The Bryant Creek assessment project

In
Douglas and Ozark counties, Missouri

An ongoing
Volunteer water quality monitoring
Project Of the

Ozark chapter

of

Missouri master naturalists

Updated through March 29, 2013

The Project

In Spring 2010, members of the Ozark Chapter of Missouri Master Naturalists undertook an ambitious project to conduct chemical and biological monitoring at every mile of the "floatable portion" of Bryant Creek, in Douglas and Ozark County, Missouri. Beginning at the Vera Cruz MDC Access ("Mile 0.0"), and continuing to the creek's confluence with the North Fork of the White River, the group completed an initial survey in May 2010, providing GPS coordinates for forty-nine sampling sites, collecting readings on turbidity, pH, air and water temperature, conductivity, dissolved oxygen, and phosphates at each location. An effort, hampered by high and dangerous water conditions, was made to provide macroinvertebrate collection data at each point. This portion of the project met with limited initial success, and only about one quarter of the sites were initially sampled for aquatic macroinvertebrates.

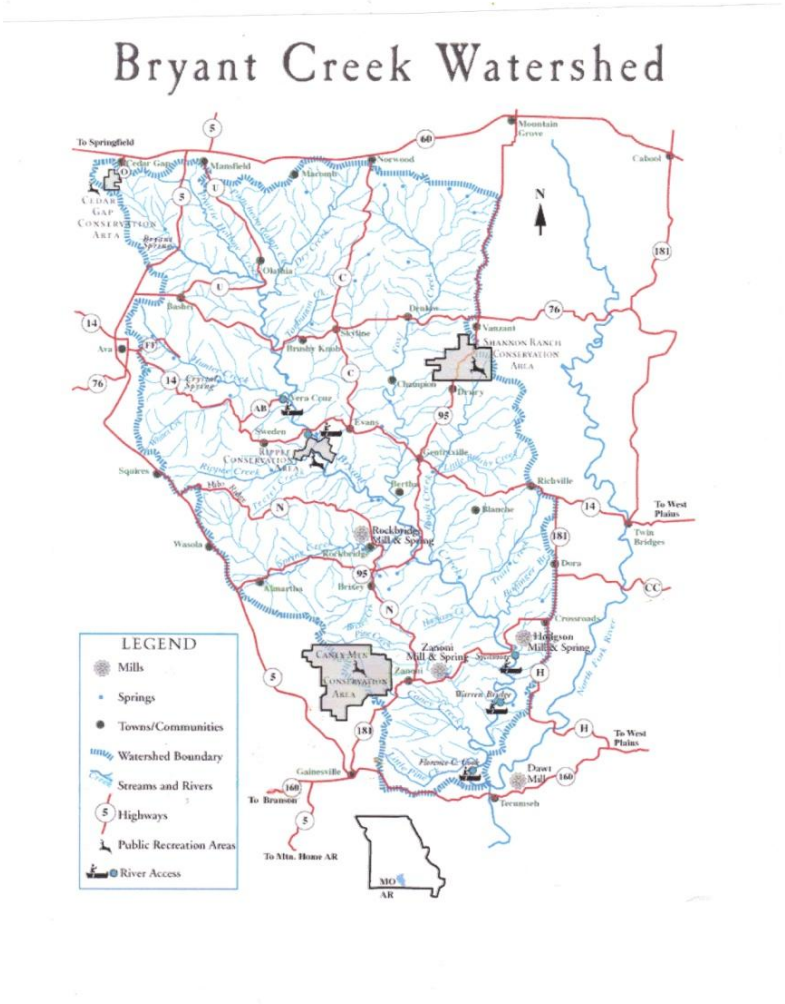
All data collected was submitted to Missouri Stream Team volunteer water quality monitoring personnel in Jefferson City in May 2010. In addition, an initial report, ***A Biological and Chemical Assessment of Bryant Creek in Douglas and Ozark Counties, Missouri,*** was completed to summarize the findings, with copies furnished to Missouri Stream Team personnel. This current report is an effort to provide a continuing, ongoing report of subsequent annual samplings at each site. Throughout the report, "BCAP" signifies "Bryant Creek Assessment Project", and the sampling sites are numbered consecutively, upstream-to-downstream, from 1-49. All data collected is under the immediate supervision of trained Volunteer Water Quality Monitors, trained and certified at Level 2 or Level 3. All data is, or has been, submitted to Missouri Stream Team.

Participants

Janet Arth, Caulfield, CMN, Introductory Level VWQM
Tom Arth, Caulfield, CMN, Level 2 VWQM
Bob Bohemier, Willow Springs, CMN, Level 1 VWQM
Barbara Cody, West Plains, CMN, Level 2 VWQM
Becky Estes, West Plains, CMN, Introductory Level VWQM
Eric Fremgen, Willow Springs, CMN, Level 1 VWQM
Dan Martin, Caulfield
Martha Mills, West Plains, CMN, Level 2 VWQM
Lorri Orlowski, West Plains
Caroline Pickering, West Plains, Introductory Level VWQM
Tim Pickering, West Plains
John Rothgeb, Caulfield, CMN, Level 3 VWQM
Sue Roberts, West Plains, CMN, Level 2 VWQM
George Sims, Mansfield, CMN, Level 3 VWQM
Alan Suffridge, West Plains

(CMN – Certified Master Naturalist; MNI—Master Naturalist Intern; VWQM – Volunteer Water Quality Monitor)

The Stream



"Bryant Creek is a typical losing stream. It begins as an intermittent flow fed by several small drainages. The headwaters lie within what is now the Cedar Gap Conservation Area, at an altitude of about one thousand feet above sea level.

At Bryant Spring, near Ava, it becomes perennial for several miles, and around Dry Creek, it disappears underground. Just above Tarbutton Creek it resurfaces, and resumes its flow as a perennial (year-round) stream. At its confluence with the North Fork, its altitude is about five hundred and sixty feet above sea level.

The total length of Bryant Creek is about 60 miles, from its headwaters in Wright County until it flows into the North Fork River just above Norfork Lake in Ozark County. It is floatable for 42.6 miles from Vera Cruz to the North Fork." (Bryant Watershed Education Project)

The Sampling Sites

Site	Location	Mile	Team	Latitude	Longitude
1	Vera Cruz	0.00	SIMS	36.91412	92.49550
2		1.00	SIMS	36.90326	92.48869
3		2.00	SIMS	36.89349	92.48801
4	Highway 14	3.00	SIMS	36.88719	92.47341
5		4.00	SIMS	36.87834	92.46738
6	Rippee Access	4.50	SIMS	36.87134	92.47202
7		5.00	SIMS	36.86959	92.46518
8		6.00	SIMS	36.86167	92.45451
9	Monastery Bridge	6.80	SIMS	36.85174	92.45908
10		0.20	SIMS	36.85022	92.45705
11		1.30	SIMS	36.85433	92.43963
12		2.30	SIMS	36.84424	92.42919
13		3.20	SIMS	36.83745	92.42202
14		4.20	SIMS	36.83490	92.41315
15		5.20	SIMS	36.83317	92.39885
16	Bertha Bridge	5.85	SIMS	36.82671	92.39013
17		0.45	SIMS	36.82542	92.38482
18		1.45	SIMS	36.81785	92.38049
19		2.45	SIMS	36.80939	92.37354
20		3.45	SIMS	36.80035	92.36142
21		4.45	SIMS	36.78889	92.36805
22	Highway 95		CODY/MILLS	36.78310	92.36694
23		0.70	CODY/MILLS	36.77808	92.35693
24		1.70	CODY/MILLS	36.78064	92.34158

25		2.70	CODY/MILLS	36.76926	92.33888
26		3.70	CODY/MILLS	36.76222	92.32835
27		4.70	CODY/MILLS	36.75787	92.31480
28		5.70	CODY/MILLS	36.74563	92.31130
29		6.70	CODY/MILLS	36.73487	92.30096
30		7.70	CODY/MILLS	36.73524	92.28699
31		8.70	CODY/MILLS	36.72411	92.28157
32	Sycamore Access		ROTHGEB	36.70754	92.26486
33		1.01	ROTHGEB	36.69535	92.26439
34		2.10	ROTHGEB	36.68901	92.27448
35		3.12	ROTHGEB	36.67948	92.26787
36		3.99	ROTHGEB	36.67935	92.28034
37		5.02	ROTHGEB	36.67422	92.27876
38		6.00	ROTHGEB	36.67311	92.26380
39		7.05	ROTHGEB	36.66296	92.27131
40	Warren Bridge		ROTHGEB	36.66816	92.28104
41		1.03	ARTH	36.65696	92.28264
42		3.15	ARTH	36.63735	92.28860
43		3.56	ARTH	36.63377	92.28618
44		4.38	ARTH	36.62775	92.29045
45		6.42	ARTH	36.62481	92.30119
46		7.92	ARTH	36.61530	92.29269
47		9.57	ARTH	36.60128	92.31009
48		10.08	ARTH	36.59792	92.29357
49	North Fork	11.30	ARTH	36.59633	92.28886

Methodology

At each site, precise geographic coordinates were determined, utilizing Garmin GPSMAP 76CSx global positioning units, provided for the project by Missouri Stream Team, or personally owned Garmin eTrex and Bushnell ONIX 200CR units (Team A) and reported in DDD.ddddd format. Air and water temperatures, measured in degrees Celcius, were recorded at each sampling site.

Chemical Sampling:

At the direction of Priscilla Stotts, former Volunteer Water Quality Monitoring Coordinator for the Missouri Stream Team program, the sampling teams conducted chemical/physical testing at each site, following sampling guidelines as taught in the Missouri Volunteer Water Quality Monitoring program, Introductory through Level 2 training. Each team was led by one or more VWQM volunteers who had completed Level 2, or higher, training, and been certified at that level. Tests performed at each site included:

- **pH** Samples were analyzed, using the Hach Pocket Pal pH Tester, as provided by Missouri Stream Team. The devices were pre-calibrated before use, using a two-point calibration at pH 7.00 and 10.00.
- **Conductivity** Samples were analyzed, using the ECTester conductivity pen, supplied by Missouri Stream Team. The devices were pre-calibrated prior to use, using a calibration solution of 1000 µS/cm.
- **Turbidity** Samples were analyzed for turbidity, using the turbidity tubes supplied by the VWQM program. Turbidity was measured in Nephelometric Turbidity Units (NTU).
- **Dissolved Oxygen** Samples were analyzed, using the Hach Model OX-2P dissolved oxygen test kit, with results reported in mg/l and in percentage saturation.
- **Phosphate** Although phosphate testing is not normally conducted by the Missouri VWQM program, the teams performed phosphate analysis at the request of Priscilla Stotts, using Hach Pocket Colorimeter II test kits, provided for the project by Missouri Stream Team.
- **Nitrate** Nitrate analysis, normally conducted as part of the chemical analysis mandated by the VWQM procedures, was initially *not* performed in 2010 and 2011, at the request of the VWQM program; however, beginning with the 2012 sampling season, nitrate analysis was added to the sampling protocol.

Biological Sampling:

At each sampling site, ***where water conditions were conducive to macroinvertebrate sampling***, three samplings for benthic macroinvertebrates were conducted, utilizing one-meter nets, as provided by the VWQM program. Some teams performed on-site identifications. Other teams, because of the distance and time factors involved, preserved the captured specimens in an 80% ethyl alcohol solution, for later identification and classification by Level 2 or 3 monitors. All procedures, as presented in Missouri VWQM training, were followed.

Acknowledgements

Grateful appreciation is extended to the following individuals and organizations who made this project possible and successful:

Andrew Branson, Stream Team Biologist, MDC
Jim and Dianne Darlington, Meramec River Kayak Swarm
Sherry Fischer, VWQM Coordinator, Missouri Stream Team, MDC
Susan Higgins, VWQM Coordinator, Missouri Stream Team, DNR
Amy Meier, Stream Team Biologist, MDC
Chris Riggert, VWQM Coordinator, Missouri Stream Team, MDC
Priscilla Stotts, Former VWQM Coordinator, Missouri Stream Team, DNR
Missouri Department of Conservation
Missouri Department of Natural Resources
Missouri Stream Team
Ozark Chapter, Missouri Master Naturalist

Site 1

Vera Cruz MDC access, mile 0.0
Immediately downstream of County Road C-224
Douglas County
Lat 36.91412°N, Long 92.49550°W

April 2010

August 2010

March 2012

Biological Sampling

Date	Lvl	Cd	Db	My	RS	Rf	St	Pn	OB	Cm	Cr	Cy	Dr	Da	Sd	FF	Al	Ws	AW	BF	Lc	Md	LS	OS	Score
5/10	2	3		6			25					1							1			2			15
8/10	2	9		15		1						7													11
4/11	2	7		24		1					5	1							14			1			15
3/12	2	2		22																1		1			8
3/13	3	3		23	4		5	1			1	2						2					1		22

Sensitive

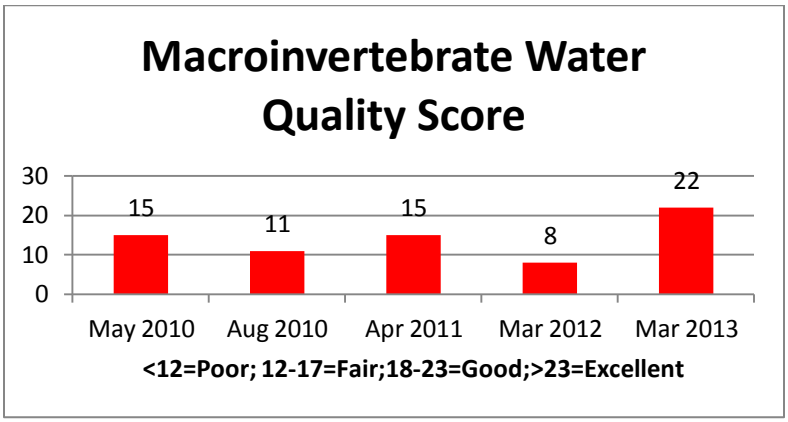
Cd – Caddisfly
Db – Dobsonfly
My- Mayfly
RS – Right Snail
Rf – Riffle Beetle
St – Stonefly
Pn – Water Penny

Somewhat Tolerant

OB – Other Beetle
Cm – Clam/Mussel
Cr – Cranefly
Cy – Crayfish
Dr – Dragonfly
Da – Damselfly
Sd -- Scud
FF -- Fishfly
Al - Alderfly
Ws – Watersnipe Fly

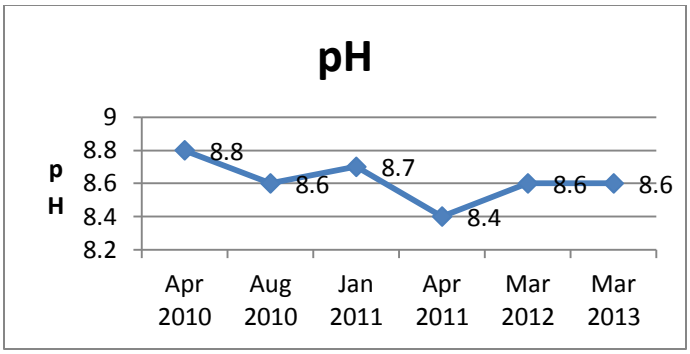
Tolerant

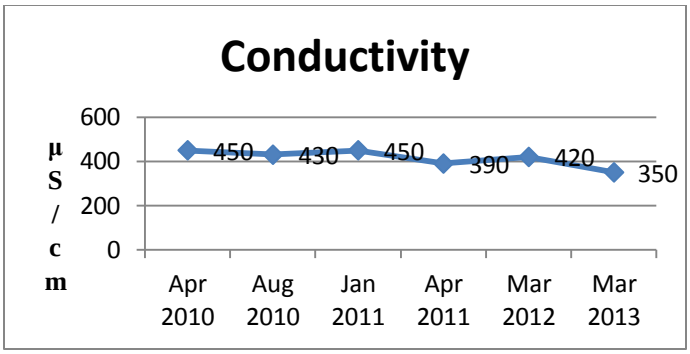
AW – Aquatic Worm
BF - Blackfly
Lc - Leech
Md - Midge
LS – Left Snail
OS – Other Snail

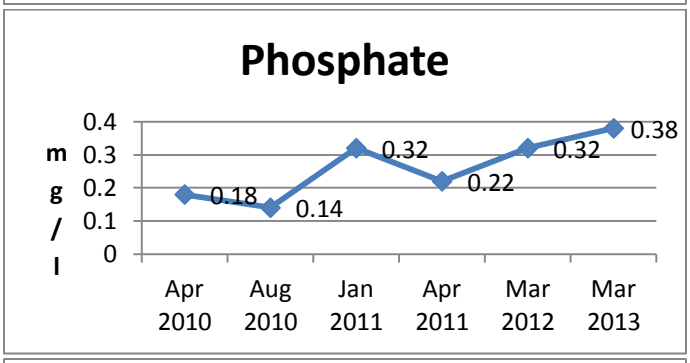


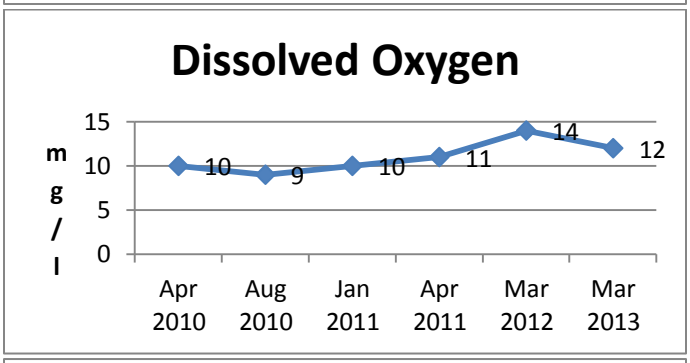
Chemical Sampling

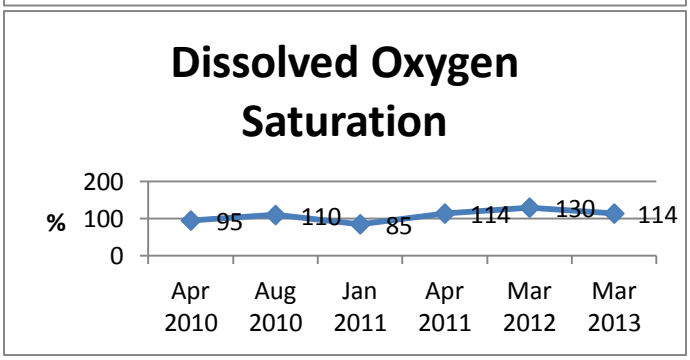
Date	Level	Air	Water	pH	Cond	Phosphate	Turbidity	DO/Sat	Nitrate
4/2/10	2	17°	13°	8.8	450	0.18	<10	10/95%	-
8/8/10	2	40°	25.5°	8.6	430	0.14	<10	9/110%	0.25
1/29/11	2	14°	8°	8.7	450	0.32	<10	10/85%	0.25
4/8/11	2	30°	17°	8.4	390	0.22	<10	11/114%	0.5
3/10/12	2	19°	12°	8.6	420	0.32	<10	14/130%	0.25
3/28/13	3	15°	13°	8.6	350	0.38	<10	12/114%	0.5

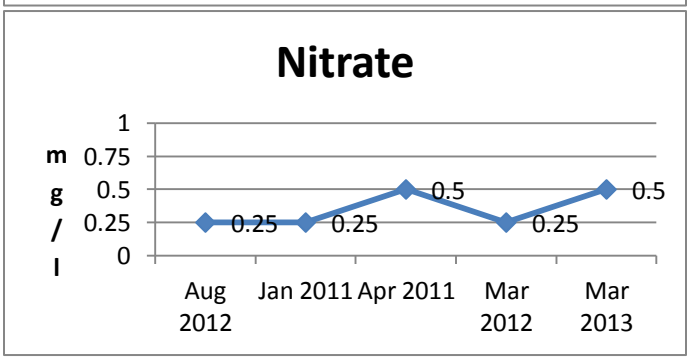










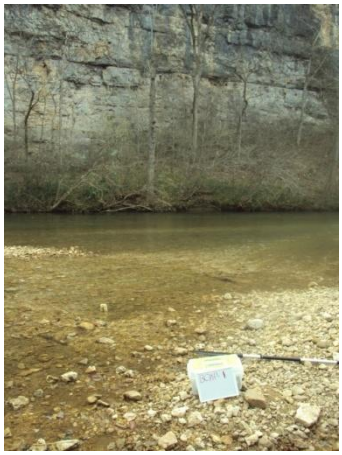


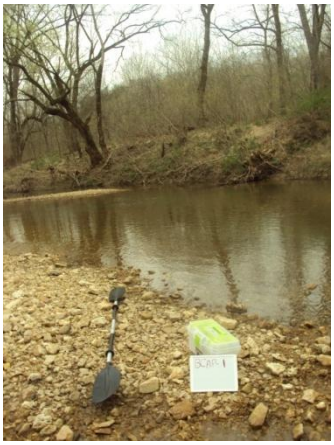
Site Notes and Journal: Initial sampling was conducted immediately downstream from the bridge, on the left bank.

March 2012: Since last sampling, a new concrete bridge has been constructed across the stream, probably adversely affecting macroinvertebrates.

Site 2

1.0 mile below Vera Cruz MDC access
.27 miles ds tributary @ Sweden Hollow
Douglas County
Lat 36.90326°N, Long 92.48869°W





April 2010

June 2011

May 2012

Biological Sampling

Date	Lvl	Cd	Db	My	RS	Rf	St	Pn	OB	Cm	Cr	Cy	Dr	Da	Sd	FF	Al	Ws	AW	BF	Lc	Md	LS	OS	Score
5/10	2	6		20	2		21	1			3	6	1						23						22
5/12	2	60		13	75		6				1	6								4		1			18

Sensitive

Cd – Caddisfly
Db – Dobsonfly
My- Mayfly
RS – Right Snail
Rf – Riffle Beetle
St – Stonefly
Pn – Water Penny

Somewhat Tolerant

OB – Other Beetle
Cm – Clam/Mussel
Cr – Cranefly
Cy – Crayfish
Dr – Dragonfly
Da – Damselfly
Sd -- Scud
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Ws – Watersnipe Fly

Tolerant

AW – Aquatic Worm
BF - Blackfly
Lc - Leech
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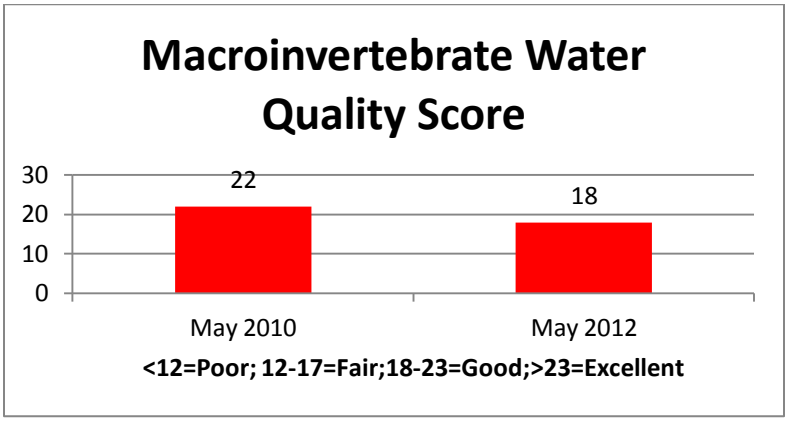
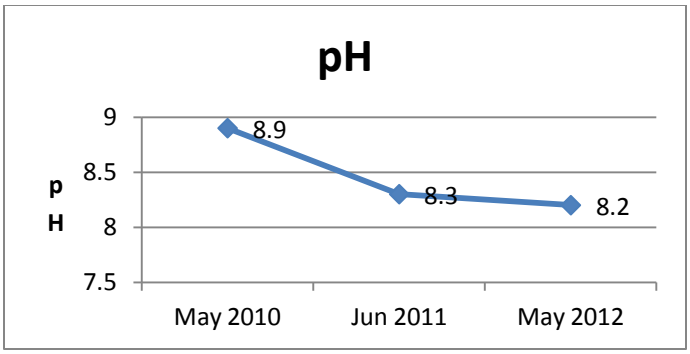
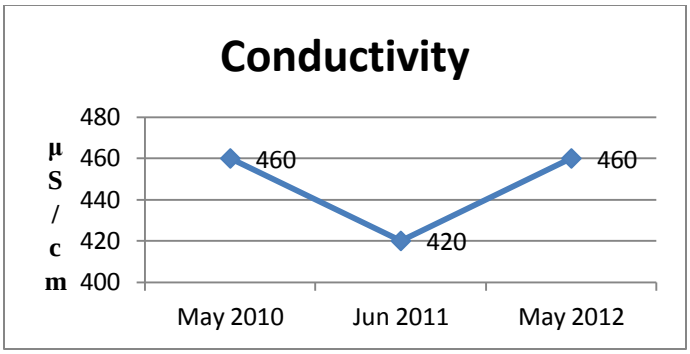
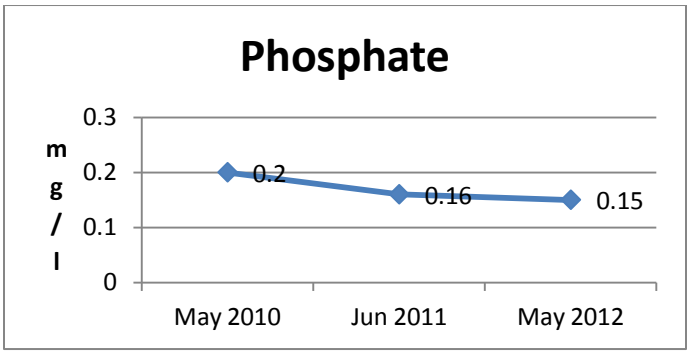


