	142.6	10.22	33.13	7.49	121.7	8.91	31.64	8.13	108.2	7.84	32.42
6/29/13 17:15	141.4	10.13	33.11	7.49	125	9.15	31.66	8.14	109.5	7.93	32.44
6/29/13 17:30	138.5	9.94	33.04	7.49	124.4	9.11	31.59	8.15	110.9	8.03	32.43
6/29/13 17:45	135.9	9.76	32.95	7.5	123.6	9.05	31.57	8.15	111.2	8.06	32.42
6/29/13 18:00	134	9.64	32.84	7.5	124.7	9.12	31.63	8.16	111.6	8.09	32.4
6/29/13 18:15	130.8	9.44	32.72	7.5	124.5	9.11	31.64	8.16	111.9	8.12	32.33
6/29/13 18:30	127.6	9.23	32.6	7.5	119.8	8.78	31.56	8.15	110.9	8.06	32.26
6/29/13 18:45	123.4	8.94	32.46	7.51	118.2	8.68	31.47	8.14	110.1	8	32.19
6/29/13 19:00	119.4	8.68	32.32	7.5	113.7	8.36	31.36	8.12	109.1	7.94	32.13
6/29/13 19:15	115.4	8.4	32.15	7.5	110.7	8.16	31.27	8.1	107.3	7.82	32.06
6/29/13 19:30	110.7	8.08	32	7.5	105.6	7.79	31.15	8.07	104.8	7.65	31.98
6/29/13 19:45	106.7	7.81	31.86	7.49	100.7	7.45	31.02	8.05	103.4	7.56	31.9
6/29/13 20:00	102.8	7.54	31.7	7.49	96.6	7.16	30.92	8.03	101.2	7.41	31.81
6/29/13 20:15	98.5	7.24	31.56	7.48	92.9	6.9	30.78	8.01	98.4	7.21	31.72
6/29/13 20:30	94.7	6.99	31.4	7.48	88.7	6.6	30.66	7.99	95.9	7.04	31.62
6/29/13 20:45	86.3	6.39	31.24	7.47	84.5	6.3	30.53	7.97	92.1	6.77	31.53
6/29/13 21:00	79.5	5.89	31.09	7.48	80.8	6.04	30.39	7.96	90.5	6.67	31.43
6/29/13 21:15	75.9	5.64	30.93	7.48	77.8	5.82	30.29	7.94	88.2	6.51	31.33
6/29/13 21:30	72.5	5.41	30.77	7.49	74.5	5.59	30.17	7.93	85.7	6.34	31.24
6/29/13 21:45	68.8	5.14	30.61	7.49	71.3	5.36	30.07	7.92	83.2	6.16	31.13
6/29/13 22:00	68.3	5.12	30.45	7.49	69.2	5.21	29.97	7.91	80.8	5.99	31.03
6/29/13 22:15	67.2	5.05	30.3	7.48	66.9	5.05	29.87	7.9	79	5.87	30.93
6/29/13 22:30	58.1	4.38	30.17	7.48	65.1	4.92	29.76	7.89	76.6	5.7	30.83
6/29/13 22:45	58.7	4.43	30.03	7.47	63.3	4.79	29.68	7.89	75.3	5.62	30.72
6/29/13 23:00	63.2	4.79	29.89	7.47	61.6	4.67	29.55	7.89	73.8	5.51	30.61
6/29/13 23:15	64.1	4.86	29.75	7.47	59.9	4.55	29.45	7.88	72.2	5.4	30.51
6/29/13 23:30	52.4	3.98	29.64	7.47	58.9	4.48	29.37	7.88	70.8	5.31	30.4
6/29/13 23:45	61.8	4.71	29.49	7.47	57.6	4.39	29.26	7.88	69.1	5.19	30.29
6/30/13 0:00	58.4	4.46	29.36	7.46	56.6	4.32	29.15	7.87	68	5.11	30.18
