SEDIMENT OXYGEN DEMAND ANALYSIS

HARPETH RIVER SYSTEM
CHEATHAM, DAVIDSON, AND WILLIAMSON COUNTIES, TENNESSEE

HARPETH CONSERVANCY
BRENTWOOD, TENNESSEE

Prepared by:

Nicholas Carmean
Richard W. Rogers

AquAeTer, Inc.
Brentwood, TN

November 2017

TABLE OF CONTENTS

LIST OF TABLES

Table Number **Table Description** **Page Number**

LIST OF FIGURES

Figure Number **Figure Description** **Page Number**

LIST OF APPENDICES

Appendix Number **Appendix Description**

SECTION 1.0

INTRODUCTION

1.1 PURPOSE OF STUDY

The Harpeth Conservancy requested that **AquAeTer** perform sediment oxygen demand (SOD) measurements throughout the Harpeth River watershed. **AquAeTer** used these measurements to calculate the sediment oxygen demand rate for each of the sample locations.

1.2 STUDY AREA

The Harpeth River system is over 125 miles in total River Miles and has a watershed size of approximately 870 square miles. The headwaters begin in Rutherford County, Tennessee and the mainstem River then flows through Williamson, Davidson and Cheatham Counties in Tennessee. The confluence of the Harpeth River and the Cumberland River is located in the northwestern corner of Cheatham County, Tennessee. This watershed is comprised of agricultural land, wooded and undeveloped land, residential land, and urban areas.

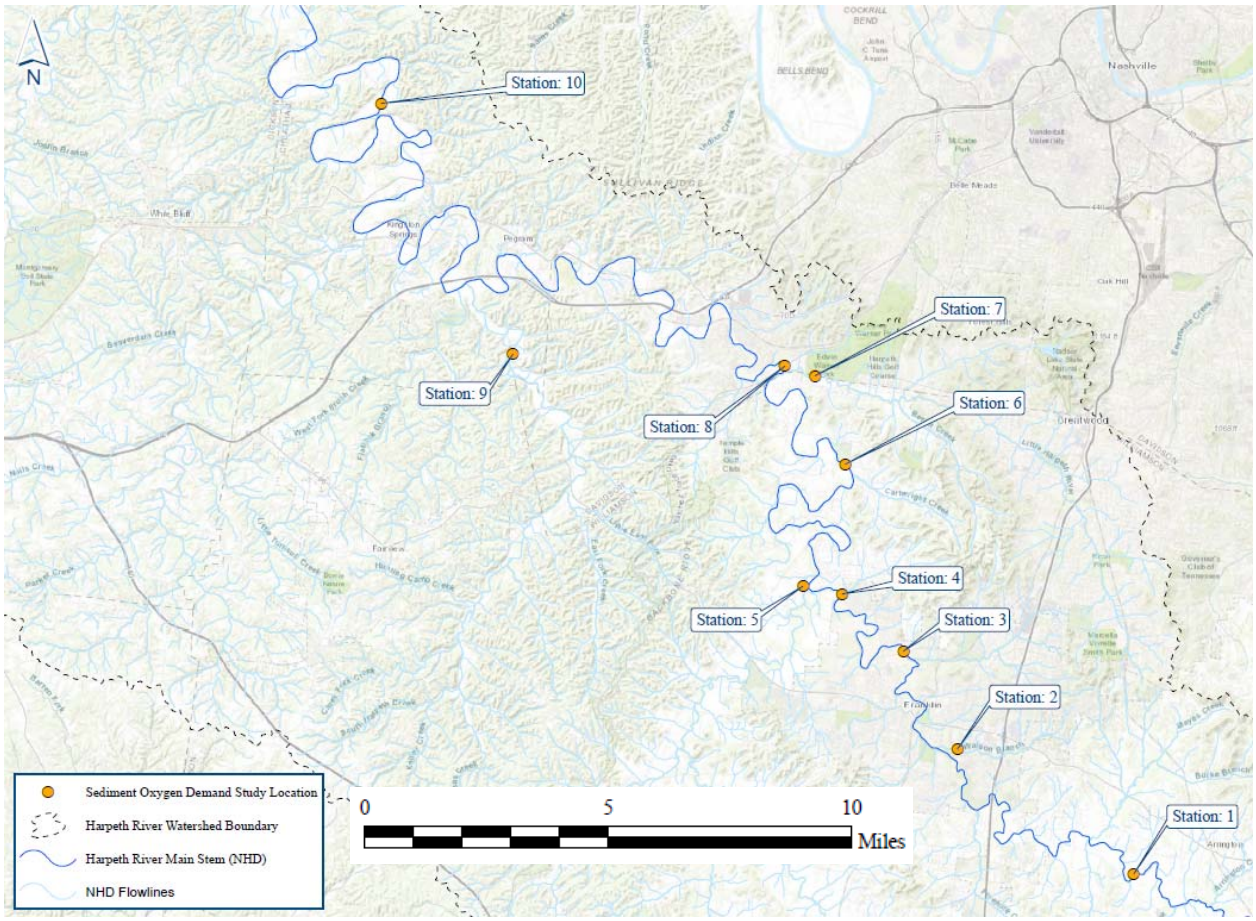
1.2.1 Note about Report Figures

All figures will be embedded within the text of the report in smaller versions. Full size figures are provided in Appendix 1.

1.3 SEDIMENT OXYGEN DEMAND

AquAeTer measured SOD at ten locations on the Harpeth River and its tributaries as presented in Figure 1. The Harpeth River is a pool and riffle stream. The variable velocities in the Harpeth River allow for sediment to deposit in the main channel and its tributaries. Based on visual observation during deployment in the River, the channel bottom changes slightly from site to site. The sediment generally ranges from a fine silt to a mixture of small cobble.

Figure 1. AquAeTer Sediment Oxygen Demand Sampling Locations



1.3.1 <u>Methodology</u>

SOD rates were determined using the *in situ* methods and calculations found in Murphy and Hicks (Murphy & Hicks, 1986). Two to three SOD chambers were placed at each location. The chambers are designed so that the bottom is open to the sediments. Water in the chamber is circulated using a submersible pump. The sides and top of each chamber are sealed so that there is no exchange with areas outside of the chamber. For each station, a "blank" chamber was also deployed to determine the oxygen uptake due to the water column. The blank is filled with river water, but is not open to the sediment. Water is also circulated in this chamber with a submersible

pump. After the blank is filled, the chamber is sealed to prevent exchange of DO from outside the chamber.

All chambers were deployed in areas of sediment deposition within the channel. Most stations were deployed in waters greater than three feet. The locations of each deployment were based upon availability of sediment and the appropriate depths for which to allow the chambers to be fully submersed.

At each location, the last chamber deployed was monitored in real-time to determine the deployment length. Once a decay rate in that chamber was confirmed, the chambers were then retrieved.

The SOD rate is calculated using the following equation:

$$k_{4,T} = \frac{15.500031 * V}{A} * S \qquad \textbf{1}$$

where:

	$k_{4,T}$	= SOD rate at temperature, T, g/m^2/day;
	15.5	= Conversion factor, g/1,000 mg*1440 min/day * 1 f^2/0.3048^2 m^2
	V	= Water volume in chamber = 64.86 L;
	A	= Sediment surface area in chamber = 2.906 ft^2;
	S	= Uptake rate of oxygen from chamber – blank, mg O_2 / L / min.

To determine the SOD rate at 20°C, the following equation is used:

$$k_{4,T} = k_{4,20} * \theta_4^{(T-20)} \qquad \textbf{2}$$

where:

	$k_{4,20}$	= SOD rate at 20°C, g/m^2/day;
	θ_4	= 1.06; and,
	T	= Measurement temperature, °C.

The temperature correction equation is based on the Arrhenius equation, with an empirically derived value for θ. This temperature correction equation has been utilized by numerous water quality professionals since the Streeter-Phelps model.

The uptake rate of oxygen within each chamber was determined by the change in concentration over the time of the measurement. The SOD chambers measured the uptake from the water column and the sediment. The “blank” chamber results were subtracted from the SOD chamber results from each station to develop the oxygen uptake rate. The volume of water in each chamber and the exposed surface area are each known.

The sampling date and time for the locations, previously shown in Figure 1, are provided in Table 1. The field ID used for each station is also given so that the data provided in the Appendices can be related to the results presented in the report.

Table 1. SOD Locations

SOD	START	STOP	FIELD ID
Station 1	9/25/2017 12:55	9/25/2017 13:55	Harpeth at Trinity Road
Station 2	9/27/2017 7:30	9/27/2017 8:30	Watson Branch
Station 3	9/27/2017 9:55	9/27/2017 10:55	Harpeth Near Spencer Creek
Station 4	9/25/2017 16:00	9/25/2017 17:00	Harpeth at Cotton Lane
Station 5	9/27/2017 13:25	9/27/2017 14:25	Harpeth Downstream West Harpeth
Station 6	9/27/2017 15:25	9/27/2017 16:25	Harpeth at Moran Road
Station 7	9/26/2017 14:30	9/26/2017 15:30	Little Harpeth
Station 8	9/26/2017 12:25	9/26/2017 13:25	Harpeth at Highway 100
Station 9	9/28/2017 12:45	9/28/2017 13:45	South Harpeth
Station 10	9/26/2017 8:40	9/26/2017 9:40	Harpeth at the Narrows

1.3.2 Devices

The SOD chambers, shown in Figure 2, consist of an aluminum cylindrical enclosure, a 12-volt pump for circulation of the water within the chamber, and a Hydrolab Mini-Sonde continuous monitor with a stirrer to monitor DO within the chamber over time.

In the picture to the right, the chamber in the foreground has a sonde in place and is ready to be deployed. The sonde was set in the chamber at a level where the sensors would not come in contact with the bottom sediments. The chamber in the background is awaiting the sonde.

Figure 2. SOD Chambers

1.3.3 2000 EPA SOD Study

In August of 2000 the United States EPA conducted a SOD study in the Harpeth River mainstem, results are located in Appendix 4. Sample locations included six stations, although only data for three was provided. Four of these stations were located near stations for this current study and two had data available.

In particular, HR85.6 was located near the **AquAeTer** Station 3. The EPA location was upstream of Spencer Creek and the **AquAeTer** location was downstream of Spencer Creek. However, both of these locations were upstream of the City of Franklin Water Reclamation Facility (WRF). The EPA's average SOD rate from the 2000 study at this location was 2.86 $g/m^2/day$.

The EPA station at HR68.7 was located at Moran Road, similar to **AquAeTer** Station 6. The EPA's average SOD rate at this location during the 2000 study was 2.50 $g/m^2/day$.

SECTION 2.0

RESULTS

2.1 2017 AQUAETER SOD STUDY

Overall, the data measured in the Harpeth River and the tributary channels were varied. The greatest SOD rate measured was at Station 6, which was measured in an area within the channel that was comprised primarily of sand and silt with interspersed large gravel. The results are shown in Table 2.

SOD STATION	FIELD ID	SOD RATE MEASURED AT TEMPERATURE, T $k_{4,T}$ ($g/m^2/day$)	SOD RATE AT STANDARD TEMPERATURE, 20°C $k_{4,20}$ ($g/m^2/day$)
Station 1	Harpeth at Trinity Road	4.22 at 22.48°C	3.65
Station 2	Watson Branch	3.27 at 20.18°C	3.24
Station 3	Harpeth Near Spencer Creek	3.63 at 22.02°C	3.23
Station 4	Harpeth at Cotton Lane	5.20 at 24.22°C	4.07
Station 5	Harpeth Downstream West Harpeth	4.57 at 23.36°C	3.76
Station 6	Harpeth at Moran Road	6.83 at 24.54°C	5.24
Station 7	Little Harpeth	4.34 at 22.15°C	3.83
Station 8	Harpeth at Highway 100	1.90 at 24.29°C	0.89
Station 9	South Harpeth	5.98 at 24.72°C	4.54

Station 10	Harpeth at the Narrows	7.67 at 24.72°C	5.83

Further explanation on each individual site is provided below. An example of the data collected is presented in Figure 3. All results are presented in Appendix 2. All raw data are presented in Appendix 3. Field notes are included in Appendix 3

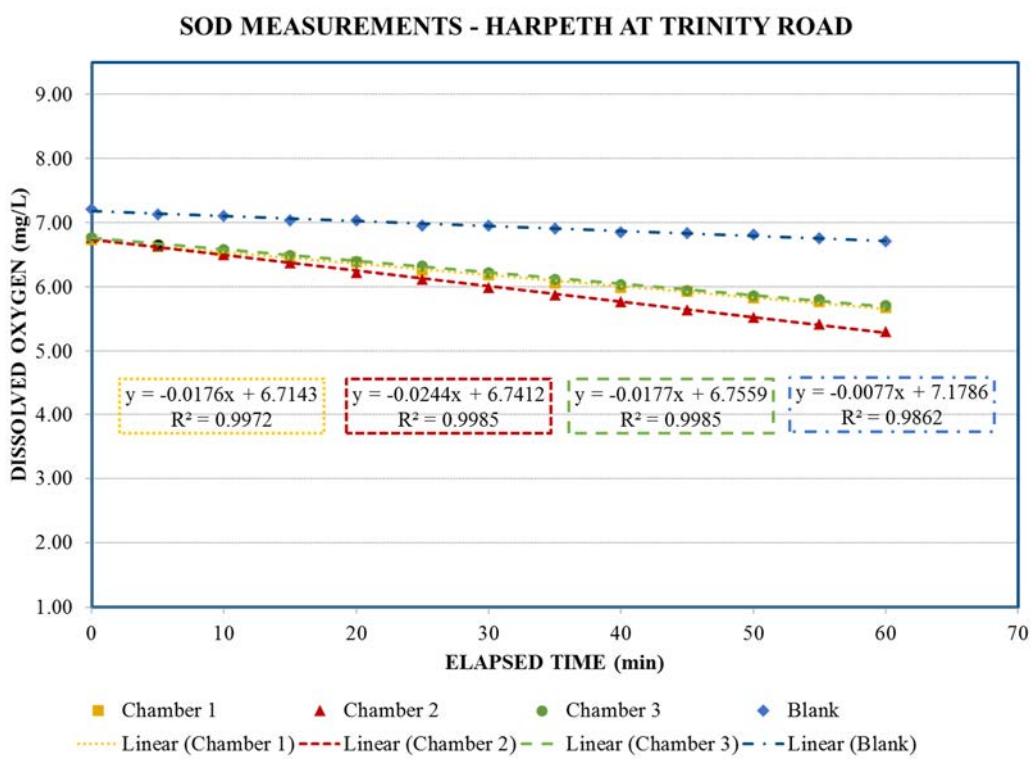
Table 2. SOD Results

SOD STATION	**FIELD ID**	**SOD RATE MEASURED AT TEMPERATURE, T** $k_{4,T}$ **(g/m²/day)**	**SOD RATE AT STANDARD TEMPERATURE, 20°C** $k_{4,20}$ **(g/m²/day)**
Station 1	Harpeth at Trinity Road	4.22 at 22.48°C	3.65
Station 2	Watson Branch	3.27 at 20.18°C	3.24
Station 3	Harpeth Near Spencer Creek	3.63 at 22.02°C	3.23
Station 4	Harpeth at Cotton Lane	5.20 at 24.22°C	4.07
Station 5	Harpeth Downstream West Harpeth	4.57 at 23.36°C	3.76
Station 6	Harpeth at Moran Road	6.83 at 24.54°C	5.24
Station 7	Little Harpeth	4.34 at 22.15°C	3.83
Station 8	Harpeth at Highway 100	1.90 at 24.29°C	0.89
Station 9	South Harpeth	5.98 at 24.72°C	4.54

Station 10	Harpeth at the Narrows	7.67 at 24.72°C	5.83

AquAeTer personnel deployed the SOD chambers at all locations without issues regarding property access or depth of the River. All sample locations were accessible by foot and no additional gear was necessary. It was noted that at all locations light penetration reached the bottom of the River and no obvious suspended solids were affecting the natural state of the system. The total precipitation within a watershed may impact the clarity of water based upon the surrounding land use. In the Williamson County, Tennessee area, 0.47 inches of rainfall was received in the prior 7-days prior to the start of this study. The 2-week total prior to the beginning of the study was 1.88 inches in the Williamson County, Tennessee area.

Figure 3. Example of DO Consumption Measurements



All Hydrolabs used in the field for this particular study were calibrated daily, prior to leaving the **AquAeTer** office each morning, and were post validated, upon arrival back to the **AquAeTer** office, in the evening. These data were used to correct the measured dissolved oxygen based upon equipment drift during use. All data used were corrected for this factor.

2.1.1 Station 1 – Harpeth River Near Trinity Road

This sample location was upstream of the Trinity Road bridge crossing. This site is upstream from the City of Franklin, Tennessee. At the time of deployment the bridge was not present and work was currently being performed to reconstruct the bridge. This location was an active construction site and access was granted by the on-site manager for the construction company. While on site, it was noted that fine sediments and sand were present both upstream and downstream of the bridge crossing. The SOD chambers were deployed approximately 100 meters upstream from the bridge abutments. The sediment was a very soft silt with small deposits of sand within the silt. No larger sediment was observed in the vicinity of the chambers.

Figure 4. SOD Chambers at Station 1

At this sample location, three chambers and the blank chamber were deployed. The temperature corrected SOD rate, based on the average of each individual chamber was 3.65 $g/m^2/day$ at 20°C. The range of the three chambers deployed was 2.96 $g/m^2/day$ at 20°C to 5.00 $g/m^2/day$ at 20°C.

2.1.2 Station 2 – Watson Branch

Figure 5. SOD Chamber Deployment at Station 2

This sample location was chosen to measure a small tributary to the River to represent those tributaries in the watershed with smaller drainage areas. The drainage area to the point of deployment is approximately 4.46 miles. This site was located upstream from Royal Oaks Court, downstream from Mack Hatcher Memorial Parkway. This stream was a shallow stream with multiple riffle/run complexes and few deeper pools at the time of the measurement. One of the pool areas was used for the deployment area of the SOD chambers. The sediment in the area of deployment was primarily sand with small amounts of silt, detritus and leaf litter. Interspersed within the sand was small to large gravel.

At this sample location, two chambers and the blank chamber were deployed. The temperature corrected SOD rate, based on the average of each individual chamber was 3.24 g/m^2/day at 20°C. The range of the two chambers deployed was 2.76 g/m^2/day at 20°C to 3.71 g/m^2/day at 20°C.

2.1.3 Station 3 – Harpeth River Near Spencer Creek

Figure 6. SOD Chambers at Station 3

Station 3 was located on the mainstem of the Harpeth River in the City of Franklin. The site was located downstream from the confluence with Spencer Creek and approximately 150 meters above the WRF outfall. The area in which the chambers were deployed was a deep run below a deep pool area at the time of the measurement. The sediment at this location was primarily a fine silt sand combination with small gravel in minimal quantities throughout.

At this sample location, two chambers and the blank chamber were deployed. The temperature corrected SOD rate, based on the average of each individual chamber was 3.23 g/m^2/day at 20°C. The range of the two chambers deployed was 2.47 g/m^2/day at 20°C to 3.99 g/m^2/day at 20°C.

2.1.4 Station 4 – Harpeth River at Cotton Lane

Figure 7. Station 4 Deployment Area

Station 4 was the first station on the River below the outfall of the WRF. It was noted at this station that there were various pathways down to the River from the adjacent park area. Debris left behind by people accessing the River was also observed while on site. The deployment area was located approximately 25 meters above the Cotton Lane Bridge near the end of a riffle, in a deep run area at the time of the measurement. The sediment at this location was primarily a fine sand and silt combination. Interspersed in the smaller substrate was small to large gravel and small cobble.

At this sample location, three chambers and the blank chamber were deployed. The temperature corrected SOD rate, based on the average of each individual chamber was 4.07 g/m^2/day at 20°C. The range of the two chambers deployed was 2.77 g/m^2/day at 20°C to 4.93 g/m^2/day at 20°C.

2.1.5 Station 5 – Harpeth River Downstream from the West Harpeth River

Station 5 was located downstream from the West Harpeth River. The deployment area was determined during the site visit based on the estimated location of full mixing of the Harpeth River and the West Harpeth River, approximately 75 meters downstream from the confluence. This area was primarily dominated by large gravel and small to medium size cobble. Small depositional areas of fine sand and silt, with small to large gravel interspersion, were also identified.

At this sample location, two chambers and the blank chamber were deployed. One chamber was deployed in a depositional area and one chamber was deployed in the larger substrate area. It was determined in the field that approximately 15 percent of the River was of similar composition to the depositional area and 85 percent of the River was similar to the larger substrate area. Therefore, a weighted average of the SOD chamber readings was calculated. The temperature corrected SOD rate, based on the weighted average of each individual chamber was 3.76 g/m^2/day at 20°C. The range of the two chambers deployed was 0.26 g/m^2/day at 20°C for the larger substrate to 4.46 g/m^2/day at 20°C for the fine sand and silt substrate.

Figure 8. Station 5 Deployment Area

2.1.6 Station 6 – Harpeth River near Moran Road

Figure 9. Chamber Deployment at Station 6

The station 6 deployment area was located approximately 40 meters downstream from the Moran Road bridge crossing. This segment of the river was a shallow riffle/run complex at the time of measurement. The deployment area was considered a deep riffle at the time of the measurement. The substrate at this location was determined to be dominated by small to large gravel and small cobble. Also observed was a small amount of fine sand and silt covering the large substrate.

At this sample location, two chambers and the blank chamber were deployed. The temperature corrected SOD rate, based on the average of each individual chamber was 5.24 g/m^2/day at 20°C. The range of the two chambers deployed was 5.17 g/m^2/day at 20°C to 5.32 g/m^2/day at 20°C.

2.1.7 Station 7 – Little Harpeth River

Station 7 was located on the Little Harpeth River, a major tributary to the Harpeth River. The deployment area was located within Percy Werner Park and was accessible by paved footpath. The area was observed as an active fisheries area and was characterized as a run with a deep pool near a meander in the channel at the time of the measurement. The substrate in this area was identified as a fine sand and silt mix with a small to medium gravel interspersed.

Figure 10. Deployment at Station 7

At this sample location, two chambers and the blank chamber were deployed. The temperature corrected SOD rate, based on the average of each individual chamber was 3.83 g/m^2/day at 20°C. The range of the two chambers deployed was 1.72 g/m^2/day at 20°C to 5.94 g/m^2/day at 20°C.

2.1.8 Station 8 – Harpeth River at Highway 100

Station 8 was accessed via the Harpeth River State Park parking lot located along Highway 100. The access point was accessible to both fishing and kayaking patrons. This area was dominated by large substrate, with little sediment deposition. The deployment area was located approximately 50 meters upstream from the Highway 100 Bridge and approximately 150 meters downstream from the Little Harpeth River confluence. The area selected for deployment was dominated by large gravel, small cobble and deposits of fine sand surrounding the larger sediment.

Figure 11. Chamber Deployment at Station 8

At this sample location, two chambers and the blank chamber were deployed. However, one of the chambers was excluded from the calculation due to the slight upward trend in dissolved oxygen. This is believed to have occurred due to a poor seating of the chamber in the available sediment. The lack of fine sediment may have allowed for infiltration of new water between the larger sediment and into the chamber. The temperature corrected SOD rate, based on the viable chamber was 0.89 g/m^2/day at 20°C.

2.1.9 Station 9 – South Harpeth River

Figure 12. Station 9 Chamber Deployment Area

Station 9 was located on the South Harpeth River adjacent to pasture land along South Harpeth Road. This station also served as an example of a major tributary within Harpeth River watershed. The deployment area at this station was near the end of a deep run/pool complex at the time of the measurement. The chambers were placed in sediment that was primarily fine sand, with small and medium gravel interspersed.

At this sample location, two chambers and the blank chamber were deployed. The temperature corrected SOD rate, based on the average of each individual chamber was 4.54 $g/m^2/day$ at 20°C. The range of the two chambers deployed was 4.31 $g/m^2/day$ at 20°C to 4.78 $g/m^2/day$ at 20°C.

2.1.10 Station 10 – Harpeth River at the Narrows

Station 10 was the furthest downstream location on the River. This site was located near a popular recreational vessel retrieval location. The deployment area was located approximately 200 meters downstream from the Cedar Hill Road Bridge. A large gravel bar was located in the middle of this site location and water was flowing through both channels. However, the majority of the water was passing along the left bank, and that is where the deployment area was located. This area of the River was a deep run located near the end of a shallow riffle at the time of the measurement. The substrate in this area was characterized as coarse sand, small to large gravel, small cobble, with small amounts of silt.

Figure 13. Upstream View from Station 10

At this sample location, three chambers and the blank chamber were deployed. The temperature corrected SOD rate, based on the average of each individual chamber was 5.83 $g/m^2/day$ at 20°C. The range of the two chambers deployed was 0.81 $g/m^2/day$ at 20°C to 9.46 $g/m^2/day$ at 20°C.

2.1.11 Data Review

Data at each of the stations ranged widely from 0.24 $g/m^2/day$ to 9.46 $g/m^2/day$. While this range is large, many factors must be considered in the SOD rates. One of the main factors in the Harpeth River Watershed is the varying substrates and the percent composition of the overall sediment within a stream. Depositional areas will likely have a greater demand for oxygen due to the potential organic matter that settles in these areas, while areas of larger gravel and cobble composition will ultimately have less demand for oxygen due to a lower potential for the deposition of organic matter. The substrate at any particular location within the River will change as the River changes throughout the seasons and years.