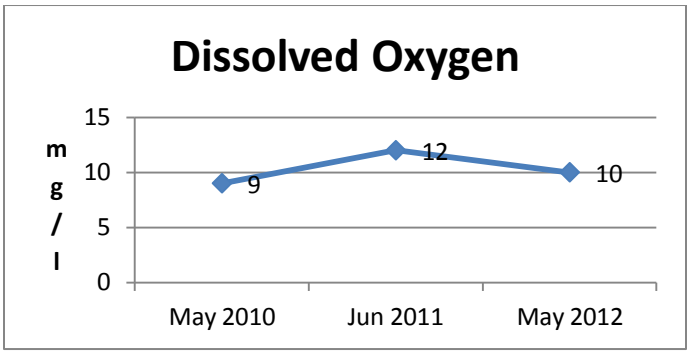
Chemical Sampling

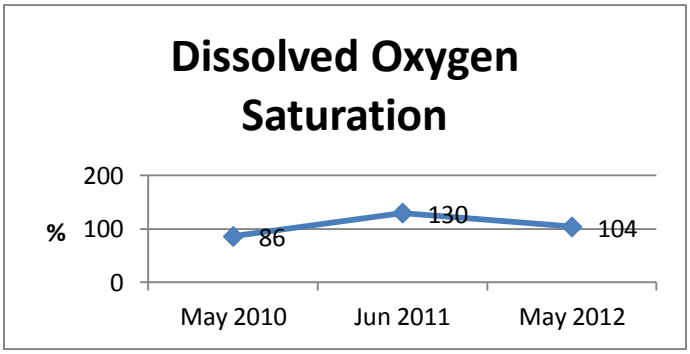
Date	Level	Air	Water	pH	Cond	Phosphate	Turbidity	DO/Sat	Nitrate
5/7/10	2	17°	13°	8.9	460	0.20	<10	9/86%	-
6/8/11	3	29°	19°	8.3	420	0.16	<10	12/130%	-
5/23/12	2	16°	17°	8.2	460	0.15	<10	10/104%	0.25

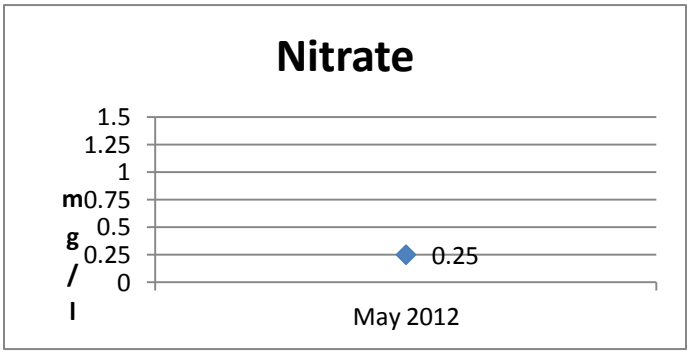












Site Notes and Journal:

Site 3

2.0 miles below Vera Cruz MDC access,
200 feet ds Planer Branch
Douglas County
Lat 36.89320°N, Long 92.48851°W

April 2010

June 2011

May 2012

Biological Sampling

Date	Lvl	Cd	Db	My	RS	Rf	St	Pn	OB	Cm	Cr	Cy	Dr	Da	Sd	FF	Al	Ws	AW	BF	Lc	Md	LS	OS	Score
5/10	2	3		15	4	1	14	4			2	4							3	9					24
5/12	2	30		5	7	2						51													16

Sensitive

Cd – Caddisfly
Db – Dobsonfly
My- Mayfly
RS – Right Snail
Rf – Riffle Beetle
St – Stonefly
Pn – Water Penny

Somewhat Tolerant

OB – Other Beetle
Cm – Clam/Mussel
Cr – Cranefly
Cy – Crayfish
Dr – Dragonfly
Da – Damselfly
Sd -- Scud
FF -- Fishfly
Al - Alderfly
Ws – Watersnipe Fly

Tolerant

AW – Aquatic Worm
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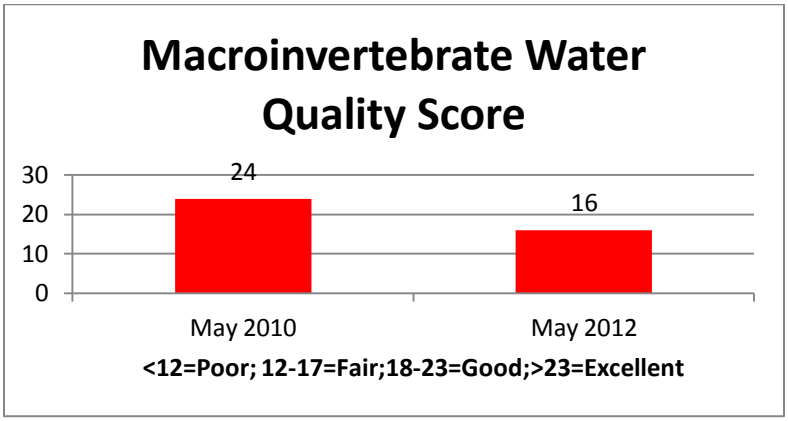
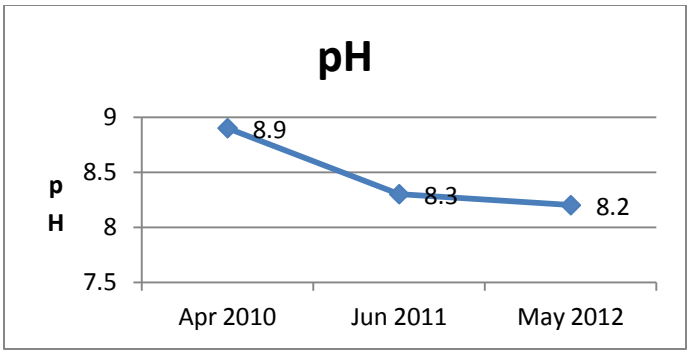
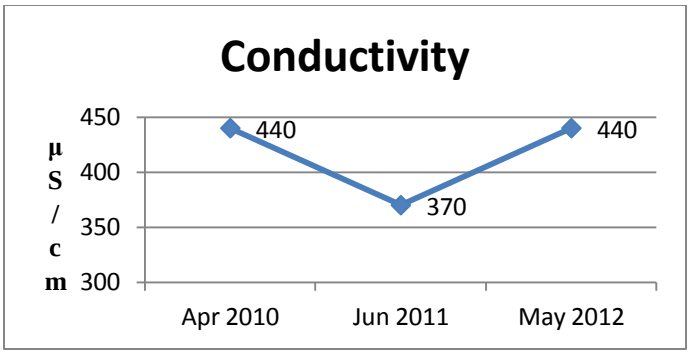
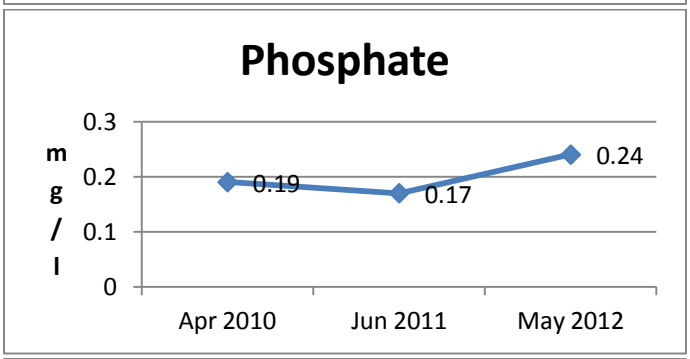


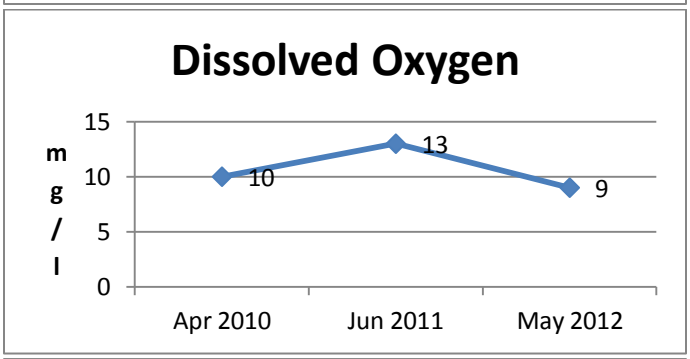
Chemical Sampling

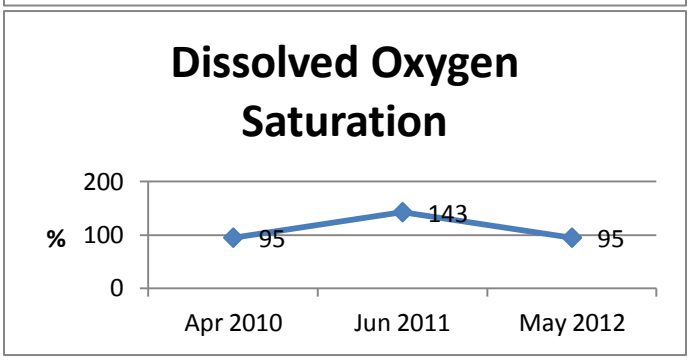
Date	Level	Air	Water	pH	Cond	Phosphate	Turbidity	DO/Sat	Nitrate
4/2/10	2	19°	13°	8.9	440	0.19	<10	10/95%	-
6/8/11	3	29°	20°	8.3	370	0.17	<10	13/143%	-
5/23/12	2	21°	18°	8.2	440	0.24	<10	9/95%	0.5

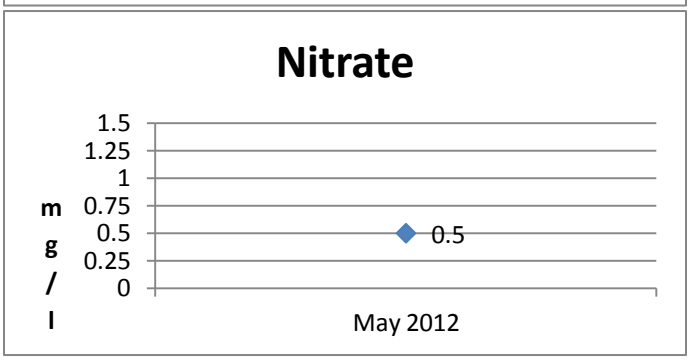












Site Notes and Journal:

Site 4

3.0 miles below Vera Cruz MDC access just upstream of Highway 14 bridge
PLSS section line Section 3 and Section 4
Douglas County
Lat 36.88720°N, Long 92.47342°W

April 2010

June 2011

May 2012

Biological Sampling

Date	Lvl	Cd	Db	My	RS	Rf	St	Pn	OB	Cm	Cr	Cy	Dr	Da	Sd	FF	Al	Ws	AW	BF	Lc	Md	LS	OS	Score
5/10	2	3		42		1	1	3			1	2			1				2	3		3			24
5/12	2	20		5	14	5	3		1			4	1									1			22

Sensitive

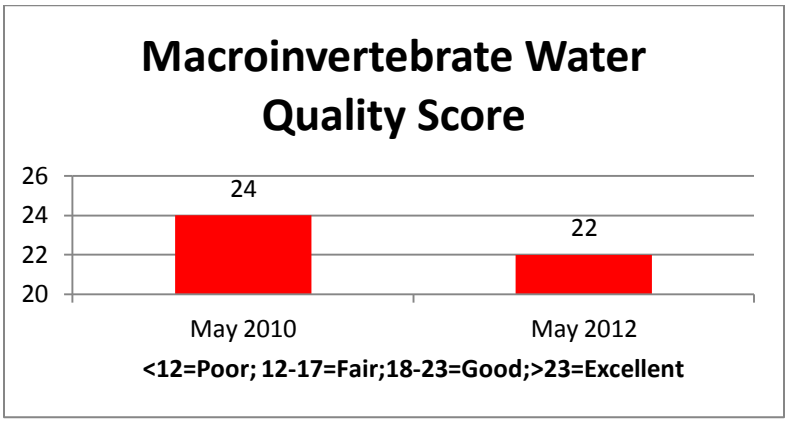
Cd – Caddisfly
Db – Dobsonfly
My- Mayfly
RS – Right Snail
Rf – Riffle Beetle
St – Stonefly
Pn – Water Penny

Somewhat Tolerant

OB – Other Beetle
Cm – Clam/Mussel
Cr – Cranefly
Cy – Crayfish
Dr – Dragonfly
Da – Damselfly
Sd -- Scud
FF -- Fishfly
Al - Alderfly
Ws – Watersnipe Fly

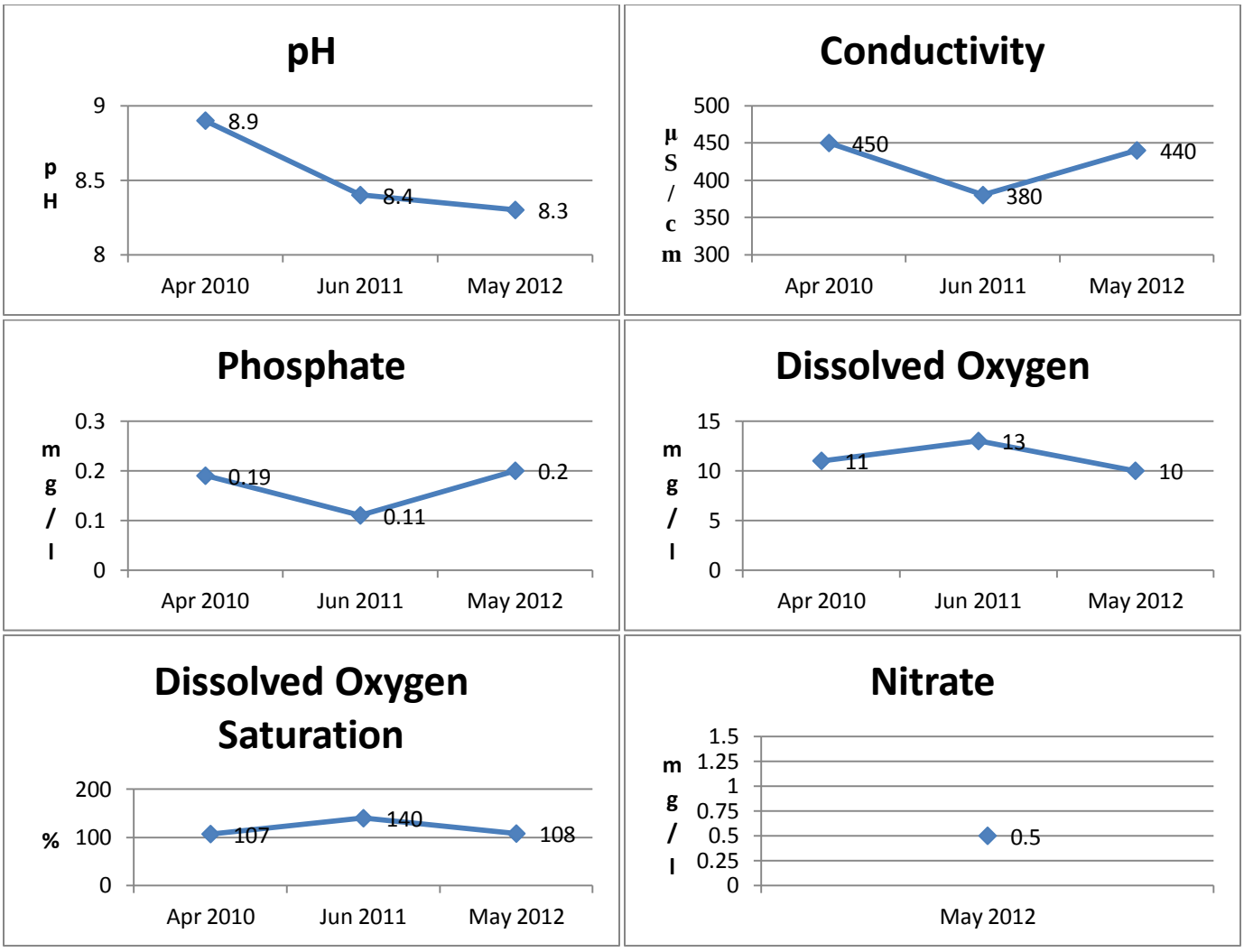
Tolerant

AW – Aquatic Worm
BF - Blackfly
Lc - Leech
Md - Midge
LS – Left Snail
OS – Other Snail



Chemical Sampling

Date	Level	Air	Water	pH	Cond	Phosphate	Turbidity	DO/Sat	Nitrate
4/2/10	2	20°	14°	8.9	450	0.19	<10	11/107%	-
6/8/11	3	29°	19°	8.4	380	0.11	<10	13/140%	-
5/23/12	2	19°	19°	8.3	440	0.20	<10	10/108%	0.5



Site Notes and Journal: From data contained in the *Paddler's Guide*, the Highway 14 bridge was expected to lie 2.5 miles downstream from the Rippee Access. GPS data showed the location to instead fall at almost exactly three miles from the access. Samplings were made just upstream of the bridge.

Site 5

4.0 miles below Vera Cruz MDC access
Approximately 200 feet upstream 1st trib in Section 3
Douglas County
Lat 36.87834°N, Long 92.46662°W

April 2010

June 2011

May 2012

Biological Sampling

Date	Lvl	Cd	Db	My	RS	Rf	St	Pn	OB	Cm	Cr	Cy	Dr	Da	Sd	FF	Al	Ws	AW	BF	Lc	Md	LS	OS	Score
5/10	2	3		12		1	28				1	6							15						17

Sensitive

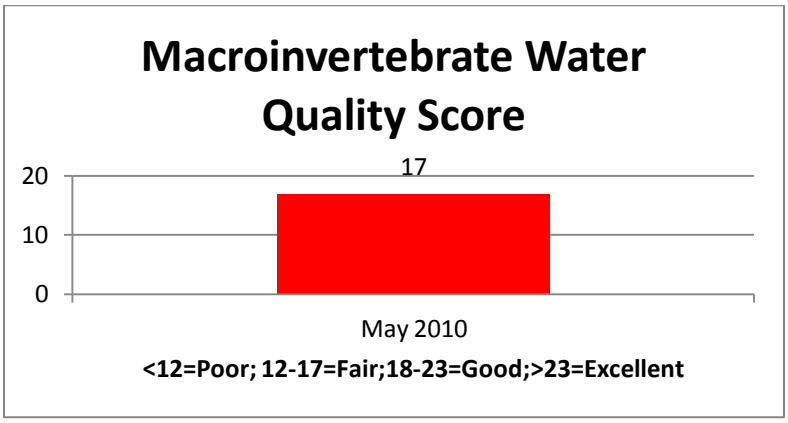
Cd – Caddisfly
Db – Dobsonfly
My- Mayfly
RS – Right Snail
Rf – Riffle Beetle
St – Stonefly
Pn – Water Penny

Somewhat Tolerant

OB – Other Beetle
Cm – Clam/Mussel
Cr – Cranefly
Cy – Crayfish
Dr – Dragonfly
Da – Damselfly
Sd -- Scud
FF -- Fishfly
Al - Alderfly
Ws – Watersnipe Fly

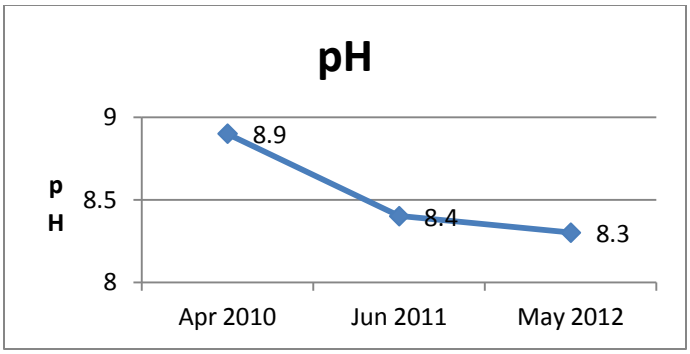
Tolerant

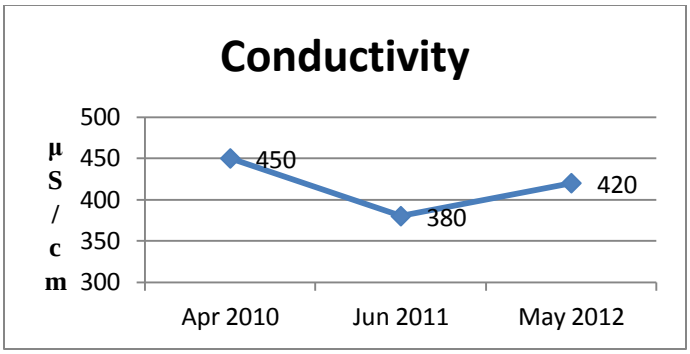
AW – Aquatic Worm
BF - Blackfly
Lc - Leech
Md - Midge
LS – Left Snail
OS – Other Snail

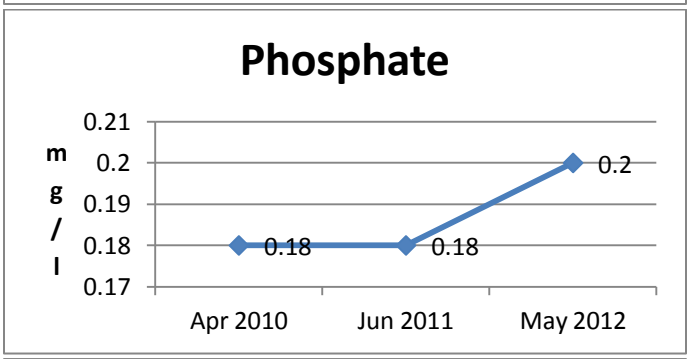


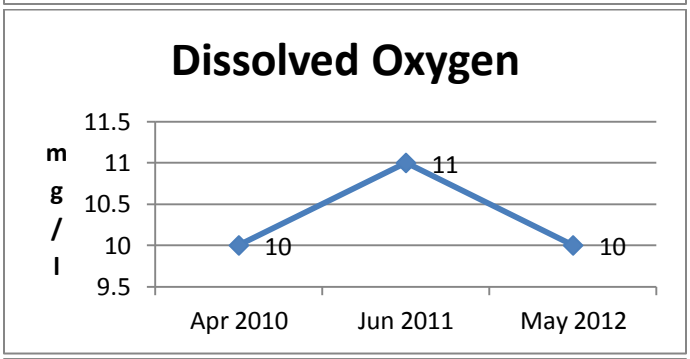
Chemical Sampling

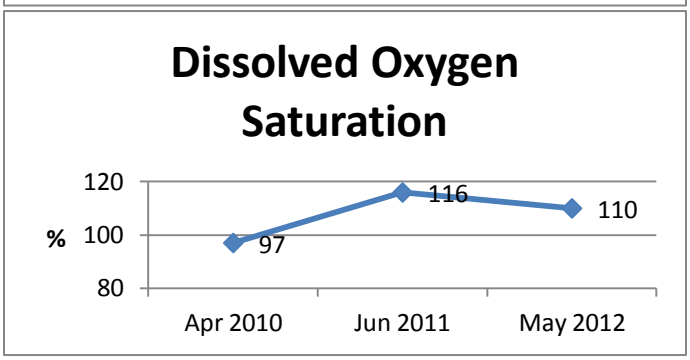
Date	Level	Air	Water	pH	Cond	Phosphate	Turbidity	DO/Sat	Nitrate
4/2/10	2	22°	14°	8.9	450	0.18	<10	10/97%	-
6/8/11	3	32°	19°	8.4	380	0.18	<10	11/116%	-
5/23/12	2	25°	20°	8.3	420	0.20	<10	10/110%	0.5

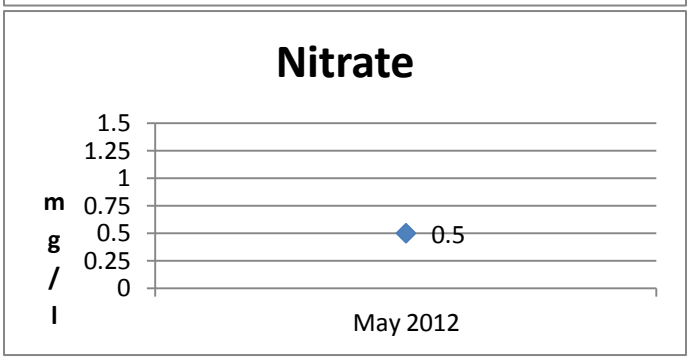












Site Notes and Journal:

Site 6

4.5 miles below Vera Cruz MDC access @ Rippee MDC access
County Road 329
Douglas County
Lat 36.87133°N, Long 92.47178°W

April 2010

June 2011

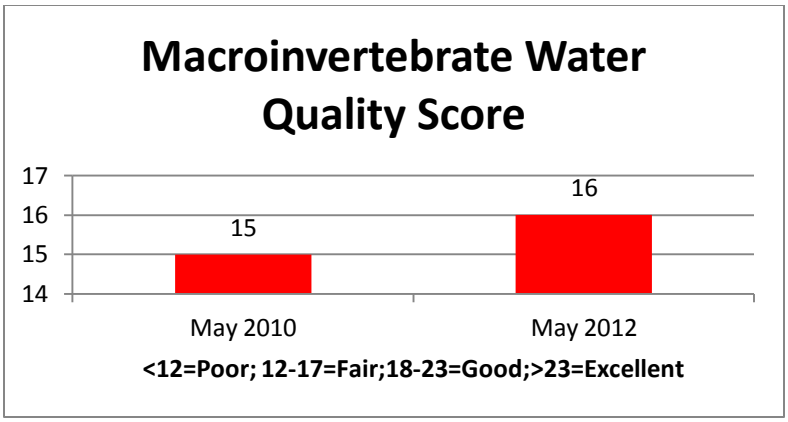
Biological Sampling

Date	Lvl	Cd	Db	My	RS	Rf	St	Pn	OB	Cm	Cr	Cy	Dr	Da	Sd	FF	Al	Ws	AW	BF	Lc	Md	LS	OS	Score
5/10	2			55	1	1					2	6							1			2			15
5/12	2	4	3	15	12				1			13													16

Sensitive
Cd – Caddisfly
Db – Dobsonfly
My- Mayfly
RS – Right Snail
Rf – Riffle Beetle
St – Stonefly
Pn – Water Penny

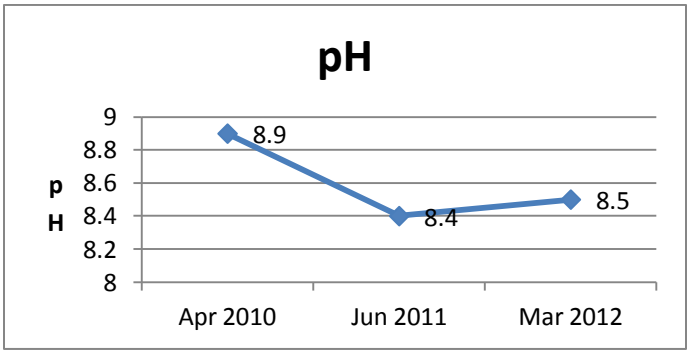
Somewhat Tolerant
OB – Other Beetle
Cm – Clam/Mussel
Cr – Cranefly
Cy – Crayfish
Dr – Dragonfly
Da – Damselfly
Sd -- Scud
FF -- Fishfly
Al - Alderfly
Ws – Watersnipe Fly