6/30/13 0:15	50.5	3.87	29.24	7.46	56.2	4.3	29.04	7.88	63.9	4.82	30.07
6/30/13 0:30	60.6	4.65	29.11	7.45	55.2	4.23	28.94	7.87	66	4.98	29.97
6/30/13 0:45	58.2	4.48	29	7.45	54.6	4.19	28.82	7.88	64.7	4.9	29.87

6/30/13 1:00	57.3	4.42	28.89	7.44	54.4	4.19	28.72	7.87	63.8	4.83	29.76
6/30/13 1:15	57.2	4.42	28.76	7.44	54	4.17	28.55	7.88	62.5	4.74	29.65
6/30/13 1:30	56.1	4.34	28.66	7.44	53.4	4.13	28.43	7.88	61.6	4.69	29.55
6/30/13 1:45	56	4.34	28.56	7.44	52.9	4.1	28.33	7.88	60.9	4.64	29.45
6/30/13 2:00	52.3	4.06	28.46	7.43	52.1	4.04	28.25	7.88	59.4	4.54	29.36
6/30/13 2:15	53.8	4.19	28.35	7.43	51.4	4	28.17	7.88	58.7	4.49	29.26
6/30/13 2:30	53	4.13	28.25	7.43	50.7	3.95	28.09	7.87	55.4	4.25	29.16
6/30/13 2:45	51.8	4.04	28.15	7.42	49.3	3.84	28.02	7.87	56.4	4.32	29.07
6/30/13 3:00	50.7	3.96	28.07	7.42	49.1	3.83	27.95	7.87	55.6	4.27	28.97
6/30/13 3:15	49.4	3.87	27.97	7.41	45.7	3.57	27.87	7.87	54.3	4.18	28.88
6/30/13 3:30	49	3.85	27.87	7.41	47.5	3.72	27.79	7.87	53.5	4.13	28.78
6/30/13 3:45	47.9	3.76	27.77	7.41	46.8	3.67	27.71	7.86	52.2	4.03	28.69
6/30/13 4:00	47.2	3.71	27.67	7.41	45.9	3.6	27.64	7.86	51.2	3.96	28.59
6/30/13 4:15	46.9	3.69	27.57	7.39	45.2	3.55	27.55	7.85	49.8	3.86	28.5
6/30/13 4:30	45.8	3.61	27.47	7.39	44.6	3.51	27.46	7.85	49.1	3.81	28.4
6/30/13 4:45	45.2	3.57	27.36	7.4	43.7	3.44	27.37	7.85	47.8	3.71	28.3
6/30/13 5:00	44.9	3.56	27.26	7.39	43.3	3.42	27.29	7.84	46.9	3.65	28.2
6/30/13 5:15	44.5	3.54	27.15	7.39	42.4	3.35	27.18	7.84	45.7	3.56	28.1
6/30/13 5:30	44	3.5	27.04	7.38	41.9	3.32	27.09	7.83	44.5	3.47	28
6/30/13 5:45	43.4	3.47	26.92	7.38	41.1	3.26	26.98	7.83	43.4	3.4	27.89
6/30/13 6:00	42.8	3.42	26.82	7.38	40.5	3.22	26.88	7.83	42.8	3.36	27.79
6/30/13 6:15	42.7	3.42	26.73	7.38	39.7	3.16	26.8	7.81	41.5	3.26	27.71
6/30/13 6:30	41.8	3.35	26.63	7.37	39.1	3.12	26.7	7.81	40.5	3.19	27.62
6/30/13 6:45	41.9	3.37	26.55	7.37	38.8	3.1	26.62	7.8	39.7	3.13	27.54
6/30/13 7:00	41.6	3.35	26.47	7.37	38.9	3.11	26.53	7.8	38.9	3.07	27.47
6/30/13 7:15	41.8	3.36	26.41	7.35	38.8	3.11	26.46	7.79	38.3	3.03	27.39
6/30/13 7:30	41.2	3.32	26.33	7.36	39.1	3.14	26.41	7.79	37.7	2.98	27.33
6/30/13 7:45	41.4	3.34	26.26	7.36	40.2	3.23	26.39	7.79	37.6	2.98	27.27