Appendix 1. Report Figures

APPENDIX 1

FIGURES

Appendix 2. SOD Calculations

APPENDIX 2

SOD CALCULATIONS

Appendix 3. Raw Data Collected

APPENDIX 3

RAW DATA COLLECTED

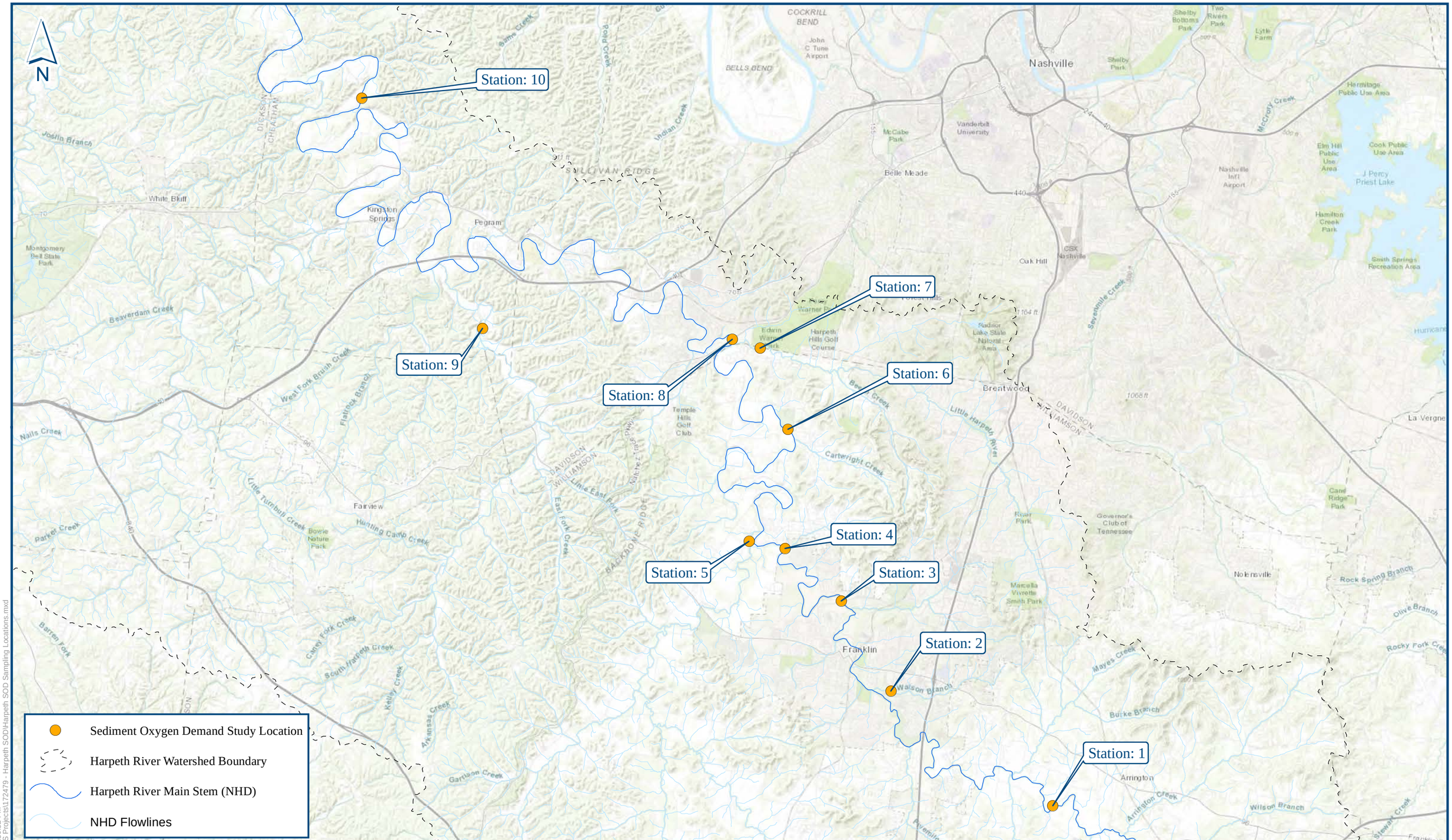
Appendix 4. 2000 EPA SOD Study Results

APPENDIX 4

2000 EPA SOD STUDY RESULTS

APPENDIX 1

FIGURES



AquAeTer

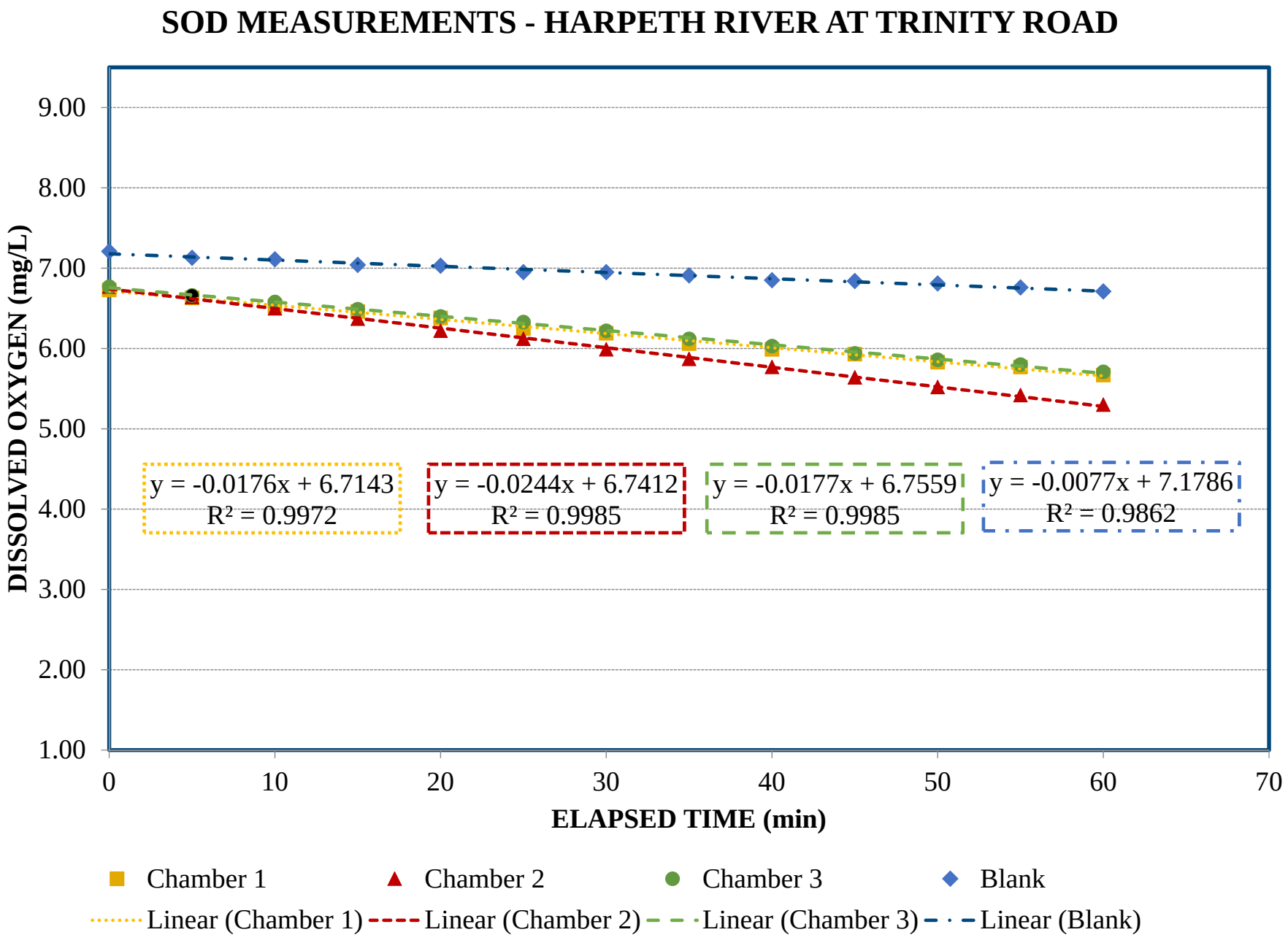
0 5 10 Miles

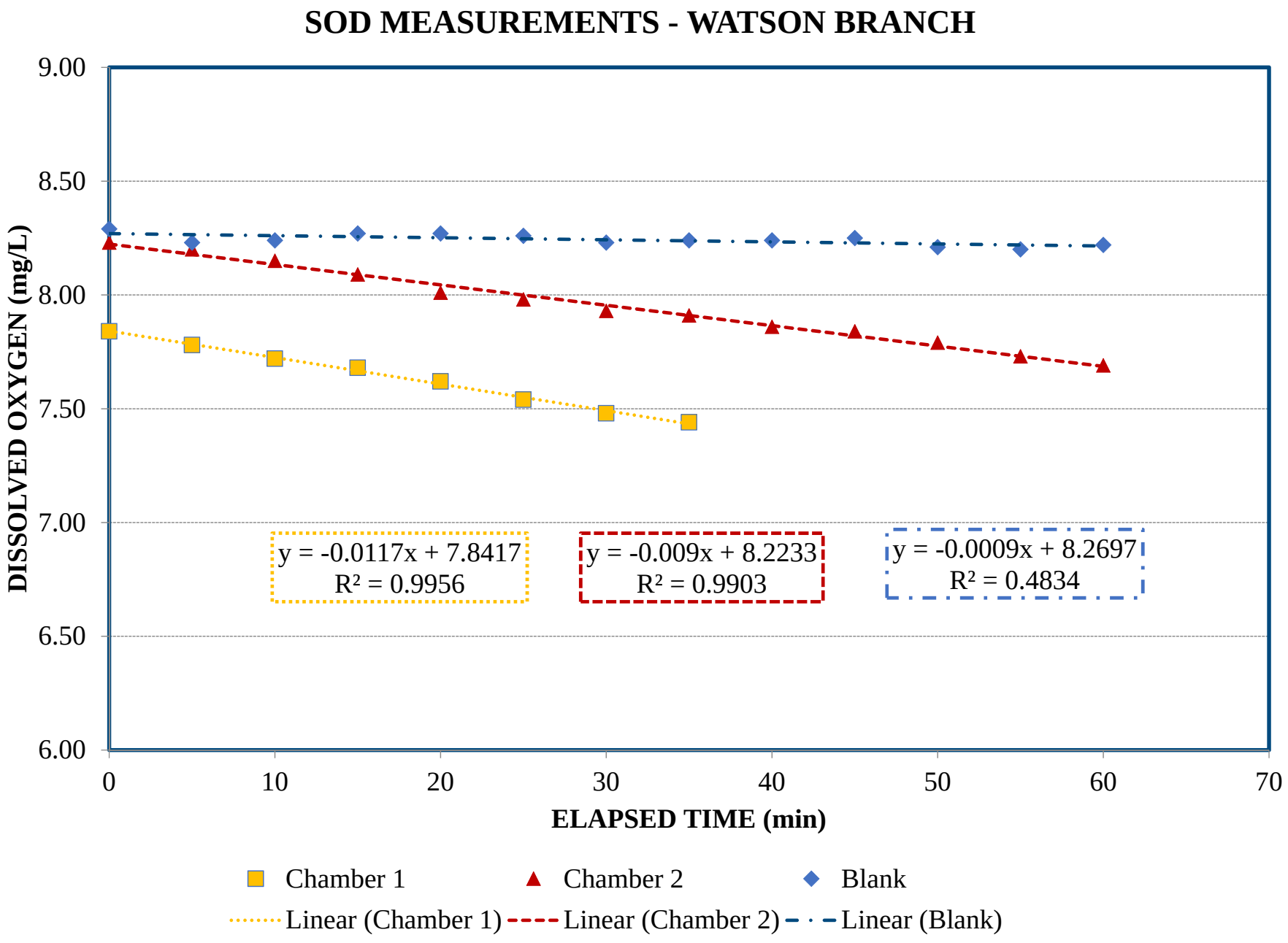
CLIENT: Harpeth Conservancy
LOCATION: Harpeth River, Tennessee
PROJECT FILE:

FIGURE 1
SOD SAMPLE LOCATIONS

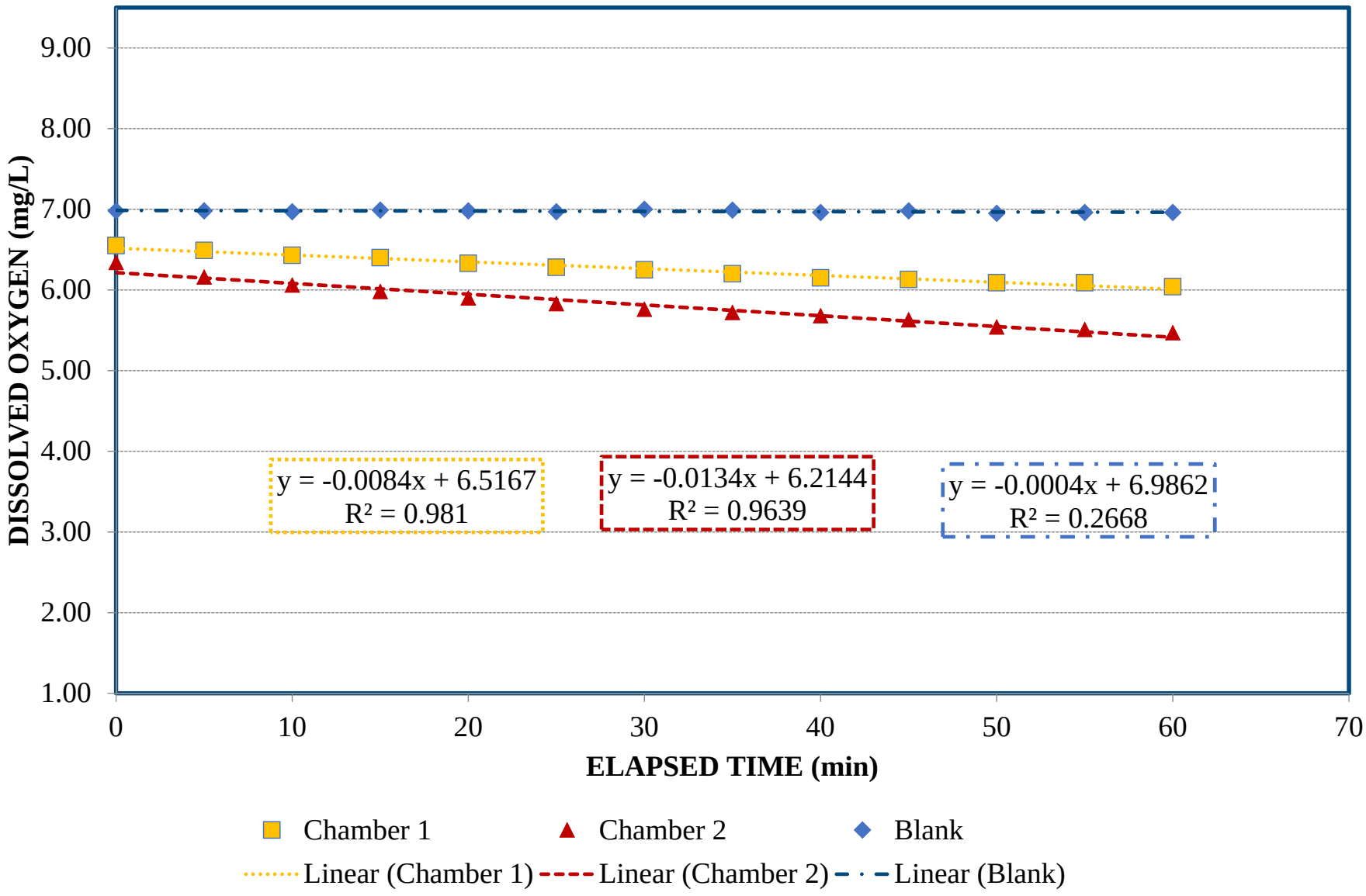
User Name: RRogers
Date Saved: 10/26/2017 12:30:52 PM
Document Path: I:\DATA\GIS Projects\172479 - Harpeth SOD\Harpeth SOD Sampling Locations.mxd

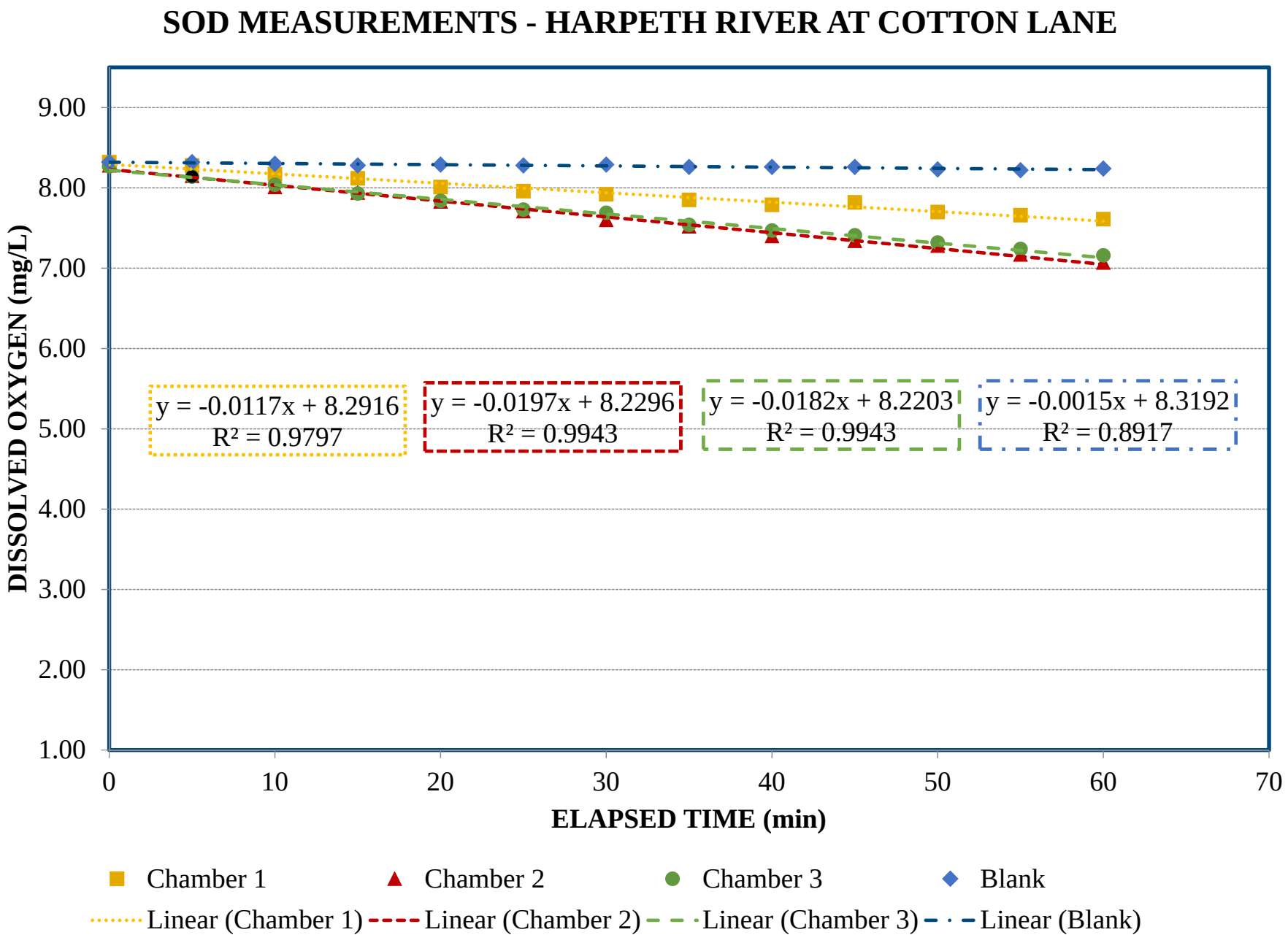
Coordinate System: NAD 1983 CORS96 StatePlane Tennessee FIPS 4100 Ft US

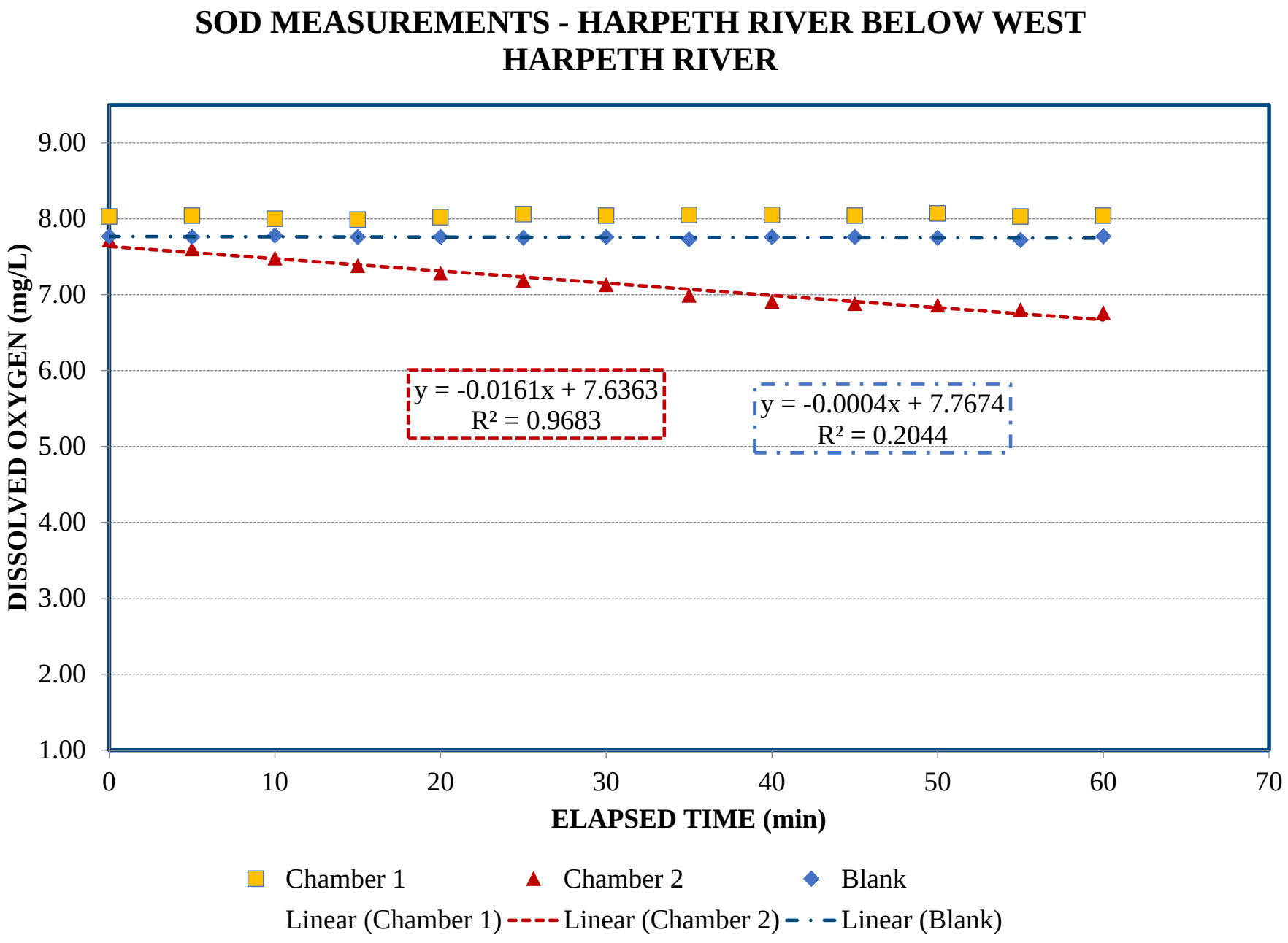

SOD MEASUREMENTS - HARPETH RIVER AT TRINITY ROAD
DISSOLVED OXYGEN (mg/L)
9.00
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0
10
20
30
40
50
60
70
ELAPSED TIME (min)
y = -0.0176x + 6.7143
R² = 0.9972
y = -0.0244x + 6.7412
R² = 0.9985
y = -0.0177x + 6.7559
R² = 0.9985
y = -0.0077x + 7.1786
R² = 0.9862
Chamber 1
Chamber 2
Chamber 3
Blank
Linear (Chamber 1)
Linear (Chamber 2)
Linear (Chamber 3)
Linear (Blank)