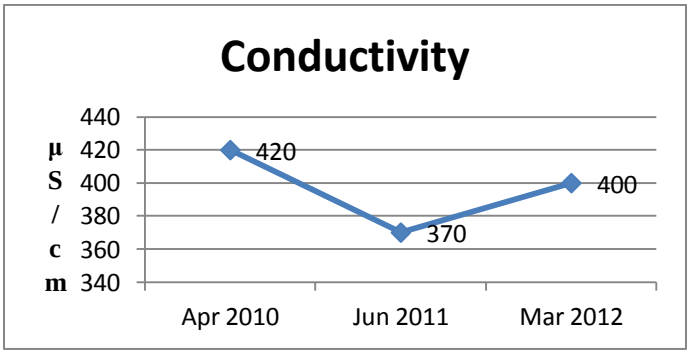
Tolerant
AW – Aquatic Worm
BF - Blackfly
Lc - Leech
Md - Midge
LS – Left Snail
OS – Other Snail

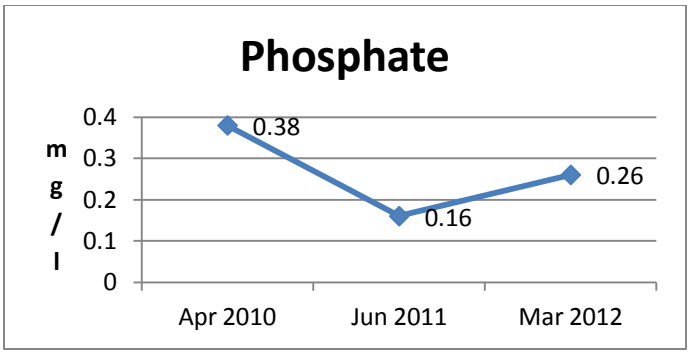


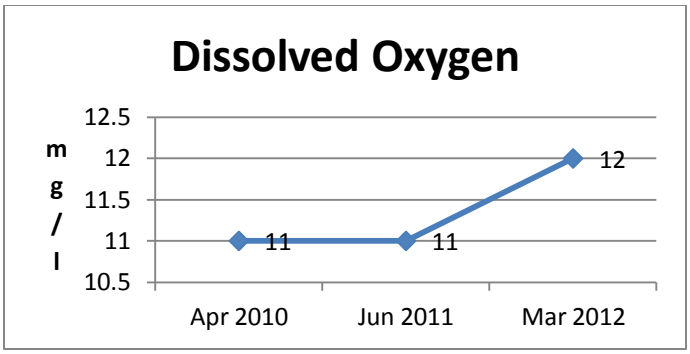
Chemical Sampling

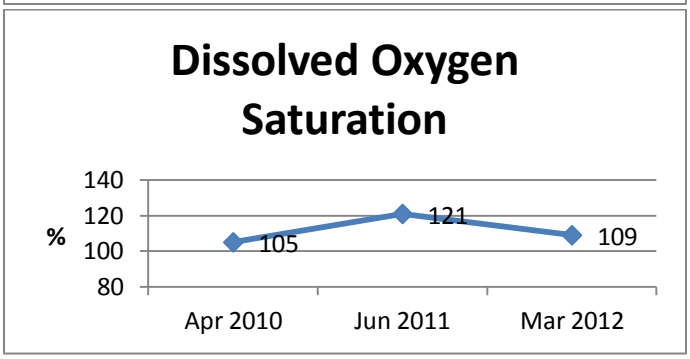
Date	Level	Air	Water	pH	Cond	Phosphate	Turbidity	DO/Sat	Nitrate
4/18/10	2	19°	15°	8.9	420	0.38	<10	11/105%	-
6/8/11	3	25°	20°	8.4	370	0.16	<10	11/121%	-
3/10/12	2	19°	11°	8.5	400	0.26	<10	12/109%	0.25

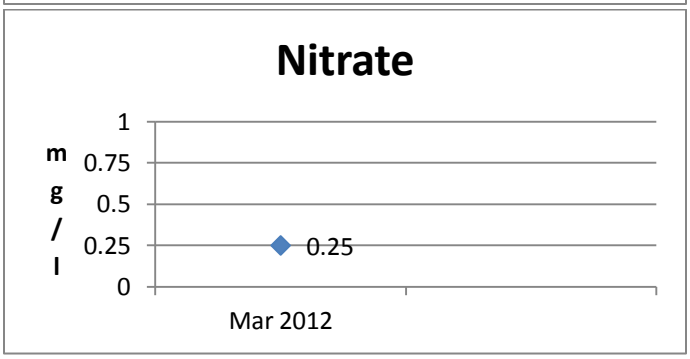












Site Notes and Journal:

May 2010: High and fast-moving water over the bridge necessitated macroinvertebrate sampling immediately downstream, on the left bank, visible in the left photo above.

March 2012: Water level too high and fast for macroinvertebrate sampling.

Site 7

5.0 miles below Vera Cruz MDC access
0.5 miles downstream from Site 6. Approximately 20' ds confluence with 2nd tributary in Section 10
Douglas County
Lat 36.86950°N, Long 92.46565°W

April 2010

June 2011

May 2012

Biological Sampling

Date	Lvl	Cd	Db	My	RS	Rf	St	Pn	OB	Cm	Cr	Cy	Dr	Da	Sd	FF	Al	Ws	AW	BF	Lc	Md	LS	OS	Score
5/10	2	5	1	10	1	1	21	2			2	10							14			1			27
5/12	2	25	2	16	1	2			2		1	133							3			3			25

Sensitive

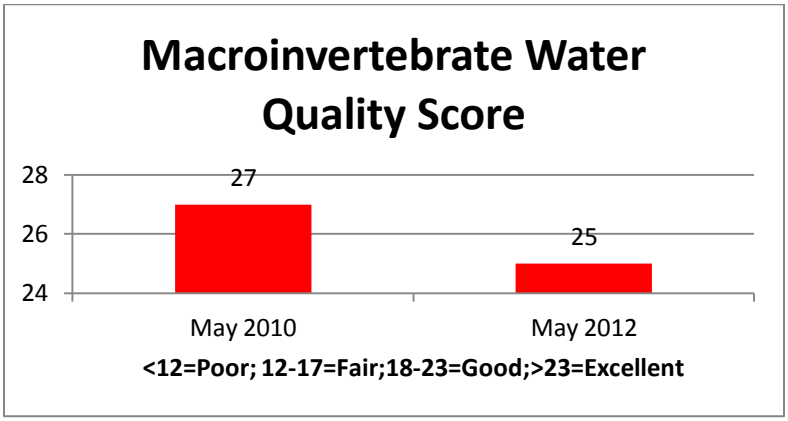
Cd – Caddisfly
Db – Dobsonfly
My- Mayfly
RS – Right Snail
Rf – Riffle Beetle
St – Stonefly
Pn – Water Penny

Somewhat Tolerant

OB – Other Beetle
Cm – Clam/Mussel
Cr – Cranefly
Cy – Crayfish
Dr – Dragonfly
Da – Damselfly
Sd -- Scud
FF -- Fishfly
Al - Alderfly
Ws – Watersnipe Fly

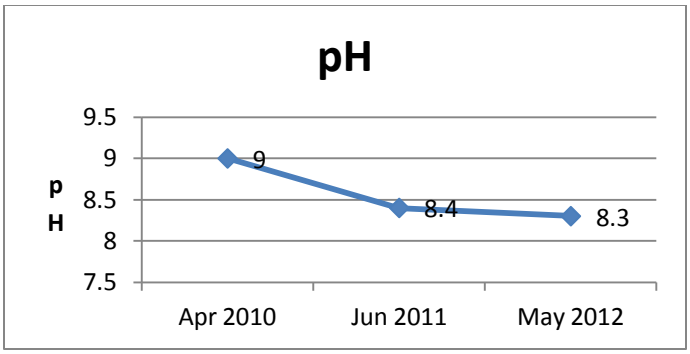
Tolerant

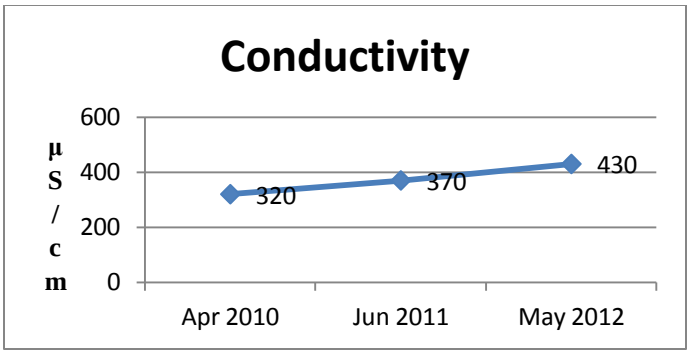
AW – Aquatic Worm
BF - Blackfly
Lc - Leech
Md - Midge
LS – Left Snail
OS – Other Snail

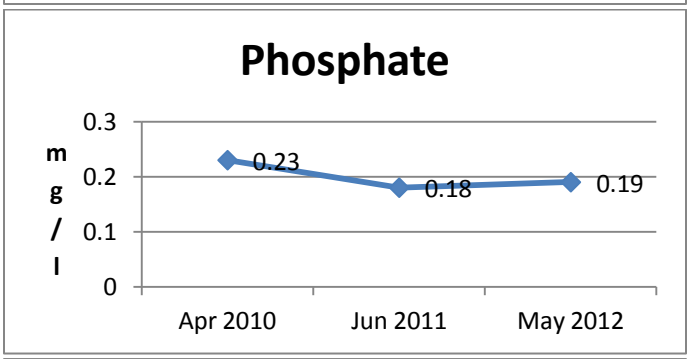


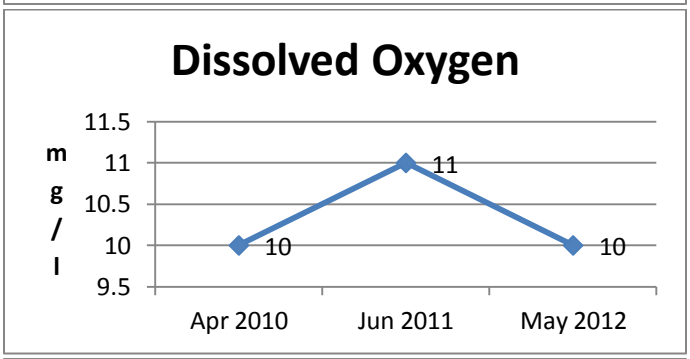
Chemical Sampling

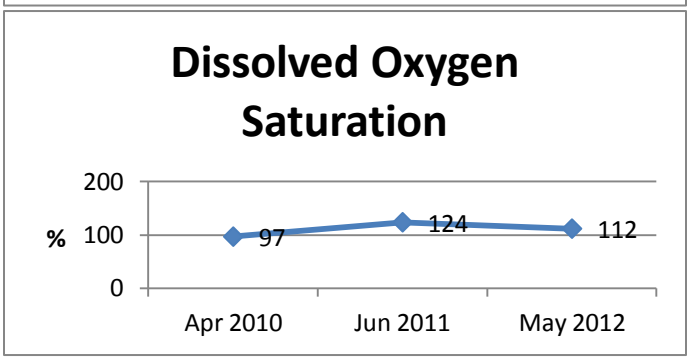
Date	Level	Air	Water	pH	Cond	Phosphate	Turbidity	DO/Sat	Nitrate
4/18/10	2	19°	14°	9.0	320	0.23	<10	10/97%	-
6/8/11	3	30°	21°	8.4	370	0.18	<10	11/124%	-
5/23/12	2	28°	21°	8.3	430	0.19	<10	10/112%	0.5

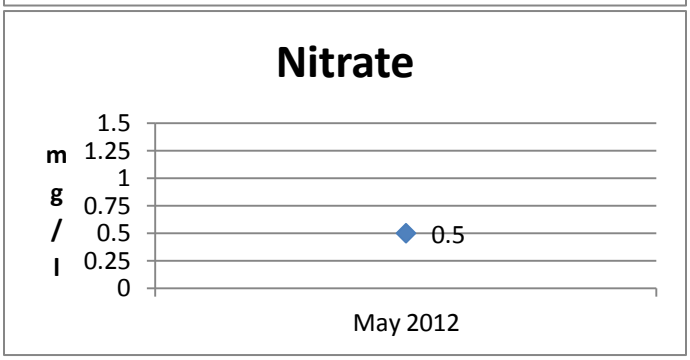












Site Notes and Journal:

Site 8

6.0 miles below Vera Cruz MDC access
At Brown Cave
Douglas County
Lat 36.86167°N, Long 92.45451°W

April 2010

June 2011

May 2012

Biological Sampling

Date	Lvl	Cd	Db	My	RS	Rf	St	Pn	OB	Cm	Cr	Cy	Dr	Da	Sd	FF	Al	Ws	AW	BF	Lc	Md	LS	OS	Score
5/10	2	10	4	13		5	41				2	4	1						3						22
5/12	2	32	5	20	1							8							2			2			16

Sensitive

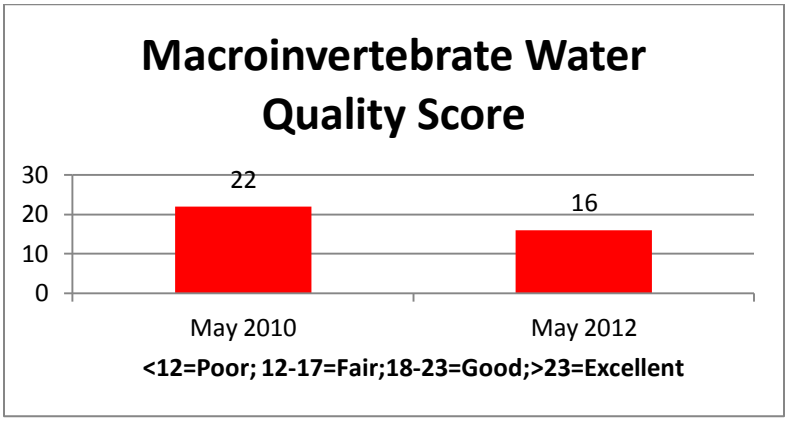
Cd – Caddisfly
Db – Dobsonfly
My- Mayfly
RS – Right Snail
Rf – Riffle Beetle
St – Stonefly
Pn – Water Penny

Somewhat Tolerant

OB – Other Beetle
Cm – Clam/Mussel
Cr – Cranefly
Cy – Crayfish
Dr – Dragonfly
Da – Damselfly
Sd -- Scud
FF -- Fishfly
Al - Alderfly
Ws – Watersnipe Fly

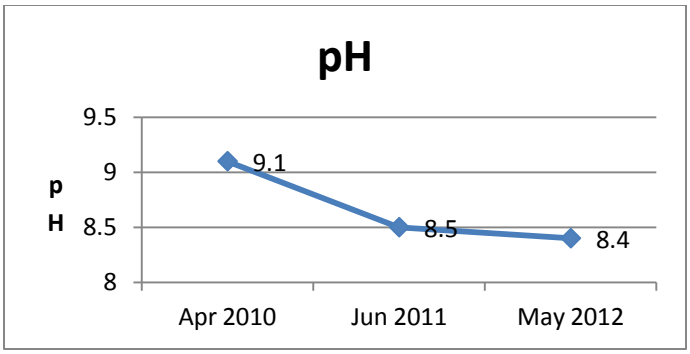
Tolerant

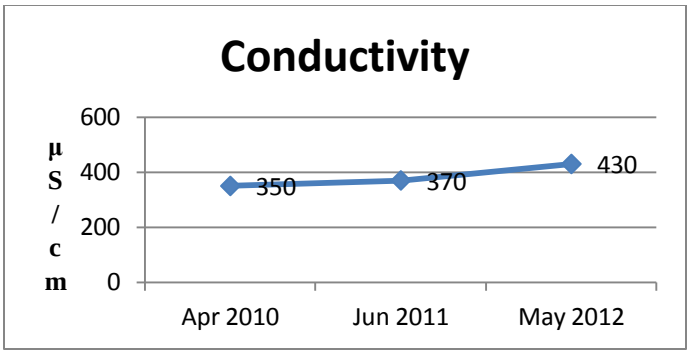
AW – Aquatic Worm
BF - Blackfly
Lc - Leech
Md - Midge
LS – Left Snail
OS – Other Snail

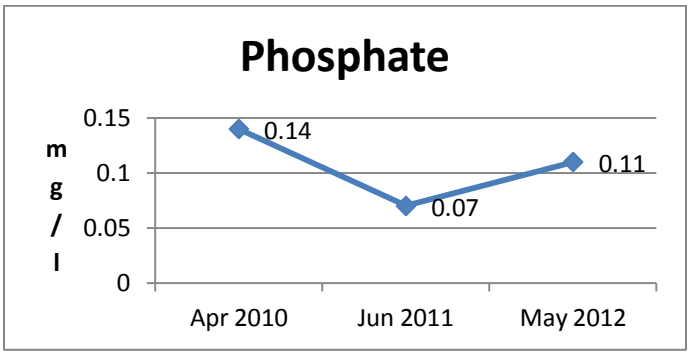


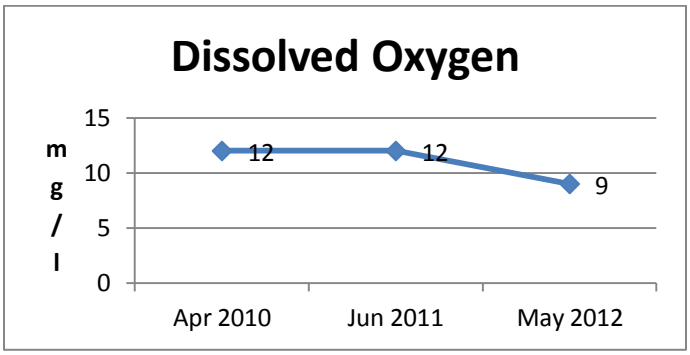
Chemical Sampling

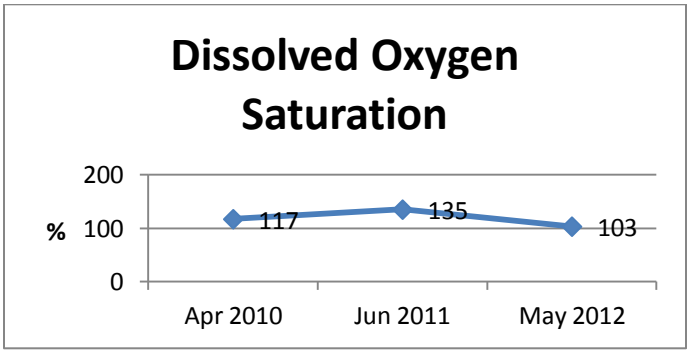
Date	Level	Air	Water	pH	Cond	Phosphate	Turbidity	DO/Sat	Nitrate
4/18/10	2	26°	14°	9.1	350	0.14	<10	12/117%	-
6/8/11	3	31°	21°	8.5	370	0.07	<10	12/135%	-
5/23/12	2	25°	22°	8.4	430	0.11	<10	9/103%	0.25

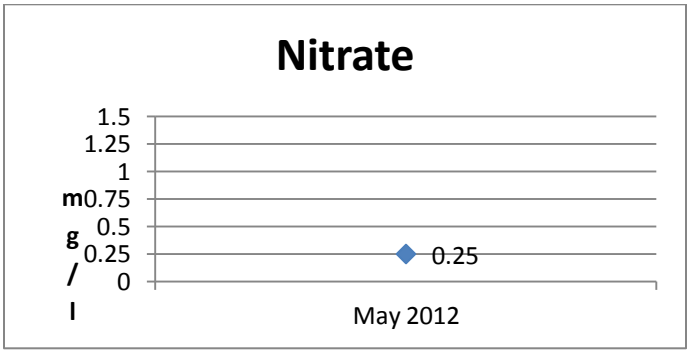












Site Notes and Journal:

Site 9

6.8 miles below Vera Cruz MDC access @ Monastery Bridge
Immediately downstream bridge crossing County Road 14-335
Douglas County
Lat 36.85174°N, Long 92.45908°W

April 2010

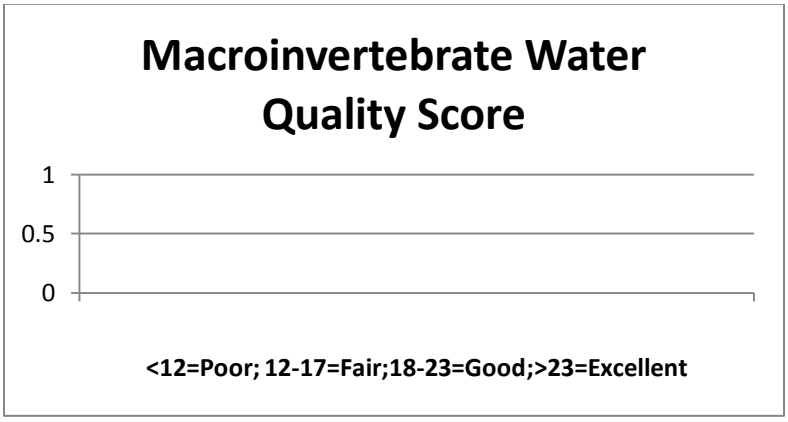
Biological Sampling

Date	Lvl	Cd	Db	My	RS	Rf	St	Pn	OB	Cm	Cr	Cy	Dr	Da	Sd	FF	Al	Ws	AW	BF	Lc	Md	LS	OS	Score

Sensitive
Cd – Caddisfly
Db – Dobsonfly
My- Mayfly
RS – Right Snail
Rf – Riffle Beetle
St – Stonefly
Pn – Water Penny

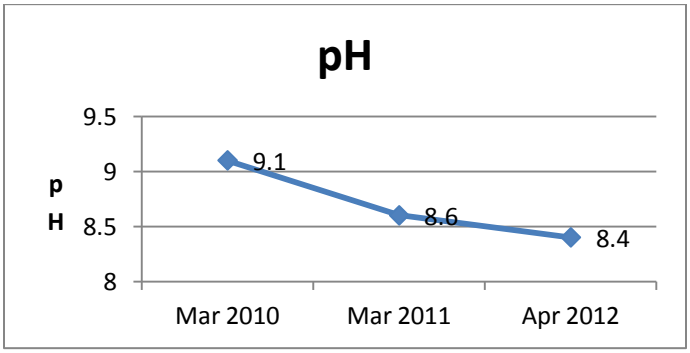
Somewhat Tolerant
OB – Other Beetle
Cm – Clam/Mussel
Cr – Cranefly
Cy – Crayfish
Dr – Dragonfly
Da – Damselfly
Sd -- Scud
FF -- Fishfly
Al - Alderfly
Ws – Watersnipe Fly

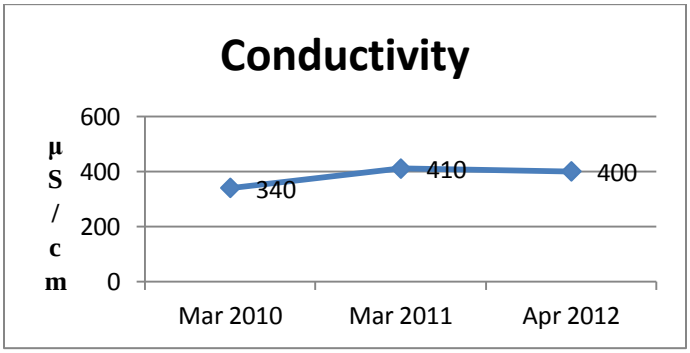
Tolerant
AW – Aquatic Worm
BF - Blackfly
Lc - Leech
Md - Midge
LS – Left Snail
OS – Other Snail

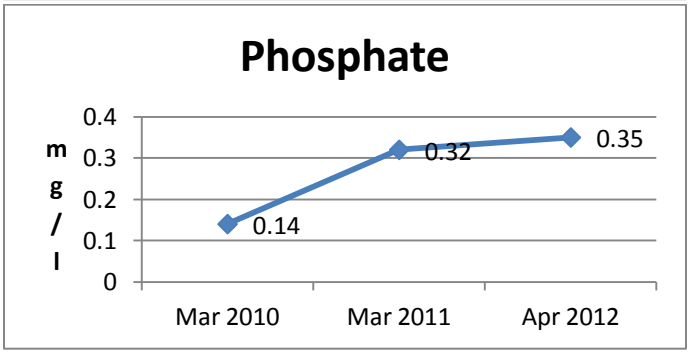


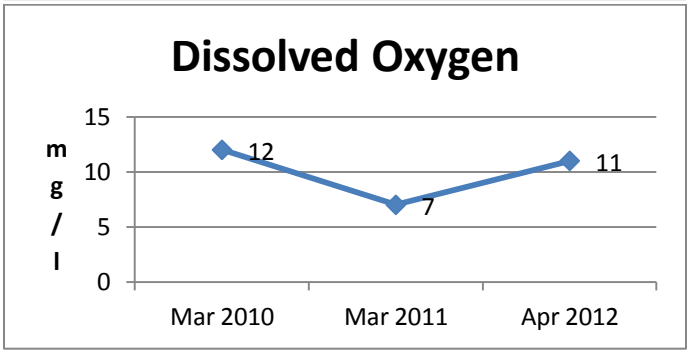
Chemical Sampling

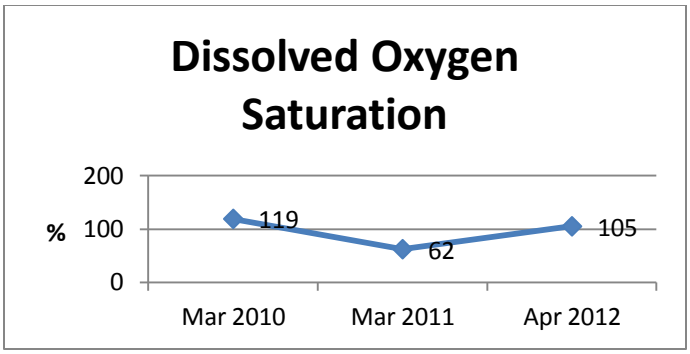
Date	Level	Air	Water	pH	Cond	Phosphate	Turbidity	DO/Sat	Nitrate
3/24/10	2	29°	15°	9.1	340	0.14	<10	12/119%	-
3/20/11	3	22°	10°	8.6	410	0.32	<10	7/62%	-
4/22/12	2	18°	13°	8.4	400	0.35	<10	11/105%	0.25

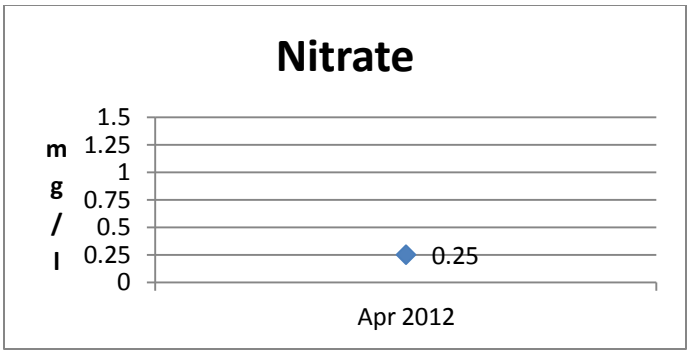












Site Notes and Journal: Very swift waters at this site may cause a lack of suitable macroinvertebrate monitoring locations. Site 10, however, is located only 0.2 miles downstream.