6/30/13 8:00	41.8	3.38	26.19	7.36	41	3.29	26.38	7.79	37.7	2.98	27.22
6/30/13 8:15	42.5	3.44	26.11	7.36	42.4	3.4	26.38	7.79	37.7	2.99	27.18
6/30/13 8:30	43.6	3.53	26.08	7.36	43.1	3.46	26.43	7.79	38	3.02	27.17
6/30/13 8:45	44.5	3.61	26.08	7.36	44	3.53	26.49	7.79	38.8	3.08	27.17
6/30/13 9:00	47.6	3.85	26.14	7.35	45.7	3.66	26.58	7.79	39.9	3.16	27.19
6/30/13 9:15	47.7	3.85	26.2	7.34	47.3	3.77	26.72	7.79	41	3.25	27.22
6/30/13 9:30	49.1	3.96	26.26	7.35	48.1	3.83	26.84	7.78	42.7	3.38	27.27
6/30/13 9:45	50.9	4.1	26.34	7.35	50.2	3.99	26.99	7.78	42.5	3.36	27.33
6/30/13 10:00	53	4.27	26.44	7.34	52.2	4.13	27.14	7.78	46.1	3.64	27.39
6/30/13 10:15	55.3	4.44	26.53	7.34	54.2	4.28	27.28	7.78	49.2	3.89	27.46
6/30/13 10:30	58.1	4.65	26.69	7.34	56	4.41	27.42	7.79	51.8	4.08	27.56
6/30/13 10:45	61.4	4.9	26.89	7.35	60.4	4.74	27.61	7.8	54.6	4.29	27.66
6/30/13 11:00	65.3	5.19	27.12	7.33	62.9	4.92	27.78	7.8	57.8	4.54	27.76

6/30/13 11:15	68.3	5.41	27.38	7.34	66.5	5.18	27.99	7.81	60.9	4.77	27.87
6/30/13 11:30	71.6	5.64	27.64	7.33	69.9	5.43	28.25	7.82	64.4	5.03	28.02
6/30/13 11:45	76.7	6.01	27.95	7.33	73.8	5.7	28.48	7.83	68	5.3	28.17
6/30/13 12:00	81.3	6.34	28.18	7.32	77.9	6	28.71	7.84	71.9	5.59	28.32
6/30/13 12:15	85.8	6.66	28.52	7.33	82	6.28	28.97	7.85	75.7	5.86	28.5
6/30/13 12:30	88	6.79	28.84	7.32	86.3	6.59	29.23	7.86	79	6.11	28.64
6/30/13 12:45	90	6.92	29.03	7.34	90.9	6.9	29.5	7.87	82.3	6.34	28.81
6/30/13 13:00	95.4	7.3	29.32	7.35	95.6	7.23	29.76	7.89	86.6	6.65	29
6/30/13 13:15	100.4	7.63	29.65	7.33	99.2	7.46	30.04	7.9	89.3	6.85	29.08
6/30/13 13:30	99	7.54	29.6	7.34	102.8	7.72	30.17	7.91	91.4	7.01	29.11
6/30/13 13:45	105.4	7.96	30.05	7.33	104.2	7.8	30.31	7.92	94	7.19	29.24
6/30/13 14:00	108	8.14	30.15	7.34	105.9	7.92	30.38	7.93	96.6	7.37	29.38
6/30/13 14:15	105.8	7.97	30.17	7.35	108.9	8.12	30.53	7.94	98.5	7.51	29.46
6/30/13 14:30	106.9	8.05	30.24	7.36	110.4	8.22	30.61	7.95	100.9	7.69	29.49
6/30/13 14:45	109	8.21	30.2	7.36	111	8.27	30.58	7.95	97.2	7.4	29.49
6/30/13 15:00	114.4	8.57	30.53	7.36	111.9	8.34	30.59	7.96	102.4	7.8	29.51