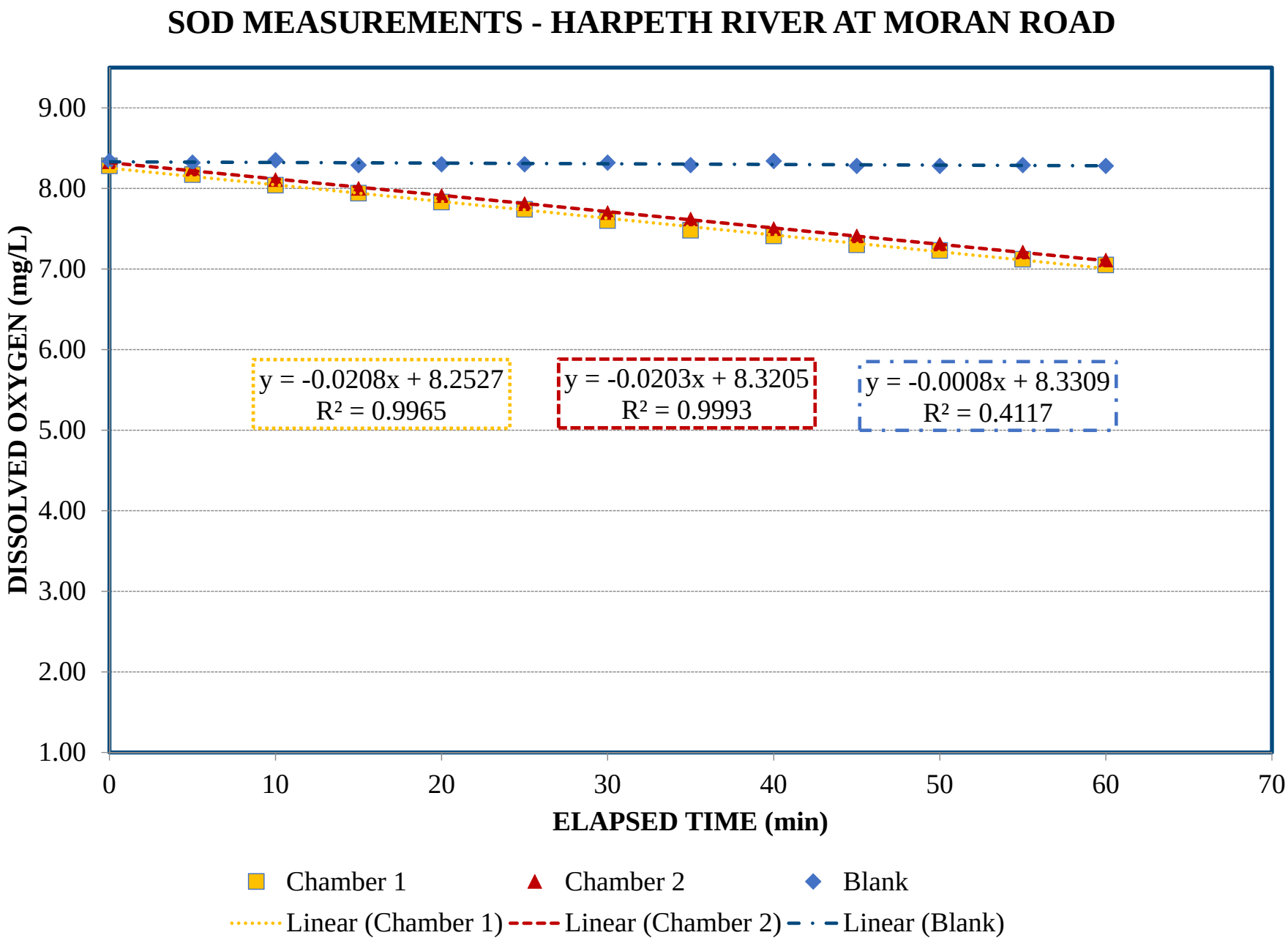

SOD MEASUREMENTS - WATSON BRANCH
DISSOLVED OXYGEN (mg/L)
9.00
8.50
8.00
7.50
7.00
6.50
6.00
0
10
20
30
40
50
60
70
ELAPSED TIME (min)
y = -0.0117x + 7.8417
R² = 0.9956
y = -0.009x + 8.2233
R² = 0.9903
y = -0.0009x + 8.2697
R² = 0.4834
Chamber 1
Chamber 2
Blank
Linear (Chamber 1)
Linear (Chamber 2)
Linear (Blank)

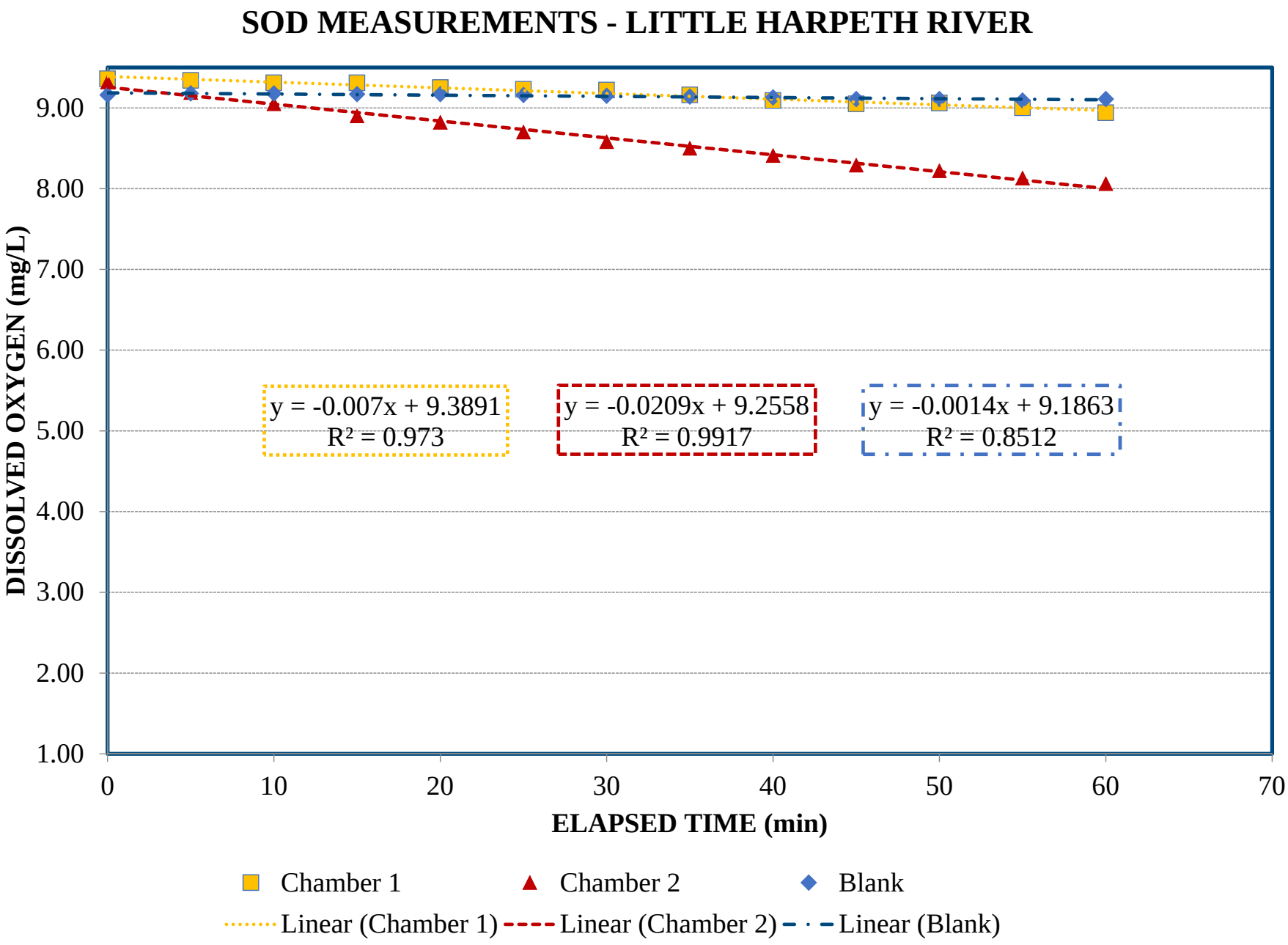
SOD MEASUREMENTS - HARPETH RIVER BELOW SPENCER CREEK

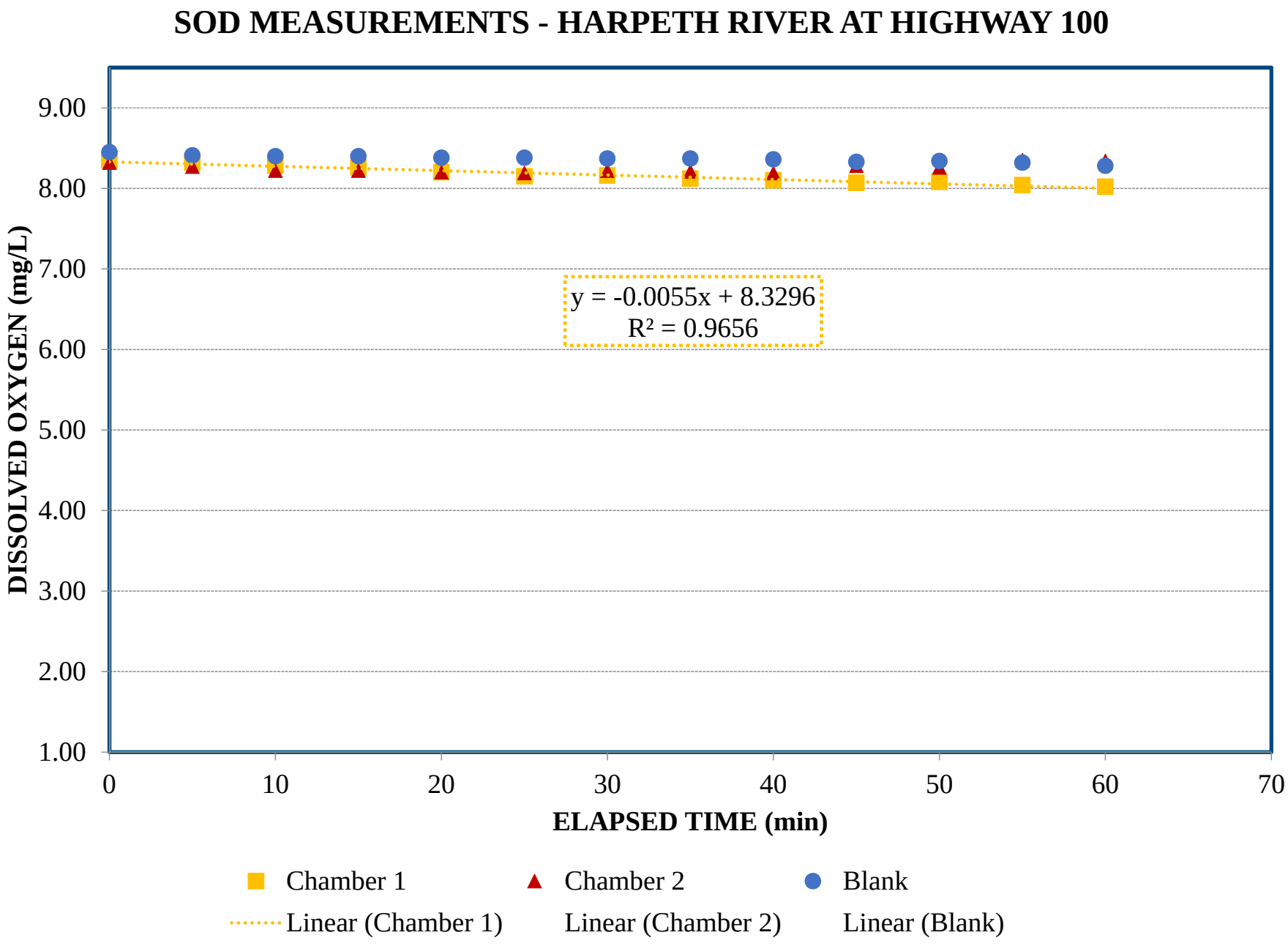


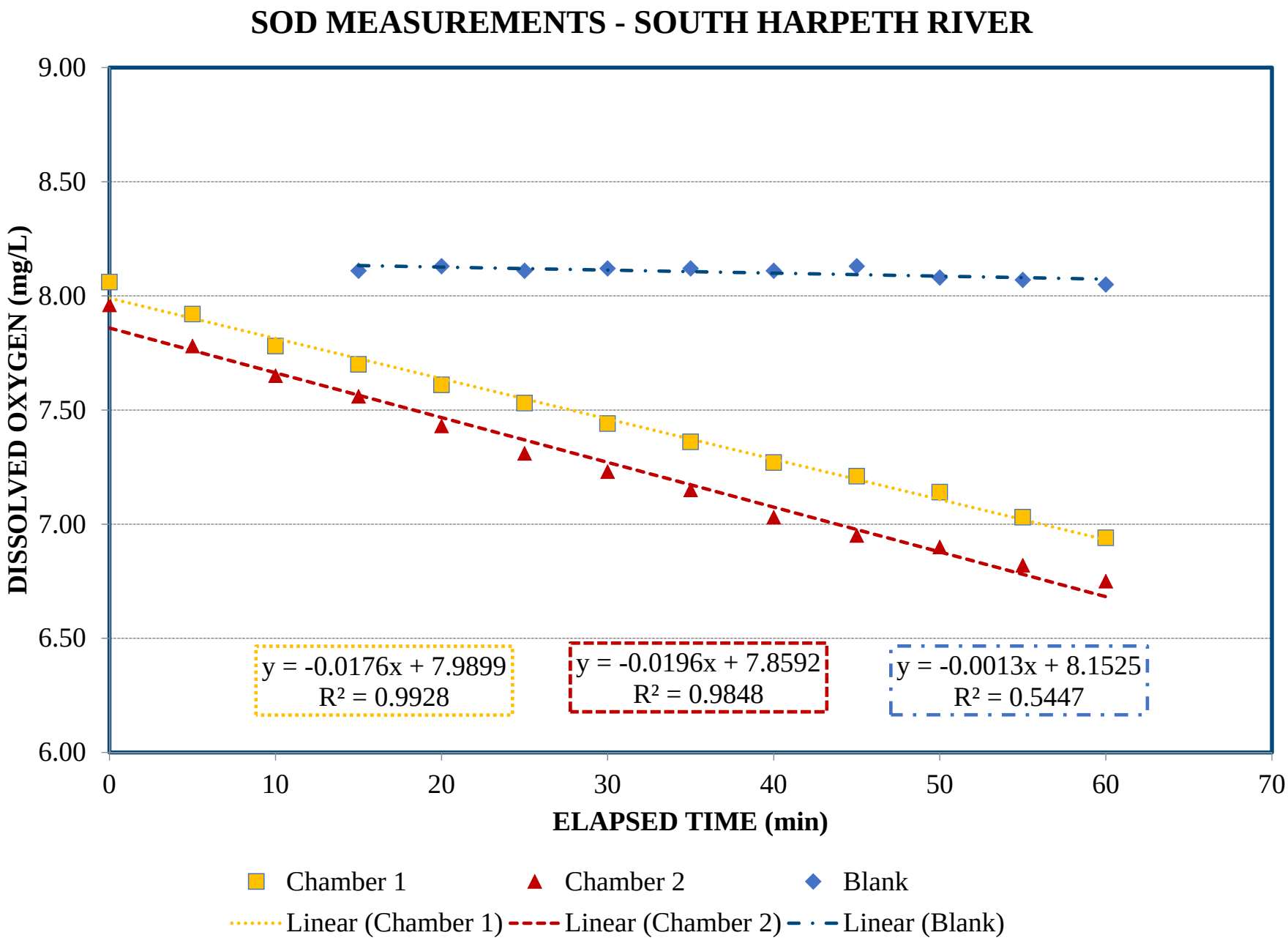

SOD MEASUREMENTS - HARPETH RIVER AT COTTON LANE
DISSOLVED OXYGEN (mg/L)
9.00
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0
10
20
30
40
50
60
70
ELAPSED TIME (min)
y = -0.0117x + 8.2916
R² = 0.9797
y = -0.0197x + 8.2296
R² = 0.9943
y = -0.0182x + 8.2203
R² = 0.9943
y = -0.0015x + 8.3192
R² = 0.8917
Chamber 1
Chamber 2
Chamber 3
Blank
Linear (Chamber 1)
Linear (Chamber 2)
Linear (Chamber 3)
Linear (Blank)

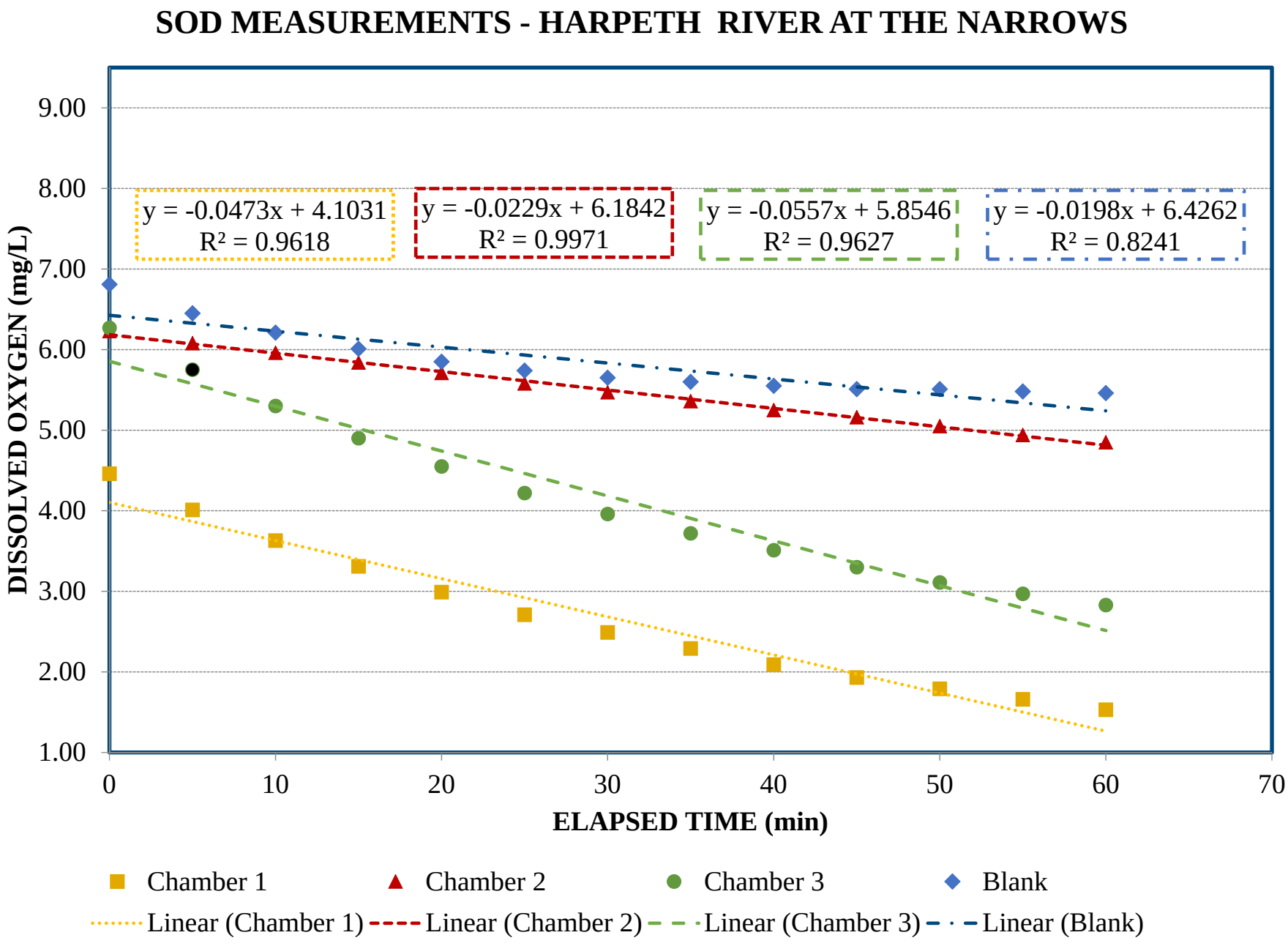

SOD MEASUREMENTS - HARPETH RIVER BELOW WEST HARPETH RIVER
DISSOLVED OXYGEN (mg/L)
9.00
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0
10
20
30
40
50
60
70
ELAPSED TIME (min)
y = -0.0161x + 7.6363
R² = 0.9683
y = -0.0004x + 7.7674
R² = 0.2044
Chamber 1
Chamber 2
Blank
Linear (Chamber 1)
Linear (Chamber 2)
Linear (Blank)


SOD MEASUREMENTS - HARPETH RIVER AT MORAN ROAD
DISSOLVED OXYGEN (mg/L)
9.00
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0
10
20
30
40
50
60
70
ELAPSED TIME (min)
y = -0.0208x + 8.2527
R² = 0.9965
y = -0.0203x + 8.3205
R² = 0.9993
y = -0.0008x + 8.3309
R² = 0.4117
Chamber 1
Chamber 2
Blank
Linear (Chamber 1)
Linear (Chamber 2)
Linear (Blank)


SOD MEASUREMENTS - LITTLE HARPETH RIVER
DISSOLVED OXYGEN (mg/L)
9.00
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0
10
20
30
40
50
60
70
ELAPSED TIME (min)
y = -0.007x + 9.3891
R² = 0.973
y = -0.0209x + 9.2558
R² = 0.9917
y = -0.0014x + 9.1863
R² = 0.8512
Chamber 1
Chamber 2
Blank
Linear (Chamber 1)
Linear (Chamber 2)
Linear (Blank)


SOD MEASUREMENTS - HARPETH RIVER AT HIGHWAY 100
DISSOLVED OXYGEN (mg/L)
9.00
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0
10
20
30
40
50
60
70
ELAPSED TIME (min)
y = -0.0055x + 8.3296
R² = 0.9656
Chamber 1
Chamber 2
Blank
Linear (Chamber 1)
Linear (Chamber 2)
Linear (Blank)


SOD MEASUREMENTS - SOUTH HARPETH RIVER
DISSOLVED OXYGEN (mg/L)
9.00
8.50
8.00
7.50
7.00
6.50
6.00
0
10
20
30
40
50
60
70
ELAPSED TIME (min)
y = -0.0176x + 7.9899
R² = 0.9928
y = -0.0196x + 7.8592
R² = 0.9848
y = -0.0013x + 8.1525
R² = 0.5447
Chamber 1
Chamber 2
Blank
Linear (Chamber 1)
Linear (Chamber 2)
Linear (Blank)


SOD MEASUREMENTS - HARPETH RIVER AT THE NARROWS
y = -0.0473x + 4.1031
R² = 0.9618
y = -0.0229x + 6.1842
R² = 0.9971
y = -0.0557x + 5.8546
R² = 0.9627
y = -0.0198x + 6.4262
R² = 0.8241
DISSOLVED OXYGEN (mg/L)
9.00
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0
10
20
30
40
50
60
70
ELAPSED TIME (min)
Chamber 1
Chamber 2
Chamber 3
Blank
Linear (Chamber 1)
Linear (Chamber 2)
Linear (Chamber 3)
Linear (Blank)

APPENDIX 2

SOD CALCULATIONS

SUMMARY OF SOD CALCULATIONS

LOCATION	AVERAGE TEMPERATURE (°C)	DO UTILIZATION SLOPE b_1 ($mgO_2/L/min$)		SOD RATE $k_{4(T)}$ ($g/ft^2/day$)	TEMPERATURE CORRECTED RATES $k_{4(20)}$ ($g/ft^2/day$)	SOD RATE $k_{4(T)}$ ($g/m^2/day$)	TEMPERATURE CORRECTED RATES $k_{4(20)}$ ($g/m^2/day$)
Station 1							
Chamber 1	22.47	-0.0176		0.32	0.28	3.42	2.96
Chamber 2	22.48	-0.0244		0.54	0.47	5.78	5.00
Chamber 3	22.48	-0.0177		0.32	0.28	3.46	2.99
Average	22.48	-0.0199					
Control	22.58	-0.0077					
Station 1	22.48	-0.0199		0.39	0.34	4.22	3.65
Station 2							
Chamber 1	20.13	-0.0117		0.35	0.35	3.74	3.71
Chamber 2	20.23	-0.009		0.26	0.26	2.8	2.76
Average	20.18	-0.0104					
Control	20.23	-0.0009					
Station 2	20.18	-0.0104		0.3	0.30	3.27	3.24
Station 3							
Chamber 1	21.97	-0.0084		0.26	0.23	2.77	2.47
Chamber 2	22.06	-0.0134		0.42	0.37	4.5	3.99
Average	22.02	-0.0109					
Control	22.07	-0.0004					
Station 3	22.02	-0.01		0.34	0.30	3.63	3.23

LOCATION	AVERAGE TEMPERATURE (°C)	DO UTILIZATION SLOPE b_1 ($mgO_2/L/min$)		SOD RATE $k_{4(T)}$ ($g/ft^2/day$)	TEMPERATURE CORRECTED RATES $k_{4(20)}$ ($g/ft^2/day$)	SOD RATE $k_{4(T)}$ ($g/m^2/day$)	TEMPERATURE CORRECTED RATES $k_{4(20)}$ ($g/m^2/day$)
Station 4							
Chamber 1	24.19	-0.0117		0.33	0.26	3.53	2.77
Chamber 2	24.21	-0.0197		0.58	0.45	6.3	4.93
Chamber 3	24.26	-0.0182		0.54	0.42	5.78	4.51
Average	24.22	-0.0165					
Control	24.32	-0.0015					
Station 4	24.22	-0.0165		0.48	0.38	5.2	4.07
Station 5							
Chamber 1	23.30	0.0005	*	0.03	0.02	0.31	0.26
Chamber 2	23.37	-0.0161		0.5	0.41	5.43	4.46
Average	23.36	-0.0136					
Control	23.40	-0.0004					
Station 5	23.36	-0.01		0.42	0.35	4.57	3.76
Station 6							
Chamber 1	24.51	-0.0208		0.64	0.49	6.92	5.32
Chamber 2	24.57	-0.0203		0.63	0.48	6.75	5.17
Average	24.54	-0.0206					
Control	24.60	-0.0008					
Station 6	24.54	-0.02		0.63	0.48	6.83	5.24
Station 7							
Chamber 1	22.10	-0.007		0.18	0.16	1.94	1.72