Site 10

0.2 miles below Monastery Bridge access
Douglas County
Lat 36.85022°N, Long 92.45705°W

April 2010

Biological Sampling

Date	Lvl	Cd	Db	My	RS	Rf	St	Pn	OB	Cm	Cr	Cy	Dr	Da	Sd	FF	Al	Ws	AW	BF	Lc	Md	LS	OS	Score
4/12	2	7	2	55		2	25				1	19			1				6						22

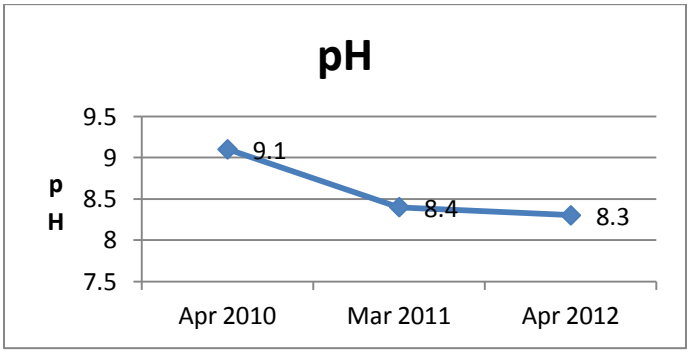
Sensitive
- Cd – Caddisfly
- Db – Dobsonfly
- My- Mayfly
- RS – Right Snail
- Rf – Riffle Beetle
- St – Stonefly
- Pn – Water Penny

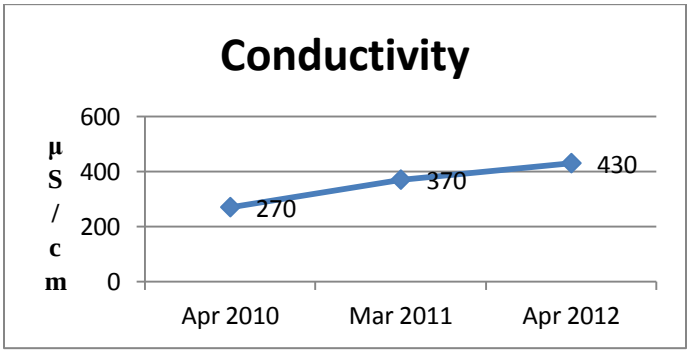
Somewhat Tolerant
- OB – Other Beetle
- Cm – Clam/Mussel
- Cr – Cranefly
- Cy – Crayfish
- Dr – Dragonfly
- Da – Damselfly
- Sd -- Scud
- FF -- Fishfly
- Al - Alderfly
- Ws – Watersnipe Fly

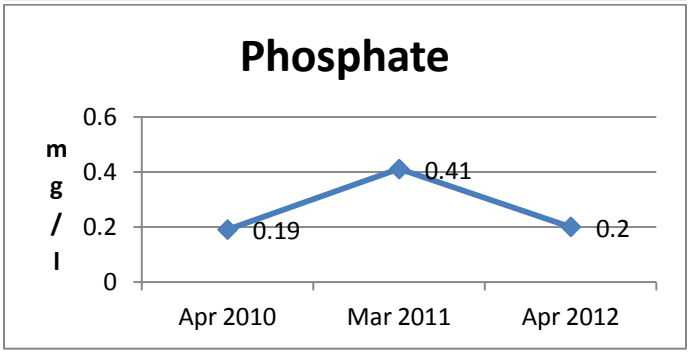
Tolerant
- AW – Aquatic Worm
- BF - Blackfly
- Lc - Leech
- Md - Midge
- LS – Left Snail
- OS – Other Snail

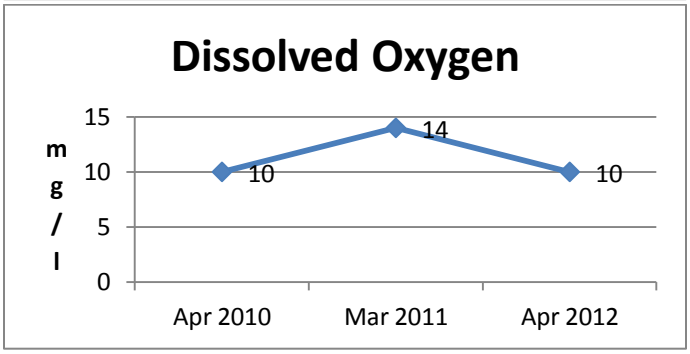
Chemical Sampling

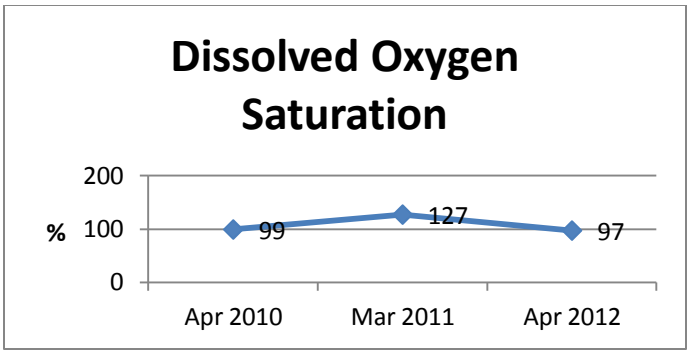
Date	Level	Air	Water	pH	Cond	Phosphate	Turbidity	DO/Sat	Nitrate
4/18/10	2	27°	15°	9.1	270	0.19	<10	10/99%	-
3/20/11	3	21°	11°	8.4	370	0.41	<10	14/127%	-
4/22/12	2	16°	14°	8.3	430	0.20	<10	10/97%	0.25

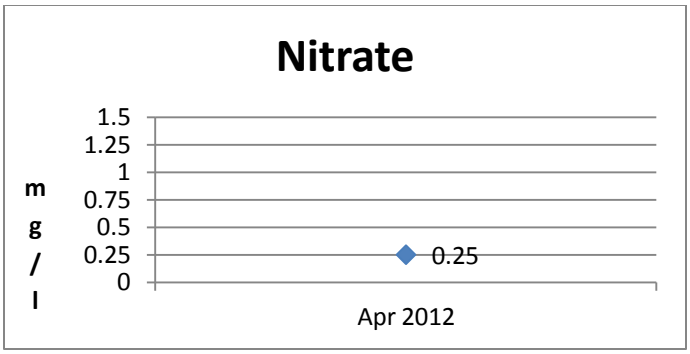








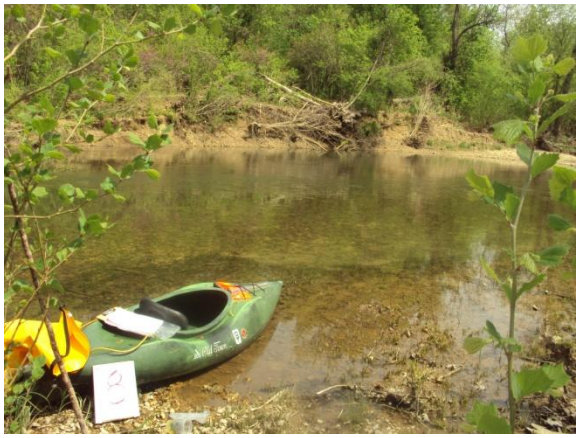




Site Notes and Journal:

Site 11

1.3 miles below Monastery Bridge access
.21 miles (345 meters) ds confluence of 1st trib in Section 14 near Trimble Spring
Douglas County
Lat 36.85434°N, Long 92.44078°W



April 2010

March 2011

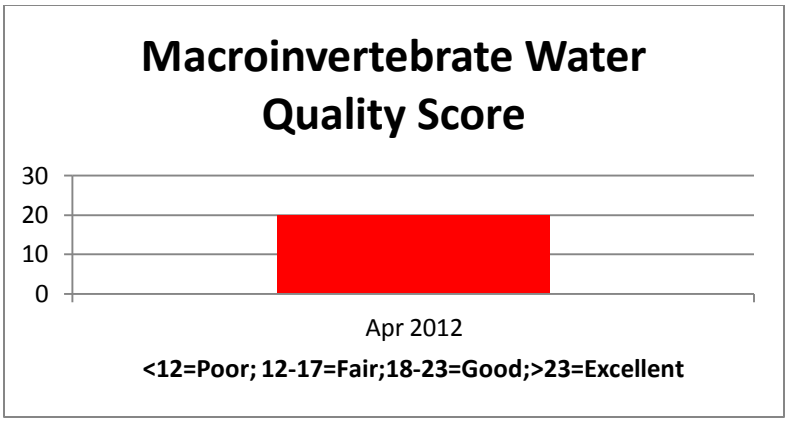
Biological Sampling

Date	Lvl	Cd	Db	My	RS	Rf	St	Pn	OB	Cm	Cr	Cy	Dr	Da	Sd	FF	Al	Ws	AW	BF	Lc	Md	LS	OS	Score
4/12	2	11	4	40			10	1				9	1						7						20

Sensitive
Cd – Caddisfly
Db – Dobsonfly
My- Mayfly
RS – Right Snail
Rf – Riffle Beetle
St – Stonefly
Pn – Water Penny

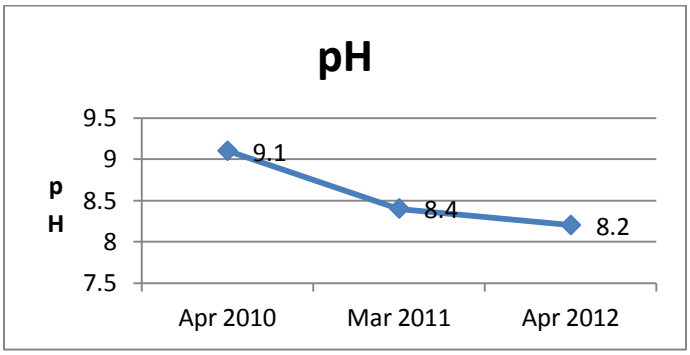
Somewhat Tolerant
OB – Other Beetle
Cm – Clam/Mussel
Cr – Cranefly
Cy – Crayfish
Dr – Dragonfly
Da – Damselfly
Sd -- Scud
FF -- Fishfly
Al - Alderfly
Ws – Watersnipe Fly

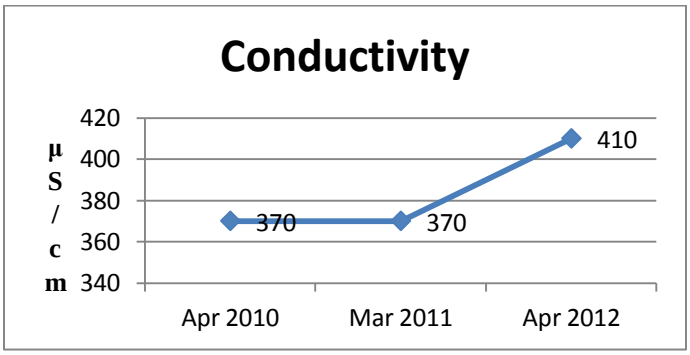
Tolerant
AW – Aquatic Worm
BF - Blackfly
Lc - Leech
Md - Midge
LS – Left Snail
OS – Other Snail

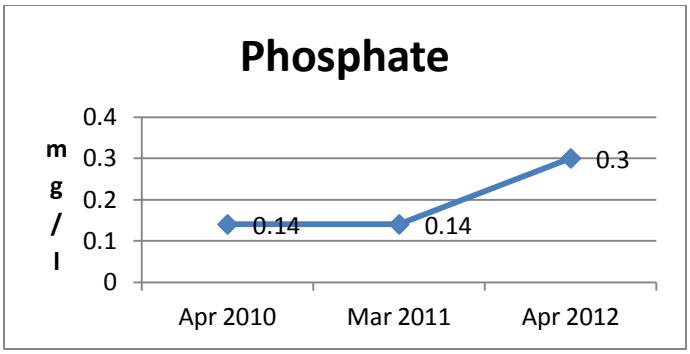


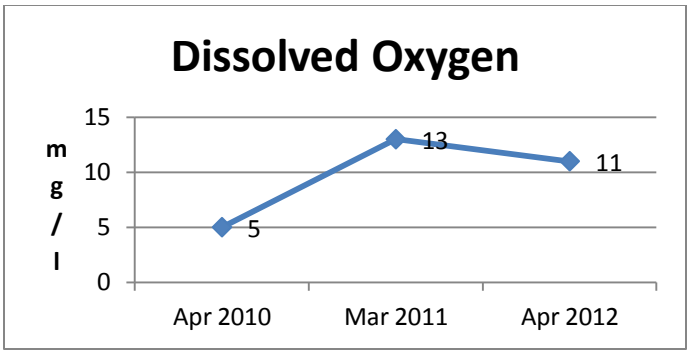
Chemical Sampling

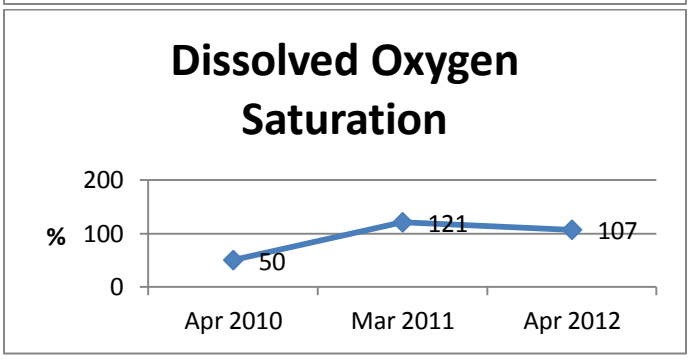
Date	Level	Air	Water	pH	Cond	Phosphate	Turbidity	DO/Sat	Nitrate
4/18/10	2	21°	15°	9.1	370	0.14	<10	5/50%	-
3/20/11	3	26°	12°	8.4	370	0.14	<10	13/121%	-
4/22/12	2	16.5°	14°	8.2	410	0.30	<10	11/107%	0.25

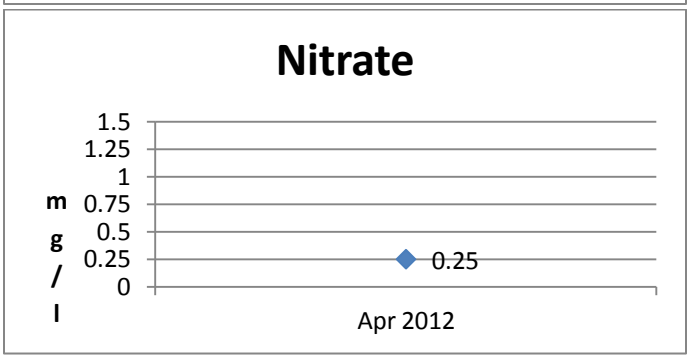












Site Notes and Journal:

Site 12

2.3 miles below Monastery Bridge access
Near Boiler Hollow. Approx. 200 ft ds confluence with 1st trib in Section 13
Douglas County
Lat 36.84425°N, Long 92.42920°W

April 2010

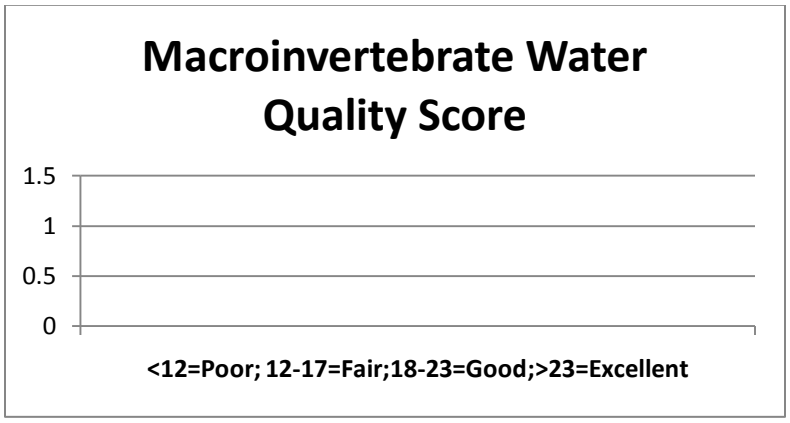
Biological Sampling

Date	Lvl	Cd	Db	My	RS	Rf	St	Pn	OB	Cm	Cr	Cy	Dr	Da	Sd	FF	Al	Ws	AW	BF	Lc	Md	LS	OS	Score

Sensitive
Cd – Caddisfly
Db – Dobsonfly
My- Mayfly
RS – Right Snail
Rf – Riffle Beetle
St – Stonefly
Pn – Water Penny

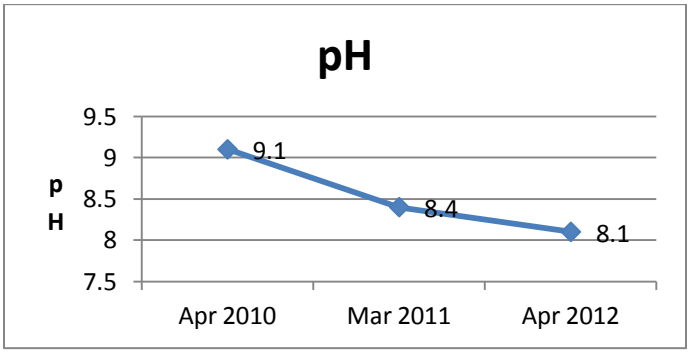
Somewhat Tolerant
OB – Other Beetle
Cm – Clam/Mussel
Cr – Cranefly
Cy – Crayfish
Dr – Dragonfly
Da – Damselfly
Sd -- Scud
FF -- Fishfly
Al - Alderfly
Ws – Watersnipe Fly

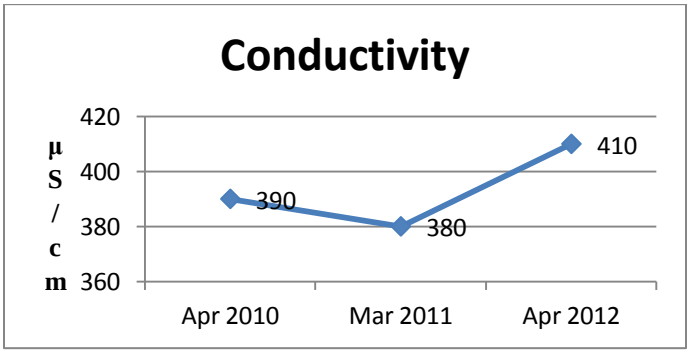
Tolerant
AW – Aquatic Worm
BF - Blackfly
Lc - Leech
Md - Midge
LS – Left Snail
OS – Other Snail

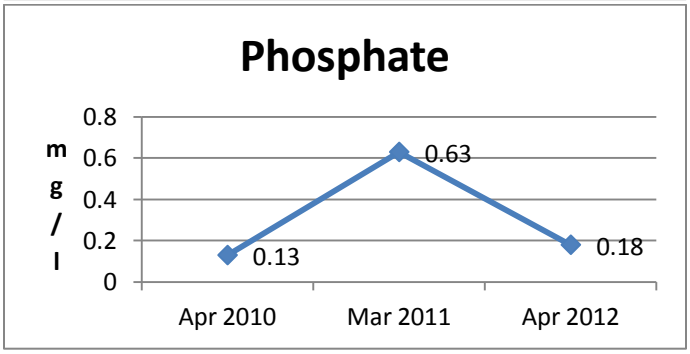


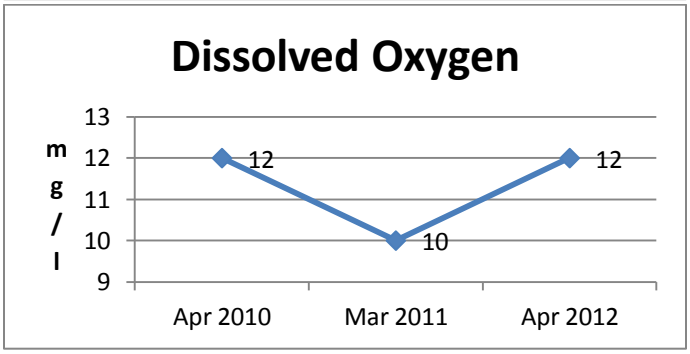
Chemical Sampling

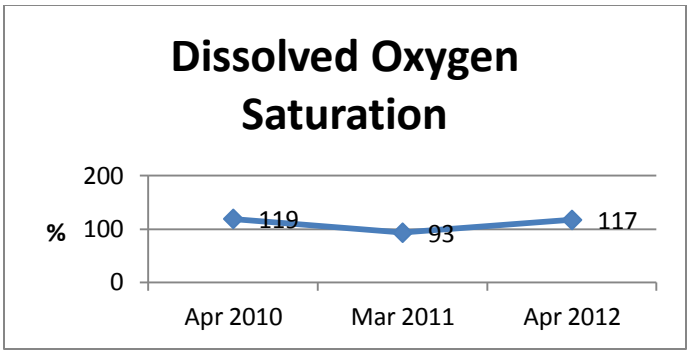
Date	Level	Air	Water	pH	Cond	Phosphate	Turbidity	DO/Sat	Nitrate
4/18/10	2	19°	15°	9.1	390	0.13	<10	12/119%	-
3/20/11	3	20°	12°	8.4	380	0.63	<10	10/93%	-
4/22/12	2	17.5°	14°	8.1	410	0.18	<10	12/117%	0.25

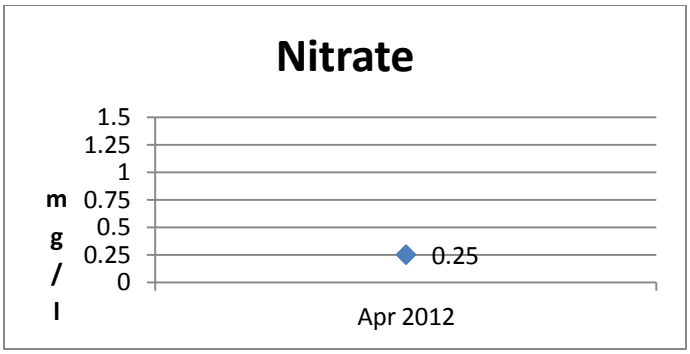












Site Notes and Journal: April 2012: No sites conducive to macroinvertebrate sampling.