6/30/13 15:15	115	8.59	30.73	7.37	112.4	8.37	30.62	7.97	100.6	7.64	29.65
6/30/13 15:30	118.1	8.79	30.94	7.37	114.2	8.5	30.66	7.98	107.5	8.14	29.82
6/30/13 15:45	119.5	8.87	31.05	7.37	115.5	8.59	30.71	7.99	112	8.47	29.94
6/30/13 16:00	123.9	9.17	31.27	7.37	117.3	8.7	30.82	8.01	113.5	8.57	30.02
6/30/13 16:15	126.6	9.35	31.37	7.39	119.4	8.86	30.84	8.01	115.9	8.73	30.14
6/30/13 16:30	128.9	9.5	31.52	7.41	120.2	8.92	30.81	8.02	118.1	8.88	30.21
6/30/13 16:45	129.7	9.55	31.55	7.41	119.7	8.88	30.84	8.02	119.6	8.98	30.3
6/30/13 17:00	128.1	9.44	31.5	7.44	121.3	9	30.84	8.03	121.6	9.13	30.31
6/30/13 17:15	128.1	9.44	31.48	7.45	119.8	8.89	30.82	8.03	122.9	9.22	30.36
6/30/13 17:30	126.9	9.36	31.46	7.47	120.2	8.93	30.77	8.04	123.9	9.29	30.38
6/30/13 17:45	125.6	9.27	31.4	7.48	119.9	8.91	30.76	8.04	123.2	9.24	30.37
6/30/13 18:00	124.9	9.24	31.28	7.49	118.6	8.82	30.71	8.04	123.9	9.3	30.31
6/30/13 18:15	122	9.04	31.17	7.5	117.6	8.75	30.64	8.04	123.8	9.31	30.25
6/30/13 18:30	121.7	9.04	31.04	7.5	117.4	8.75	30.59	8.03	122.8	9.24	30.17
6/30/13 18:45	118.4	8.82	30.87	7.5	114.3	8.54	30.44	8.02	121.9	9.19	30.11
6/30/13 19:00	114.9	8.58	30.71	7.5	111.9	8.37	30.35	8.02	120.8	9.12	30.02
6/30/13 19:15	111.7	8.36	30.56	7.5	109	8.17	30.24	8.01	119.3	9.02	29.92
6/30/13 19:30	108.8	8.17	30.37	7.51	104.9	7.89	30.07	8	117.4	8.89	29.82
6/30/13 19:45	105.4	7.94	30.22	7.5	103.3	7.78	29.96	7.98	114.8	8.71	29.74
6/30/13 20:00	102	7.7	30.06	7.52	99	7.48	29.84	7.97	114.7	8.71	29.67
6/30/13 20:15	98.3	7.44	29.9	7.52	95.9	7.26	29.67	7.96	113	8.59	29.61
6/30/13 20:30	93.8	7.13	29.74	7.51	92	6.98	29.52	7.95	111.1	8.45	29.54
6/30/13 20:45	89.8	6.84	29.58	7.51	88.6	6.75	29.34	7.93	109.6	8.35	29.49
6/30/13 21:00	87	6.65	29.42	7.51	86.1	6.58	29.19	7.92	107.8	8.21	29.45
6/30/13 21:15	85.9	6.58	29.25	7.51	82.8	6.34	29.01	7.9	106.9	8.15	29.4

6/30/13 21:30	83	6.37	29.1	7.51	79.7	6.12	28.87	7.89	104.4	7.97	29.35
6/30/13 21:45	79.9	6.16	28.94	7.5	77.3	5.95	28.7	7.87	103.6	7.91	29.3
6/30/13 22:00	77.4	5.98	28.78	7.5	75.7	5.84	28.59	7.86	102.6	7.85	29.27
6/30/13 22:15	75.1	5.81	28.62	7.51	72.1	5.58	28.43	7.85	101.4	7.76	29.22