LOCATION	AVERAGE TEMPERATURE (°C)	DO UTILIZATION SLOPE b_1 ($mgO_2/L/min$)		SOD RATE $k_{4(T)}$ ($g/ft^2/day$)	TEMPERATURE CORRECTED RATES $k_{4(20)}$ ($g/ft^2/day$)	SOD RATE $k_{4(T)}$ ($g/m^2/day$)	TEMPERATURE CORRECTED RATES $k_{4(20)}$ ($g/m^2/day$)
Chamber 2	22.19	-0.0209		0.63	0.55	6.75	5.94
Average	22.15	-0.0140					
Control	22.24	-0.0014					
Station 7	22.15	-0.01		0.4	0.35	4.34	3.83
Station 8							
Chamber 1	24.29	-0.0055		0.11	0.09	1.14	0.89
Chamber 2	24.40	0.0009	*	0.1	0.08	1.07	0.83
Average	24.35	-0.0023					
Control	24.38	-0.0022	*				
Station 8	24.29	-0.0055		0.11	0.09	1.14	0.89
Station 9							
Chamber 1	24.60	-0.0176		0.52	0.40	5.64	4.31
Chamber 2	24.83	-0.0196		0.59	0.45	6.33	4.78
Average	24.72	-0.0186					
Control	25.16	-0.0013					
Station 9	24.72	-0.0186		0.56	0.43	5.98	4.54
Station 10							
Chamber 1	24.64	-0.0473		0.88	0.67	9.51	7.26
Chamber 2	24.84	-0.0229		0.1	0.08	1.07	0.81
Chamber 3	24.68	-0.0557		1.15	0.88	12.42	9.46
Average	24.72	-0.0420					

LOCATION	AVERAGE TEMPERATURE (°C)	DO UTILIZATION SLOPE b_1 ($mgO_2/L/min$)		SOD RATE $k_{4(T)}$ ($g/ft^2/day$)	TEMPERATURE CORRECTED RATES $k_{4(20)}$ ($g/ft^2/day$)	SOD RATE $k_{4(T)}$ ($g/m^2/day$)	TEMPERATURE CORRECTED RATES $k_{4(20)}$ ($g/m^2/day$)
Control	24.83	-0.0198					
Station 10	24.72	-0.0420		0.71	0.54	7.67	5.83

V	64.86	Liters
A	2.906	feet squared
Conversion	1.44	min·g/mg·day
Theta	1.06	
Metric Conversion	15.500031	$ft^2 \cdot min \cdot g/m^2 \cdot mg \cdot day$

APPENDIX 3

RAW DATA COLLECTED

172 Harpeth staff 9-25-17
NTR, JWM, Dan + Madeline Harpeth SOD
80°F + Sunny
no PPE
0825 - Calibrate sondes - NTR
Set auto read for 1200 @ 5 min intervals.
0850 Calibration complete
1120 - Leave AAT for Trinity
1220 - Arrive @ Site 1 - Trinity Road
1255 - First reading
1355 - Last reading
- Pack up + Head to Cedar Creek
1425 - Arrive Cedar Creek + scout for location to set chambers.
- No suitable location
1445 - Move on to Harpeth @ Cotton Ln.
1515 - Arrive @ cotton Lane
1600 - First reading @ Cotton Ln
1700 - Last reading.
- Pack up
1800 - Arrive AAT
1805 - Post validate
1816 - Finish

9-25-17

09/26/17 RES, NR, AGX
70°F, Foggy

0630 - Calibrate sondes
Set read for 0800 @ 5 mins
0655 - Calibration complete
0705 - Leave AAT.
0750 - Arrived at first site - Narrows @ Harpeth
0840 : First Reading
0926 : Sediment characteristics : small gravel ~~step~~ small to fine gravel. Small amount of detritus, small woody debris.
0945 : last reading
1010 : last site
1140 : Arrived @ Harpeth @ 100
1225 : First Reading
1318 : Sediment, cobble, large gravel, small gravel, fine gravel - no true silt, very little. Very little detritus
1355 : Arrived @ little Harpeth used 097 and 795
1430 : First reading
1515 - Sediment - Cobble, largest small gravel pebble + ~sand

1530: Final reading
1557: leaving site
1621: Arrived back at office
1647: Post validation complete

9-27-17
Harpeth SED

NTL, TWM + DF
60°F Clear
0515 - start calibration
Set sondes for 0645, end 2100
0600 - Leave AAT
0655 - Arrive Watson branch @
S. Royal Oaks dr.
0730 - First reading @ Watson Branch.
Sediment - slight detritus
sand, large gravel, pebble
0755 - 097 Calibration → 1413 @ 66.5
1409 @ 66.5
Init. DO - 100.1% 66.6°F / 9.27 mg/L 66.6
Cal 100% 66.7°F / 9.23 mg/L 66.7
0805 - 1st reading for 097
0840 - Last reading @ Watson Branch
Pack up to head for
Harpeth near Spencer.
0915 - Arrive @ Franklin First United
Methodist + Harpeth near
Spencer Creek.
0940 - Set up / table collapse.
0955 - First reading
1030 - MPL + RWR arrive @ site
1050 - Leave
1055 - Last Reading

1200 - Arrive @ Harpeth DS of
W Harpeth
1215 First Reading
Sediments - small, cobble, large
gravel, sand, small gravel
1315 - Slight increase noted in
chambers DO reading
1325 - Reseat chambers @ start Reading
substrate predominantly sand +
some gravel
1425 - Last reading + pack up.
1445 - Leave site for Moran Rd.
1500 - Arrive Moran Rd + set up
1525 - First reading at Moran Rd.
1625 - Last reading > pack up.
1715 - Start post val
1734 - Finish post val

9-27-17

Harpeth SOD Study 9-28-17

Personnel: RWR ; AN ;
75°, Sunny Clear
0821 - Begin sonde calibrations & programming
- Pulled all existing data & saved on
RWR's Field Computer
1130 - Arrive @ 1468 S. Harpeth Rd
Tina & Durand McIntosh
615-289-0723

1245 = First Reading
1250 097 = 94.6% DO
~~55~~
759 = Control Sonde
1252 - 097 = 96.8%
1254 Sonde 289 93.2% DO
1257 Sonde 759 99.4% DO
- Second Reading
1325 097 = 90.8% 7.49 mg/L
1327 289 = 86.0% 7.10 mg/L
1329 759 = 100.3% 8.24 mg/L
- 3rd Reading
1359 097 = 85.3% 7.00 mg/L
1400 289 = 80.1% 6.60 mg/L
1402 759 = 100.5% 8.20 mg/L
1510 = Arrive @ office

Rite in the Rain

Harpeth SOD 9-28-17

1522 - Begin data sonde post validation

1544 - Post val. completed

Note: Sonde 859 was not used; no post validation required

1555 = EOD

[illegible]

Hydrolab MS5 R44097
Log File Name : 097_9_25_17
Setup Date (M/D/YYYY) : 9/25/2017
Setup Time (HH:MM:SS) : 08:57:37
Starting Date (M/D/YYYY) : 9/25/2017
Starting Time (HH:MM:SS) : 12:00:00
Stopping Date (M/D/YYYY) : 9/25/2017
Stopping Time (HH:MM:SS) : 21:00:00
Interval (HH:MM:SS) : 00:05:00
Sensor warmup (HH:MM:SS) : 00:02:00
Circltr warmup (HH:MM:SS) : 00:02:00

		DO	%Satur	SpCond
Calibration	9/25/17 8:45	100.0%	1409	
Final Verifi	9/25/17 17:57	98.7%	1373	

	Slope
DO	-0.03391
Conductivity	-93.913

Date M/D/YYYY	Time HH:MM:SS		Temp °C	Recorded SpCond mS/cm	SpCond mS/cm	Recorded SpCond µS/cm	LDO% Sat	LDO mg/l	
9/25/2017	12:55:00	0.00	22.36	0.4	0.434	434	77	6.68	H_Trinity
9/25/2017	13:00:00	5.00	22.37	0.4	0.434	434	75.9	6.58	H_Trinity
9/25/2017	13:05:00	10.00	22.39	0.4	0.434	434	74.7	6.48	H_Trinity
9/25/2017	13:10:00	15.00	22.41	0.4	0.434	434	73.9	6.41	H_Trinity
9/25/2017	13:15:00	20.00	22.42	0.4	0.434	434	73	6.32	H_Trinity
9/25/2017	13:20:00	25.00	22.44	0.4	0.434	434	71.5	6.19	H_Trinity
9/25/2017	13:25:00	30.00	22.46	0.4	0.434	434	70.9	6.13	H_Trinity
9/25/2017	13:30:00	35.00	22.48	0.4	0.434	434	69.4	6	H_Trinity
9/25/2017	13:35:00	40.00	22.51	0.4	0.434	434	68.6	5.93	H_Trinity
9/25/2017	13:40:00	45.00	22.53	0.4	0.435	435	67.9	5.87	H_Trinity
9/25/2017	13:45:00	50.00	22.55	0.4	0.435	435	66.8	5.77	H_Trinity
9/25/2017	13:50:00	55.00	22.58	0.4	0.435	435	66.1	5.71	H_Trinity
9/25/2017	13:55:00	60.00	22.61	0.4	0.434	434	65	5.61	H_Trinity

Hydrolab MS5 R41759
Log File Name : 759_9_25_17
Setup Date (M/D/YYYY) : 9/25/2017
Setup Time (HH:MM:SS) : 08:22:22
Starting Date (M/D/YYYY) : 9/25/2017
Starting Time (HH:MM:SS) : 12:00:00
Stopping Date (M/D/YYYY) : 9/25/2017
Stopping Time (HH:MM:SS) : 21:00:00
Interval (HH:MM:SS) : 00:05:00
Sensor warmup (HH:MM:SS) : 00:02:00
Circltr warmup (HH:MM:SS) : 00:02:00

		DO	%Satur	SpCond
Calibration	9/25/17 8:15		100.0%	1409
Final Verifi	9/25/17 18:15		101.3%	1412

	Slope
DO	0.0312
Conductivity	7.2

Date M/D/YYYY	Time HH:MM:SS		Temp °C	Recorded SpCond mS/cm	SpCond mS/cm	Recorded SpCond µS/cm	LDO% Sat	LDO mg/l	
9/25/2017	12:55:00	0.00	22.44	0.4	0.437	437	78.8	6.82	H_Trinity
9/25/2017	13:00:00	5.00	22.45	0.4	0.437	437	77.2	6.69	H_Trinity
9/25/2017	13:05:00	10.00	22.46	0.4	0.437	437	75.7	6.55	H_Trinity
9/25/2017	13:10:00	15.00	22.48	0.4	0.437	437	74.3	6.43	H_Trinity
9/25/2017	13:15:00	20.00	22.5	0.4	0.436	436	72.6	6.28	H_Trinity
9/25/2017	13:20:00	25.00	22.52	0.4	0.437	437	71.5	6.18	H_Trinity
9/25/2017	13:25:00	30.00	22.54	0.4	0.437	437	70	6.05	H_Trinity
9/25/2017	13:30:00	35.00	22.57	0.4	0.437	437	68.6	5.93	H_Trinity
9/25/2017	13:35:00	40.00	22.6	0.4	0.437	437	67.5	5.83	H_Trinity
9/25/2017	13:40:00	45.00	22.6	0.4	0.438	438	66	5.7	H_Trinity
9/25/2017	13:45:00	50.00	22.63	0.4	0.438	438	64.7	5.58	H_Trinity
9/25/2017	13:50:00	55.00	22.65	0.4	0.438	438	63.5	5.48	H_Trinity
9/25/2017	13:55:00	60.00	22.68	0.4	0.438	438	62.2	5.36	H_Trinity

MiniSonde5 R40859
Log File Name : 859_9_25_17
Setup Date (M/D/YYYY) : 9/25/2017
Setup Time (HH:MM:SS) : 08:33:00
Starting Date (M/D/YYYY) : 9/25/2017
Starting Time (HH:MM:SS) : 12:00:00
Stopping Date (M/D/YYYY) : 9/25/2017
Stopping Time (HH:MM:SS) : 21:00:00
Interval (HH:MM:SS) : 00:05:00
Sensor warmup (HH:MM:SS) : 00:02:00
Circltr warmup (HH:MM:SS) : 00:02:00

		DO %Satur	SpCond
Calibration	9/25/17 8:25	100.0%	1409
Final Verifi	9/25/17 18:02	99.4%	1424

	Slope
DO	-0.01497
Conductivity	37.43501

Date M/D/YYYY	Time HH:MM:SS		Temp °C	Recorded SpCond mS/cm	SpCond mS/cm	Recorded SpCond µS/cm	LDO% Sat	LDO mg/l	
9/25/2017	16:00:00	0.00	22.45	0.4	0.431	431	77.7	6.73	H_Trinity
9/25/2017	16:05:00	5.00	22.46	0.4	0.431	431	76.5	6.62	H_Trinity
9/25/2017	16:10:00	10.00	22.48	0.4	0.43	430	75.6	6.54	H_Trinity
9/25/2017	16:15:00	15.00	22.5	0.4	0.43	430	74.5	6.45	H_Trinity
9/25/2017	16:20:00	20.00	22.52	0.4	0.431	431	73.6	6.36	H_Trinity
9/25/2017	16:25:00	25.00	22.53	0.4	0.43	430	72.8	6.29	H_Trinity
9/25/2017	16:30:00	30.00	22.54	0.4	0.431	431	71.6	6.18	H_Trinity
9/25/2017	16:35:00	35.00	22.56	0.4	0.431	431	70.4	6.08	H_Trinity
9/25/2017	16:40:00	40.00	22.58	0.4	0.43	430	69.4	5.99	H_Trinity
9/25/2017	16:45:00	45.00	22.6	0.4	0.43	430	68.4	5.9	H_Trinity
9/25/2017	16:50:00	50.00	22.62	0.4	0.431	431	67.3	5.81	H_Trinity
9/25/2017	16:55:00	55.00	22.64	0.4	0.43	430	66.7	5.75	H_Trinity
9/25/2017	17:00:00	60.00	22.66	0.4	0.431	431	65.6	5.66	H_Trinity

MiniSonde5 R65289
Log File Name : 289_9_25_17
Setup Date (M/D/YYYY) : 9/25/2017
Setup Time (HH:MM:SS) : 08:44:16
Starting Date (M/D/YYYY) : 9/25/2017
Starting Time (HH:MM:SS) : 12:00:00
Stopping Date (M/D/YYYY) : 9/25/2017
Stopping Time (HH:MM:SS) : 21:00:00
Interval (HH:MM:SS) : 00:05:00
Sensor warmup (HH:MM:SS) : 00:02:00
Circltr warmup (HH:MM:SS) : 00:02:00

		DO %Satur	SpCond
Calibration	9/25/17 8:35	100.0%	1409
Final Verifi	9/25/17 18:07	98.8%	1413

	Slope
DO	-0.03021
Conductivity	10.06993

Date M/D/YYYY	Time HH:MM:SS		Temp °C	Recorded SpCond mS/cm	SpCond mS/cm	Recorded SpCond µS/cm	LDO% Sat	LDO mg/l	
9/25/2017	16:00:00	0.00	22.46	0.4	0.437	437	82.3	7.13	H_Trinity
9/25/2017	16:05:00	5.00	22.48	0.4	0.437	437	81.5	7.05	H_Trinity
9/25/2017	16:10:00	10.00	22.48	0.4	0.437	437	81.2	7.03	H_Trinity
9/25/2017	16:15:00	15.00	22.5	0.4	0.437	437	80.4	6.96	H_Trinity
9/25/2017	16:20:00	20.00	22.52	0.4	0.437	437	80.4	6.95	H_Trinity
9/25/2017	16:25:00	25.00	22.55	0.4	0.437	437	79.3	6.86	H_Trinity
9/25/2017	16:30:00	30.00	22.57	0.4	0.437	437	79.4	6.86	H_Trinity
9/25/2017	16:35:00	35.00	22.59	0.4	0.437	437	78.9	6.82	H_Trinity
9/25/2017	16:40:00	40.00	22.62	0.4	0.437	437	78.3	6.76	H_Trinity
9/25/2017	16:45:00	45.00	22.65	0.4	0.437	437	78.2	6.75	H_Trinity
9/25/2017	16:50:00	50.00	22.67	0.4	0.437	437	77.9	6.72	H_Trinity
9/25/2017	16:55:00	55.00	22.7	0.4	0.437	437	77.4	6.67	H_Trinity
9/25/2017	17:00:00	60.00	22.73	0.4	0.437	437	76.9	6.62	H_Trinity

Hydrolab MS5 R44097
Log File Name : 097-9-27-17
Setup Date (M/D/YYYY) : 9/27/2017
Setup Time (HH:MM:SS) : 07:58:23
Starting Date (M/D/YYYY) : 9/27/2017
Starting Time (HH:MM:SS) : 08:05:00
Stopping Date (M/D/YYYY) : 9/27/2017
Stopping Time (HH:MM:SS) : 21:00:00
Interval (HH:MM:SS) : 00:05:00
Sensor warmup (HH:MM:SS) : 00:02:00
Circltr warmup (HH:MM:SS) : 00:02:00

		DO	%Satur	SpCond
Calibration	9/27/17 7:55	100.0%		1413
Final Verifi	9/27/17 17:26	99.7%		1407

	Slope
DO	-0.00757
Conductivity	-15.1313

Date M/D/YYYY	Time HH:MM:SS		Temp °C	Recorded SpCond mS/cm	SpCond mS/cm	Recorded SpCond µS/cm	LDO% Sat	LDO mg/l	
9/27/2017	8:05:00	0.00	20.12	0.6	0.631	631	86.6	7.84	Watson B
9/27/2017	8:10:00	5.00	20.13	0.6	0.631	631	85.9	7.78	Watson B
9/27/2017	8:15:00	10.00	20.13	0.6	0.631	631	85.3	7.72	Watson B
9/27/2017	8:20:00	15.00	20.13	0.6	0.631	631	84.9	7.68	Watson B
9/27/2017	8:25:00	20.00	20.13	0.6	0.631	631	84.2	7.62	Watson B
9/27/2017	8:30:00	25.00	20.13	0.6	0.631	631	83.3	7.54	Watson B
9/27/2017	8:35:00	30.00	20.14	0.6	0.63	630	82.7	7.48	Watson B
9/27/2017	8:40:00	35.00	20.14	0.6	0.631	631	82.2	7.44	Watson B

MiniSonde5 R40859
Log File Name : 859-9-27-17
Setup Date (M/D/YYYY) : 9/27/2017
Setup Time (HH:MM:SS) : 05:39:14
Starting Date (M/D/YYYY) : 9/27/2017
Starting Time (HH:MM:SS) : 06:45:00
Stopping Date (M/D/YYYY) : 9/27/2017
Stopping Time (HH:MM:SS) : 21:00:00 1440
Interval (HH:MM:SS) : 00:05:00
Sensor warmup (HH:MM:SS) : 00:02:00
Circltr warmup (HH:MM:SS) : 00:02:00

		DO	%Satur	SpCond
Calibration	9/27/17 5:37	100.0%	1409	
Final Verifi	9/27/17 17:31	99.3%	1399	

	Slope
DO	-0.01412
Conductivity	-20.1681

Date M/D/YYYY	Time HH:MM:SS		Temp °C	Recorded SpCond mS/cm	SpCond mS/cm	Recorded SpCond µS/cm	LDO% Sat	LDO mg/l	
9/27/2017	7:40:00	0.00	20.22	0.6	0.628	628	91	8.22	Watson B
9/27/2017	7:45:00	5.00	20.23	0.6	0.628	628	90.7	8.19	Watson B
9/27/2017	7:50:00	10.00	20.23	0.6	0.628	628	90.1	8.14	Watson B
9/27/2017	7:55:00	15.00	20.23	0.6	0.628	628	89.4	8.08	Watson B
9/27/2017	8:00:00	20.00	20.23	0.6	0.628	628	88.6	8	Watson B
9/27/2017	8:05:00	25.00	20.23	0.6	0.627	627	88.2	7.97	Watson B
9/27/2017	8:10:00	30.00	20.23	0.6	0.628	628	87.7	7.92	Watson B
9/27/2017	8:15:00	35.00	20.23	0.6	0.627	627	87.4	7.9	Watson B
9/27/2017	8:20:00	40.00	20.23	0.6	0.627	627	86.9	7.85	Watson B
9/27/2017	8:25:00	45.00	20.23	0.6	0.627	627	86.7	7.83	Watson B
9/27/2017	8:30:00	50.00	20.23	0.6	0.627	627	86	7.77	Watson B
9/27/2017	8:35:00	55.00	20.23	0.6	0.627	627	85.3	7.71	Watson B
9/27/2017	8:40:00	60.00	20.23	0.6	0.626	626	84.9	7.67	Watson B

MiniSonde5 R65289
Log File Name : 289-9-27-17
Setup Date (M/D/YYYY) : 9/27/2017
Setup Time (HH:MM:SS) : 05:25:47
Starting Date (M/D/YYYY) : 9/27/2017
Starting Time (HH:MM:SS) : 06:45:00
Stopping Date (M/D/YYYY) : 9/27/2017
Stopping Time (HH:MM:SS) : 21:00:00
Interval (HH:MM:SS) : 00:05:00
Sensor warmup (HH:MM:SS) : 00:02:00
Circltr warmup (HH:MM:SS) : 00:02:00

		DO	%Satur	SpCond
Calibration	9/27/17 5:24		100.0%	1409
Final Verifi	9/27/17 17:19		99.1%	1402

	Slope
DO	-0.01813
Conductivity	-14.0979

Date M/D/YYYY	Time HH:MM:SS		Temp °C	Recorded SpCond mS/cm	SpCond mS/cm	Recorded SpCond µS/cm	LDO% Sat	LDO mg/l	
9/27/2017	7:40:00	0.00	20.23	0.6	0.624	624	91.6	8.27	Watson B
9/27/2017	7:45:00	5.00	20.23	0.6	0.624	624	90.9	8.21	Watson B
9/27/2017	7:50:00	10.00	20.24	0.6	0.624	624	91	8.22	Watson B
9/27/2017	7:55:00	15.00	20.23	0.6	0.624	624	91.3	8.25	Watson B
9/27/2017	8:00:00	20.00	20.23	0.6	0.624	624	91.4	8.25	Watson B
9/27/2017	8:05:00	25.00	20.23	0.6	0.624	624	91.2	8.24	Watson B
9/27/2017	8:10:00	30.00	20.23	0.6	0.624	624	90.8	8.21	Watson B
9/27/2017	8:15:00	35.00	20.23	0.6	0.624	624	91	8.22	Watson B
9/27/2017	8:20:00	40.00	20.23	0.6	0.624	624	91	8.22	Watson B
9/27/2017	8:25:00	45.00	20.23	0.6	0.624	624	91.1	8.23	Watson B
9/27/2017	8:30:00	50.00	20.23	0.6	0.624	624	90.7	8.19	Watson B
9/27/2017	8:35:00	55.00	20.23	0.6	0.625	625	90.5	8.18	Watson B
9/27/2017	8:40:00	60.00	20.23	0.6	0.624	624	90.8	8.2	Watson B

Hydrolab MS5 R44097
Log File Name : 097-9-27-17
Setup Date (M/D/YYYY) : 9/27/2017
Setup Time (HH:MM:SS) : 07:58:23
Starting Date (M/D/YYYY) : 9/27/2017
Starting Time (HH:MM:SS) : 08:05:00
Stopping Date (M/D/YYYY) : 9/27/2017
Stopping Time (HH:MM:SS) : 21:00:00
Interval (HH:MM:SS) : 00:05:00
Sensor warmup (HH:MM:SS) : 00:02:00
Circltr warmup (HH:MM:SS) : 00:02:00

		DO	%Satur	SpCond
Calibration	9/27/17 7:55		100.0%	1413
Final Verifi	9/27/17 17:26		99.7%	1407

	Slope
DO	-0.00757
Conductivity	-15.1313

Date M/D/YYYY	Time HH:MM:SS		Temp °C	Recorded SpCond mS/cm	SpCond mS/cm	Recorded SpCond µS/cm	LDO% Sat	LDO mg/l	
9/27/2017	9:55:00	0.00	21.94	0.5	0.513	513	74.8	6.54	H_Spence
9/27/2017	10:00:00	5.00	21.91	0.5	0.513	513	74.1	6.48	H_Spence
9/27/2017	10:05:00	10.00	21.92	0.5	0.513	513	73.5	6.42	H_Spence
9/27/2017	10:10:00	15.00	21.92	0.5	0.513	513	73.1	6.39	H_Spence
9/27/2017	10:15:00	20.00	21.93	0.5	0.513	513	72.3	6.32	H_Spence
9/27/2017	10:20:00	25.00	21.94	0.5	0.513	513	71.7	6.27	H_Spence
9/27/2017	10:25:00	30.00	21.95	0.5	0.514	514	71.5	6.24	H_Spence
9/27/2017	10:30:00	35.00	21.97	0.5	0.514	514	70.8	6.19	H_Spence
9/27/2017	10:35:00	40.00	21.98	0.5	0.514	514	70.4	6.14	H_Spence
9/27/2017	10:40:00	45.00	21.99	0.5	0.514	514	70.1	6.12	H_Spence
9/27/2017	10:45:00	50.00	22.01	0.5	0.514	514	69.7	6.08	H_Spence
9/27/2017	10:50:00	55.00	22.04	0.5	0.514	514	69.7	6.08	H_Spence
9/27/2017	10:55:00	60.00	22.06	0.5	0.514	514	69.1	6.03	H_Spence