Site 13

3.2 miles below Monastery Bridge access
Near Barn Hollow. Approx 500 ft us confluence of 3rd trib in Section 19.
Douglas County
Lat 36.83745°N, Long 92.42202°W

April 2010

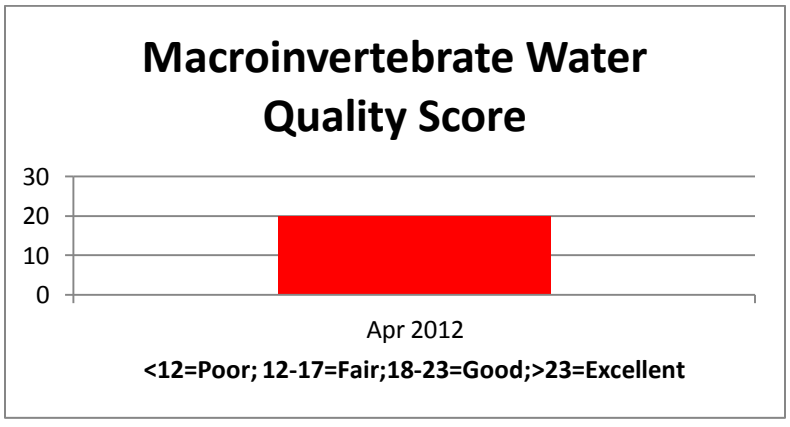
Biological Sampling

Date	Lvl	Cd	Db	My	RS	Rf	St	Pn	OB	Cm	Cr	Cy	Dr	Da	Sd	FF	Al	Ws	AW	BF	Lc	Md	LS	OS	Score
4/12	2	7		64	14		15			2	1	6							28			2			20

Sensitive
Cd – Caddisfly
Db – Dobsonfly
My- Mayfly
RS – Right Snail
Rf – Riffle Beetle
St – Stonefly
Pn – Water Penny

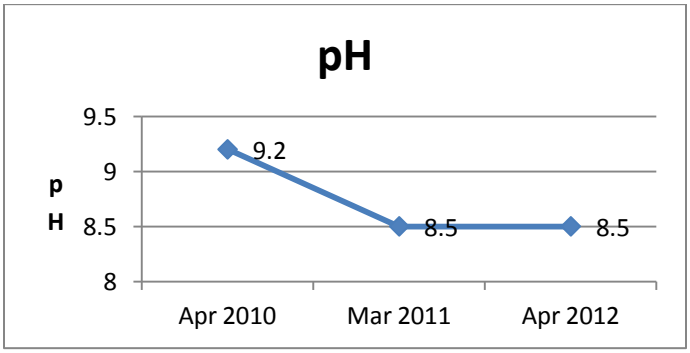
Somewhat Tolerant
OB – Other Beetle
Cm – Clam/Mussel
Cr – Cranefly
Cy – Crayfish
Dr – Dragonfly
Da – Damselfly
Sd -- Scud
FF -- Fishfly
Al - Alderfly
Ws – Watersnipe Fly

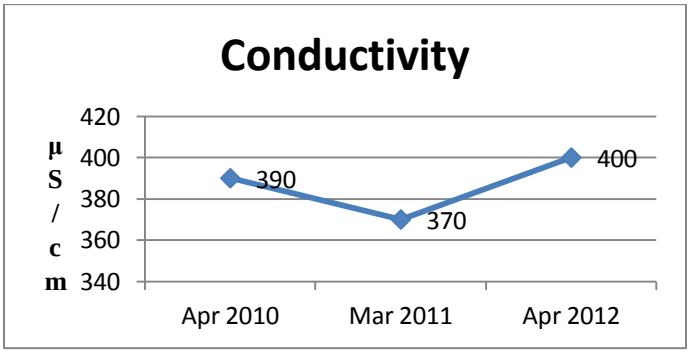
Tolerant
AW – Aquatic Worm
BF - Blackfly
Lc - Leech
Md - Midge
LS – Left Snail
OS – Other Snail

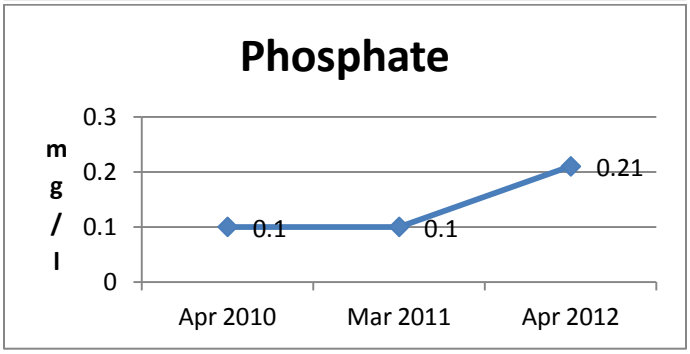


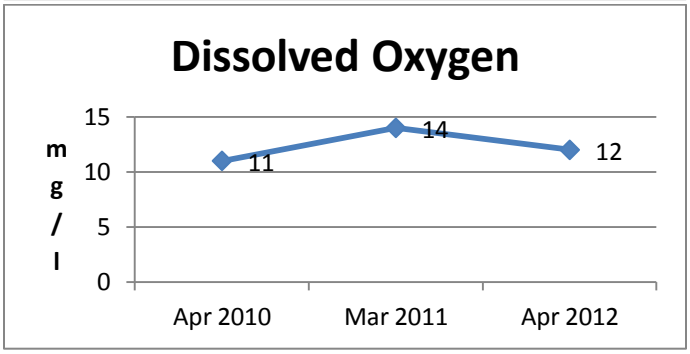
Chemical Sampling

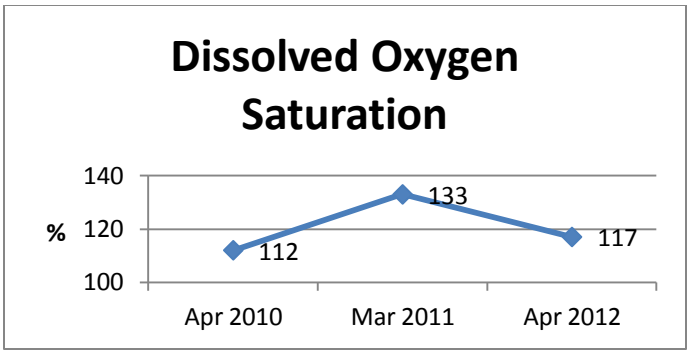
Date	Level	Air	Water	pH	Cond	Phosphate	Turbidity	DO/Sat	Nitrate
4/18/10	2	22°	16°	9.2	390	0.10	<10	11/112%	-
3/20/11	3	28°	13°	8.5	370	0.10	<10	14/133%	-
4/22/12	2	15.5°	14°	8.5	400	0.21	<10	12/117%	0.25

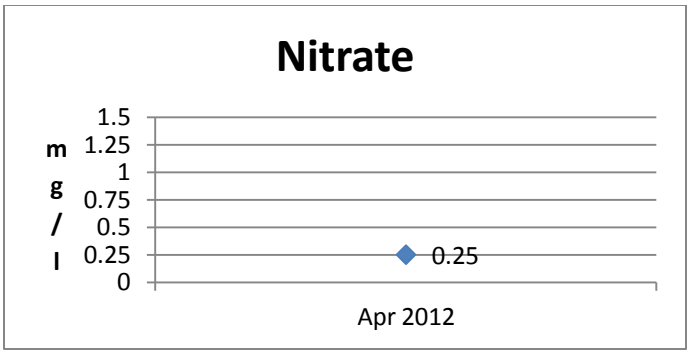












Site Notes and Journal:

Site 14

4.2 miles below Monastery Bridge access
.2 miles us Coon Den Spring
Douglas County
Lat 36.83491°N, Long 92.41384°W

April 2010

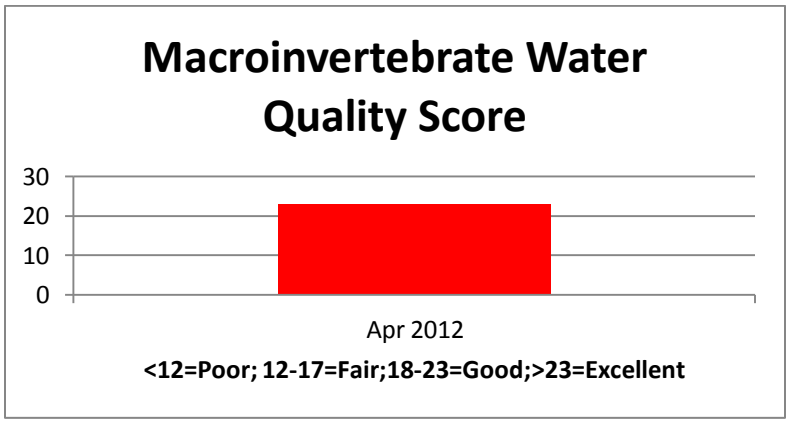
Biological Sampling

Date	Lvl	Cd	Db	My	RS	Rf	St	Pn	OB	Cm	Cr	Cy	Dr	Da	Sd	FF	Al	Ws	AW	BF	Lc	Md	LS	OS	Score
4/12	2	7	10	44	7	1	9			3		4							10						23

Sensitive
Cd – Caddisfly
Db – Dobsonfly
My- Mayfly
RS – Right Snail
Rf – Riffle Beetle
St – Stonefly
Pn – Water Penny

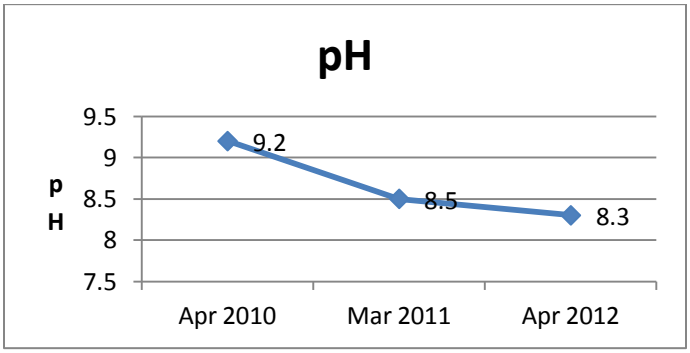
Somewhat Tolerant
OB – Other Beetle
Cm – Clam/Mussel
Cr – Cranefly
Cy – Crayfish
Dr – Dragonfly
Da – Damselfly
Sd -- Scud
FF -- Fishfly
Al - Alderfly
Ws – Watersnipe Fly

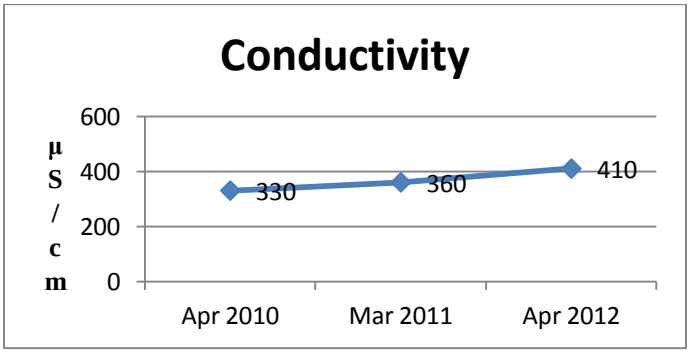
Tolerant
AW – Aquatic Worm
BF - Blackfly
Lc - Leech
Md - Midge
LS – Left Snail
OS – Other Snail

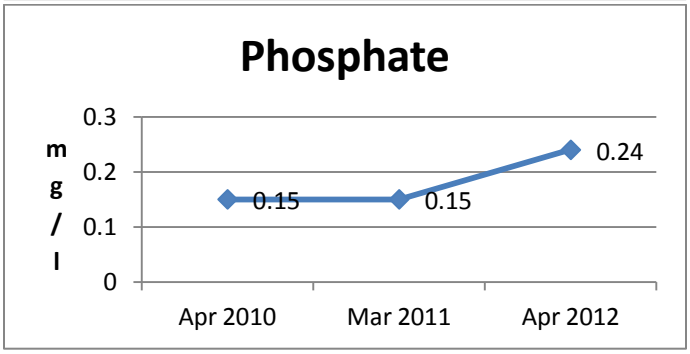


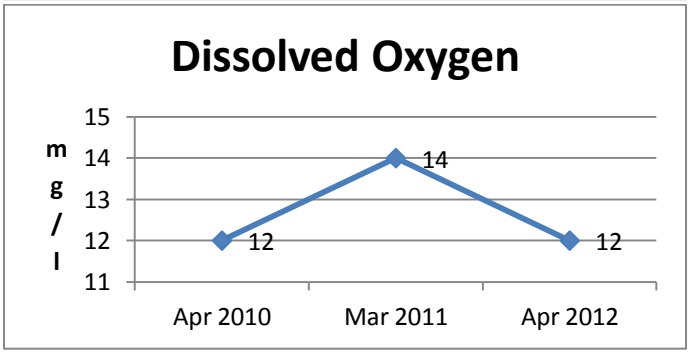
Chemical Sampling

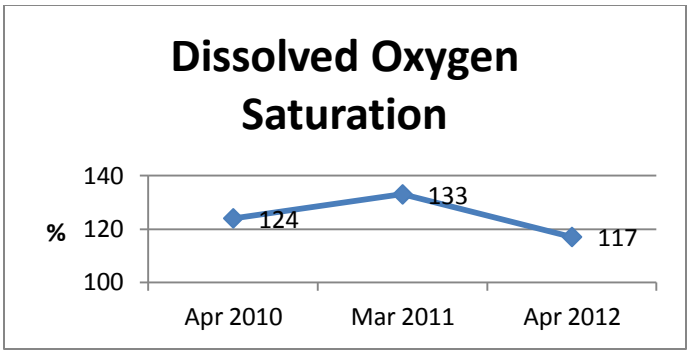
Date	Level	Air	Water	pH	Cond	Phosphate	Turbidity	DO/Sat	Nitrate
4/18/10	2	27°	17°	9.2	330	0.15	<10	12/124%	-
3/20/11	3	29°	13°	8.5	360	0.15	<10	14/133%	-
4/22/12	2	15°	14°	8.3	410	0.24	<10	12/117%	0.25

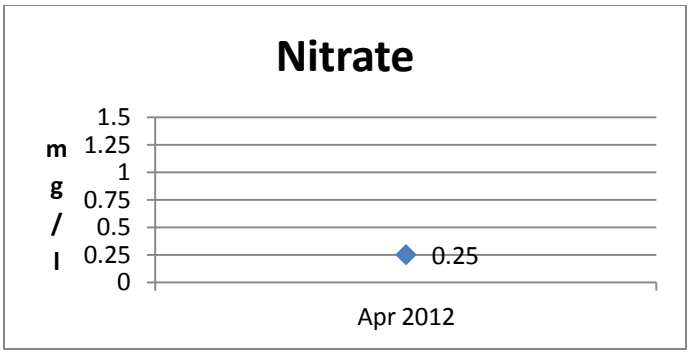












Site Notes and Journal:

Site 15

5.2 miles below Monastery Bridge access
Approx .36 miles ds Columbus Spring and 875 ft us 1st trib in Section 20
Douglas County
Lat 36.83317°N, Long 92.39884°W

April 2010

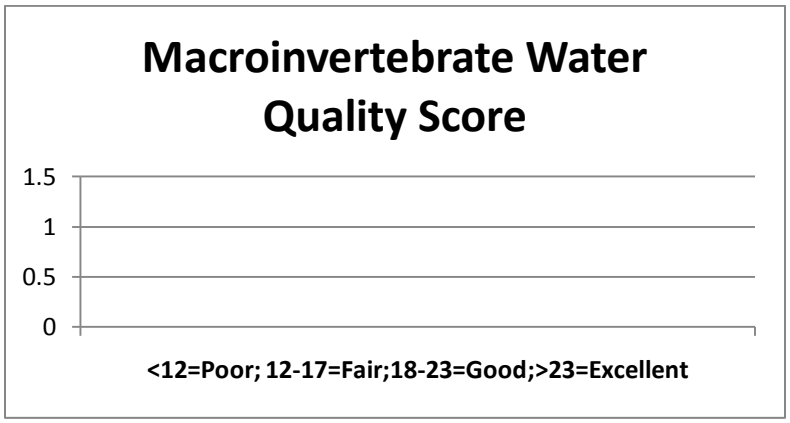
Biological Sampling

Date	Lvl	Cd	Db	My	RS	Rf	St	Pn	OB	Cm	Cr	Cy	Dr	Da	Sd	FF	Al	Ws	AW	BF	Lc	Md	LS	OS	Score

Sensitive
Cd – Caddisfly
Db – Dobsonfly
My- Mayfly
RS – Right Snail
Rf – Riffle Beetle
St – Stonefly
Pn – Water Penny

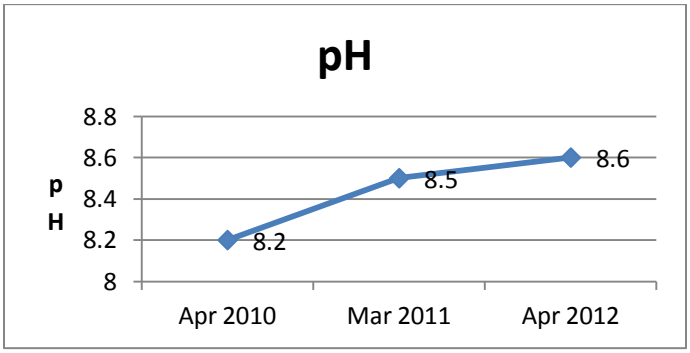
Somewhat Tolerant
OB – Other Beetle
Cm – Clam/Mussel
Cr – Cranefly
Cy – Crayfish
Dr – Dragonfly
Da – Damselfly
Sd -- Scud
FF -- Fishfly
Al - Alderfly
Ws – Watersnipe Fly

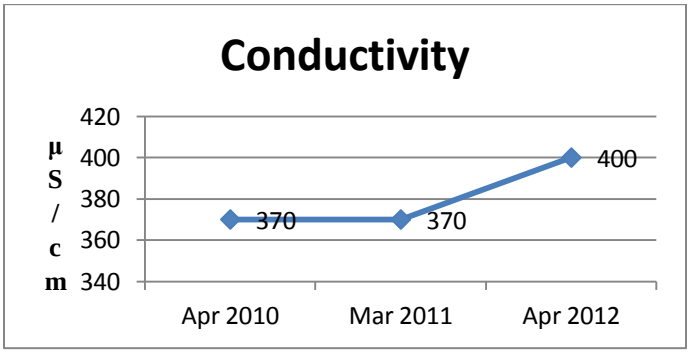
Tolerant
AW – Aquatic Worm
BF - Blackfly
Lc - Leech
Md - Midge
LS – Left Snail
OS – Other Snail

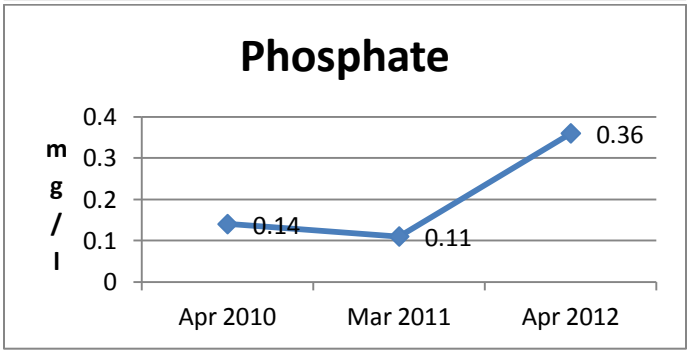


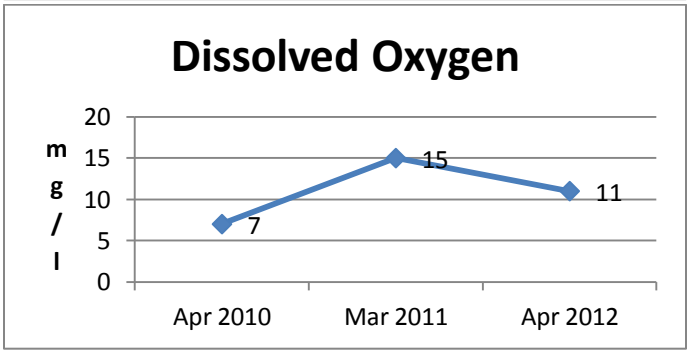
Chemical Sampling

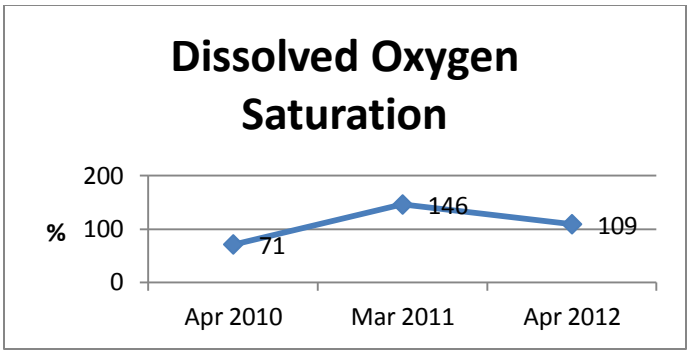
Date	Level	Air	Water	pH	Cond	Phosphate	Turbidity	DO/Sat	Nitrate
4/18/10	2	18°	16°	8.2	370	0.14	<10	7/71%	-
3/20/11	3	26°	14°	8.5	370	0.11	<10	15/146%	-
4/22/12	2	17°	15°	8.6	400	0.36	<10	11/109%	0.25

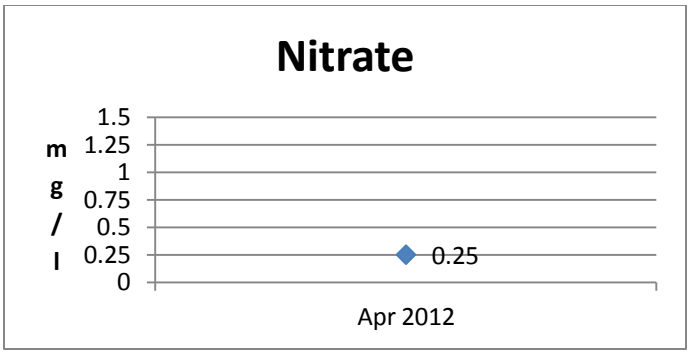












Site Notes and Journal: April 2012: No sites suitable for macroinvertebrate sampling.

Site 16

Bertha Ford/Bridge access, County Road 345
5.85 miles below Monastery Bridge access
Douglas County
Lat 36.82671°N, Long 92.39015°W

April 2010

May 2012

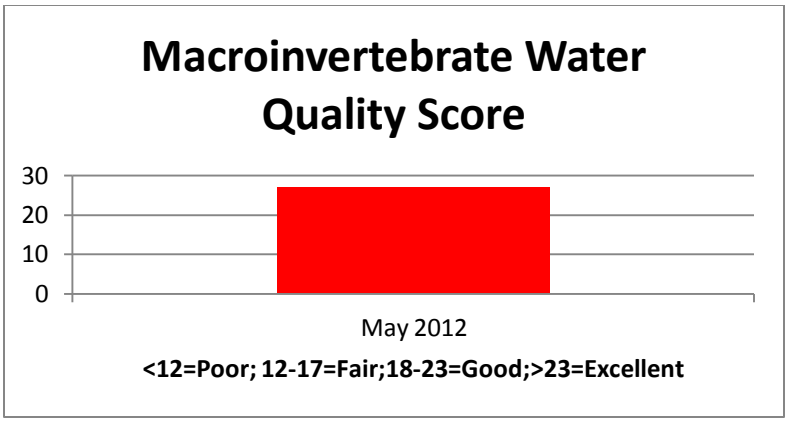
Biological Sampling

Date	Lvl	Cd	Db	My	RS	Rf	St	Pn	OB	Cm	Cr	Cy	Dr	Da	Sd	FF	Al	Ws	AW	BF	Lc	Md	LS	OS	Score
5/12	2	23	2	12	22	1	1		1	2		7							1			1	1		27

Sensitive
- Cd – Caddisfly
- Db – Dobsonfly
- My- Mayfly
- RS – Right Snail
- Rf – Riffle Beetle
- St – Stonefly
- Pn – Water Penny

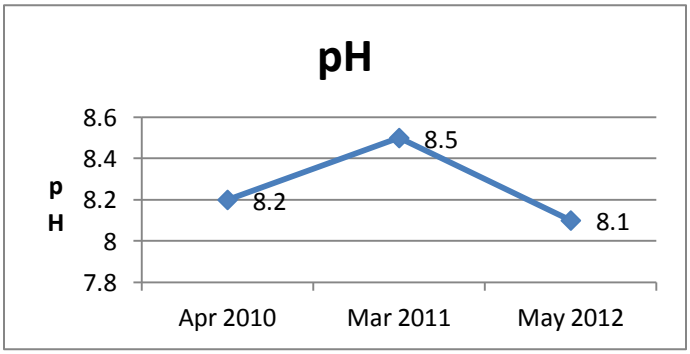
Somewhat Tolerant
- OB – Other Beetle
- Cm – Clam/Mussel
- Cr – Cranefly
- Cy – Crayfish
- Dr – Dragonfly
- Da – Damselfly
- Sd -- Scud
- FF -- Fishfly
- Al - Alderfly
- Ws – Watersnipe Fly

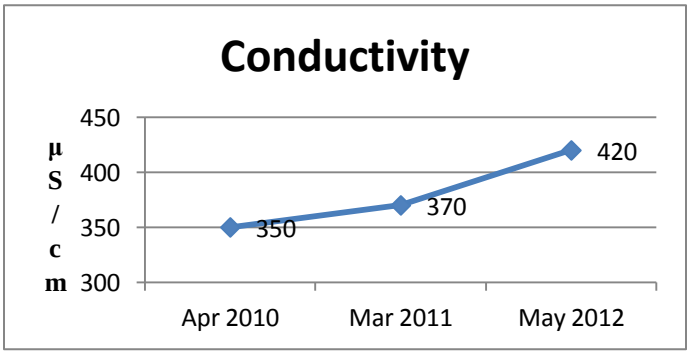
Tolerant
- AW – Aquatic Worm
- BF - Blackfly
- Lc - Leech
- Md - Midge
- LS – Left Snail
- OS – Other Snail

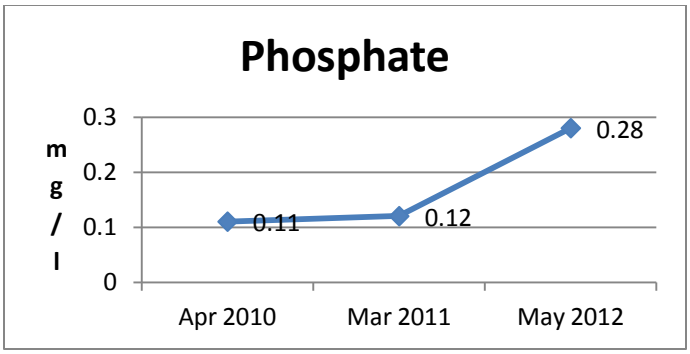


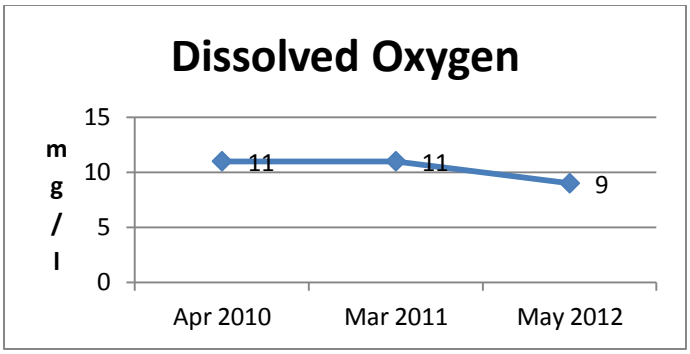
Chemical Sampling

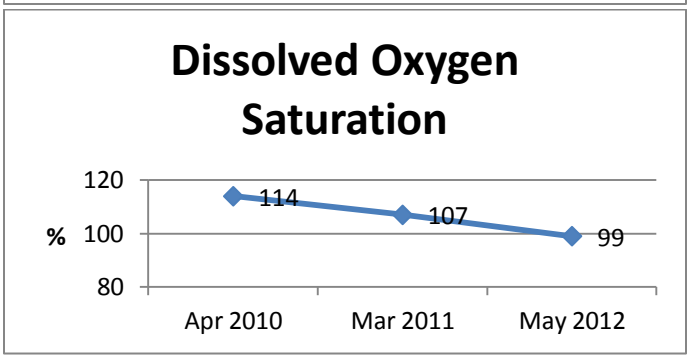
Date	Level	Air	Water	pH	Cond	Phosphate	Turbidity	DO/Sat	Nitrate
4/18/10	2	19°	17°	8.2	350	0.11	<10	11/114%	-
3/20/11	3	27°	14°	8.5	370	0.12	<10	11/107%	-
5/21/12	3	20°	20°	8.1	420	0.28	<10	9/99%	0.25

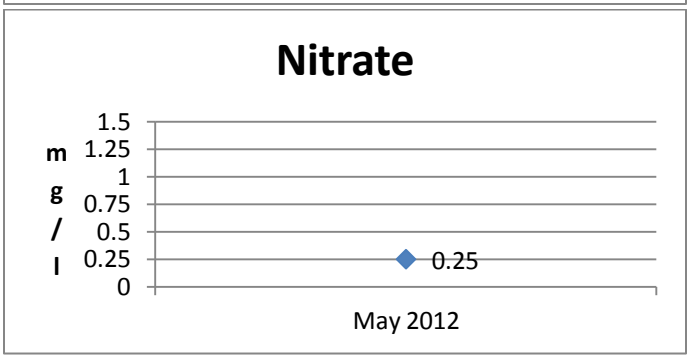












Site Notes and Journal:

Site 17

.45 miles below Bertha Ford/Bridge
Approx 300 ft ds confluence with Fox Creek
Douglas County
Lat 36.82542°N, Long 92.38482°W

April 2010

May 2012

Biological Sampling

Date	Lvl	Cd	Db	My	RS	Rf	St	Pn	OB	Cm	Cr	Cy	Dr	Da	Sd	FF	Al	Ws	AW	BF	Lc	Md	LS	OS	Score

Sensitive

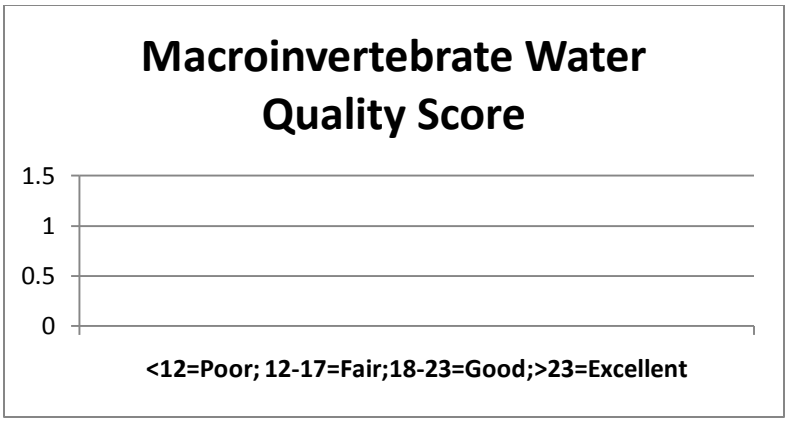
Cd – Caddisfly
Db – Dobsonfly
My- Mayfly
RS – Right Snail
Rf – Riffle Beetle
St – Stonefly
Pn – Water Penny

Somewhat Tolerant

OB – Other Beetle
Cm – Clam/Mussel
Cr – Cranefly
Cy – Crayfish
Dr – Dragonfly
Da – Damselfly
Sd -- Scud
FF -- Fishfly
Al - Alderfly
Ws – Watersnipe Fly

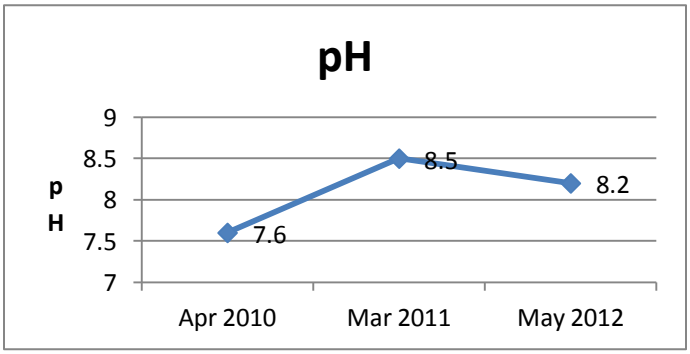
Tolerant

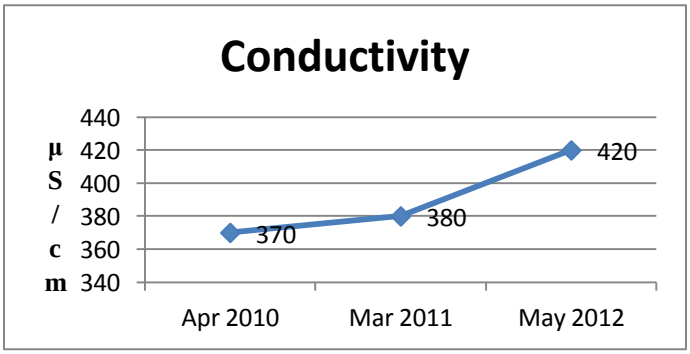
AW – Aquatic Worm
BF - Blackfly
Lc - Leech
Md - Midge
LS – Left Snail
OS – Other Snail

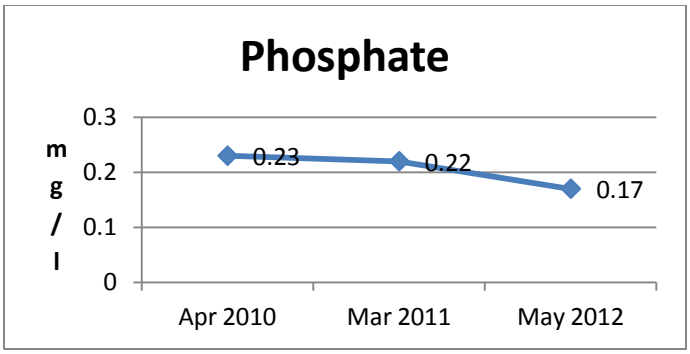


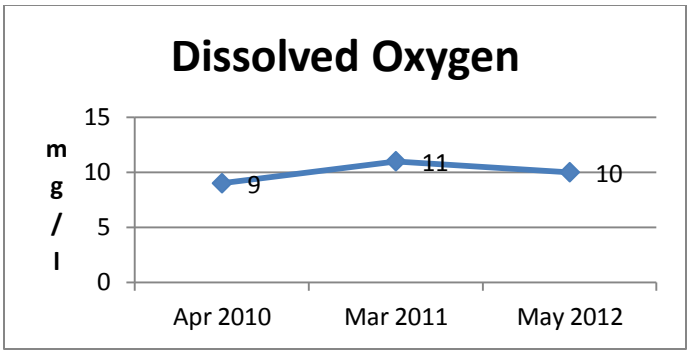
Chemical Sampling

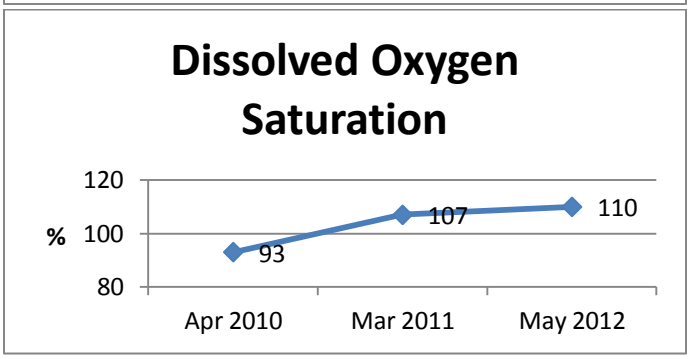
Date	Level	Air	Water	pH	Cond	Phosphate	Turbidity	DO/Sat	Nitrate
4/18/10	2	18°	17°	7.6	370	0.23	<10	9/93%	-
3/20/11	3	25°	14°	8.5	380	0.22	<10	11/107%	-
5/21/12	3	21°	20°	8.2	420	0.17	<10	10/110%	0.25

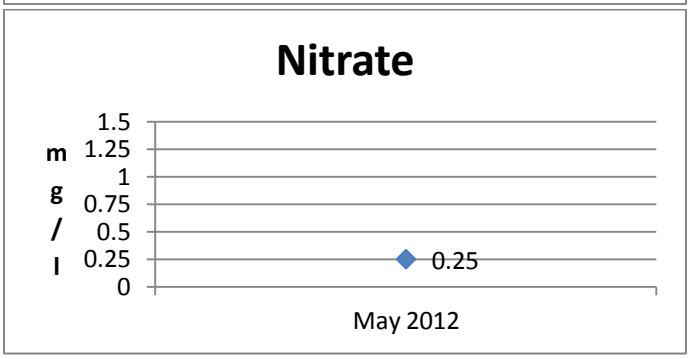












Site Notes and Journal:

Site 18

1.45 miles below Bertha Ford/Bridge
Approx 500 ft ds confluence of 1st trib at Turkey Flat Hollow in Section 28
Douglas County
Lat 36.81785°N, Long 92.38049°W

April 2010

May 2012

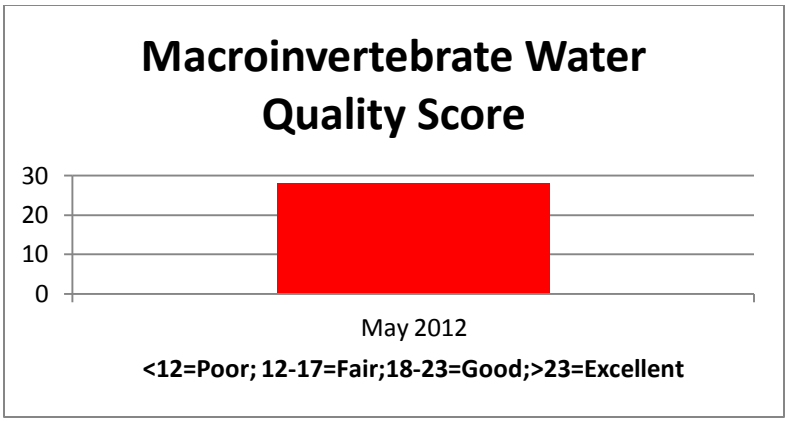
Biological Sampling

Date	Lvl	Cd	Db	My	RS	Rf	St	Pn	OB	Cm	Cr	Cy	Dr	Da	Sd	FF	Al	Ws	AW	BF	Lc	Md	LS	OS	Score
5/12	2	20	5	10	10	1	5			2	1	5			1				30	1					28

Sensitive
Cd – Caddisfly
Db – Dobsonfly
My- Mayfly
RS – Right Snail
Rf – Riffle Beetle
St – Stonefly
Pn – Water Penny

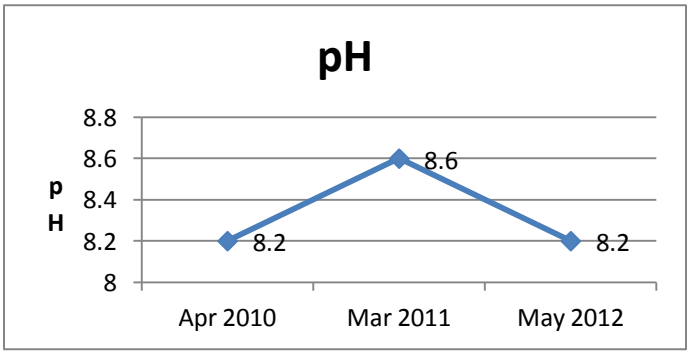
Somewhat Tolerant
OB – Other Beetle
Cm – Clam/Mussel
Cr – Cranefly
Cy – Crayfish
Dr – Dragonfly
Da – Damselfly
Sd -- Scud
FF -- Fishfly
Al - Alderfly
Ws – Watersnipe Fly

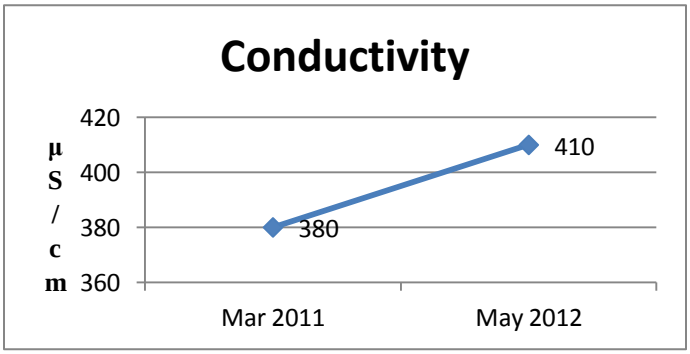
Tolerant
AW – Aquatic Worm
BF - Blackfly
Lc - Leech
Md - Midge
LS – Left Snail
OS – Other Snail

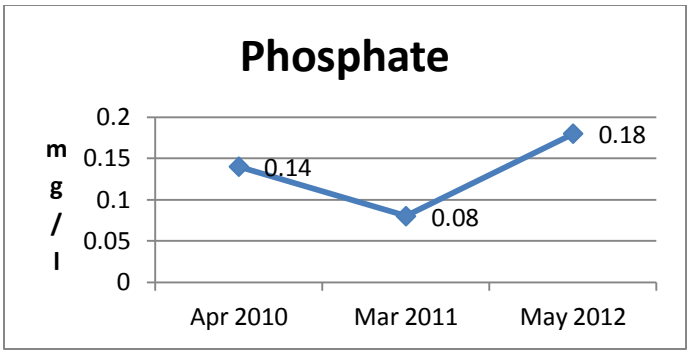


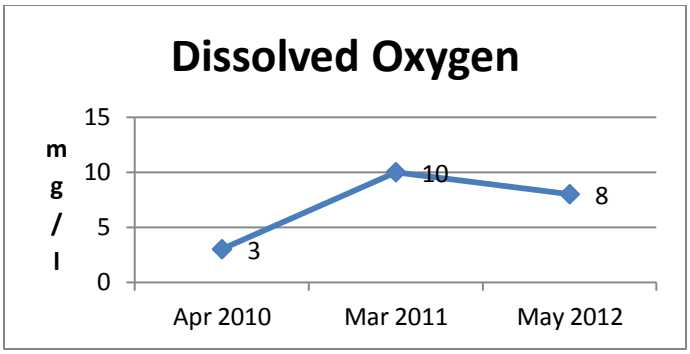
Chemical Sampling

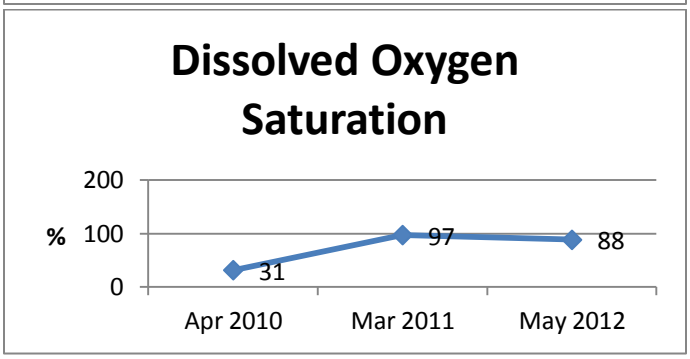
Date	Level	Air	Water	pH	Cond	Phosphate	Turbidity	DO/Sat	Nitrate
4/18/10	2	17°	17°	8.2	N/A	0.14	<10	3/31%	-
3/20/11	3	22°	14°	8.6	380	0.08	<10	10/97%	-
5/21/12	3	21°	20°	8.2	410	0.18	<10	8/88%	0.25

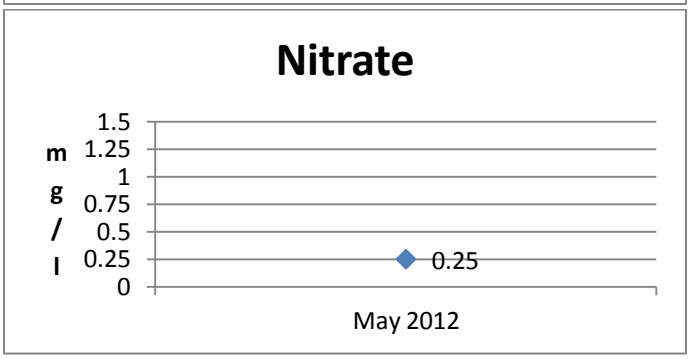












Site Notes and Journal:

Site 19

2.45 miles below Bertha Ford/Bridge
Approximately .5 miles us confluence of Spring Creek
Douglas County
Lat 36.80939°N, Long 92.37354°W

April 2010

May 2012

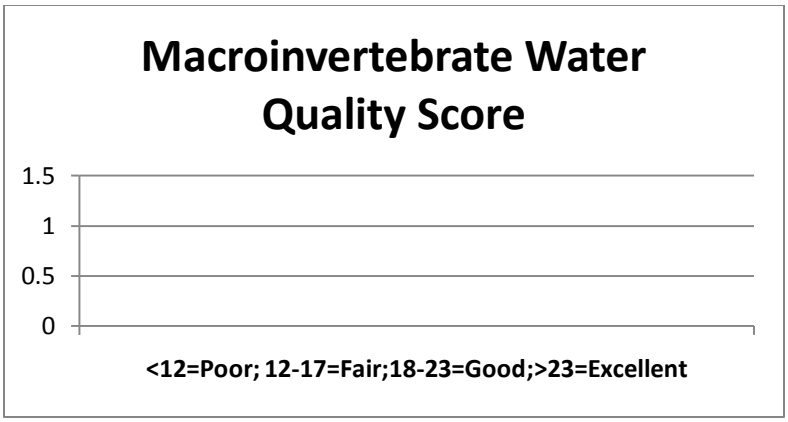
Biological Sampling

Date	Lvl	Cd	Db	My	RS	Rf	St	Pn	OB	Cm	Cr	Cy	Dr	Da	Sd	FF	Al	Ws	AW	BF	Lc	Md	LS	OS	Score

Sensitive
Cd – Caddisfly
Db – Dobsonfly
My- Mayfly
RS – Right Snail
Rf – Riffle Beetle
St – Stonefly
Pn – Water Penny

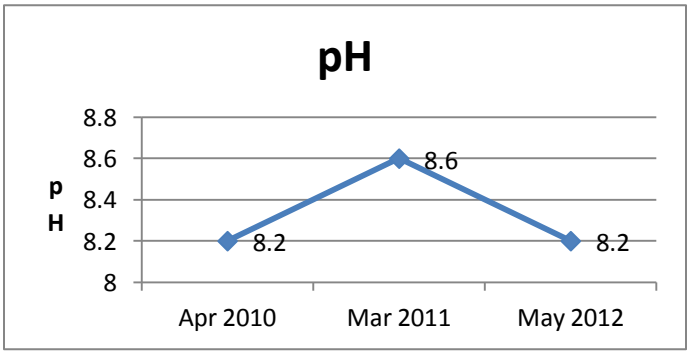
Somewhat Tolerant
OB – Other Beetle
Cm – Clam/Mussel
Cr – Cranefly
Cy – Crayfish
Dr – Dragonfly
Da – Damselfly
Sd -- Scud
FF -- Fishfly
Al - Alderfly
Ws – Watersnipe Fly

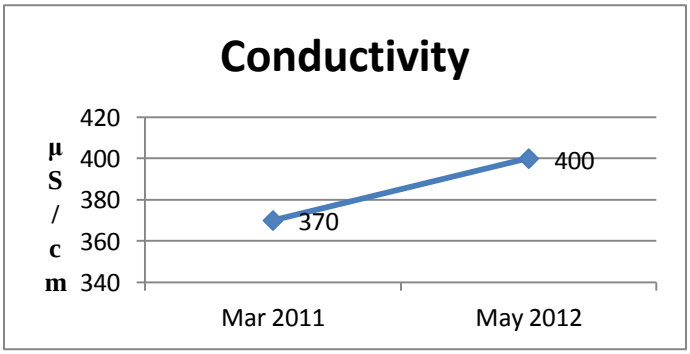
Tolerant
AW – Aquatic Worm
BF - Blackfly
Lc - Leech
Md - Midge
LS – Left Snail
OS – Other Snail

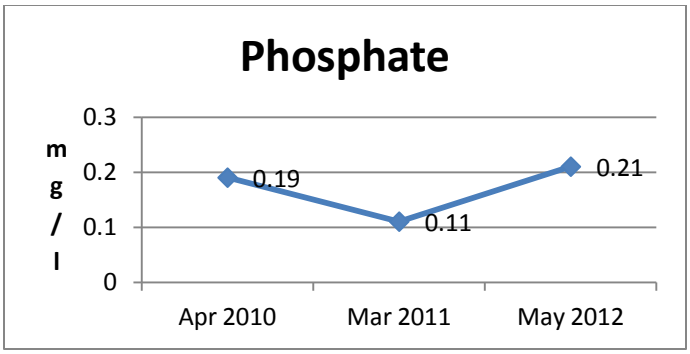


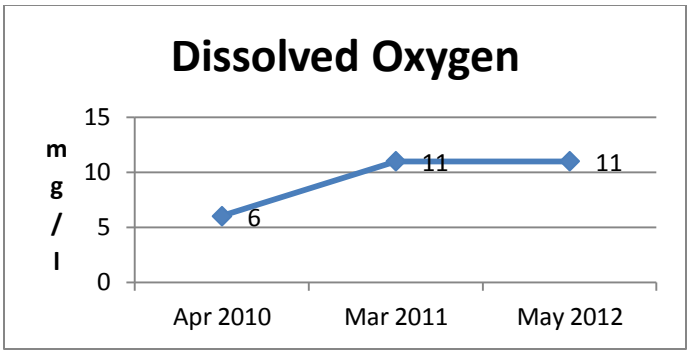
Chemical Sampling

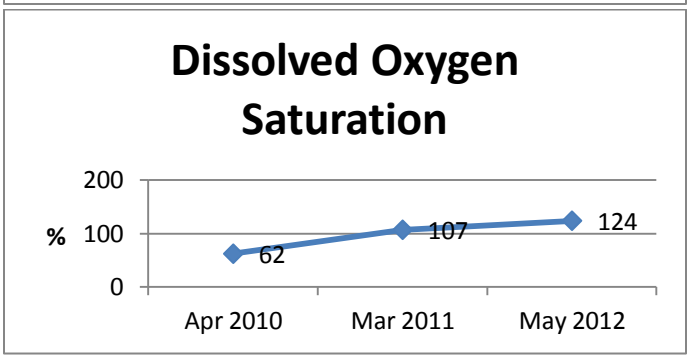
Date	Level	Air	Water	pH	Cond	Phosphate	Turbidity	DO/Sat	Nitrate
4/18/10	2	14°	17°	8.2	N/A	0.19	<10	6/62%	-
3/20/11	3	24°	14°	8.6	370	0.11	<10	11/107%	-
5/20/12	3	25°	21°	8.2	400	0.21	<10	11/124%	0.25

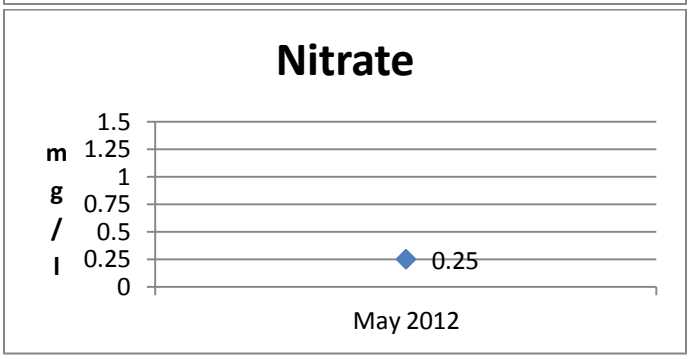












Site Notes and Journal:

Site 20

3.45 miles below Bertha Ford/Bridge
Approximately .45 miles ds confluence of Spring Creek
Douglas County
Lat 36.80035°N, Long 92.36142°W

April 2010

May 2012

Biological Sampling

Date	Lvl	Cd	Db	My	RS	Rf	St	Pn	OB	Cm	Cr	Cy	Dr	Da	Sd	FF	Al	Ws	AW	BF	Lc	Md	LS	OS	Score
5/12	2	30	1	12	18	3	4	1	1	4		10							6	2					29

Sensitive

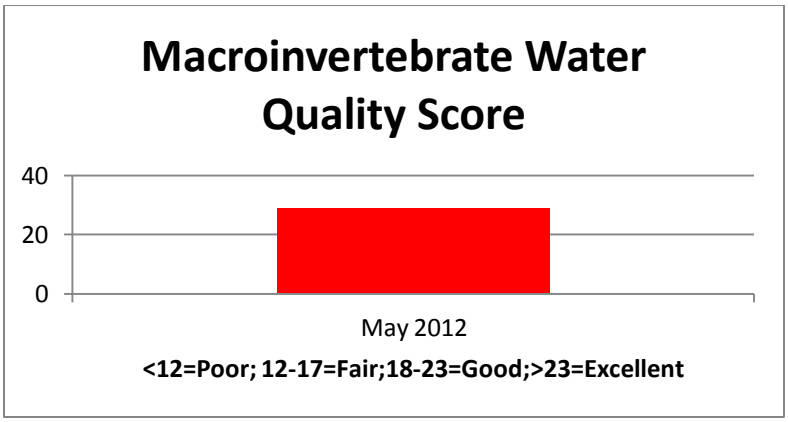
Cd – Caddisfly
Db – Dobsonfly
My- Mayfly
RS – Right Snail
Rf – Riffle Beetle
St – Stonefly
Pn – Water Penny

Somewhat Tolerant

OB – Other Beetle
Cm – Clam/Mussel
Cr – Cranefly
Cy – Crayfish
Dr – Dragonfly
Da – Damselfly
Sd -- Scud
FF -- Fishfly
Al - Alderfly
Ws – Watersnipe Fly

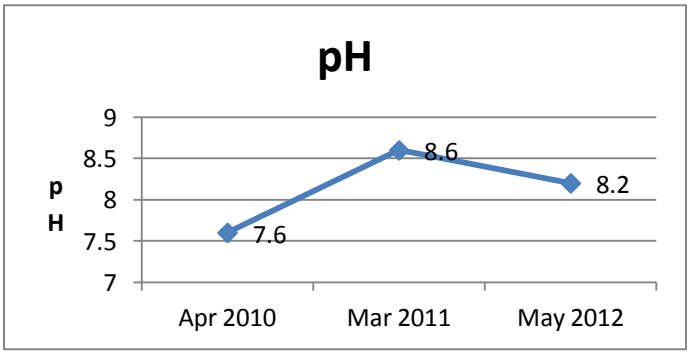
Tolerant

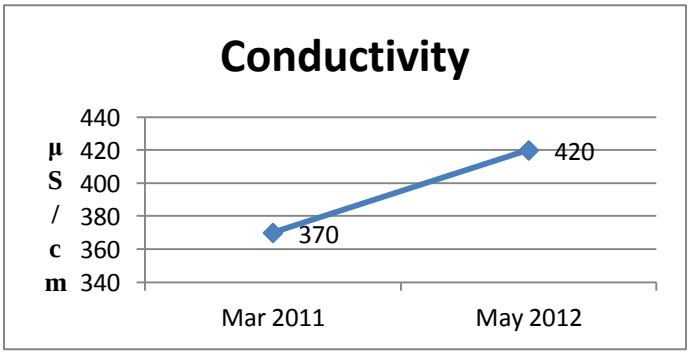
AW – Aquatic Worm
BF - Blackfly
Lc - Leech
Md - Midge
LS – Left Snail
OS – Other Snail