6/30/13 22:30	72.8	5.65	28.47	7.51	70	5.43	28.29	7.84	99.7	7.63	29.17
6/30/13 22:45	70.5	5.49	28.33	7.51	67.7	5.26	28.16	7.83	98.8	7.57	29.13
6/30/13 23:00	69.7	5.44	28.18	7.51	65.8	5.13	28.02	7.82	96.6	7.41	29.08
6/30/13 23:15	68.2	5.34	28.02	7.52	64	5	27.92	7.81	95.9	7.36	29.02
6/30/13 23:30	66.4	5.21	27.87	7.51	62.6	4.9	27.8	7.8	93.2	7.17	28.95
6/30/13 23:45	64.6	5.08	27.72	7.51	60.8	4.77	27.66	7.79	91.8	7.06	28.88
7/1/13 0:00	63.5	5	27.59	7.51	59.2	4.65	27.55	7.78	90	6.94	28.81
7/1/13 0:15	62.5	4.94	27.45	7.51	57.7	4.54	27.45	7.77	88.1	6.8	28.73
7/1/13 0:30	60.9	4.82	27.33	7.51	55.6	4.39	27.34	7.77	86.5	6.69	28.65
7/1/13 0:45	59.4	4.71	27.22	7.5	54.5	4.31	27.24	7.76	84.7	6.55	28.58
7/1/13 1:00	58.6	4.66	27.1	7.5	52.9	4.19	27.15	7.75	82.6	6.41	28.49
7/1/13 1:15	58	4.62	26.99	7.5	51.5	4.08	27.05	7.74	80.8	6.27	28.4
7/1/13 1:30	57	4.55	26.87	7.5	50.4	4.01	26.93	7.74	78.5	6.1	28.31
7/1/13 1:45	56.7	4.54	26.75	7.5	49	3.9	26.86	7.73	76.7	5.97	28.21
7/1/13 2:00	56.3	4.51	26.66	7.49	47.8	3.81	26.78	7.72	74.3	5.8	28.11
7/1/13 2:15	55.1	4.42	26.55	7.49	46.2	3.69	26.66	7.72	72.4	5.66	28.01
7/1/13 2:30	54.3	4.37	26.44	7.5	44.9	3.59	26.59	7.71	70	5.48	27.92
7/1/13 2:45	53.9	4.34	26.35	7.49	43.4	3.48	26.49	7.7	68.7	5.39	27.82
7/1/13 3:00	53.7	4.33	26.24	7.48	42.7	3.43	26.41	7.7	60.8	4.77	27.73
7/1/13 3:15	53.3	4.31	26.13	7.48	41.3	3.32	26.32	7.69	64.4	5.07	27.63
7/1/13 3:30	53.1	4.3	26.05	7.48	40.3	3.25	26.24	7.68	62.2	4.9	27.53
7/1/13 3:45	53.1	4.32	25.94	7.48	39.4	3.17	26.15	7.68	60.7	4.79	27.43
7/1/13 4:00	52.2	4.25	25.85	7.48	38.4	3.1	26.07	7.67	58.7	4.64	27.34
7/1/13 4:15	51.7	4.21	25.76	7.47	37.5	3.03	25.98	7.67	56.7	4.49	27.23
7/1/13 4:30	51.6	4.21	25.67	7.48	37	3	25.91	7.66	54.9	4.36	27.14
7/1/13 4:45	50.7	4.15	25.58	7.48	36.1	2.92	25.83	7.66	53.4	4.25	27.04
7/1/13 5:00	50.1	4.1	25.49	7.47	35.2	2.86	25.75	7.65	51.6	4.11	26.94
7/1/13 5:15	49.6	4.07	25.42	7.46	34.4	2.8	25.67	7.65	50.3	4.01	26.85
7/1/13 5:30	49.5	4.07	25.32	7.48	34	2.77	25.59	7.64	48.7	3.89	26.74
7/1/13 5:45	48.5	3.99	25.25	7.49	33.4	2.72	25.52	7.64	47.6	3.81	26.65
7/1/13 6:00	48.7	4.02	25.15	7.49	32.7	2.67	25.46	7.63	42.6	3.41	26.56