MiniSonde5 R40859
Log File Name : 859-9-27-17
Setup Date (M/D/YYYY) : 9/27/2017
Setup Time (HH:MM:SS) : 05:39:14
Starting Date (M/D/YYYY) : 9/27/2017
Starting Time (HH:MM:SS) : 06:45:00
Stopping Date (M/D/YYYY) : 9/27/2017
Stopping Time (HH:MM:SS) : 21:00:00
Interval (HH:MM:SS) : 00:05:00
Sensor warmup (HH:MM:SS) : 00:02:00
Circltr warmup (HH:MM:SS) : 00:02:00

		DO	%Satur	SpCond
Calibration	9/27/17 5:37		100.0%	1409
Final Verifi	9/27/17 17:31		99.3%	1399

	Slope
DO	-0.01412
Conductivity	-20.1681

Date M/D/YYYY	Time HH:MM:SS		Temp °C	Recorded SpCond mS/cm	SpCond mS/cm	Recorded SpCond µS/cm	LDO% Sat	LDO mg/l	
9/27/2017	9:55:00	0.00	21.97	0.5	0.516	516	72.4	6.32	H_Spence
9/27/2017	10:00:00	5.00	21.99	0.5	0.516	516	70.3	6.14	H_Spence
9/27/2017	10:05:00	10.00	22	0.5	0.516	516	69.2	6.04	H_Spence
9/27/2017	10:10:00	15.00	22.02	0.5	0.516	516	68.3	5.96	H_Spence
9/27/2017	10:15:00	20.00	22.02	0.5	0.516	516	67.3	5.88	H_Spence
9/27/2017	10:20:00	25.00	22.04	0.5	0.516	516	66.6	5.81	H_Spence
9/27/2017	10:25:00	30.00	22.05	0.5	0.516	516	65.8	5.74	H_Spence
9/27/2017	10:30:00	35.00	22.07	0.5	0.515	515	65.2	5.69	H_Spence
9/27/2017	10:35:00	40.00	22.08	0.5	0.515	515	64.8	5.65	H_Spence
9/27/2017	10:40:00	45.00	22.1	0.5	0.515	515	64.2	5.6	H_Spence
9/27/2017	10:45:00	50.00	22.12	0.5	0.515	515	63.3	5.51	H_Spence
9/27/2017	10:50:00	55.00	22.14	0.5	0.515	515	62.9	5.48	H_Spence
9/27/2017	10:55:00	60.00	22.16	0.5	0.515	515	62.5	5.44	H_Spence

MiniSonde5 R65289
Log File Name : 289-9-27-17
Setup Date (M/D/YYYY) : 9/27/2017
Setup Time (HH:MM:SS) : 05:25:47
Starting Date (M/D/YYYY) : 9/27/2017
Starting Time (HH:MM:SS) : 06:45:00
Stopping Date (M/D/YYYY) : 9/27/2017
Stopping Time (HH:MM:SS) : 21:00:00
Interval (HH:MM:SS) : 00:05:00
Sensor warmup (HH:MM:SS) : 00:02:00
Circltr warmup (HH:MM:SS) : 00:02:00

		DO	%Satur	SpCond
Calibration	9/27/17 5:24		100.0%	1409
Final Verifi	9/27/17 17:19		99.1%	1402

	Slope
DO	-0.01813
Conductivity	-14.0979

Date M/D/YYYY	Time HH:MM:SS		Temp °C	Recorded SpCond mS/cm	SpCond mS/cm	Recorded SpCond µS/cm	LDO% Sat	LDO mg/l	
9/27/2017	9:55:00	0.00	22.01	0.5	0.51	510	79.6	6.95	H_Spence
9/27/2017	10:00:00	5.00	22.01	0.5	0.51	510	79.6	6.95	H_Spence
9/27/2017	10:05:00	10.00	22.02	0.5	0.51	510	79.6	6.94	H_Spence
9/27/2017	10:10:00	15.00	22.03	0.5	0.51	510	79.8	6.96	H_Spence
9/27/2017	10:15:00	20.00	22.03	0.5	0.51	510	79.6	6.95	H_Spence
9/27/2017	10:20:00	25.00	22.04	0.5	0.51	510	79.5	6.94	H_Spence
9/27/2017	10:25:00	30.00	22.06	0.5	0.51	510	79.9	6.97	H_Spence
9/27/2017	10:30:00	35.00	22.07	0.5	0.51	510	79.9	6.96	H_Spence
9/27/2017	10:35:00	40.00	22.09	0.5	0.51	510	79.6	6.93	H_Spence
9/27/2017	10:40:00	45.00	22.11	0.5	0.51	510	79.8	6.95	H_Spence
9/27/2017	10:45:00	50.00	22.13	0.5	0.51	510	79.3	6.91	H_Spence
9/27/2017	10:50:00	55.00	22.15	0.5	0.51	510	79.5	6.92	H_Spence
9/27/2017	10:55:00	60.00	22.18	0.5	0.51	510	79.6	6.92	H_Spence

Hydrolab MS5 R44097
Log File Name : 097_9_25_17
Setup Date (M/D/YYYY) : 9/25/2017
Setup Time (HH:MM:SS) : 08:57:37
Starting Date (M/D/YYYY) : 9/25/2017
Starting Time (HH:MM:SS) : 12:00:00
Stopping Date (M/D/YYYY) : 9/25/2017
Stopping Time (HH:MM:SS) : 21:00:00
Interval (HH:MM:SS) : 00:05:00
Sensor warmup (HH:MM:SS) : 00:02:00
Circltr warmup (HH:MM:SS) : 00:02:00

		DO	%Satur	SpCond
Calibration	9/25/17 8:45	100.0%	1409	
Final Verifi	9/25/17 17:57	98.7%	1373	

	Slope
DO	-0.03391
Conductivity	-93.913

Date M/D/YYYY	Time HH:MM:SS		Temp °C	Recorded SpCond mS/cm	SpCond mS/cm	Recorded SpCond µS/cm	LDO% Sat	LDO mg/l	
9/25/2017	16:00:00	0.00	24.29	0.5	0.498	498	98.4	8.23	H_Cotton
9/25/2017	16:05:00	5.00	24.24	0.5	0.499	499	97.9	8.19	H_Cotton
9/25/2017	16:10:00	10.00	24.23	0.5	0.499	499	96.6	8.08	H_Cotton
9/25/2017	16:15:00	15.00	24.22	0.5	0.499	499	95.9	8.03	H_Cotton
9/25/2017	16:20:00	20.00	24.2	0.5	0.499	499	94.6	7.92	H_Cotton
9/25/2017	16:25:00	25.00	24.19	0.5	0.499	499	93.9	7.87	H_Cotton
9/25/2017	16:30:00	30.00	24.18	0.5	0.499	499	93.5	7.83	H_Cotton
9/25/2017	16:35:00	35.00	24.17	0.5	0.499	499	92.6	7.76	H_Cotton
9/25/2017	16:40:00	40.00	24.16	0.5	0.499	499	91.9	7.7	H_Cotton
9/25/2017	16:45:00	45.00	24.15	0.5	0.499	499	92.2	7.73	H_Cotton
9/25/2017	16:50:00	50.00	24.14	0.5	0.5	500	90.6	7.6	H_Cotton
9/25/2017	16:55:00	55.00	24.13	0.5	0.5	500	90.2	7.56	H_Cotton
9/25/2017	17:00:00	60.00	24.12	0.5	0.5	500	89.6	7.51	H_Cotton

Hydrolab MS5 R41759
Log File Name : 759_9_25_17
Setup Date (M/D/YYYY) : 9/25/2017
Setup Time (HH:MM:SS) : 08:22:22
Starting Date (M/D/YYYY) : 9/25/2017
Starting Time (HH:MM:SS) : 12:00:00
Stopping Date (M/D/YYYY) : 9/25/2017
Stopping Time (HH:MM:SS) : 21:00:00
Interval (HH:MM:SS) : 00:05:00
Sensor warmup (HH:MM:SS) : 00:02:00
Circltr warmup (HH:MM:SS) : 00:02:00

		DO %Satur	SpCond
Calibration	9/25/17 8:15	100.0%	1409
Final Verifi	9/25/17 18:15	101.3%	1412

	Slope
DO	0.0312
Conductivity	7.2

Date M/D/YYYY	Time HH:MM:SS		Temp °C	Recorded SpCond mS/cm	SpCond mS/cm	Recorded SpCond µS/cm	LDO% Sat	LDO mg/l	
9/25/2017	16:00:00	0.00	24.27	0.5	0.5	500	100	8.36	H_Cotton
9/25/2017	16:05:00	5.00	24.25	0.5	0.5	500	98.4	8.24	H_Cotton
9/25/2017	16:10:00	10.00	24.24	0.5	0.5	500	96.7	8.1	H_Cotton
9/25/2017	16:15:00	15.00	24.23	0.5	0.5	500	96	8.03	H_Cotton
9/25/2017	16:20:00	20.00	24.22	0.5	0.5	500	94.6	7.92	H_Cotton
9/25/2017	16:25:00	25.00	24.21	0.5	0.5	500	93.1	7.8	H_Cotton
9/25/2017	16:30:00	30.00	24.21	0.5	0.5	500	91.8	7.69	H_Cotton
9/25/2017	16:35:00	35.00	24.2	0.5	0.5	500	90.9	7.61	H_Cotton
9/25/2017	16:40:00	40.00	24.19	0.5	0.5	500	89.4	7.49	H_Cotton
9/25/2017	16:45:00	45.00	24.18	0.5	0.5	500	88.7	7.43	H_Cotton
9/25/2017	16:50:00	50.00	24.17	0.5	0.5	500	87.9	7.37	H_Cotton
9/25/2017	16:55:00	55.00	24.16	0.5	0.5	500	86.6	7.26	H_Cotton
9/25/2017	17:00:00	60.00	24.17	0.5	0.5	500	85.6	7.17	H_Cotton

MiniSonde5 R40859
Log File Name : 859_9_25_17
Setup Date (M/D/YYYY) : 9/25/2017
Setup Time (HH:MM:SS) : 08:33:00
Starting Date (M/D/YYYY) : 9/25/2017
Starting Time (HH:MM:SS) : 12:00:00
Stopping Date (M/D/YYYY) : 9/25/2017
Stopping Time (HH:MM:SS) : 21:00:00
Interval (HH:MM:SS) : 00:05:00
Sensor warmup (HH:MM:SS) : 00:02:00
Circltr warmup (HH:MM:SS) : 00:02:00

		DO	%Satur	SpCond
Calibration	9/25/17 8:25		100.0%	1409
Final Verifi	9/25/17 18:02		99.4%	1424

	Slope
DO	-0.01497
Conductivity	37.43501

Date M/D/YYYY	Time HH:MM:SS		Temp °C	Recorded SpCond mS/cm	SpCond mS/cm	Recorded SpCond µS/cm	LDO% Sat	LDO mg/l	
9/25/2017	16:00:00	0.00	24.34	0.5	0.493	493	98.5	8.23	H_Cotton
9/25/2017	16:05:00	5.00	24.32	0.5	0.493	493	97	8.1	H_Cotton
9/25/2017	16:10:00	10.00	24.3	0.5	0.494	494	95.8	8	H_Cotton
9/25/2017	16:15:00	15.00	24.29	0.5	0.494	494	94.4	7.89	H_Cotton
9/25/2017	16:20:00	20.00	24.28	0.5	0.494	494	93.3	7.8	H_Cotton
9/25/2017	16:25:00	25.00	24.27	0.5	0.495	495	92	7.69	H_Cotton
9/25/2017	16:30:00	30.00	24.25	0.5	0.496	496	91.4	7.65	H_Cotton
9/25/2017	16:35:00	35.00	24.24	0.5	0.496	496	89.6	7.5	H_Cotton
9/25/2017	16:40:00	40.00	24.23	0.5	0.496	496	88.8	7.43	H_Cotton
9/25/2017	16:45:00	45.00	24.22	0.5	0.497	497	88	7.37	H_Cotton
9/25/2017	16:50:00	50.00	24.21	0.5	0.497	497	87	7.28	H_Cotton
9/25/2017	16:55:00	55.00	24.2	0.5	0.498	498	86	7.2	H_Cotton
9/25/2017	17:00:00	60.00	24.2	0.5	0.498	498	85	7.12	H_Cotton

MiniSonde5 R65289
Log File Name : 289_9_25_17
Setup Date (M/D/YYYY) : 9/25/2017
Setup Time (HH:MM:SS) : 08:44:16
Starting Date (M/D/YYYY) : 9/25/2017
Starting Time (HH:MM:SS) : 12:00:00
Stopping Date (M/D/YYYY) : 9/25/2017
Stopping Time (HH:MM:SS) : 21:00:00
Interval (HH:MM:SS) : 00:05:00
Sensor warmup (HH:MM:SS) : 00:02:00
Circltr warmup (HH:MM:SS) : 00:02:00

		DO	%Satur	SpCond
Calibration	9/25/17 8:35		100.0%	1409
Final Verifi	9/25/17 18:07		98.8%	1413

	Slope
DO	-0.03021
Conductivity	10.06993

Date M/D/YYYY	Time HH:MM:SS		Temp °C	Recorded SpCond mS/cm	SpCond mS/cm	Recorded SpCond µS/cm	LDO% Sat	LDO mg/l	
9/25/2017	16:00:00	0.00	24.45	0.5	0.499	499	98.9	8.24	H_Cotton
9/25/2017	16:05:00	5.00	24.4	0.5	0.499	499	98.7	8.24	H_Cotton
9/25/2017	16:10:00	10.00	24.38	0.5	0.499	499	98.5	8.22	H_Cotton
9/25/2017	16:15:00	15.00	24.36	0.5	0.499	499	98.1	8.2	H_Cotton
9/25/2017	16:20:00	20.00	24.34	0.5	0.499	499	98.3	8.21	H_Cotton
9/25/2017	16:25:00	25.00	24.32	0.5	0.499	499	98.2	8.2	H_Cotton
9/25/2017	16:30:00	30.00	24.31	0.5	0.499	499	98.2	8.21	H_Cotton
9/25/2017	16:35:00	35.00	24.29	0.5	0.499	499	97.9	8.18	H_Cotton
9/25/2017	16:40:00	40.00	24.28	0.5	0.499	499	97.7	8.17	H_Cotton
9/25/2017	16:45:00	45.00	24.27	0.5	0.499	499	97.6	8.17	H_Cotton
9/25/2017	16:50:00	50.00	24.26	0.5	0.499	499	97.3	8.14	H_Cotton
9/25/2017	16:55:00	55.00	24.25	0.5	0.499	499	97.1	8.13	H_Cotton
9/25/2017	17:00:00	60.00	24.24	0.5	0.499	499	97.4	8.15	H_Cotton

Hydrolab MS5 R44097
Log File Name : 097-9-27-17
Setup Date (M/D/YYYY) : 9/27/2017
Setup Time (HH:MM:SS) : 07:58:23
Starting Date (M/D/YYYY) : 9/27/2017
Starting Time (HH:MM:SS) : 08:05:00
Stopping Date (M/D/YYYY) : 9/27/2017
Stopping Time (HH:MM:SS) : 21:00:00
Interval (HH:MM:SS) : 00:05:00
Sensor warmup (HH:MM:SS) : 00:02:00
Circltr warmup (HH:MM:SS) : 00:02:00

		DO	%Satur	SpCond
Calibration	9/27/17 7:55	100.0%		1413
Final Verifi	9/27/17 17:26	99.7%		1407

	Slope
DO	-0.00757
Conductivity	-15.1313

Date M/D/YYYY	Time HH:MM:SS		Temp °C	Recorded SpCond mS/cm	SpCond mS/cm	Recorded SpCond µS/cm	LDO% Sat	LDO mg/l	
9/27/2017	13:25:00	0.00	23.16	0.5	0.503	503	94	8.02	H_Wharpeth
9/27/2017	13:30:00	5.00	23.19	0.5	0.503	503	93.9	8.02	H_Wharpeth
9/27/2017	13:35:00	10.00	23.21	0.5	0.503	503	93.5	7.98	H_Wharpeth
9/27/2017	13:40:00	15.00	23.23	0.5	0.503	503	93.5	7.97	H_Wharpeth
9/27/2017	13:45:00	20.00	23.25	0.5	0.504	504	93.9	8	H_Wharpeth
9/27/2017	13:50:00	25.00	23.27	0.5	0.504	504	94.3	8.04	H_Wharpeth
9/27/2017	13:55:00	30.00	23.3	0.5	0.504	504	94.1	8.02	H_Wharpeth
9/27/2017	14:00:00	35.00	23.33	0.5	0.504	504	94.3	8.03	H_Wharpeth
9/27/2017	14:05:00	40.00	23.35	0.5	0.504	504	94.3	8.03	H_Wharpeth
9/27/2017	14:10:00	45.00	23.37	0.5	0.504	504	94.3	8.02	H_Wharpeth
9/27/2017	14:15:00	50.00	23.39	0.5	0.504	504	94.7	8.05	H_Wharpeth
9/27/2017	14:20:00	55.00	23.41	0.5	0.504	504	94.3	8.01	H_Wharpeth
9/27/2017	14:25:00	60.00	23.43	0.5	0.504	504	94.4	8.02	H_Wharpeth

MiniSonde5 R40859
Log File Name : 859-9-27-17
Setup Date (M/D/YYYY) : 9/27/2017
Setup Time (HH:MM:SS) : 05:39:14
Starting Date (M/D/YYYY) : 9/27/2017
Starting Time (HH:MM:SS) : 06:45:00
Stopping Date (M/D/YYYY) : 9/27/2017
Stopping Time (HH:MM:SS) : 21:00:00
Interval (HH:MM:SS) : 00:05:00
Sensor warmup (HH:MM:SS) : 00:02:00
Circltr warmup (HH:MM:SS) : 00:02:00

		DO	%Satur	SpCond
Calibration	9/27/17 5:37		100.0%	1409
Final Verifi	9/27/17 17:31		99.3%	1399

	Slope
DO	-0.01412
Conductivity	-20.1681

Date M/D/YYYY	Time HH:MM:SS		Temp °C	Recorded SpCond mS/cm	SpCond mS/cm	Recorded SpCond µS/cm	LDO% Sat	LDO mg/l	
9/27/2017	13:25:00	0.00	23.24	0.5	0.507	507	90.1	7.68	H_Wharpeth
9/27/2017	13:30:00	5.00	23.26	0.5	0.506	506	88.7	7.56	H_Wharpeth
9/27/2017	13:35:00	10.00	23.28	0.5	0.507	507	87.4	7.44	H_Wharpeth
9/27/2017	13:40:00	15.00	23.31	0.5	0.506	506	86.3	7.34	H_Wharpeth
9/27/2017	13:45:00	20.00	23.33	0.5	0.506	506	85.1	7.24	H_Wharpeth
9/27/2017	13:50:00	25.00	23.36	0.5	0.506	506	84.1	7.15	H_Wharpeth
9/27/2017	13:55:00	30.00	23.38	0.5	0.506	506	83.4	7.09	H_Wharpeth
9/27/2017	14:00:00	35.00	23.39	0.5	0.506	506	81.7	6.95	H_Wharpeth
9/27/2017	14:05:00	40.00	23.41	0.5	0.506	506	80.9	6.87	H_Wharpeth
9/27/2017	14:10:00	45.00	23.43	0.5	0.506	506	80.5	6.84	H_Wharpeth
9/27/2017	14:15:00	50.00	23.45	0.5	0.505	505	80.3	6.82	H_Wharpeth
9/27/2017	14:20:00	55.00	23.46	0.5	0.506	506	79.7	6.76	H_Wharpeth
9/27/2017	14:25:00	60.00	23.49	0.5	0.505	505	79.2	6.72	H_Wharpeth

MiniSonde5 R65289
Log File Name : 289-9-27-17
Setup Date (M/D/YYYY) : 9/27/2017
Setup Time (HH:MM:SS) : 05:25:47
Starting Date (M/D/YYYY) : 9/27/2017
Starting Time (HH:MM:SS) : 06:45:00
Stopping Date (M/D/YYYY) : 9/27/2017
Stopping Time (HH:MM:SS) : 21:00:00
Interval (HH:MM:SS) : 00:05:00
Sensor warmup (HH:MM:SS) : 00:02:00
Circltr warmup (HH:MM:SS) : 00:02:00

		DO	%Satur	SpCond
Calibration	9/27/17 5:24		100.0%	1409
Final Verifi	9/27/17 17:19		99.1%	1402

	Slope
DO	-0.01813
Conductivity	-14.0979

Date M/D/YYYY	Time HH:MM:SS		Temp °C	Recorded SpCond mS/cm	SpCond mS/cm	Recorded SpCond µS/cm	LDO% Sat	LDO mg/l	
9/27/2017	13:25:00	0.00	23.24	0.5	0.503	503	90.6	7.72	H_Wharpeth
9/27/2017	13:30:00	5.00	23.28	0.5	0.503	503	90.4	7.71	H_Wharpeth
9/27/2017	13:35:00	10.00	23.3	0.5	0.503	503	90.8	7.73	H_Wharpeth
9/27/2017	13:40:00	15.00	23.34	0.5	0.503	503	90.5	7.71	H_Wharpeth
9/27/2017	13:45:00	20.00	23.36	0.5	0.503	503	90.6	7.71	H_Wharpeth
9/27/2017	13:50:00	25.00	23.39	0.5	0.503	503	90.6	7.7	H_Wharpeth
9/27/2017	13:55:00	30.00	23.41	0.5	0.503	503	90.7	7.71	H_Wharpeth
9/27/2017	14:00:00	35.00	23.43	0.5	0.503	503	90.3	7.67	H_Wharpeth
9/27/2017	14:05:00	40.00	23.45	0.5	0.503	503	90.6	7.7	H_Wharpeth
9/27/2017	14:10:00	45.00	23.46	0.5	0.503	503	90.7	7.7	H_Wharpeth
9/27/2017	14:15:00	50.00	23.48	0.5	0.503	503	90.6	7.69	H_Wharpeth
9/27/2017	14:20:00	55.00	23.5	0.5	0.503	503	90.2	7.66	H_Wharpeth
9/27/2017	14:25:00	60.00	23.51	0.5	0.503	503	90.8	7.71	H_Wharpeth

Hydrolab MS5 R44097
Log File Name : 097-9-27-17
Setup Date (M/D/YYYY) : 9/27/2017
Setup Time (HH:MM:SS) : 07:58:23
Starting Date (M/D/YYYY) : 9/27/2017
Starting Time (HH:MM:SS) : 08:05:00
Stopping Date (M/D/YYYY) : 9/27/2017
Stopping Time (HH:MM:SS) : 21:00:00
Interval (HH:MM:SS) : 00:05:00
Sensor warmup (HH:MM:SS) : 00:02:00
Circltr warmup (HH:MM:SS) : 00:02:00

		DO %Satura	SpCond
Calibration	9/27/17 7:55	100.0%	1409
Final Verificatio	9/27/17 17:26	99.7%	1407

	Slope
DO	-0.007566
Conductivity	-5.043783

Date M/D/YYYY	Time HH:MM:SS		Temp °C	Recorded SpCond mS/cm	SpCond mS/cm	Recorded SpCond µS/cm	LDO% Sat	LDO mg/l	
9/27/2017	15:25:00	0.00	24.53	0.5	0.498	498	99.2	8.26	Moran
9/27/2017	15:30:00	5.00	24.5	0.5	0.498	498	97.8	8.15	Moran
9/27/2017	15:35:00	10.00	24.49	0.5	0.499	499	96.3	8.02	Moran
9/27/2017	15:40:00	15.00	24.48	0.5	0.499	499	95.1	7.92	Moran
9/27/2017	15:45:00	20.00	24.49	0.5	0.499	499	93.8	7.81	Moran
9/27/2017	15:50:00	25.00	24.49	0.5	0.499	499	92.7	7.72	Moran
9/27/2017	15:55:00	30.00	24.5	0.5	0.5	500	91	7.58	Moran
9/27/2017	16:00:00	35.00	24.5	0.5	0.5	500	89.6	7.46	Moran
9/27/2017	16:05:00	40.00	24.51	0.5	0.5	500	88.7	7.39	Moran
9/27/2017	16:10:00	45.00	24.52	0.5	0.501	501	87.5	7.28	Moran
9/27/2017	16:15:00	50.00	24.53	0.5	0.501	501	86.6	7.21	Moran
9/27/2017	16:20:00	55.00	24.54	0.5	0.501	501	85.3	7.1	Moran
9/27/2017	16:25:00	60.00	24.55	0.5	0.501	501	84.5	7.03	Moran

MiniSonde5 R40859
Log File Name : 859-9-27-17
Setup Date (M/D/YYYY) : 9/27/2017
Setup Time (HH:MM:SS) : 05:39:14
Starting Date (M/D/YYYY) : 9/27/2017
Starting Time (HH:MM:SS) : 06:45:00
Stopping Date (M/D/YYYY) : 9/27/2017
Stopping Time (HH:MM:SS) : 21:00:00
Interval (HH:MM:SS) : 00:05:00
Sensor warmup (HH:MM:SS) : 00:02:00
Circltr warmup (HH:MM:SS) : 00:02:00

		DO	%Satur	SpCond
Calibration	9/27/17 5:37		100.0%	1409
Final Verifi	9/27/17 17:31		99.3%	1399