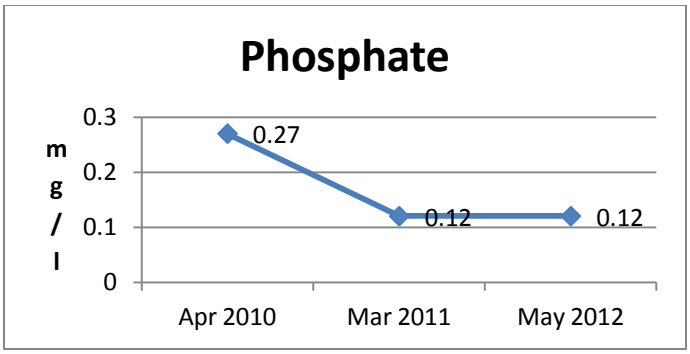


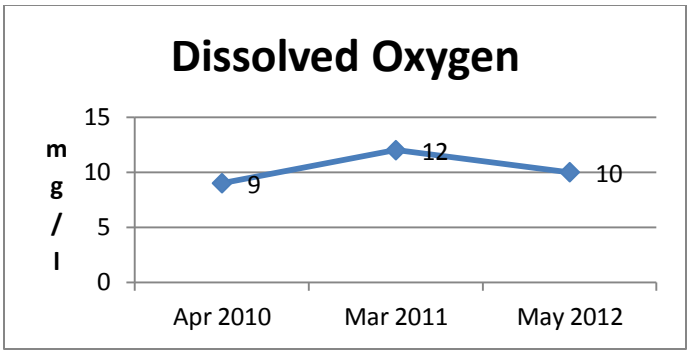
Chemical Sampling

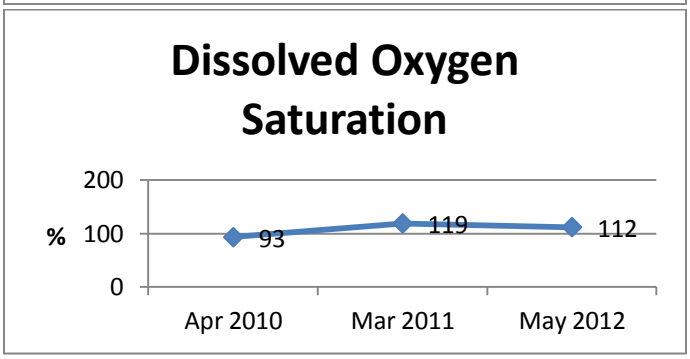
Date	Level	Air	Water	pH	Cond	Phosphate	Turbidity	DO/Sat	Nitrate
4/18/10	2	13°	17°	7.6	N/A	0.27	<10	9/93%	-
3/20/11	3	21°	15°	8.6	370	0.12	<10	12/119%	-
5/21/12	3	25°	21°	8.2	420	0.12	<10	10/112%	0.25

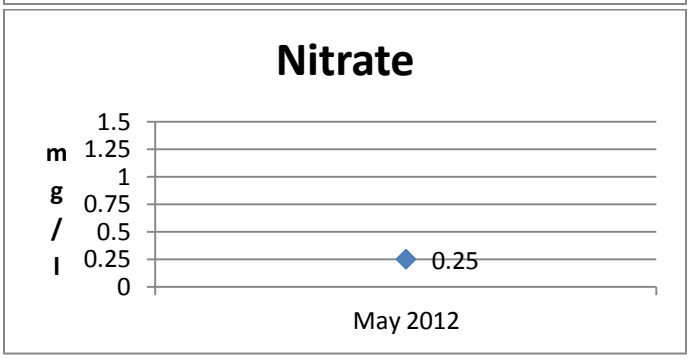












Site Notes and Journal:

Site 21

4.45 miles below Bertha Ford/Bridge
Approximately .5 miles us State Highway 95 Bridge
Ozark County
Lat 36.78890°N, Long 92.36806°W

March 2011

May 2012

Biological Sampling

Date	Lvl	Cd	Db	My	RS	Rf	St	Pn	OB	Cm	Cr	Cy	Dr	Da	Sd	FF	Al	Ws	AW	BF	Lc	Md	LS	OS	Score

Sensitive

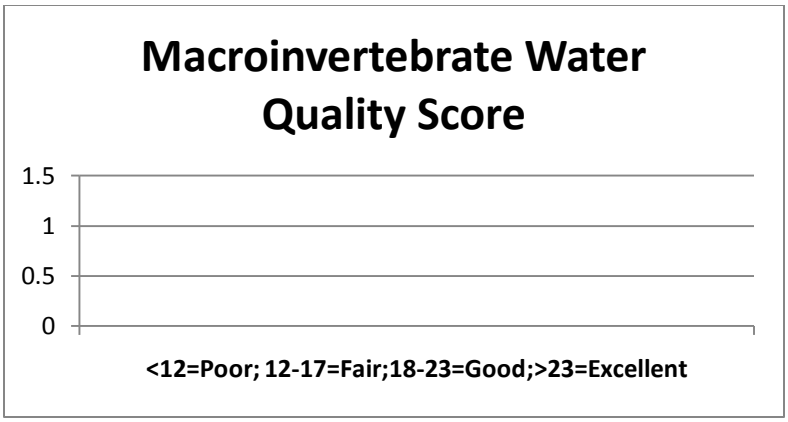
Cd – Caddisfly
Db – Dobsonfly
My- Mayfly
RS – Right Snail
Rf – Riffle Beetle
St – Stonefly
Pn – Water Penny

Somewhat Tolerant

OB – Other Beetle
Cm – Clam/Mussel
Cr – Cranefly
Cy – Crayfish
Dr – Dragonfly
Da – Damselfly
Sd -- Scud
FF -- Fishfly
Al - Alderfly
Ws – Watersnipe Fly

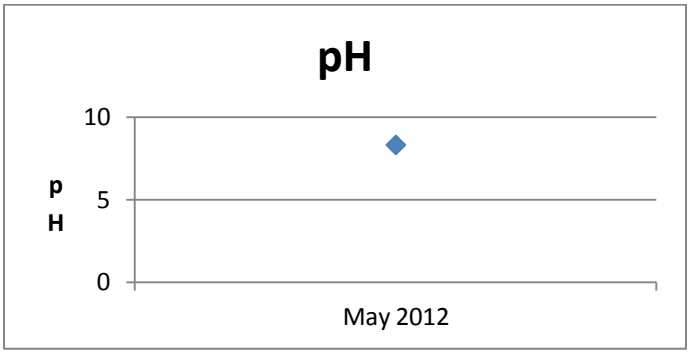
Tolerant

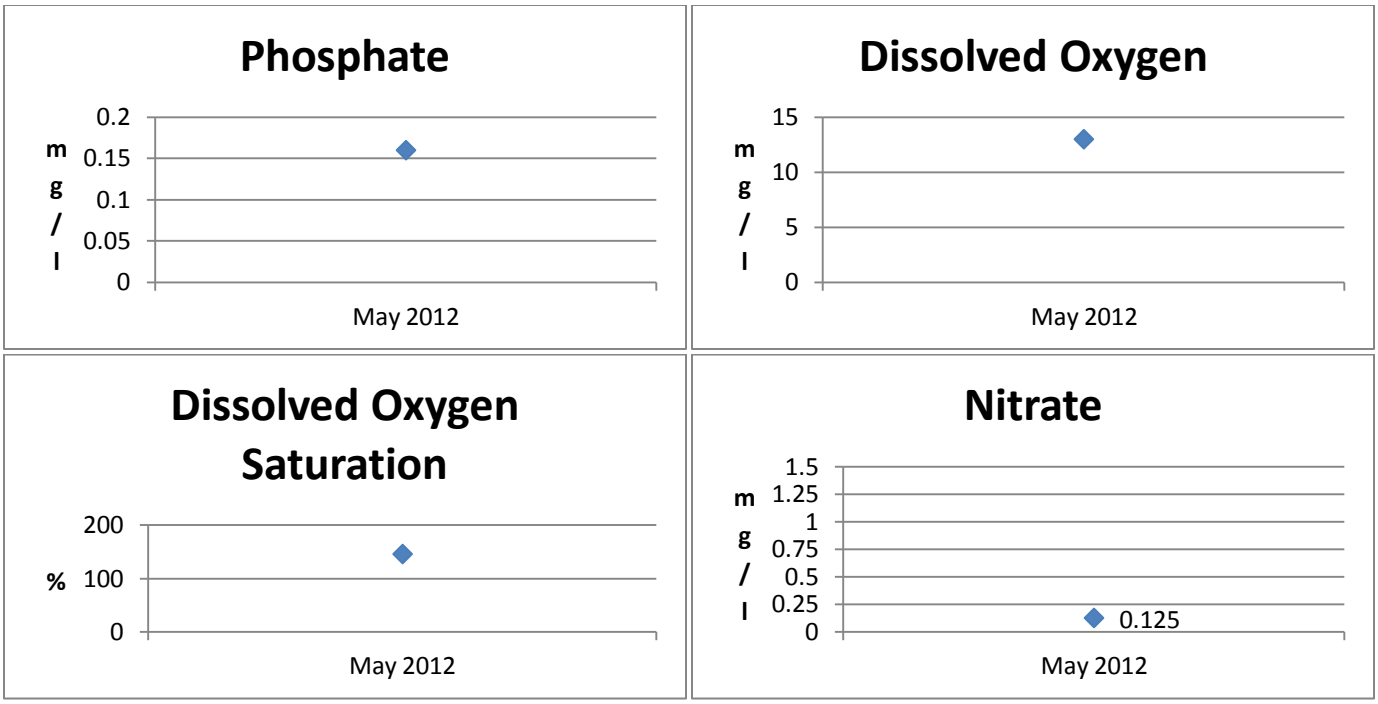
AW – Aquatic Worm
BF - Blackfly
Lc - Leech
Md - Midge
LS – Left Snail
OS – Other Snail



Chemical Sampling

Date	Level	Air	Water	pH	Cond	Phosphate	Turbidity	DO/Sat	Nitrate
5/21/12	3	27°	21°	8.3	400	0.16	<10	13/146%	<0.25





Site Notes and Journal:

3/20/11: After initial sampling of this section of the creek in 2010, it was determined that the distance between Site #20 and the Highway 95 bridge, shown to be 0.3 miles in the *Paddler's Guide*, was actually substantially longer, over one mile. During the 2011 sampling excursion, this additional sampling point was added, one mile downstream from Site #20 and about 0.5 miles above the Highway 95 bridge. No actual sampling was done at this site, however, due to impending darkness.

Site 22

Highway 95 Bridge
Ozark County
Lat 36.78311°N, Long 92.36695°W

April 2010

June 2011

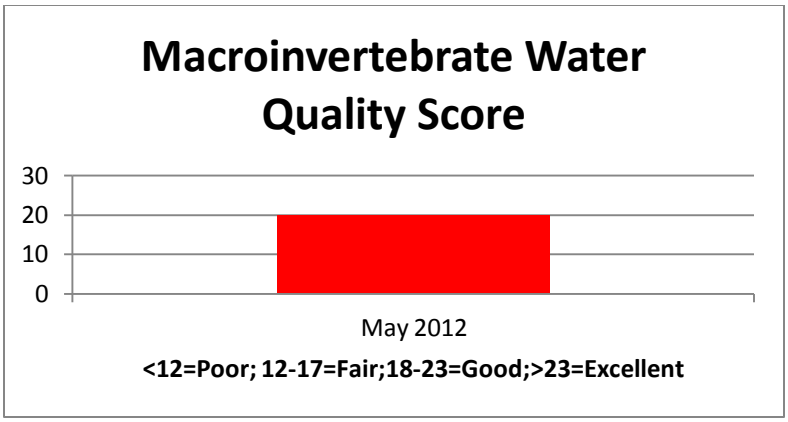
Biological Sampling

Date	Lvl	Cd	Db	My	RS	Rf	St	Pn	OB	Cm	Cr	Cy	Dr	Da	Sd	FF	Al	Ws	AW	BF	Lc	Md	LS	OS	Score
5/12	2	15	7	20	22		6			1		3							3						20

Sensitive
Cd – Caddisfly
Db – Dobsonfly
My- Mayfly
RS – Right Snail
Rf – Riffle Beetle
St – Stonefly
Pn – Water Penny

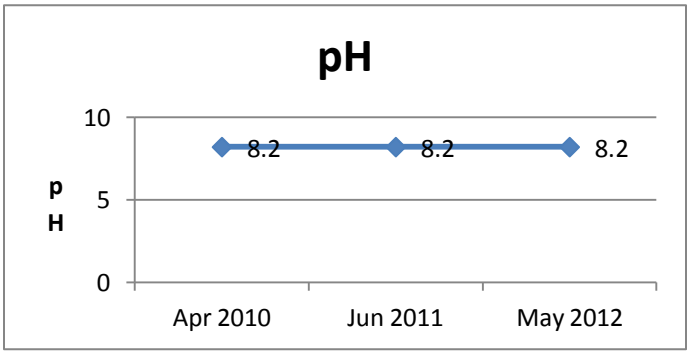
Somewhat Tolerant
OB – Other Beetle
Cm – Clam/Mussel
Cr – Cranefly
Cy – Crayfish
Dr – Dragonfly
Da – Damselfly
Sd -- Scud
FF -- Fishfly
Al - Alderfly
Ws – Watersnipe Fly

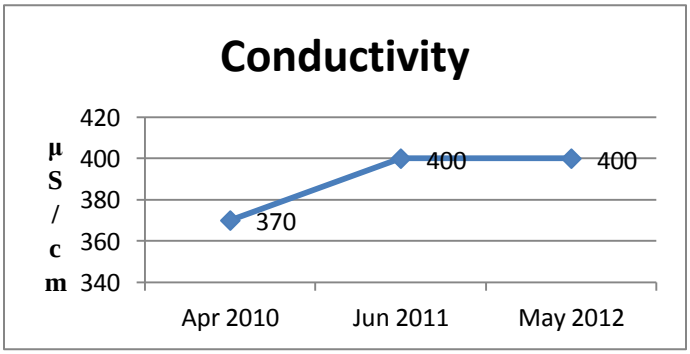
Tolerant
AW – Aquatic Worm
BF - Blackfly
Lc - Leech
Md - Midge
LS – Left Snail
OS – Other Snail

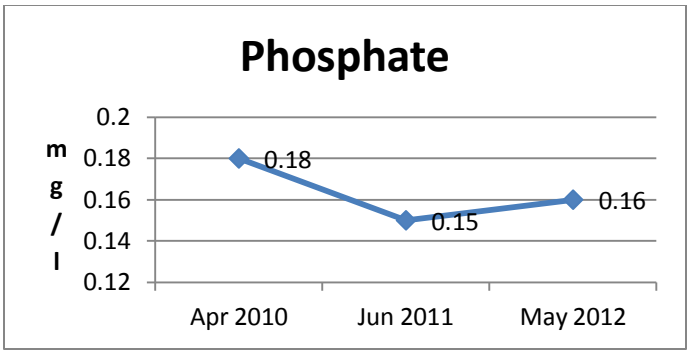


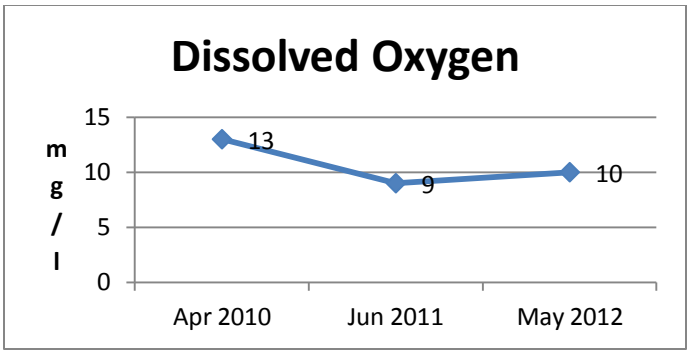
Chemical Sampling

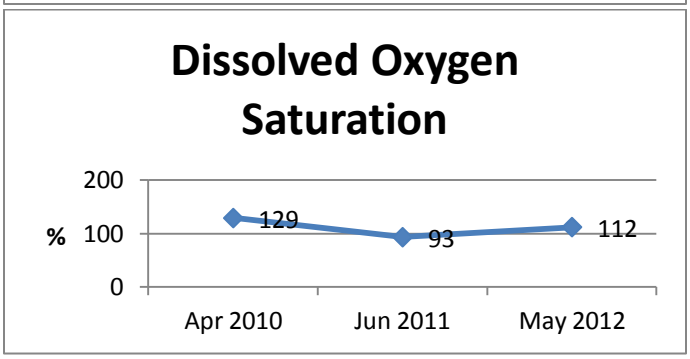
Date	Level	Air	Water	pH	Cond	Phosphate	Turbidity	DO/Sat	Nitrate
4/2/10	2	17°	15°	8.2	370	0.18	<10	13/129%	-
6/23/11	3	27°	17°	8.2	400	0.15	<10	9/93%	-
5/5/12	3	29°	21°	8.2	400	0.16	<10	10/112%	0.25

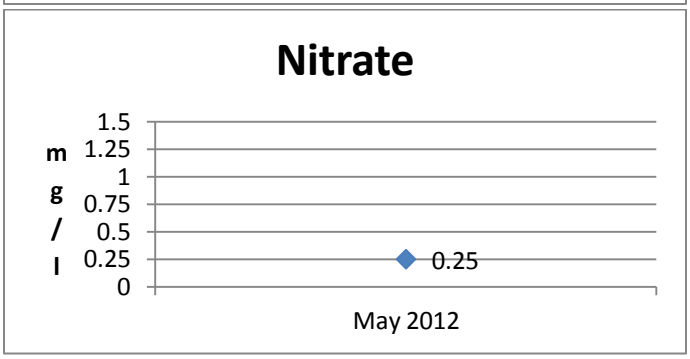












Site Notes and Journal:

Site 23

0.7 mile below Highway 95 Bridge
Approx .2 miles ds Boat Gunnel Hollow, 300 ft ds 1st trib in Section 11
Ozark County
Lat 36.77808°N, Long 92.35693°W

April 2010

June 2011

May 2012

Biological Sampling

Date	Lvl	Cd	Db	My	RS	Rf	St	Pn	OB	Cm	Cr	Cy	Dr	Da	Sd	FF	Al	Ws	AW	BF	Lc	Md	LS	OS	Score

Sensitive

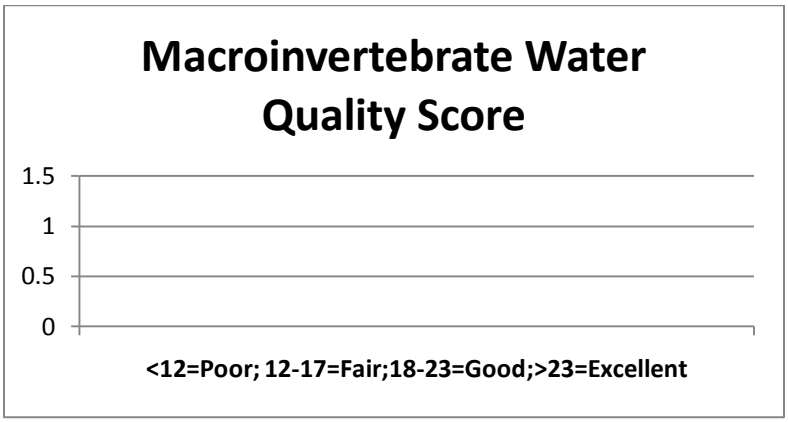
Cd – Caddisfly
Db – Dobsonfly
My- Mayfly
RS – Right Snail
Rf – Riffle Beetle
St – Stonefly
Pn – Water Penny

Somewhat Tolerant

OB – Other Beetle
Cm – Clam/Mussel
Cr – Cranefly
Cy – Crayfish
Dr – Dragonfly
Da – Damselfly
Sd -- Scud
FF -- Fishfly
Al - Alderfly
Ws – Watersnipe Fly

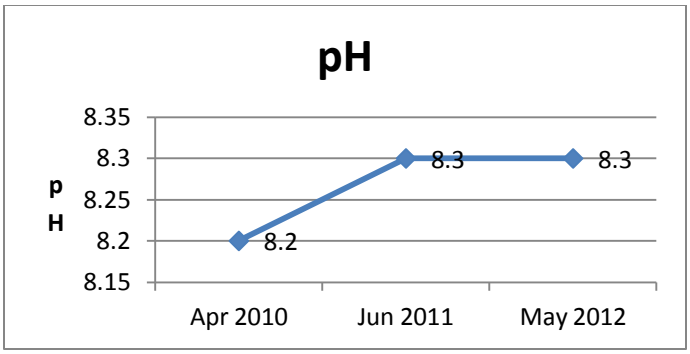
Tolerant

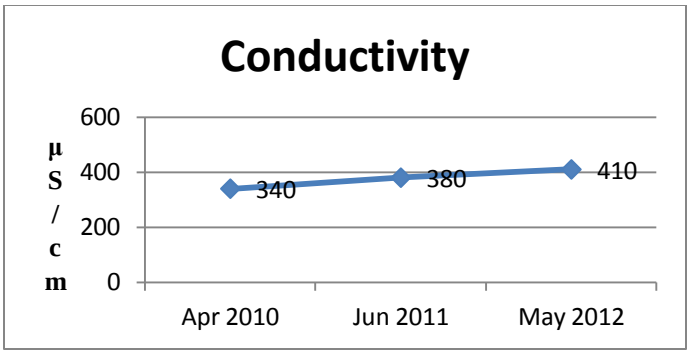
AW – Aquatic Worm
BF - Blackfly
Lc - Leech
Md - Midge
LS – Left Snail
OS – Other Snail

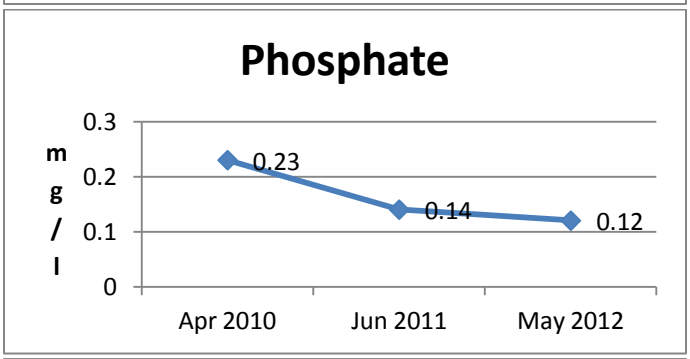


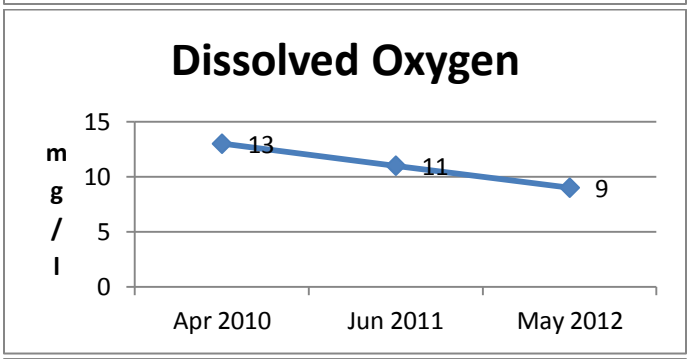
Chemical Sampling

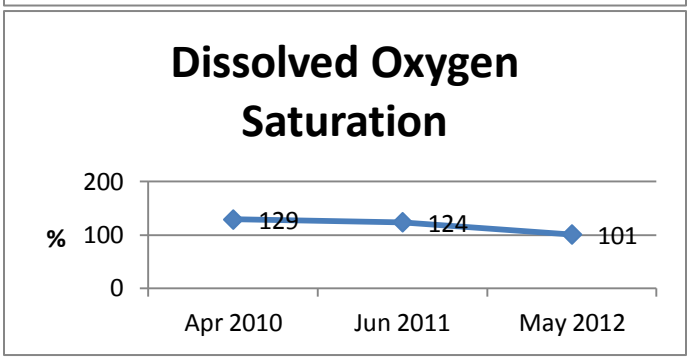
Date	Level	Air	Water	pH	Cond	Phosphate	Turbidity	DO/Sat	Nitrate
4/2/10	2	25°	15°	8.2	340	0.23	<10	13/129%	-
6/23/11	3	30°	21°	8.3	380	0.14	<10	11/124%	-
5/5/12	3	24°	21°	8.3	410	0.12	<10	9/101%	0.25

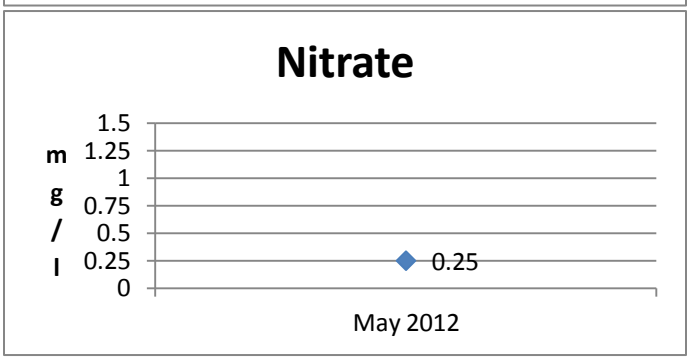










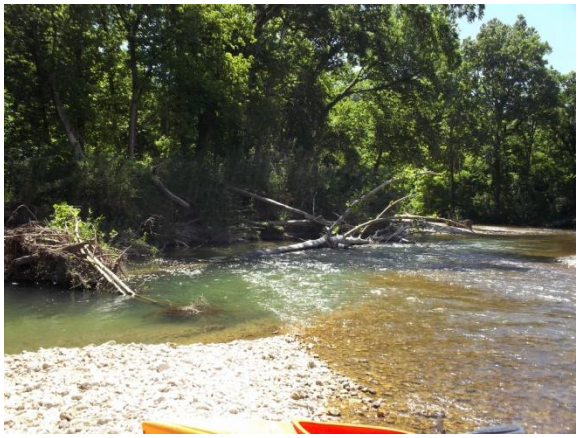


Site Notes and Journal:

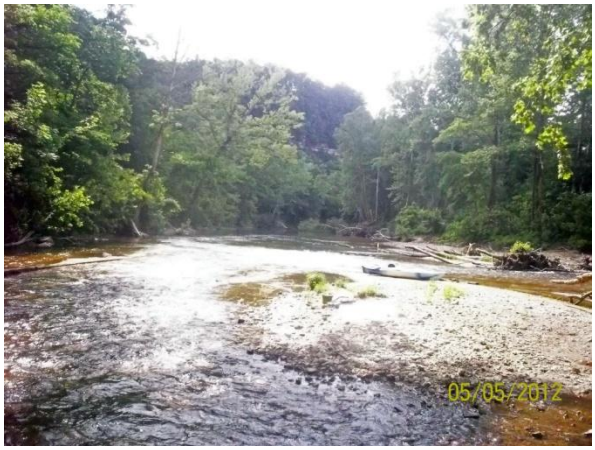
Site 24

1.7 miles below Highway 95 Bridge
Approximately .3 miles ds confluence of Dry Creek
Ozark County
Lat 36.78064°N, Long 92.34079°W