7/1/13 6:15	51	4.21	25.08	7.48	32	2.61	25.38	7.62	39.3	3.16	26.46
7/1/13 6:30	57.2	4.73	25.01	7.49	31.1	2.54	25.31	7.62	40.2	3.23	26.38
7/1/13 6:45	58.9	4.87	24.95	7.5	30.6	2.51	25.25	7.61	42.3	3.41	26.3
7/1/13 7:00	59.8	4.95	24.89	7.52	30.2	2.48	25.2	7.61	41.6	3.36	26.22
7/1/13 7:15	68.5	5.68	24.82	7.51	30.1	2.47	25.15	7.6	40.7	3.29	26.15
7/1/13 7:30	72	5.97	24.77	7.51	30.2	2.48	25.11	7.6	40.2	3.25	26.1

7/1/13 7:45	76.8	6.38	24.72	7.51	31.1	2.55	25.11	7.6	39.6	3.21	26.04
7/1/13 8:00	82.5	6.86	24.69	7.5	32.2	2.64	25.17	7.59	39.5	3.2	26.02
7/1/13 8:15	84.6	7.04	24.67	7.5	33.8	2.77	25.22	7.59	39.9	3.23	25.99
7/1/13 8:30	90	7.49	24.67	7.51	36.9	3.02	25.35	7.6	40	3.24	25.99
7/1/13 8:45					39.5	3.23	25.41	7.61	40.8	3.3	26.01
7/1/13 9:00					42.9	3.49	25.55	7.61	41.5	3.36	26.06
7/1/13 9:15					46.1	3.74	25.73	7.62	42.7	3.46	26.12
7/1/13 9:30					48.6	3.94	25.81	7.63	44.1	3.56	26.21
7/1/13 9:45					52.7	4.26	25.9	7.64	45.8	3.69	26.29
7/1/13 10:00					53.6	4.34	25.99	7.64	47.8	3.85	26.37
7/1/13 10:15					57.1	4.61	26.12	7.65	50.1	4.03	26.47
7/1/13 10:30					59.3	4.77	26.25	7.66	51.3	4.12	26.52
7/1/13 10:45					64.6	5.17	26.52	7.67	53.5	4.29	26.58
7/1/13 11:00					67.9	5.43	26.65	7.69	56.3	4.5	26.75
7/1/13 11:15					71.5	5.7	26.75	7.7	60.3	4.81	26.93
7/1/13 11:30					76.1	6.04	26.95	7.72	62.5	4.97	27.03
7/1/13 11:45					80.1	6.34	27.2	7.74	64.9	5.15	27.13
7/1/13 12:00					85.8	6.76	27.42	7.75	66.9	5.3	27.23
7/1/13 12:15					89.9	7.05	27.68	7.77	70.8	5.59	27.47
7/1/13 12:30					96	7.5	27.89	7.8	74.8	5.88	27.69
7/1/13 12:45					100.4	7.81	28.09	7.81	71.5	5.6	27.9
7/1/13 13:00					104.3	8.09	28.24	7.83	66.7	5.22	27.96
7/1/13 13:15					109.5	8.46	28.52	7.83	82	6.4	28.08
7/1/13 13:30					112.1	8.64	28.64	7.85	82.7	6.46	28.06
7/1/13 13:45					116.3	8.93	28.87	7.87	85.6	6.66	28.24
7/1/13 14:00					120.8	9.24	29.1	7.89	88.2	6.85	28.39
7/1/13 14:15					125.8	9.58	29.35	7.91	92	7.13	28.55
7/1/13 14:30					131.6	9.97	29.65	7.94	93.7	7.25	28.59
7/1/13 14:45					135.9	10.24	29.93	7.97	94.2	7.27	28.71
7/1/13 15:00					143.4	10.75	30.26	8	97.9	7.54	28.83
7/1/13 15:15					147.3	11.01	30.44	8.04	99.1	7.62	28.92