	Slope
DO	-0.01412
Conductivity	-20.1681

Date M/D/YYYY	Time HH:MM:SS		Temp °C	Recorded SpCond mS/cm	SpCond mS/cm	Recorded SpCond µS/cm	LDO% Sat	LDO mg/l	
9/27/2017	15:25:00	0.00	24.53	0.5	0.496	496	99.4	8.28	Moran
9/27/2017	15:30:00	5.00	24.53	0.5	0.496	496	98.4	8.19	Moran
9/27/2017	15:35:00	10.00	24.54	0.5	0.496	496	96.8	8.06	Moran
9/27/2017	15:40:00	15.00	24.54	0.5	0.497	497	95.5	7.95	Moran
9/27/2017	15:45:00	20.00	24.55	0.5	0.497	497	94.5	7.86	Moran
9/27/2017	15:50:00	25.00	24.57	0.5	0.497	497	93.4	7.76	Moran
9/27/2017	15:55:00	30.00	24.57	0.5	0.497	497	92	7.65	Moran
9/27/2017	16:00:00	35.00	24.58	0.5	0.497	497	91.1	7.57	Moran
9/27/2017	16:05:00	40.00	24.59	0.5	0.497	497	89.6	7.45	Moran
9/27/2017	16:10:00	45.00	24.6	0.5	0.497	497	88.6	7.36	Moran
9/27/2017	16:15:00	50.00	24.61	0.5	0.498	498	87.4	7.26	Moran
9/27/2017	16:20:00	55.00	24.62	0.5	0.498	498	86.1	7.16	Moran
9/27/2017	16:25:00	60.00	24.63	0.5	0.498	498	85	7.06	Moran

MiniSonde5 R65289
Log File Name : 289-9-27-17
Setup Date (M/D/YYYY) : 9/27/2017
Setup Time (HH:MM:SS) : 05:25:47
Starting Date (M/D/YYYY) : 9/27/2017
Starting Time (HH:MM:SS) : 06:45:00
Stopping Date (M/D/YYYY) : 9/27/2017
Stopping Time (HH:MM:SS) : 21:00:00
Interval (HH:MM:SS) : 00:05:00
Sensor warmup (HH:MM:SS) : 00:02:00
Circltr warmup (HH:MM:SS) : 00:02:00

		DO	%Satur	SpCond
Calibration	9/27/17 5:24		100.0%	1409
Final Verifi	9/27/17 17:19		99.1%	1402

	Slope
DO	-0.01813
Conductivity	-14.0979

Date M/D/YYYY	Time HH:MM:SS		Temp °C	Recorded SpCond mS/cm	SpCond mS/cm	Recorded SpCond µS/cm	LDO% Sat	LDO mg/l	
9/27/2017	15:25:00	0.00	24.54	0.5	0.494	494	99.4	8.28	Moran
9/27/2017	15:30:00	5.00	24.55	0.5	0.494	494	99.3	8.26	Moran
9/27/2017	15:35:00	10.00	24.56	0.5	0.495	495	99.7	8.29	Moran
9/27/2017	15:40:00	15.00	24.57	0.5	0.494	494	99	8.23	Moran
9/27/2017	15:45:00	20.00	24.58	0.5	0.494	494	99	8.23	Moran
9/27/2017	15:50:00	25.00	24.59	0.5	0.494	494	99	8.23	Moran
9/27/2017	15:55:00	30.00	24.6	0.5	0.494	494	99.3	8.25	Moran
9/27/2017	16:00:00	35.00	24.61	0.5	0.494	494	99	8.22	Moran
9/27/2017	16:05:00	40.00	24.62	0.5	0.495	495	99.5	8.27	Moran
9/27/2017	16:10:00	45.00	24.63	0.5	0.494	494	98.9	8.21	Moran
9/27/2017	16:15:00	50.00	24.64	0.5	0.494	494	98.8	8.21	Moran
9/27/2017	16:20:00	55.00	24.65	0.5	0.494	494	99	8.22	Moran
9/27/2017	16:25:00	60.00	24.65	0.5	0.495	495	98.9	8.21	Moran

Hydrolab MS5 R44097
Log File Name : 097-9-26-17
Setup Date (M/D/YYYY) : 9/26/2017
Setup Time (HH:MM:SS) : 06:56:41
Starting Date (M/D/YYYY) : 9/26/2017
Starting Time (HH:MM:SS) : 08:00:00
Stopping Date (M/D/YYYY) : 9/26/2017
Stopping Time (HH:MM:SS) : 20:00:00
Interval (HH:MM:SS) : 00:05:00
Sensor warmup (HH:MM:SS) : 00:02:00
Circltr warmup (HH:MM:SS) : 00:02:00

		DO	%Satur	SpCond
Calibration	9/26/17 6:50	100.0%		1409
Final Verifi	9/26/17 16:03	98.5%		1397

	Slope
DO	-0.03906
Conductivity	-31.2477

Date M/D/YYYY	Time HH:MM:SS		Temp °C	Recorded SpCond mS/cm	SpCond mS/cm	Recorded SpCond µS/cm	LDO% Sat	LDO mg/l	
9/26/2017	14:30:00	0.00	22.07	0.6	0.593	593	106.2	9.25	L Harpeth
9/26/2017	14:35:00	5.00	22.04	0.6	0.594	594	105.8	9.23	L Harpeth
9/26/2017	14:40:00	10.00	22.03	0.6	0.594	594	105.5	9.2	L Harpeth
9/26/2017	14:45:00	15.00	22.04	0.6	0.594	594	105.5	9.2	L Harpeth
9/26/2017	14:50:00	20.00	22.05	0.6	0.594	594	104.8	9.14	L Harpeth
9/26/2017	14:55:00	25.00	22.06	0.6	0.594	594	104.6	9.12	L Harpeth
9/26/2017	15:00:00	30.00	22.08	0.6	0.594	594	104.4	9.1	L Harpeth
9/26/2017	15:05:00	35.00	22.09	0.6	0.594	594	103.7	9.04	L Harpeth
9/26/2017	15:10:00	40.00	22.12	0.6	0.594	594	103	8.97	L Harpeth
9/26/2017	15:15:00	45.00	22.14	0.6	0.594	594	102.6	8.93	L Harpeth
9/26/2017	15:20:00	50.00	22.16	0.6	0.594	594	102.7	8.94	L Harpeth
9/26/2017	15:25:00	55.00	22.18	0.6	0.594	594	102.1	8.88	L Harpeth
9/26/2017	15:30:00	60.00	22.2	0.6	0.594	594	101.4	8.82	L Harpeth

Hydrolab MS5 R41759
Log File Name : 759-9-26-17
Setup Date (M/D/YYYY) : 9/26/2017
Setup Time (HH:MM:SS) : 06:35:33
Starting Date (M/D/YYYY) : 9/26/2017
Starting Time (HH:MM:SS) : 08:00:00
Stopping Date (M/D/YYYY) : 9/26/2017
Stopping Time (HH:MM:SS) : 20:00:00
Interval (HH:MM:SS) : 00:05:00
Sensor warmup (HH:MM:SS) : 00:02:00
Circltr warmup (HH:MM:SS) : 00:02:00

		DO	%Satur	SpCond
Calibration	9/26/17 6:30		100.0%	1409
Final Verifi	9/26/17 16:21		99.8%	1396

	Slope
DO	-0.00487
Conductivity	-31.6751

Date M/D/YYYY	Time HH:MM:SS		Temp °C	Recorded SpCond mS/cm	SpCond mS/cm	Recorded SpCond µS/cm	LDO% Sat	LDO mg/l	
9/26/2017	14:30:00	0.00	22.13	0.6	0.59	590	107	9.31	L Harpeth
9/26/2017	14:35:00	5.00	22.12	0.6	0.59	590	105.4	9.18	L Harpeth
9/26/2017	14:40:00	10.00	22.12	0.6	0.59	590	103.8	9.04	L Harpeth
9/26/2017	14:45:00	15.00	22.13	0.6	0.59	590	102.1	8.89	L Harpeth
9/26/2017	14:50:00	20.00	22.14	0.6	0.59	590	101.2	8.81	L Harpeth
9/26/2017	14:55:00	25.00	22.16	0.6	0.59	590	99.9	8.69	L Harpeth
9/26/2017	15:00:00	30.00	22.17	0.6	0.59	590	98.4	8.56	L Harpeth
9/26/2017	15:05:00	35.00	22.19	0.6	0.59	590	97.5	8.48	L Harpeth
9/26/2017	15:10:00	40.00	22.22	0.6	0.59	590	96.5	8.39	L Harpeth
9/26/2017	15:15:00	45.00	22.23	0.6	0.59	590	95.2	8.27	L Harpeth
9/26/2017	15:20:00	50.00	22.25	0.6	0.59	590	94.4	8.2	L Harpeth
9/26/2017	15:25:00	55.00	22.27	0.6	0.59	590	93.4	8.11	L Harpeth
9/26/2017	15:30:00	60.00	22.29	0.6	0.59	590	92.7	8.04	L Harpeth

MiniSonde5 R65289
Log File Name : 289-9-26-17
Setup Date (M/D/YYYY) : 9/26/2017
Setup Time (HH:MM:SS) : 06:49:43
Starting Date (M/D/YYYY) : 9/26/2017
Starting Time (HH:MM:SS) : 08:00:00
Stopping Date (M/D/YYYY) : 9/26/2017
Stopping Time (HH:MM:SS) : 20:00:00
Interval (HH:MM:SS) : 00:05:00
Sensor warmup (HH:MM:SS) : 00:02:00
Circltr warmup (HH:MM:SS) : 00:02:00

		DO	%Satur	SpCond
Calibration	9/26/17 6:43		100.0%	1409
Final Verifi	9/26/17 16:33		99.3%	1394

	Slope
DO	-0.01708
Conductivity	-36.6102

Date M/D/YYYY	Time HH:MM:SS		Temp °C	Recorded SpCond mS/cm	SpCond mS/cm	Recorded SpCond µS/cm	LDO% Sat	LDO mg/l	
9/26/2017	14:30:00	0.00	22.18	0.6	0.589	589	104.7	9.11	L Harpeth
9/26/2017	14:35:00	5.00	22.16	0.6	0.589	589	104.9	9.13	L Harpeth
9/26/2017	14:40:00	10.00	22.16	0.6	0.589	589	104.9	9.13	L Harpeth
9/26/2017	14:45:00	15.00	22.18	0.6	0.589	589	104.9	9.12	L Harpeth
9/26/2017	14:50:00	20.00	22.2	0.6	0.589	589	104.9	9.12	L Harpeth
9/26/2017	14:55:00	25.00	22.22	0.6	0.589	589	104.8	9.11	L Harpeth
9/26/2017	15:00:00	30.00	22.23	0.6	0.589	589	104.7	9.1	L Harpeth
9/26/2017	15:05:00	35.00	22.25	0.6	0.589	589	104.6	9.09	L Harpeth
9/26/2017	15:10:00	40.00	22.28	0.6	0.589	589	104.6	9.08	L Harpeth
9/26/2017	15:15:00	45.00	22.3	0.6	0.589	589	104.4	9.06	L Harpeth
9/26/2017	15:20:00	50.00	22.31	0.6	0.589	589	104.5	9.06	L Harpeth
9/26/2017	15:25:00	55.00	22.33	0.6	0.589	589	104.3	9.04	L Harpeth
9/26/2017	15:30:00	60.00	22.36	0.6	0.589	589	104.5	9.06	L Harpeth

Hydrolab MS5 R44097
Log File Name : 097-9-26-17
Setup Date (M/D/YYYY) : 9/26/2017
Setup Time (HH:MM:SS) : 06:56:41
Starting Date (M/D/YYYY) : 9/26/2017
Starting Time (HH:MM:SS) : 08:00:00
Stopping Date (M/D/YYYY) : 9/26/2017
Stopping Time (HH:MM:SS) : 20:00:00
Interval (HH:MM:SS) : 00:05:00
Sensor warmup (HH:MM:SS) : 00:02:00
Circltr warmup (HH:MM:SS) : 00:02:00

		DO	%Satur	SpCond
Calibration	9/26/17 6:50	100.0%		1409
Final Verifi	9/26/17 16:03	98.5%		1397

	Slope
DO	-0.03906
Conductivity	-31.2477

Date M/D/YYYY	Time HH:MM:SS		Temp °C	Recorded SpCond mS/cm	SpCond mS/cm	Recorded SpCond µS/cm	LDO% Sat	LDO mg/l	
9/26/2017	12:25:00	0.00	24.06	0.5	0.48	480	98.5	8.27	H_100
9/26/2017	12:30:00	5.00	24.08	0.5	0.479	479	98.2	8.24	H_100
9/26/2017	12:35:00	10.00	24.1	0.5	0.48	480	97.7	8.2	H_100
9/26/2017	12:40:00	15.00	24.15	0.5	0.48	480	97.5	8.18	H_100
9/26/2017	12:45:00	20.00	24.2	0.5	0.48	480	96.9	8.12	H_100
9/26/2017	12:50:00	25.00	24.26	0.5	0.48	480	96.5	8.07	H_100
9/26/2017	12:55:00	30.00	24.29	0.5	0.48	480	96.6	8.08	H_100
9/26/2017	13:00:00	35.00	24.33	0.5	0.48	480	96.3	8.04	H_100
9/26/2017	13:05:00	40.00	24.38	0.5	0.48	480	96	8.02	H_100
9/26/2017	13:10:00	45.00	24.41	0.5	0.481	481	95.7	7.98	H_100
9/26/2017	13:15:00	50.00	24.47	0.5	0.481	481	95.8	7.99	H_100
9/26/2017	13:20:00	55.00	24.48	0.5	0.48	480	95.4	7.95	H_100
9/26/2017	13:25:00	60.00	24.52	0.5	0.481	481	95.2	7.93	H_100

MiniSonde5 R40859
Log File Name : 859-9-26-17
Setup Date (M/D/YYYY) : 9/26/2017
Setup Time (HH:MM:SS) : 06:42:22
Starting Date (M/D/YYYY) : 9/26/2017
Starting Time (HH:MM:SS) : 08:00:00
Stopping Date (M/D/YYYY) : 9/26/2017
Stopping Time (HH:MM:SS) : 20:00:00
Interval (HH:MM:SS) : 00:05:00
Sensor warmup (HH:MM:SS) : 00:02:00
Circltr warmup (HH:MM:SS) : 00:02:00

		DO	%Satur	SpCond
Calibration	9/26/17 6:36		100.0%	1409
Final Verifi	9/26/17 16:28		98.9%	1401

	Slope
DO	-0.02676
Conductivity	-19.4595

Date M/D/YYYY	Time HH:MM:SS		Temp °C	Recorded SpCond mS/cm	SpCond mS/cm	Recorded SpCond µS/cm	LDO% Sat	LDO mg/l	
9/26/2017	12:25:00	0.00	24.18	0.5	0.472	472	98.8	8.27	H_100
9/26/2017	12:30:00	5.00	24.19	0.5	0.472	472	98.1	8.21	H_100
9/26/2017	12:35:00	10.00	24.2	0.5	0.473	473	97.4	8.16	H_100
9/26/2017	12:40:00	15.00	24.26	0.5	0.474	474	97.6	8.16	H_100
9/26/2017	12:45:00	20.00	24.32	0.5	0.473	473	97.4	8.14	H_100
9/26/2017	12:50:00	25.00	24.38	0.5	0.473	473	97.4	8.13	H_100
9/26/2017	12:55:00	30.00	24.41	0.5	0.474	474	97.8	8.16	H_100
9/26/2017	13:00:00	35.00	24.44	0.5	0.474	474	97.7	8.15	H_100
9/26/2017	13:05:00	40.00	24.5	0.5	0.474	474	97.6	8.13	H_100
9/26/2017	13:10:00	45.00	24.53	0.5	0.474	474	98.8	8.22	H_100
9/26/2017	13:15:00	50.00	24.59	0.5	0.474	474	98.6	8.2	H_100
9/26/2017	13:20:00	55.00	24.59	0.5	0.475	475	99.7	8.29	H_100
9/26/2017	13:25:00	60.00	24.64	0.5	0.475	475	99.7	8.28	H_100

MiniSonde5 R65289
Log File Name : 289-9-26-17
Setup Date (M/D/YYYY) : 9/26/2017
Setup Time (HH:MM:SS) : 06:49:43
Starting Date (M/D/YYYY) : 9/26/2017
Starting Time (HH:MM:SS) : 08:00:00
Stopping Date (M/D/YYYY) : 9/26/2017
Stopping Time (HH:MM:SS) : 20:00:00
Interval (HH:MM:SS) : 00:05:00
Sensor warmup (HH:MM:SS) : 00:02:00
Circltr warmup (HH:MM:SS) : 00:02:00

		DO %Satı	SpCond
Calibration	9/26/17 6:43	100.0%	1409
Final Verifi	9/26/17 16:33	99.3%	1394

	Slope
DO	-0.0171
Conductivity	-36.61

Date M/D/YYYY	Time HH:MM:SS		Temp °C	Recorded SpCond mS/cm	SpCond mS/cm	Recorded SpCond µS/cm	LDO% Sat	LDO mg/l	
9/26/2017	12:25:00	0.00	24.17	0.5	0.472	472	98.8	8.42	H_100
9/26/2017	12:30:00	5.00	24.17	0.5	0.472	472	98.1	8.38	H_100
9/26/2017	12:35:00	10.00	24.18	0.5	0.473	473	97.4	8.37	H_100
9/26/2017	12:40:00	15.00	24.23	0.5	0.474	474	97.6	8.36	H_100
9/26/2017	12:45:00	20.00	24.29	0.5	0.473	473	97.4	8.34	H_100
9/26/2017	12:50:00	25.00	24.35	0.5	0.473	473	97.4	8.34	H_100
9/26/2017	12:55:00	30.00	24.38	0.5	0.474	474	97.8	8.33	H_100
9/26/2017	13:00:00	35.00	24.42	0.5	0.474	474	97.7	8.33	H_100
9/26/2017	13:05:00	40.00	24.48	0.5	0.474	474	97.6	8.32	H_100
9/26/2017	13:10:00	45.00	24.51	0.5	0.474	474	98.8	8.29	H_100
9/26/2017	13:15:00	50.00	24.56	0.5	0.474	474	98.6	8.3	H_100
9/26/2017	13:20:00	55.00	24.58	0.5	0.475	475	99.7	8.28	H_100
9/26/2017	13:25:00	60.00	24.63	0.5	0.475	475	99.7	8.24	H_100

Hydrolab MS5 R44097
Log File Name : 097-9-28-17
Setup Date (M/D/YYYY) : 9/28/2017
Setup Time (HH:MM:SS) : 08:47:43
Starting Date (M/D/YYYY) : 9/28/2017
Starting Time (HH:MM:SS) : 11:00:00
Stopping Date (M/D/YYYY) : 9/28/2017
Stopping Time (HH:MM:SS) : 20:00:00
Interval (HH:MM:SS) : 00:05:00
Sensor warmup (HH:MM:SS) : 00:02:00
Circltr warmup (HH:MM:SS) : 00:02:00

		DO	%Satur	SpCond
Calibration	9/28/17 8:44	100.0%	1409	
Final Verifi	9/28/17 15:22	103.5%	1384	

	Slope
DO	0.126633
Conductivity	-90.4523

Date M/D/YYYY	Time HH:MM:SS		Temp °C	Temp °F	SpCond mS/cm	Recorded SpCond µS/cm	LDO% Sat	LDO mg/l	
9/28/2017	12:45:00	0.00	24.54	76.1	0.295	295	98.9	8.24	S Harpeth
9/28/2017	12:50:00	5.00	24.55	76.2	0.295	295	97.3	8.1	S Harpeth
9/28/2017	12:55:00	10.00	24.56	76.3	0.295	295	95.8	7.96	S Harpeth
9/28/2017	13:00:00	15.00	24.57	76.5	0.296	296	95	7.89	S Harpeth
9/28/2017	13:05:00	20.00	24.58	76.6	0.296	296	94.1	7.8	S Harpeth
9/28/2017	13:10:00	25.00	24.59	76.7	0.297	297	93.2	7.72	S Harpeth
9/28/2017	13:15:00	30.00	24.6	76.9	0.297	297	92.4	7.64	S Harpeth
9/28/2017	13:20:00	35.00	24.61	77	0.297	297	91.6	7.56	S Harpeth
9/28/2017	13:25:00	40.00	24.62	77.1	0.297	297	90.7	7.48	S Harpeth
9/28/2017	13:30:00	45.00	24.63	77.2	0.298	298	90	7.42	S Harpeth
9/28/2017	13:35:00	50.00	24.64	77.3	0.298	298	89.2	7.35	S Harpeth
9/28/2017	13:40:00	55.00	24.65	77.4	0.298	298	88.1	7.25	S Harpeth
9/28/2017	13:45:00	60.00	24.65	77.5	0.298	298	87.1	7.16	S Harpeth

Hydrolab MS5 R41759
Log File Name : 097-9-28-17
Setup Date (M/D/YYYY) : 9/28/2017
Setup Time (HH:MM:SS) : 08:47:43
Starting Date (M/D/YYYY) : 9/28/2017
Starting Time (HH:MM:SS) : 11:00:00
Stopping Date (M/D/YYYY) : 9/28/2017
Stopping Time (HH:MM:SS) : 20:00:00
Interval (HH:MM:SS) : 00:05:00
Sensor warmup (HH:MM:SS) : 00:02:00
Circltr warmup (HH:MM:SS) : 00:02:00

		DO %Satur	SpCond
Calibration	9/28/17 8:44	100.0%	1409
Final Verifi	9/28/17 15:22	102.1%	1403

	Slope
DO	0.07598
Conductivity	-21.7085

Date M/D/YYYY	Time HH:MM:SS		Temp °C	Temp °F	SpCond mS/cm	Recorded SpCond µS/cm	LDO% Sat	LDO mg/l	
9/28/2017	12:45:00	0.00	17.97	64.3	0.344	344	108.3	10.25	S Harpeth
9/28/2017	12:50:00	5.00	18.4	65.1	0.34	340	107.8	10.11	S Harpeth
9/28/2017	12:55:00	10.00	18.19	64.7	0.344	344	108.3	10.2	S Harpeth
9/28/2017	13:00:00	15.00	24.85	76.7	0.299	299	99.3	8.22	S Harpeth
9/28/2017	13:05:00	20.00	24.91	76.8	0.299	299	99.6	8.24	S Harpeth
9/28/2017	13:10:00	25.00	24.97	77	0.3	300	99.6	8.23	S Harpeth
9/28/2017	13:15:00	30.00	25.05	77.1	0.3	300	99.8	8.24	S Harpeth
9/28/2017	13:20:00	35.00	25.12	77.2	0.3	300	100	8.24	S Harpeth
9/28/2017	13:25:00	40.00	25.21	77.4	0.3	300	100.1	8.23	S Harpeth
9/28/2017	13:30:00	45.00	25.29	77.5	0.3	300	100.4	8.25	S Harpeth
9/28/2017	13:35:00	50.00	25.35	77.6	0.3	300	100.1	8.21	S Harpeth
9/28/2017	13:40:00	55.00	25.4	77.7	0.3	300	100	8.2	S Harpeth
9/28/2017	13:45:00	60.00	25.47	77.8	0.3	300	100	8.18	S Harpeth

MiniSonde5 R65289
Log File Name : 289-9-28-17
Setup Date (M/D/YYYY) : 9/28/2017
Setup Time (HH:MM:SS) : 09:10:18
Starting Date (M/D/YYYY) : 9/28/2017
Starting Time (HH:MM:SS) : 11:00:00
Stopping Date (M/D/YYYY) : 9/28/2017
Stopping Time (HH:MM:SS) : 20:00:00
Interval (HH:MM:SS) : 00:05:00
Sensor warmup (HH:MM:SS) : 00:02:00
Circltr warmup (HH:MM:SS) : 00:02:00

		DO	%Satur	SpCond
Calibration	9/28/17 8:44	100.0%	1409	
Final Verifi	9/28/17 15:22	101.3%	1413	

	Slope
DO	0.047035
Conductivity	14.47236

Date M/D/YYYY	Time HH:MM:SS		Temp °C	Temp °F	SpCond mS/cm	Recorded SpCond µS/cm	LDO% Sat	LDO mg/l	
9/28/2017	12:45:00	0.00	24.57	76.2	0.301	301	96.5	8.03	S Harpeth
9/28/2017	12:50:00	5.00	24.65	76.4	0.301	301	94.4	7.85	S Harpeth
9/28/2017	12:55:00	10.00	24.73	76.5	0.302	302	93	7.72	S Harpeth
9/28/2017	13:00:00	15.00	24.8	76.6	0.302	302	92.1	7.63	S Harpeth
9/28/2017	13:05:00	20.00	24.88	76.8	0.302	302	90.6	7.5	S Harpeth
9/28/2017	13:10:00	25.00	24.95	76.9	0.303	303	89.4	7.38	S Harpeth
9/28/2017	13:15:00	30.00	25.01	77	0.303	303	88.5	7.3	S Harpeth
9/28/2017	13:20:00	35.00	25.07	77.1	0.303	303	87.6	7.22	S Harpeth
9/28/2017	13:25:00	40.00	25.13	77.2	0.303	303	86.3	7.11	S Harpeth
9/28/2017	13:30:00	45.00	25.19	77.3	0.303	303	85.5	7.03	S Harpeth
9/28/2017	13:35:00	50.00	25.24	77.4	0.304	304	84.9	6.98	S Harpeth
9/28/2017	13:40:00	55.00	25.28	77.5	0.304	304	83.9	6.9	S Harpeth
9/28/2017	13:45:00	60.00	25.33	77.6	0.304	304	83.2	6.83	S Harpeth

Hydrolab MS5 R44097
Log File Name : 097-9-26-17
Setup Date (M/D/YYYY) : 9/26/2017
Setup Time (HH:MM:SS) : 06:56:41
Starting Date (M/D/YYYY) : 9/26/2017
Starting Time (HH:MM:SS) : 08:00:00
Stopping Date (M/D/YYYY) : 9/26/2017
Stopping Time (HH:MM:SS) : 20:00:00
Interval (HH:MM:SS) : 00:05:00
Sensor warmup (HH:MM:SS) : 00:02:00
Circltr warmup (HH:MM:SS) : 00:02:00

		DO	%Satur	SpCond
Calibration	9/26/17 6:50	100.0%		1409
Final Verifi	9/26/17 16:03	98.5%		1397

	Slope
DO	-0.03906
Conductivity	-31.2477

Date M/D/YYYY	Time HH:MM:SS		Temp °C	Recorded SpCond mS/cm	SpCond mS/cm	Recorded SpCond µS/cm	LDO% Sat	LDO mg/l	
9/26/2017	8:40:00	0.00	24.57	0.4	0.426	426	53.4	4.44	H_Narrows
9/26/2017	8:45:00	5.00	24.59	0.4	0.425	425	47.8	3.98	H_Narrows
9/26/2017	8:50:00	10.00	24.59	0.4	0.424	424	43.2	3.6	H_Narrows
9/26/2017	8:55:00	15.00	24.6	0.4	0.423	423	39.5	3.28	H_Narrows
9/26/2017	9:00:00	20.00	24.63	0.4	0.423	423	35.7	2.96	H_Narrows
9/26/2017	9:05:00	25.00	24.63	0.4	0.422	422	32.2	2.68	H_Narrows
9/26/2017	9:10:00	30.00	24.65	0.4	0.421	421	29.6	2.46	H_Narrows
9/26/2017	9:15:00	35.00	24.66	0.4	0.42	420	27.2	2.26	H_Narrows
9/26/2017	9:20:00	40.00	24.66	0.4	0.42	420	24.8	2.06	H_Narrows
9/26/2017	9:25:00	45.00	24.68	0.4	0.419	419	22.9	1.9	H_Narrows
9/26/2017	9:30:00	50.00	24.69	0.4	0.419	419	21	1.75	H_Narrows
9/26/2017	9:35:00	55.00	24.69	0.4	0.418	418	19.5	1.62	H_Narrows
9/26/2017	9:40:00	60.00	24.71	0.4	0.418	418	18	1.49	H_Narrows

Hydrolab MS5 R41759
Log File Name : 759-9-26-17
Setup Date (M/D/YYYY) : 9/26/2017
Setup Time (HH:MM:SS) : 06:35:33
Starting Date (M/D/YYYY) : 9/26/2017
Starting Time (HH:MM:SS) : 08:00:00
Stopping Date (M/D/YYYY) : 9/26/2017
Stopping Time (HH:MM:SS) : 20:00:00
Interval (HH:MM:SS) : 00:05:00
Sensor warmup (HH:MM:SS) : 00:02:00
Circltr warmup (HH:MM:SS) : 00:02:00

		DO	%Satur	SpCond
Calibration	9/26/17 6:30	100.0%		1409
Final Verifi	9/26/17 16:21	99.8%		1396

	Slope
DO	-0.00487
Conductivity	-31.6751

Date M/D/YYYY	Time HH:MM:SS		Temp °C	Recorded SpCond mS/cm	SpCond mS/cm	Recorded SpCond µS/cm	LDO% Sat	LDO mg/l	
9/26/2017	8:40:00	0.00	24.74	0.4	0.43	430	75.2	6.23	H_Narrows
9/26/2017	8:45:00	5.00	24.76	0.4	0.429	429	73.4	6.08	H_Narrows
9/26/2017	8:50:00	10.00	24.77	0.4	0.43	430	72	5.96	H_Narrows
9/26/2017	8:55:00	15.00	24.79	0.4	0.429	429	70.4	5.84	H_Narrows
9/26/2017	9:00:00	20.00	24.82	0.4	0.429	429	69	5.71	H_Narrows
9/26/2017	9:05:00	25.00	24.83	0.4	0.43	430	67.4	5.58	H_Narrows
9/26/2017	9:10:00	30.00	24.85	0.4	0.43	430	66.1	5.47	H_Narrows
9/26/2017	9:15:00	35.00	24.86	0.4	0.43	430	64.8	5.36	H_Narrows
9/26/2017	9:20:00	40.00	24.88	0.4	0.43	430	63.5	5.25	H_Narrows
9/26/2017	9:25:00	45.00	24.89	0.4	0.43	430	62.4	5.16	H_Narrows
9/26/2017	9:30:00	50.00	24.9	0.4	0.43	430	61	5.04	H_Narrows
9/26/2017	9:35:00	55.00	24.92	0.4	0.43	430	59.7	4.93	H_Narrows
9/26/2017	9:40:00	60.00	24.93	0.4	0.43	430	58.5	4.84	H_Narrows

MiniSonde5 R40859
Log File Name : 859-9-26-17
Setup Date (M/D/YYYY) : 9/26/2017
Setup Time (HH:MM:SS) : 06:42:22
Starting Date (M/D/YYYY) : 9/26/2017
Starting Time (HH:MM:SS) : 08:00:00
Stopping Date (M/D/YYYY) : 9/26/2017
Stopping Time (HH:MM:SS) : 20:00:00
Interval (HH:MM:SS) : 00:05:00
Sensor warmup (HH:MM:SS) : 00:02:00
Circltr warmup (HH:MM:SS) : 00:02:00

		DO	%Satur	SpCond
Calibration	9/26/17 6:36		100.0%	1409
Final Verifi	9/26/17 16:28		98.9%	1401

	Slope
DO	-0.02676
Conductivity	-19.4595

Date M/D/YYYY	Time HH:MM:SS		Temp °C	Recorded SpCond mS/cm	SpCond mS/cm	Recorded SpCond µS/cm	LDO% Sat	LDO mg/l	
9/26/2017	8:40:00	0.00	24.69	0.4	0.425	425	75.3	6.25	H_Narrows
9/26/2017	8:45:00	5.00	24.68	0.4	0.424	424	69	5.73	H_Narrows
9/26/2017	8:50:00	10.00	24.67	0.4	0.423	423	63.6	5.28	H_Narrows
9/26/2017	8:55:00	15.00	24.66	0.4	0.421	421	58.8	4.88	H_Narrows
9/26/2017	9:00:00	20.00	24.66	0.4	0.42	420	54.5	4.53	H_Narrows
9/26/2017	9:05:00	25.00	24.66	0.4	0.419	419	50.6	4.2	H_Narrows
9/26/2017	9:10:00	30.00	24.67	0.4	0.418	418	47.4	3.94	H_Narrows
9/26/2017	9:15:00	35.00	24.67	0.4	0.417	417	44.6	3.7	H_Narrows
9/26/2017	9:20:00	40.00	24.68	0.4	0.417	417	41.9	3.48	H_Narrows
9/26/2017	9:25:00	45.00	24.68	0.4	0.416	416	39.4	3.27	H_Narrows
9/26/2017	9:30:00	50.00	24.7	0.4	0.415	415	37.1	3.08	H_Narrows
9/26/2017	9:35:00	55.00	24.7	0.4	0.415	415	35.4	2.94	H_Narrows
9/26/2017	9:40:00	60.00	24.71	0.4	0.414	414	33.8	2.8	H_Narrows

MiniSonde5 R65289
Log File Name : 289-9-26-17
Setup Date (M/D/YYYY) : 9/26/2017
Setup Time (HH:MM:SS) : 06:49:43
Starting Date (M/D/YYYY) : 9/26/2017
Starting Time (HH:MM:SS) : 08:00:00
Stopping Date (M/D/YYYY) : 9/26/2017
Stopping Time (HH:MM:SS) : 20:00:00
Interval (HH:MM:SS) : 00:05:00
Sensor warmup (HH:MM:SS) : 00:02:00
Circltr warmup (HH:MM:SS) : 00:02:00

		DO	%Satur	SpCond
Calibration	9/26/17 6:43	100.0%		1409
Final Verifi	9/26/17 16:33	99.3%		1394

	Slope
DO	-0.01708
Conductivity	-36.6102

Date M/D/YYYY	Time HH:MM:SS		Temp °C	Recorded SpCond mS/cm	SpCond mS/cm	Recorded SpCond µS/cm	LDO% Sat	LDO mg/l	
9/26/2017	8:40:00	0.00	24.76	0.4	0.43	430	82.1	6.8	H_Narrows
9/26/2017	8:45:00	5.00	24.77	0.4	0.43	430	77.7	6.44	H_Narrows
9/26/2017	8:50:00	10.00	24.78	0.4	0.43	430	74.8	6.2	H_Narrows
9/26/2017	8:55:00	15.00	24.79	0.4	0.43	430	72.4	6	H_Narrows
9/26/2017	9:00:00	20.00	24.81	0.4	0.431	431	70.5	5.84	H_Narrows
9/26/2017	9:05:00	25.00	24.82	0.4	0.431	431	69.2	5.73	H_Narrows
9/26/2017	9:10:00	30.00	24.84	0.4	0.431	431	68.1	5.64	H_Narrows
9/26/2017	9:15:00	35.00	24.85	0.4	0.431	431	67.5	5.59	H_Narrows
9/26/2017	9:20:00	40.00	24.86	0.4	0.431	431	66.8	5.53	H_Narrows
9/26/2017	9:25:00	45.00	24.87	0.4	0.43	430	66.4	5.49	H_Narrows
9/26/2017	9:30:00	50.00	24.88	0.4	0.43	430	66.4	5.49	H_Narrows
9/26/2017	9:35:00	55.00	24.89	0.4	0.43	430	66	5.46	H_Narrows
9/26/2017	9:40:00	60.00	24.9	0.4	0.43	430	65.8	5.44	H_Narrows

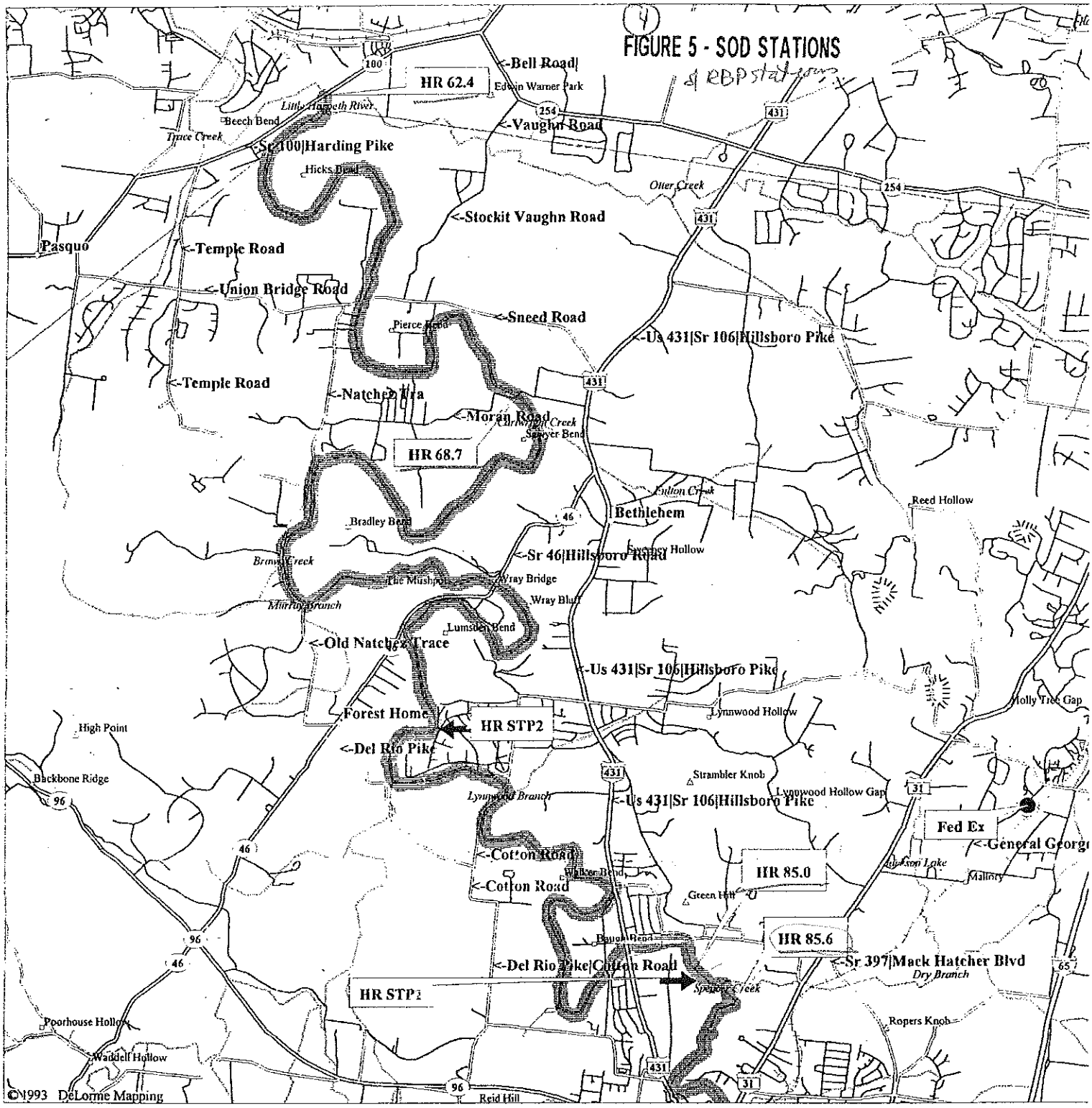
APPENDIX 4

2000 EPA SOD STUDY RESULTS

FIGURE 5 - SOD STATIONS

4

& RBP stations



LEGEND

- Population Center
- State Route
- Geo Feature
- Town, Small City
- Hill
- Park
- Interstate, Turnpike
- US Highway
- County Boundary
- Street, Road
- Hwy Ramps
- Major Street/Road
- State Route
- Interstate Highway
- US Highway
- Railroad
- River
- Open Water
- Contour

Mag 13.00
Thu Aug 10 17:35:43 2000

Scale 1:75,000 (at center)

1 Miles

2 KM

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 4

Science and Ecosystem Support Division
980 College Station Road
Athens, Georgia 30605-2720

RECEIVED

JAN 29 2001

Permit Section

January 25, 2001

4-SESD-EAB

Ms. Saya Qualls
Tennessee Department of Environment and Conservation
Division of Water Pollution Control
6th Floor, L&C Annex
401 Church Street
Nashville, TN 37243-1534

Dear Saya:

Enclosed are copies of the summarized diurnal water quality and sediment oxygen demand data for the August 22-25, 2000 study of the Harpeth River. I have stamped each page draft since I have distributed the data without all of the formal review. I will send the analytical data as soon as our office of quality assurance completes their review of that data. Meanwhile I will continue processing the reaeration data. If you have any questions concerning any of the information presented please call me anytime at (706) 355-8720.

Regards,

Mark Koenig

Mark Koenig
Environmental Engineer
Ecological Assessment Branch

PRINT
X section data & type sediment.
cool

00HRSOD.WK3

DRAFT

SEDIMENT OXYGEN DEMAND RATES
HARPETH RIVER
AUGUST 22–24, 2000

STATION	LOCATION	REPLICATE	DATE	SUBSTRATE	SOD RATE gmO2/m2/day
HR85.6	JUST UPSTREAM OF SPENCER CK	SOD CHAMBER	8/23/00	COARSE SAND & SMALL STONES W/ FINE FLOCK COVERING	
		1			4.19
		2			1.15
		4			3.25
		STATION MEAN			2.86
HR85.0	JUST DOWNSTREAM OF FRANKLIN WWTP	SOD CHAMBER	8/22/00	COARSE SAND ,SOME GRAVEL W/ FINE LAYER	
		1			2.01
		2			2.13
		4			2.77
		STATION MEAN			2.30
HR68.7	@ MORAN ROAD	SOD CHAMBER	8/23/00	COARSE SAND & SMALL STONES W/ FINE FLOCK COVERING	
		1			1.92
		2			2.54
		4			3.05
		STATION MEAN			2.50

Table
Sediment Oxygen Demand Data
Harpeth River
Franklin, Tennessee

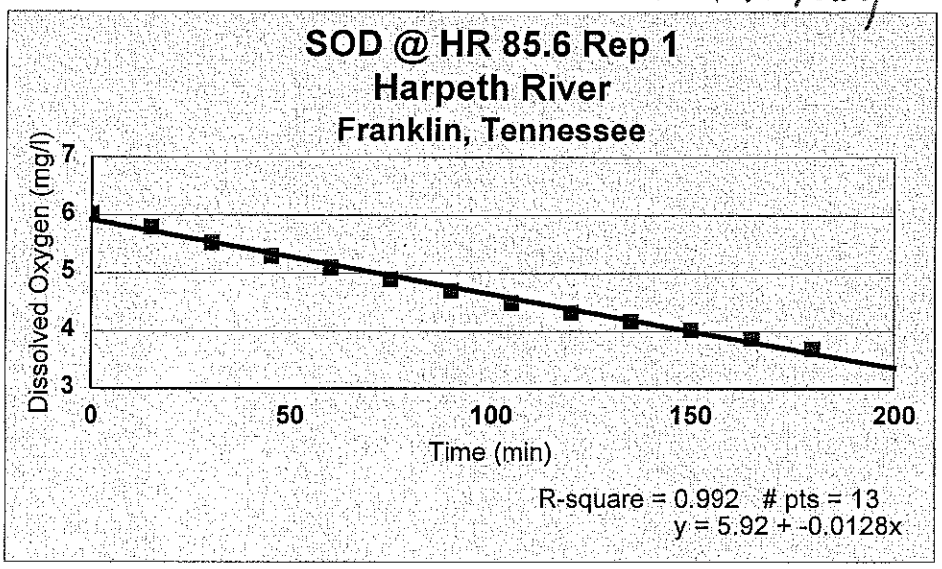
DRAFT

STA HR 85.6	Chamber 1			
Date	Time	E.T.	DO (mg/l)	Temp (C)
08/23/2000	11:00:00 AM	0	6.025	24
08/23/2000	11:15:00 AM	15	5.8	
08/23/2000	11:30:00 AM	30	5.525	
08/23/2000	11:45:00 AM	45	5.3	
08/23/2000	12:00:00 AM	60	5.1	24.25
08/23/2000	12:15:00 AM	75	4.9	
08/23/2000	12:30:00 AM	90	4.7	
08/23/2000	12:45:00 AM	105	4.5	
08/23/2000	01:00:00 PM	120	4.325	24.75
08/23/2000	01:15:00 PM	135	4.175	
08/23/2000	01:30:00 PM	150	4.025	
08/23/2000	01:45:00 PM	165	3.875	
08/23/2000	02:00:00 PM	180	3.7	25

Regression Output:

Constant		5.92
Std Err of Y Est		0.0680
R Squared		0.99
No. of Observations		13
Degrees of Freedom		11
X Coefficient(s)	-0.01278	
Std Err of Coef.	0.00034	
SOD rate =	4.19 gm O2/m2/day	
Chamber-Water Column	0.119 $gO_2/ft^2/day$	

RECEIVED
JAN 29 2001
Permit Section



DRAFT

Table
Sediment Oxygen Demand Data
Harpeth River
Franklin, Tennessee

STA HR 85.6	Chamber 2			
Date	Time	E.T.	DO (mg/l)	Temp (C)
08/23/2000	11:00:00 AM	0	6.475	24
08/23/2000	11:15:00 AM	15	6.425	
08/23/2000	11:30:00 AM	30	6.325	
08/23/2000	11:45:00 AM	45	6.3	
08/23/2000	12:00:00 AM	60	6.22	24
08/23/2000	12:15:00 AM	75	6.175	
08/23/2000	12:30:00 AM	90	6.1	
08/23/2000	12:45:00 AM	105	6.025	
08/23/2000	01:00:00 PM	120	5.975	24.5
08/23/2000	01:15:00 PM	135	5.9	
08/23/2000	01:30:00 PM	150	5.85	
08/23/2000	01:45:00 PM	165	5.825	
08/23/2000	02:00:00 PM	180	5.775	25

Regression Output:

Constant		6.47
Std Err of Y Est		0.0189
R Squared		0.99
No. of Observations		13
Degrees of Freedom		11
X Coefficient(s)	-0.00401	
Std Err of Coef.	0.00009	
SOD rate =	1.15	gm O2/m2/day
Chamber-Water Column		

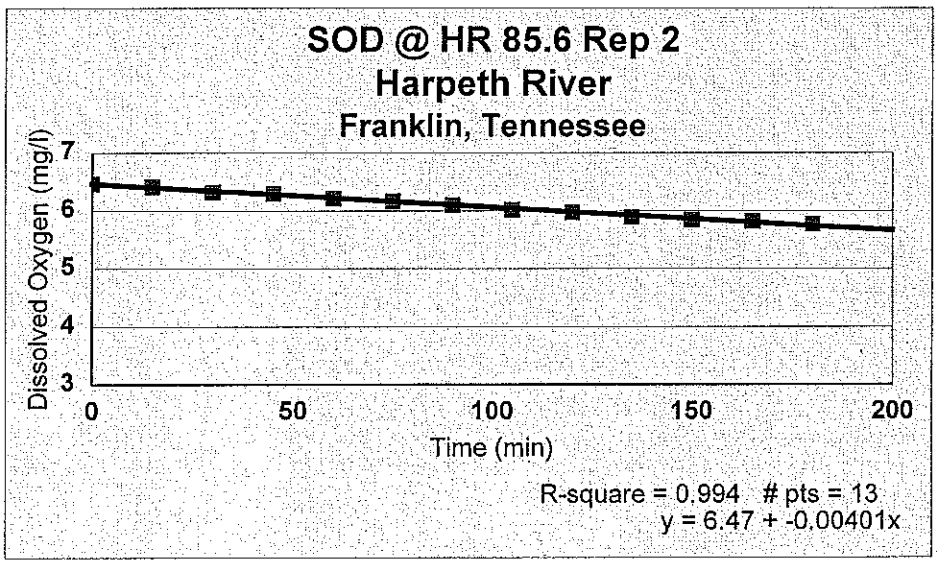


Table
Sediment Oxygen Demand Data
Harpeth River
Franklin, Tennessee

DRAFT

STA HR 85.6 Chamber 4

Date	Time	E.T.	DO (mg/l)	Temp (C)
08/23/2000	11:00:00 AM	0	5.4	24
08/23/2000	11:15:00 AM	15	5.3	
08/23/2000	11:30:00 AM	30	5.125	
08/23/2000	11:45:00 AM	45	4.95	
08/23/2000	12:00:00 AM	60	4.8	24.5
08/23/2000	12:15:00 AM	75	4.6	
08/23/2000	12:30:00 AM	90	4.475	
08/23/2000	12:45:00 AM	105	4.3	
08/23/2000	01:00:00 PM	120	4.175	24.5
08/23/2000	01:15:00 PM	135	4.025	
08/23/2000	01:30:00 PM	150	3.9	
08/23/2000	01:45:00 PM	165	3.775	
08/23/2000	02:00:00 PM	180	3.625	24.75

Regression Output:

Constant		5.40
Std Err of Y Est		0.0314
R Squared		1.00
No. of Observations		13
Degrees of Freedom		11
X Coefficient(s)	-0.01007	
Std Err of Coef.	0.00016	
S O D rate =	3.25 gm O2/m2/day	
Chamber-Water Column		

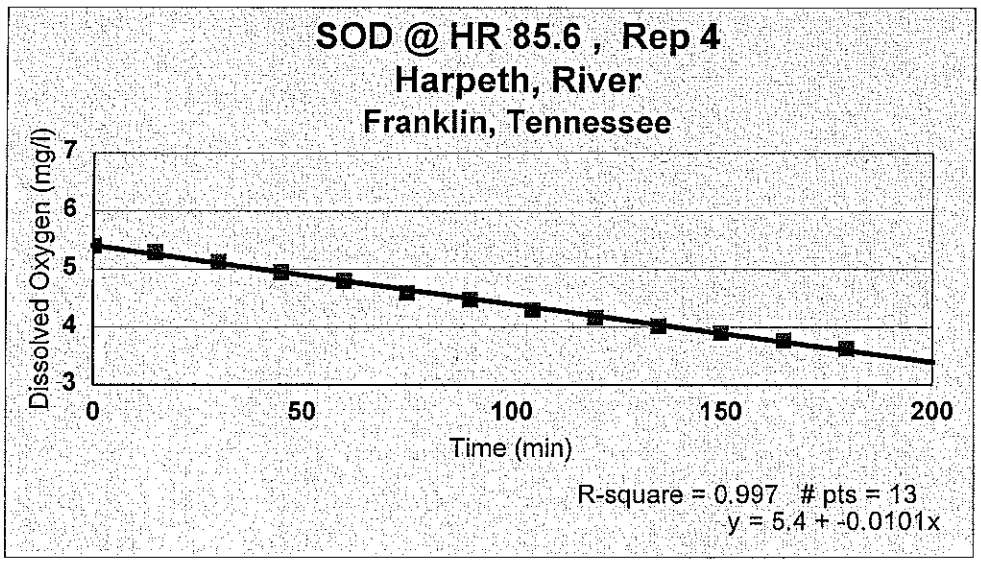


Table
Water Column Respiration Data
Harpeth River
Franklin, Tennessee

DRAFT

STA HR 85.6 Chamber 0

Date	Time	E.T.	DO (mg/l)	Temp (C)
08/23/2000	11:00:00 AM	0	6.3	24
08/23/2000	11:15:00 AM	15	6.3	
08/23/2000	11:30:00 AM	30	6.25	
08/23/2000	11:45:00 AM	45	6.25	
08/23/2000	12:00:00 AM	60	6.22	24.25
08/23/2000	12:15:00 AM	75	6.2	
08/23/2000	12:30:00 AM	90	6.2	
08/23/2000	12:45:00 AM	105	6.2	
08/23/2000	01:00:00 PM	120	6.2	24.75
08/23/2000	01:15:00 PM	135	6.2	
08/23/2000	01:30:00 PM	150	6.175	
08/23/2000	01:45:00 PM	165	6.175	
08/23/2000	02:00:00 PM	180	6.175	25