7/1/13 15:30					152.7	11.39	30.56	8.07	100.9	7.76	28.93
7/1/13 15:45					155.7	11.57	30.74	8.1	102.9	7.91	28.97
7/1/13 16:00					160.5	11.9	30.91	8.14	103.6	7.96	28.98
7/1/13 16:15					161.2	11.92	31.02	8.18	103.7	7.95	29.09
7/1/13 16:30					165.5	12.23	31.11	8.21	108.3	8.29	29.21
7/1/13 16:45					168.6	12.44	31.15	8.24	109.5	8.38	29.26
7/1/13 17:00					170.1	12.55	31.21	8.27	111.3	8.5	29.34
7/1/13 17:15					172.1	12.7	31.19	8.29	113	8.61	29.47
7/1/13 17:30					169.7	12.57	30.97	8.31	113.8	8.67	29.48
7/1/13 17:45					170.5	12.65	30.85	8.32	114.9	8.75	29.51

7/1/13 18:00					168	12.51	30.63	8.34	114.8	8.74	29.52
7/1/13 18:15					166.1	12.38	30.58	8.34	115.2	8.76	29.57
7/1/13 18:30					161.7	12.1	30.35	8.34	115.2	8.77	29.54
7/1/13 18:45					159.9	11.99	30.23	8.34	115.3	8.78	29.49
7/1/13 19:00					154.7	11.64	30.03	8.33	114.3	8.71	29.45
7/1/13 19:15					151.7	11.45	29.86	8.32	114.7	8.75	29.37
7/1/13 19:30					145.4	11.01	29.68	8.29	111	8.48	29.32
7/1/13 19:45					141.4	10.73	29.51	8.27	114	8.72	29.25
7/1/13 20:00					133.7	10.19	29.31	8.22	112.7	8.63	29.18
7/1/13 20:15					129.8	9.92	29.16	8.19	110.6	8.48	29.08
7/1/13 20:30					124.3	9.52	29.02	8.14	105	8.07	28.98
7/1/13 20:45					118.5	9.1	28.85	8.1	106.9	8.23	28.88
7/1/13 21:00					113.8	8.77	28.68	8.06	97.4	7.51	28.79
7/1/13 21:15					108.2	8.36	28.52	8.02	106.2	8.2	28.71
7/1/13 21:30					103.3	8	28.36	7.99	105.2	8.13	28.65
7/1/13 21:45					100	7.77	28.21	7.97	104.1	8.06	28.59
7/1/13 22:00					94.7	7.38	28	7.93	103.1	7.99	28.51
7/1/13 22:15					90.9	7.11	27.85	7.91	101.7	7.89	28.43
7/1/13 22:30					85	6.67	27.62	7.88	100.7	7.83	28.35
7/1/13 22:45					80.9	6.37	27.45	7.85	99.6	7.75	28.27
7/1/13 23:00					77	6.08	27.32	7.83	97.2	7.58	28.18
7/1/13 23:15					73.3	5.8	27.15	7.84	97.5	7.61	28.11
7/1/13 23:30					70.5	5.6	27.03	7.82	95.8	7.49	28.03
7/1/13 23:45					65.6	5.22	26.84	7.8	95.3	7.46	27.95
7/2/13 0:00					63.5	5.07	26.75	7.78	94.4	7.39	27.88
7/2/13 0:15					60.2	4.81	26.61	7.76	93.4	7.33	27.79
7/2/13 0:30					57.4	4.6	26.48	7.74	92.2	7.25	27.7
7/2/13 0:45					55.4	4.44	26.4	7.73	85.4	6.72	27.6