Regression Output:

Constant		6.28
Std Err of Y Est		0.0180
R Squared		0.84
No. of Observations		13
Degrees of Freedom		11
X Coefficient(s)	-0.00068	
Std Err of Coef.	0.00009	

Water Column Respiration Rate = -0.00068 mg O2/l/min

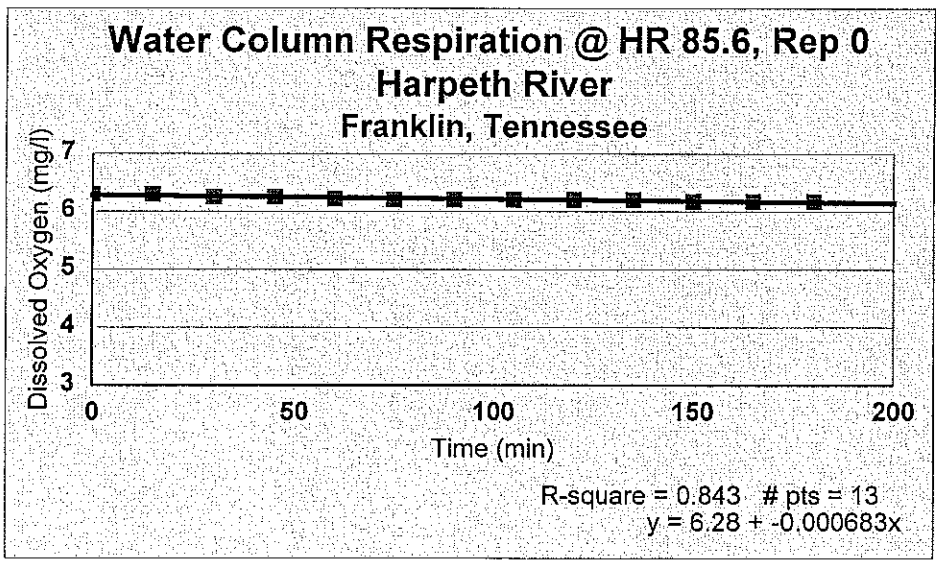


Table
Sediment Oxygen Demand Data
Harpeth River
Franklin, Tennessee

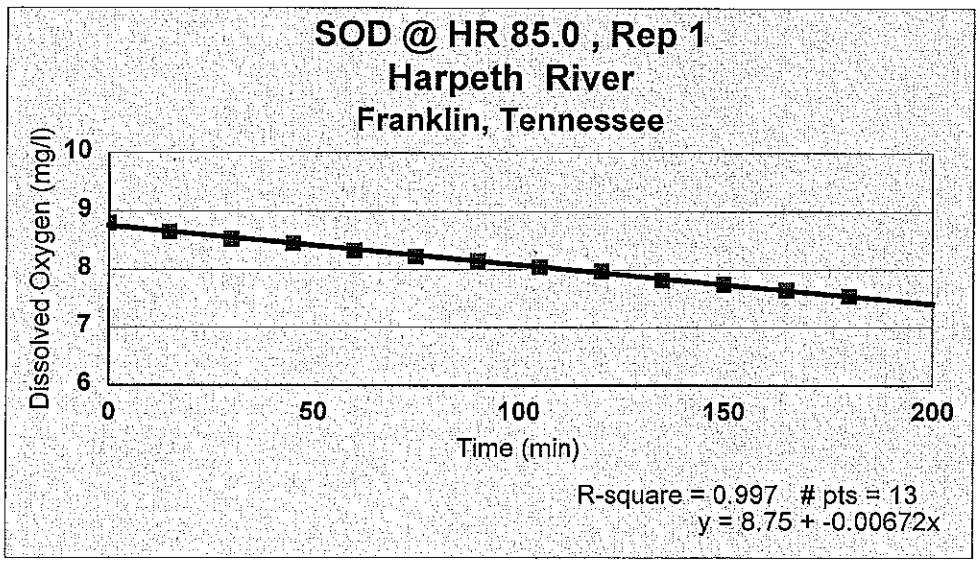
DRAFT

STA HR 85.0 Date	Chamber 1 Time	E.T.	DO (mg/l)	Temp (C)
08/22/2000	10:45:00 AM	0	8.8	24.75
08/22/2000	11:00:00 AM	15	8.65	
08/22/2000	11:15:00 AM	30	8.525	
08/22/2000	11:30:00 AM	45	8.45	
08/22/2000	11:45:00 AM	60	8.325	25
08/22/2000	12:00:00 AM	75	8.225	
08/22/2000	12:15:00 PM	90	8.15	
08/22/2000	12:30:00 PM	105	8.05	
08/22/2000	12:45:00 PM	120	7.975	
08/22/2000	13:00:00 PM	135	7.825	25.25
08/22/2000	13:15:00 PM	150	7.75	
08/22/2000	13:30:00 PM	165	7.65	
08/22/2000	13:45:00 PM	180	7.55	

Regression Output:

Constant		8.75
Std Err of Y Est		0.0223
R Squared		1.00
No. of Observations		13
Degrees of Freedom		11
X Coefficient(s)	-0.00672	
Std Err of Coef.	0.00011	

SOD rate = 2.01 gm O2/m2/day
(CHAMBER-WATER COLUMN)



DRAFT

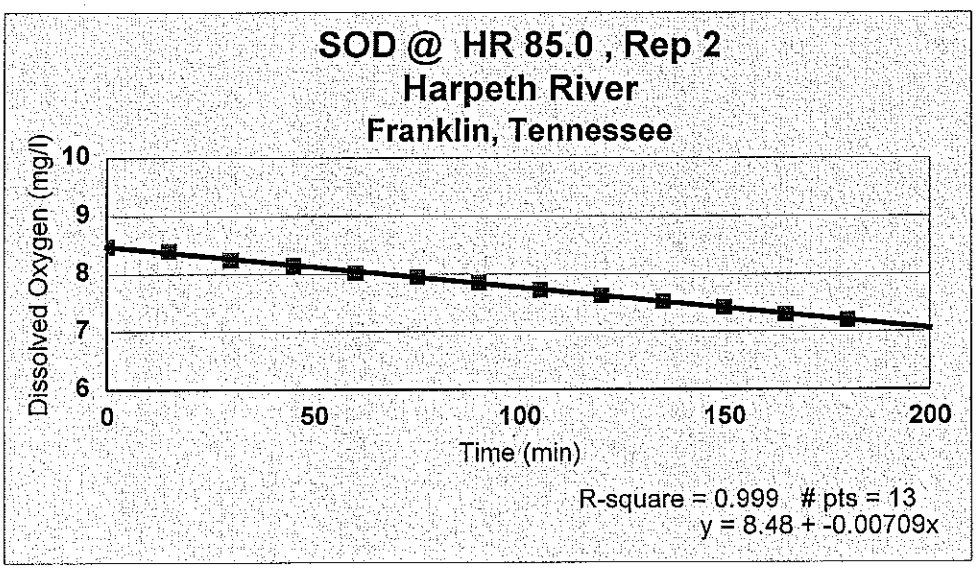
Table
Sediment Oxygen Demand Data
Harpeth River
Franklin, Tennessee

STA HR 85.0 Date	Chamber 2 Time	E.T.	DO (mg/l)	Temp (C)
08/22/2000	10:45:00 AM	0	8.475	24.5
08/22/2000	11:00:00 AM	15	8.4	
08/22/2000	11:15:00 AM	30	8.25	
08/22/2000	11:30:00 AM	45	8.15	
08/22/2000	11:45:00 AM	60	8.025	24.75
08/22/2000	12:00:00 AM	75	7.95	
08/22/2000	12:15:00 PM	90	7.85	
08/22/2000	12:30:00 PM	105	7.725	
08/22/2000	12:45:00 PM	120	7.625	
08/22/2000	13:00:00 PM	135	7.525	25.25
08/22/2000	13:15:00 PM	150	7.425	
08/22/2000	13:30:00 PM	165	7.3	
08/22/2000	13:45:00 PM	180	7.2	

Regression Output:

Constant		8.48
Std Err of Y Est		0.0143
R Squared		1.00
No. of Observations		13
Degrees of Freedom		11
X Coefficient(s)	-0.00709	
Std Err of Coef.	0.00007	

SOD rate = 2.13 gm O2/m2/day
(CHAMBER-WATER COLUMN)



DRAFT

Table
Sediment Oxygen Demand Data
Harpeth River
Franklin, Tennessee

STA HR 85.0 Date	Chamber 4 Time	E.T.	DO (mg/l)	Temp (C)
08/22/2000	10:45:00 AM	0	8.425	24.75
08/22/2000	11:00:00 AM	15	8.25	
08/22/2000	11:15:00 AM	30	8.1	
08/22/2000	11:30:00 AM	45	7.9	
08/22/2000	11:45:00 AM	60	7.825	25
08/22/2000	12:00:00 AM	75	7.7	
08/22/2000	12:15:00 PM	90	7.55	
08/22/2000	12:30:00 PM	105	7.425	
08/22/2000	12:45:00 PM	120	7.3	
08/22/2000	13:00:00 PM	135	7.125	25.25
08/22/2000	13:15:00 PM	150	7.05	
08/22/2000	13:30:00 PM	165	6.9	
08/22/2000	13:45:00 PM	180	6.8	

Regression Output:

Constant		8.37
Std Err of Y Est		0.0325
R Squared		1.00
No. of Observations		13
Degrees of Freedom		11
X Coefficient(s)	-0.00892	
Std Err of Coef.	0.00016	

SOD rate = 2.77 gm O2/m2/day
(CHAMBER-WATER COLUMN)

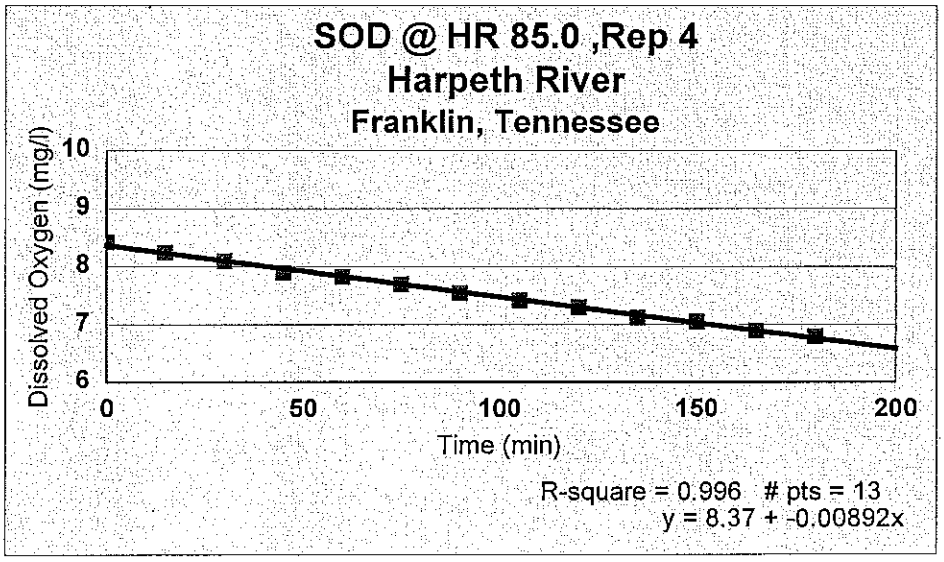


Table
Water Column Respiration Data
Harpeth River
Franklin, Tennessee

DRAFT

STA HR 85.0 Date	Chamber 0 Time	E.T.	DO (mg/l)	Temp (C)
08/22/2000	10:45:00 AM	0	8.4	24.5
08/22/2000	11:00:00 AM	15	8.35	
08/22/2000	11:15:00 AM	30	8.325	
08/22/2000	11:30:00 AM	45	8.3	
08/22/2000	11:45:00 AM	60	8.3	25
08/22/2000	12:00:00 AM	75	8.3	
08/22/2000	12:15:00 PM	90	8.3	
08/22/2000	12:30:00 PM	105	8.275	
08/22/2000	12:45:00 PM	120	8.25	
08/22/2000	13:00:00 PM	135	8.25	25.5
08/22/2000	13:15:00 PM	150	8.25	
08/22/2000	13:30:00 PM	165	8.2	
08/22/2000	13:45:00 PM	180	8.2	

Regression Output:

Constant		8.37
Std Err of Y Est		0.0169
R Squared		0.92
No. of Observations		13
Degrees of Freedom		11
X Coefficient(s)	-0.00092	
Std Err of Coef.	0.00008	

Water Column = Respiration Rate -0.00092 mg O2/l/min

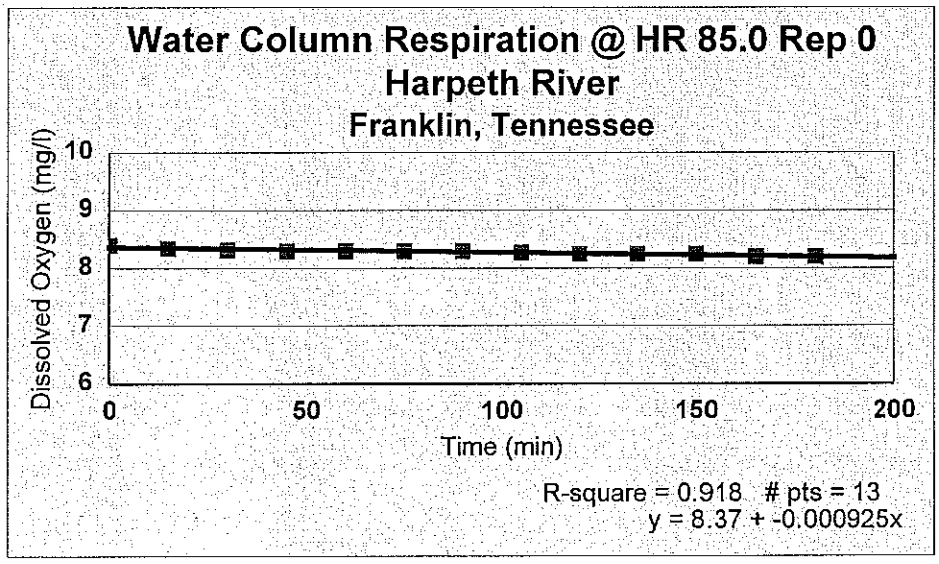


Table
Sediment Oxygen Demand Data
Harpeth River
Franklin, Tennessee

DRAFT

STA HR 68.7 Chamber 1

Date	Time	E.T.	DO (mg/l)	Temp (C)
08/24/2000	12:10:00 AM	0	6.8	
08/24/2000	12:25:00 AM	15	6.7	
08/24/2000	12:40:00 AM	30	6.6	
08/24/2000	12:55:00 AM	45	6.5	26
08/24/2000	01:10:00 PM	60	6.4	
08/24/2000	01:25:00 PM	75	6.3	
08/24/2000	01:40:00 PM	90	6.2	
08/24/2000	01:55:00 PM	105	6.1	26.25
08/24/2000	02:10:00 PM	120	6	
08/24/2000	02:25:00 PM	135	5.9	
08/24/2000	02:40:00 PM	150	5.8	
08/24/2000	02:55:00 PM	165	5.7	26.5

Regression Output:

Constant		6.80
Std Err of Y Est		0.0000
R Squared		1.00
No. of Observations		12
Degrees of Freedom		10
X Coefficient(s)	-0.00667	
Std Err of Coef.	0.00000	

SOD rate = 1.92 gm O2/m2/day
Chamber-Water Column

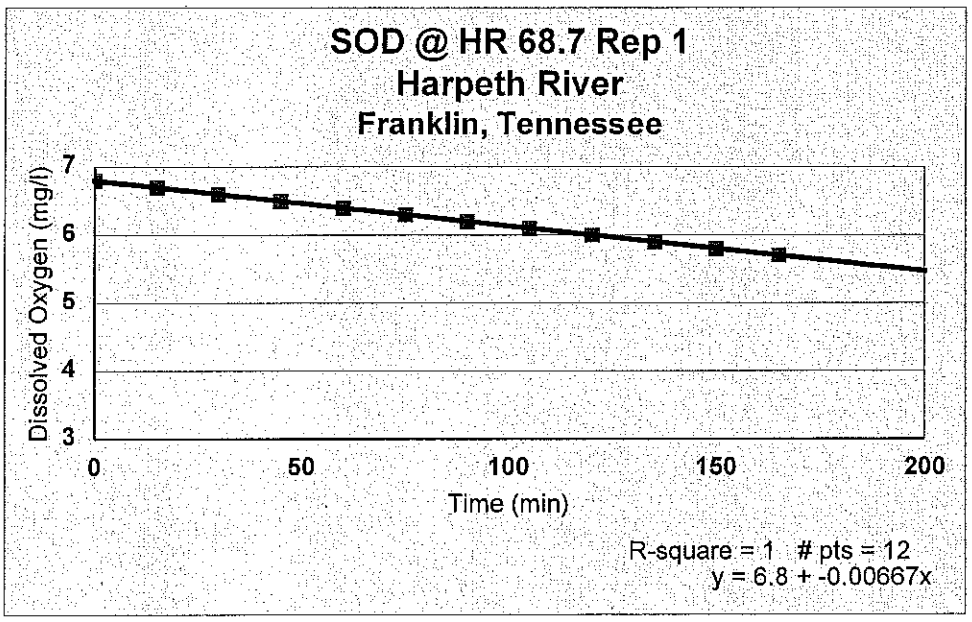


Table
Sediment Oxygen Demand Data
Harpeth River
Franklin, Tennessee

DRAFT

STA HR 68.7 Chamber 2

Date	Time	E.T.	DO (mg/l)	Temp (C)
08/24/2000	12:10:00 AM	0	6.9	
08/24/2000	12:25:00 AM	15	6.725	
08/24/2000	12:40:00 AM	30	6.575	
08/24/2000	12:55:00 AM	45	6.425	26
08/24/2000	01:10:00 PM	60	6.325	
08/24/2000	01:25:00 PM	75	6.175	
08/24/2000	01:40:00 PM	90	6.025	
08/24/2000	01:55:00 PM	105	5.9	26
08/24/2000	02:10:00 PM	120	5.825	
08/24/2000	02:25:00 PM	135	5.7	
08/24/2000	02:40:00 PM	150	5.6	
08/24/2000	02:55:00 PM	165	5.475	26.25

Regression Output:

Constant		6.84
Std Err of Y Est		0.0362
R Squared		0.99
No. of Observations		12
Degrees of Freedom		10
X Coefficient(s)	-0.00847	
Std Err of Coef.	0.00020	

SOD rate = 2.54 gm O2/m2/day
Chamber-Water Column

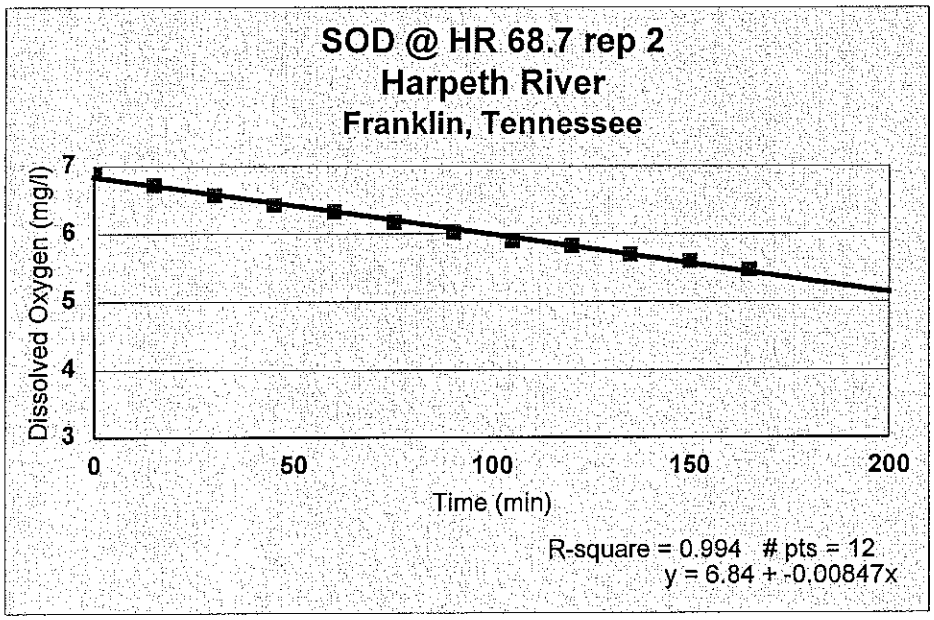


Table
Sediment Oxygen Demand Data
Harpeth River
Franklin, Tennessee

DRAFT

STA HR 68.7 Chamber 4

Date	Time	E.T.	DO (mg/l)	Temp (C)
08/24/2000	12:10:00 AM	0	6.6	
08/24/2000	12:25:00 AM	15	6.4	
08/24/2000	12:40:00 AM	30	6.225	
08/24/2000	12:55:00 AM	45	6.05	26
08/24/2000	01:10:00 PM	60	5.925	
08/24/2000	01:25:00 PM	75	5.8	
08/24/2000	01:40:00 PM	90	5.65	
08/24/2000	01:55:00 PM	105	5.5	26.25
08/24/2000	02:10:00 PM	120	5.35	
08/24/2000	02:25:00 PM	135	5.2	
08/24/2000	02:40:00 PM	150	5.05	
08/24/2000	02:55:00 PM	165	4.925	26.5

Regression Output:

Constant	6.54
Std Err of Y Est	0.0260
R Squared	1.00
No. of Observations	12
Degrees of Freedom	10
X Coefficient(s)	-0.00995
Std Err of Coef.	0.00014

S O D 3.05 gm O2/m2/day
Chamber-Water Column

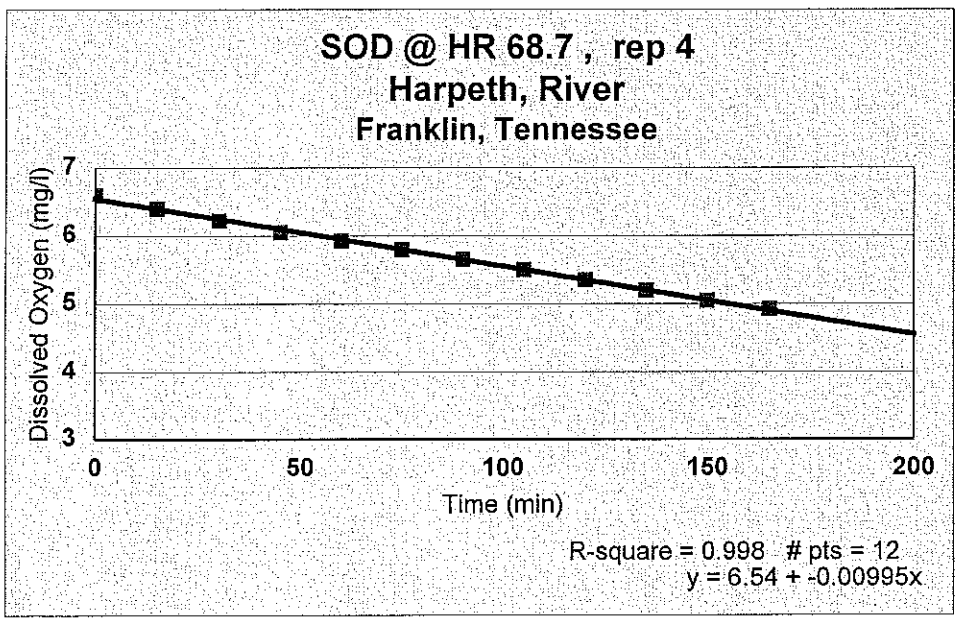


Table
Water Column Respiration Data
Harpeth River
Franklin, Tennessee

DRAFT

STA HR 68.7 Chamber 0

Date	Time	E.T.	DO (mg/l)	Temp (C)
08/24/2000	12:10:00 AM	0	7.35	26
08/24/2000	12:25:00 AM	15	7.35	
08/24/2000	12:40:00 AM	30	7.325	
08/24/2000	12:55:00 AM	45	7.325	
08/24/2000	01:10:00 PM	60	7.3	
08/24/2000	01:25:00 PM	75	7.275	
08/24/2000	01:40:00 PM	90	7.275	
08/24/2000	01:55:00 PM	105	7.25	26.25
08/24/2000	02:10:00 PM	120	7.225	
08/24/2000	02:25:00 PM	135	7.2	
08/24/2000	02:40:00 PM	150	7.2	
08/24/2000	02:55:00 PM	165	7.175	25.5

Regression Output:

Constant		7.36
Std Err of Y Est		0.0087
R Squared		0.98
No. of Observations		12
Degrees of Freedom		10
X Coefficient(s)	-0.00112	
Std Err of Coef.	0.00005	

Water Column Respiration Rate = -0.00112 g O2/l/min