7/2/13 1:00					53.1	4.27	26.29	7.72	90.2	7.12	27.51
7/2/13 1:15					50.6	4.08	26.16	7.7	88.9	7.03	27.42
7/2/13 1:30					49.1	3.97	26.07	7.69	87.6	6.93	27.32
7/2/13 1:45					46.7	3.78	25.94	7.68	85.8	6.8	27.22
7/2/13 2:00					44.7	3.62	25.85	7.68	82.5	6.55	27.12
7/2/13 2:15					43.2	3.51	25.75	7.67	82.7	6.58	27.03
7/2/13 2:30					42.2	3.43	25.68	7.66	81.3	6.48	26.93
7/2/13 2:45					40.6	3.31	25.57	7.65	79.8	6.37	26.84
7/2/13 3:00					39.3	3.2	25.49	7.65	78.3	6.26	26.74
7/2/13 3:15					38.1	3.11	25.39	7.64	77	6.17	26.65
7/2/13 3:30					37.2	3.05	25.32	7.63	75.7	6.07	26.55
7/2/13 3:45					35.7	2.92	25.22	7.62	74.2	5.96	26.47
7/2/13 4:00					34.7	2.85	25.12	7.62	67.9	5.46	26.38

7/2/13 4:15					33.7	2.77	25.02	7.61	71.6	5.77	26.29
7/2/13 4:30					32.7	2.7	24.95	7.6	70.5	5.7	26.21
7/2/13 4:45					31.6	2.61	24.85	7.6	68.9	5.57	26.12
7/2/13 5:00					30.7	2.54	24.77	7.59	67.6	5.48	26.03
7/2/13 5:15					29.8	2.47	24.68	7.58	66.1	5.37	25.95
7/2/13 5:30					28.9	2.4	24.6	7.58	64.7	5.26	25.85
7/2/13 5:45					28	2.33	24.5	7.57	63.2	5.15	25.76
7/2/13 6:00					27.4	2.28	24.41	7.56	62	5.06	25.67
7/2/13 6:15					25.8	2.15	24.31	7.55	60.7	4.96	25.58
7/2/13 6:30					25.8	2.15	24.25	7.55	59.5	4.87	25.49
7/2/13 6:45					25.2	2.1	24.16	7.54	57.5	4.71	25.42
7/2/13 7:00					24.7	2.07	24.1	7.53	56.7	4.65	25.36
7/2/13 7:15					24.2	2.03	24.06	7.53	55.9	4.59	25.32
7/2/13 7:30					24.5	2.05	24.05	7.52	54.7	4.49	25.29
7/2/13 7:45					25.4	2.13	24.06	7.52	53.8	4.42	25.26
7/2/13 8:00					26.8	2.24	24.1	7.52	53.4	4.39	25.25
7/2/13 8:15					29.7	2.48	24.21	7.53	52.7	4.33	25.27
7/2/13 8:30					33.9	2.82	24.37	7.53	52.5	4.31	25.3
7/2/13 8:45					38.2	3.17	24.56	7.54	53	4.34	25.35
7/2/13 9:00					43.8	3.61	24.8	7.56	53.3	4.37	25.4
7/2/13 9:15					48.8	4.01	25.02	7.57	54.4	4.45	25.47
7/2/13 9:30					50.4	4.13	25.29	7.59	55.7	4.55	25.56
7/2/13 9:45					61.7	5.03	25.55	7.61	56.3	4.59	25.66
7/2/13 10:00					67.8	5.5	25.84	7.63	58.1	4.73	25.79
7/2/13 10:15					74.5	6	26.17	7.65	59.7	4.84	25.95
7/2/13 10:30					81.4	6.52	26.46	7.68	59.9	4.85	26.11
7/2/13 10:45					88.4	7.04	26.79	7.71	64.2	5.18	26.29