April 2010



June 2011



May 2012

Biological Sampling

Date	Lvl	Cd	Db	My	RS	Rf	St	Pn	OB	Cm	Cr	Cy	Dr	Da	Sd	FF	Al	Ws	AW	BF	Lc	Md	LS	OS	Score
5/12	2	5		15	4	2	12	2	1			2	1									1			25

Sensitive

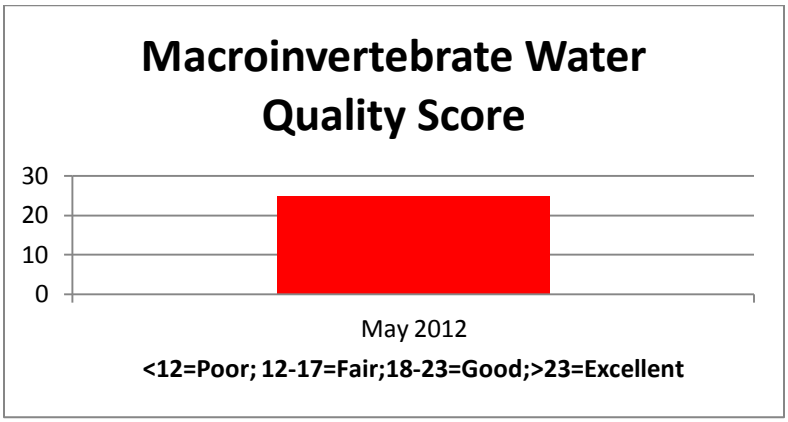
Cd – Caddisfly
Db – Dobsonfly
My- Mayfly
RS – Right Snail
Rf – Riffle Beetle
St – Stonefly
Pn – Water Penny

Somewhat Tolerant

OB – Other Beetle
Cm – Clam/Mussel
Cr – Cranefly
Cy – Crayfish
Dr – Dragonfly
Da – Damselfly
Sd -- Scud
FF -- Fishfly
Al - Alderfly
Ws – Watersnipe Fly

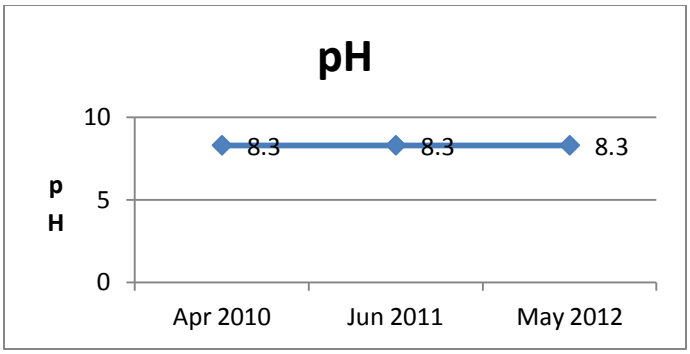
Tolerant

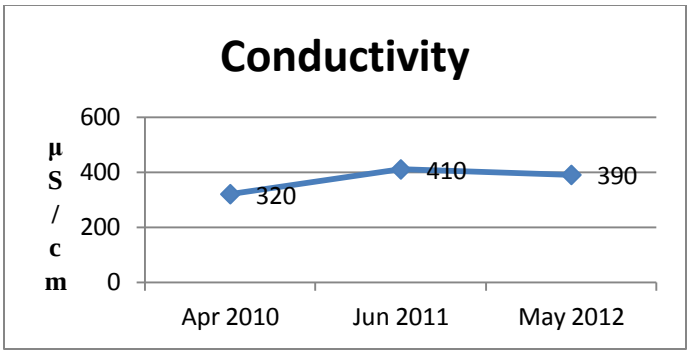
AW – Aquatic Worm
BF - Blackfly
Lc - Leech
Md - Midge
LS – Left Snail
OS – Other Snail

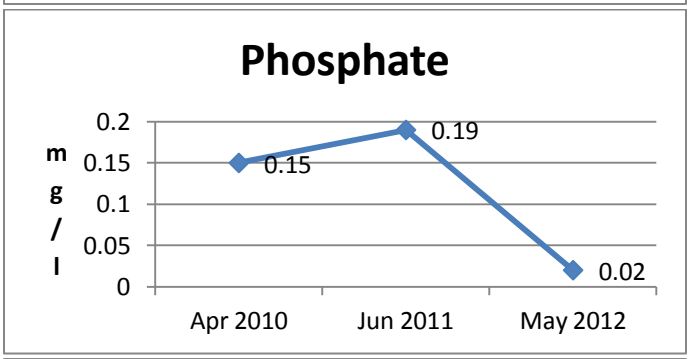


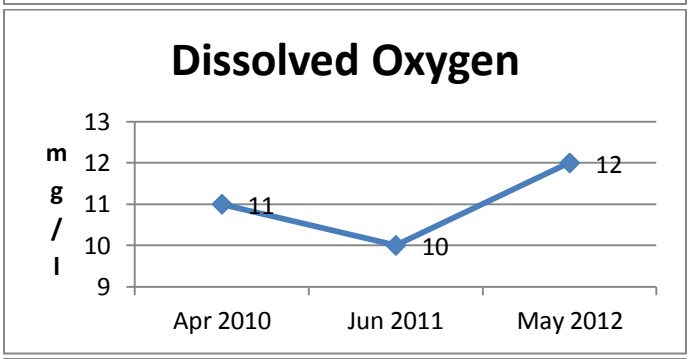
Chemical Sampling

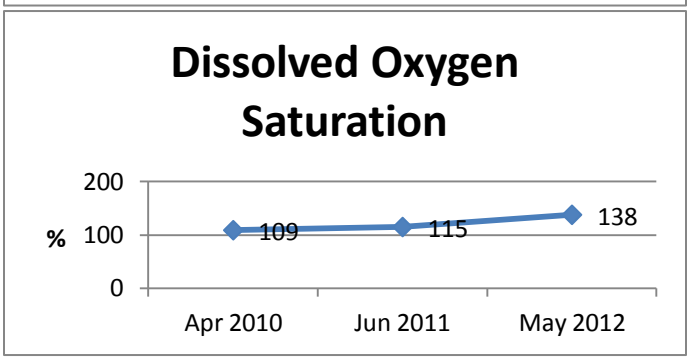
Date	Level	Air	Water	pH	Cond	Phosphate	Turbidity	DO/Sat	Nitrate
4/2/10	2	20°	15°	8.3	320	0.15	<10	11/109%	-
6/23/11	3	29°	22°	8.3	410	0.19	<10	10/115%	-
5/5/12	3	25°	22°	8.3	390	0.02	<10	12/138%	0.25

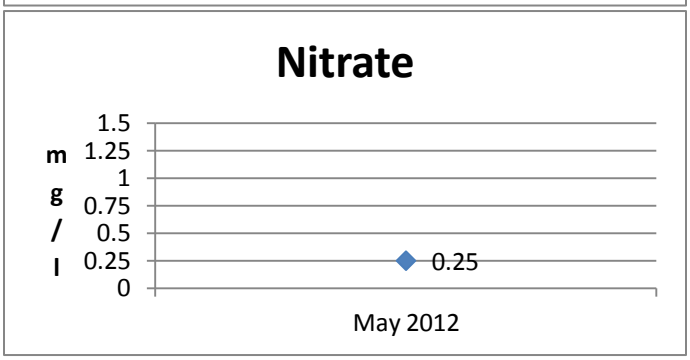










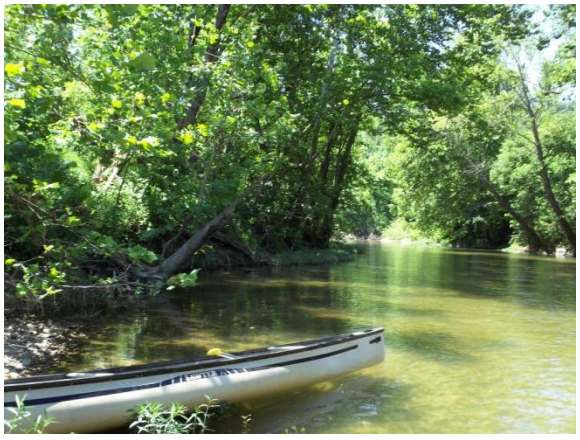


Site Notes and Journal:

Site 25

2.7 miles below Highway 95 Bridge
Approx 650 ft ds confluence of tributary at Owens Hollow
Ozark County
Lat 36.76926°N, Long 92.33888°W

April 2010



June 2011

May 2012

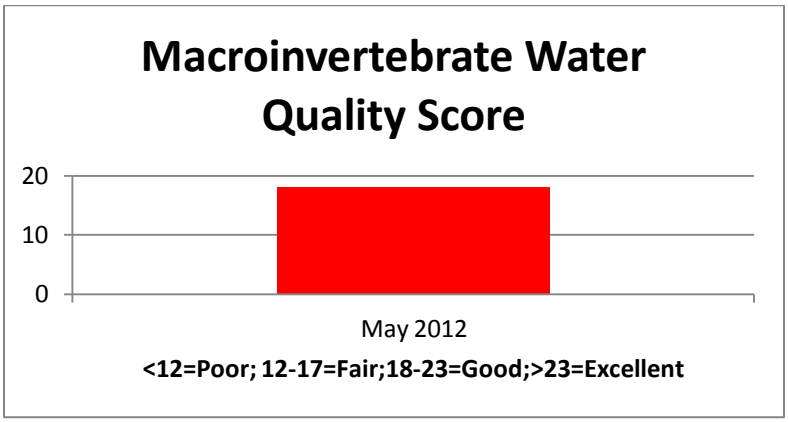
Biological Sampling

Date	Lvl	Cd	Db	My	RS	Rf	St	Pn	OB	Cm	Cr	Cy	Dr	Da	Sd	FF	Al	Ws	AW	BF	Lc	Md	LS	OS	Score
5/12	2	12		21	9	3	10					2								1					18

Sensitive
- Cd – Caddisfly
- Db – Dobsonfly
- My- Mayfly
- RS – Right Snail
- Rf – Riffle Beetle
- St – Stonefly
- Pn – Water Penny

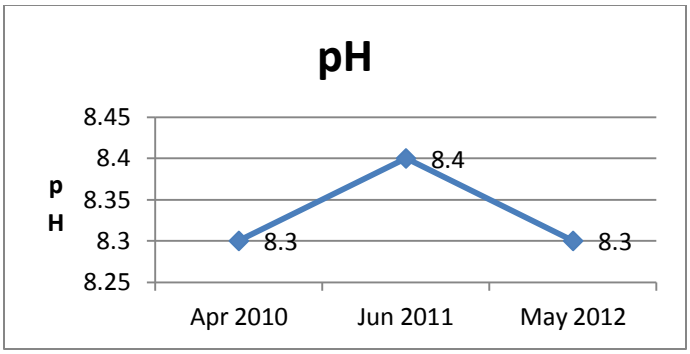
Somewhat Tolerant
- OB – Other Beetle
- Cm – Clam/Mussel
- Cr – Cranefly
- Cy – Crayfish
- Dr – Dragonfly
- Da – Damselfly
- Sd -- Scud
- FF -- Fishfly
- Al - Alderfly
- Ws – Watersnipe Fly

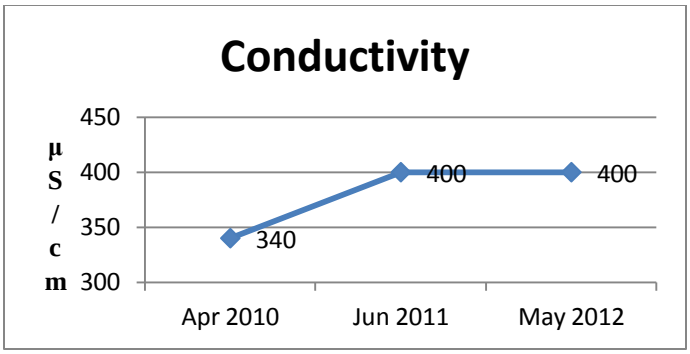
Tolerant
- AW – Aquatic Worm
- BF - Blackfly
- Lc - Leech
- Md - Midge
- LS – Left Snail
- OS – Other Snail

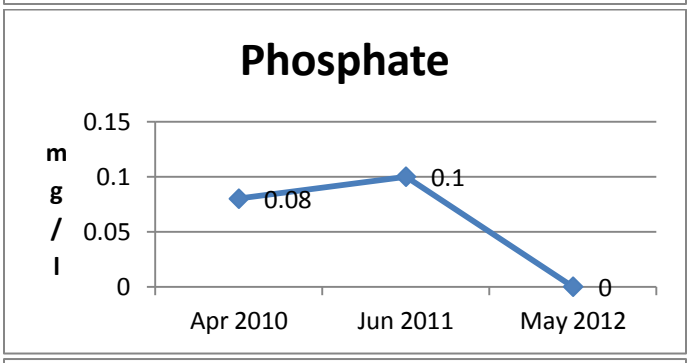


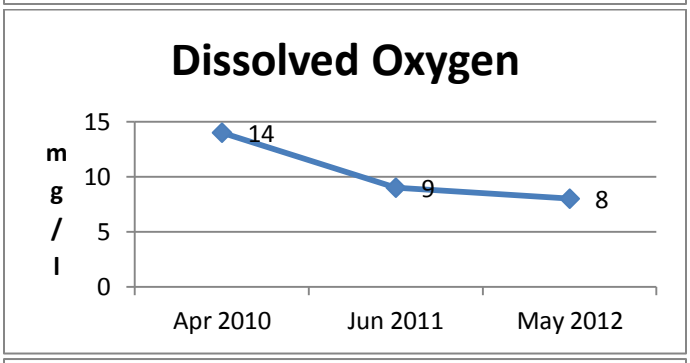
Chemical Sampling

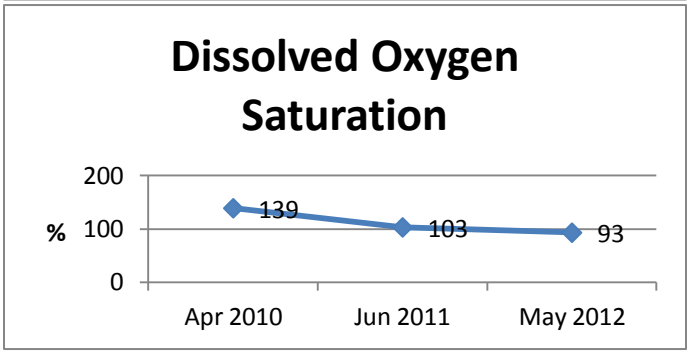
Date	Level	Air	Water	pH	Cond	Phosphate	Turbidity	DO/Sat	Nitrate
4/2/10	2	21°	15°	8.3	340	0.08	<10	14/139%	-
6/23/11	3	25°	22°	8.4	400	0.10	<10	9/103%	-
5/5/12	3	25°	23°	8.3	400	0.00	<10	8/93%	0.25

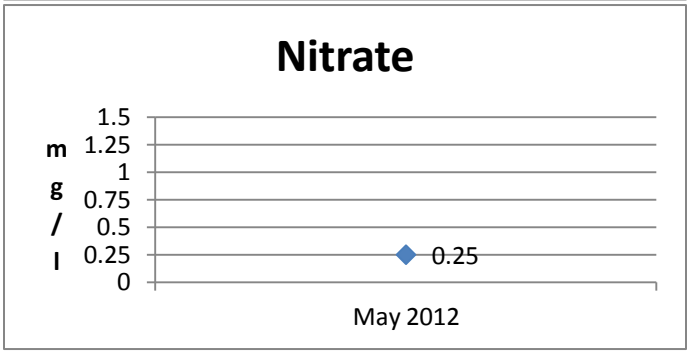












Site Notes and Journal:

Site 26

3.7 miles below Highway 95 Bridge
Between tribs 5 and 6 in Section 18 & approx .4 miles us confluence with Muddy Branch
Ozark County
Lat 36.76223°N, Long 92.32836°W

April 2010

June 2011

May 2012
Biological Sampling

Date	Lvl	Cd	Db	My	RS	Rf	St	Pn	OB	Cm	Cr	Cy	Dr	Da	Sd	FF	Al	Ws	AW	BF	Lc	Md	LS	OS	Score
4/10	2	1		162			2				4	3							7						14
5/12	2	15	3	31	6		2	1		1		2							8			1			24

Sensitive

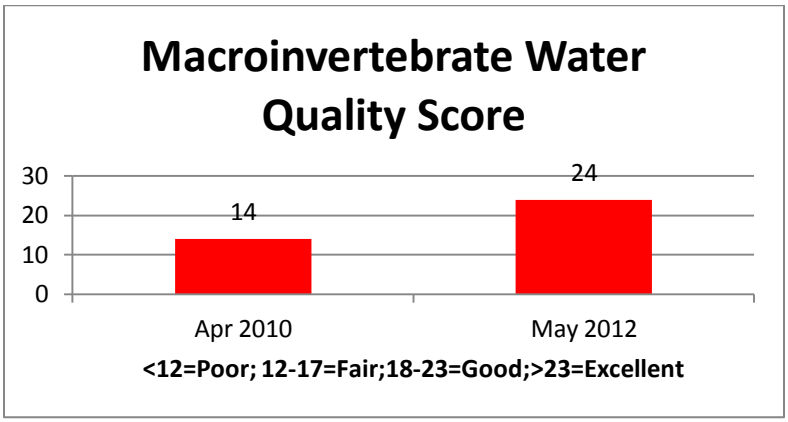
Cd – Caddisfly
Db – Dobsonfly
My- Mayfly
RS – Right Snail
Rf – Riffle Beetle
St – Stonefly
Pn – Water Penny

Somewhat Tolerant

OB – Other Beetle
Cm – Clam/Mussel
Cr – Cranefly
Cy – Crayfish
Dr – Dragonfly
Da – Damselfly
Sd -- Scud
FF -- Fishfly
Al - Alderfly
Ws – Watersnipe Fly

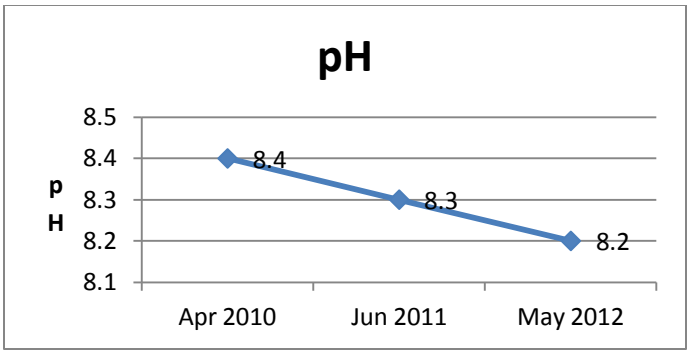
Tolerant

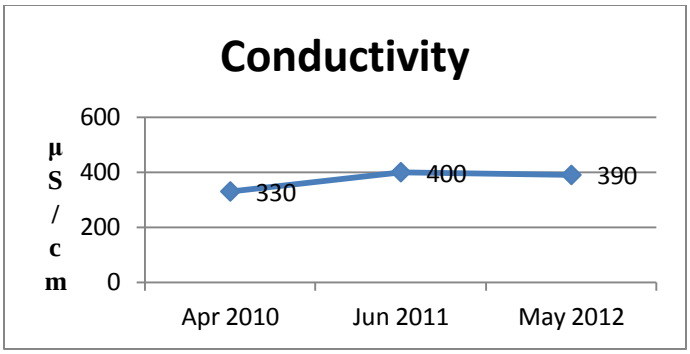
AW – Aquatic Worm
BF - Blackfly
Lc - Leech
Md - Midge
LS – Left Snail
OS – Other Snail

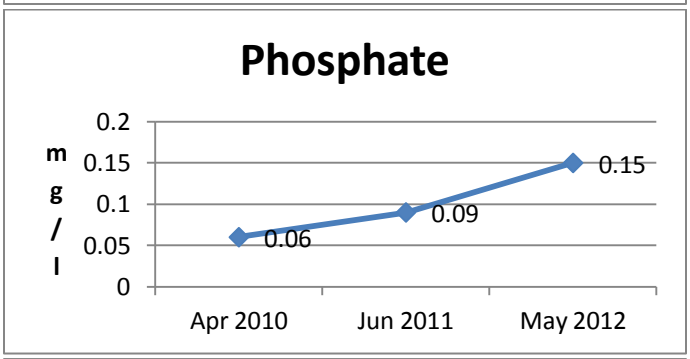


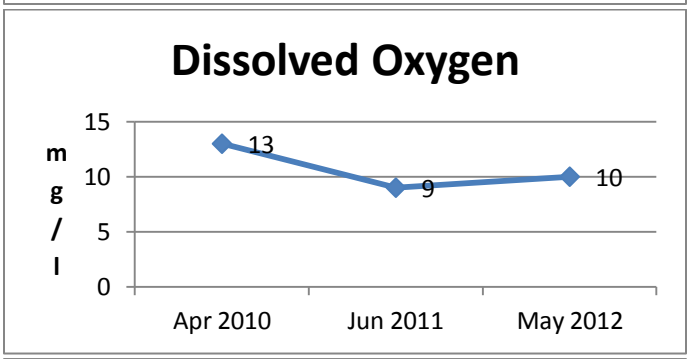
Chemical Sampling

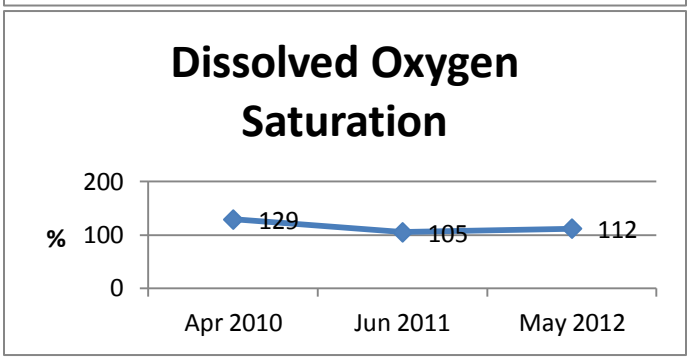
Date	Level	Air	Water	pH	Cond	Phosphate	Turbidity	DO/Sat	Nitrate
4/2/10	2	23°	15°	8.4	330	0.06	<10	13/129%	-
6/23/11	3	29°	23°	8.3	400	0.09	<10	9/105%	-
5/5/12	3	25°	21°	8.2	390	0.15	<10	10/112%	0.25

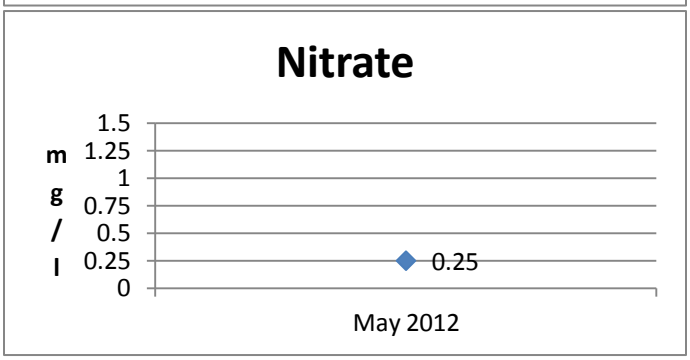








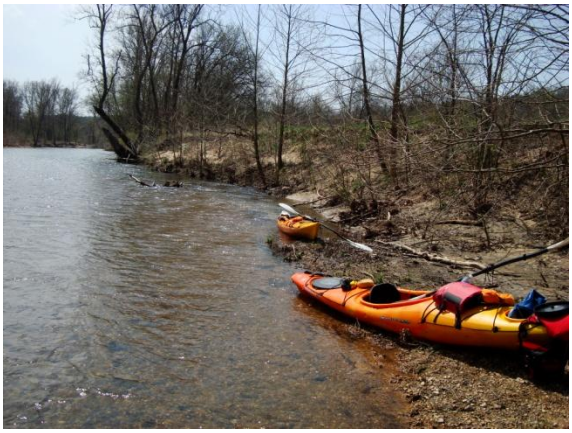




Site Notes and Journal:

Site 27

4.7 miles below Highway 95 Bridge
Approx .2 mi ds trib at Tar Kiln Hollow & 300 ft us confluence with Muddy Branch
Ozark County
Lat 36.75787°N, Long 92.31480°W



April 2010

June 2011

May 2012

Biological Sampling

Date	Lvl	Cd	Db	My	RS	Rf	St	Pn	OB	Cm	Cr	Cy	Dr	Da	Sd	FF	Al	Ws	AW	BF	Lc	Md	LS	OS	Score
5/12	2	18	4	13	4		9			2		7							3						20

Sensitive

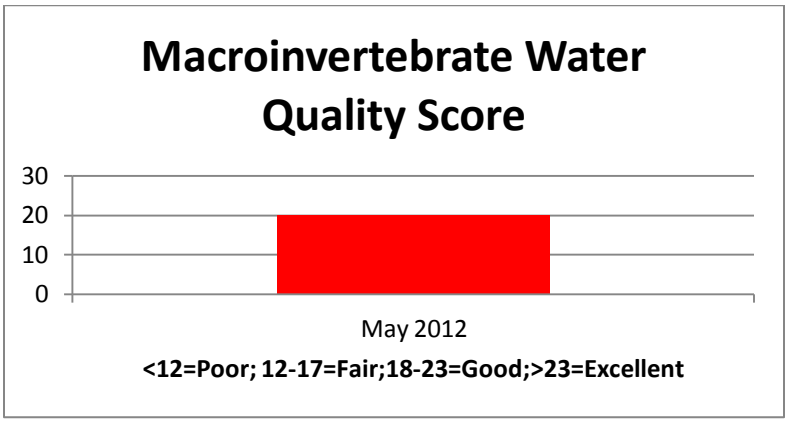
Cd – Caddisfly
Db – Dobsonfly
My- Mayfly
RS – Right Snail
Rf – Riffle Beetle
St – Stonefly
Pn – Water Penny

Somewhat Tolerant

OB – Other Beetle
Cm – Clam/Mussel
Cr – Cranefly
Cy – Crayfish
Dr – Dragonfly
Da – Damselfly
Sd -- Scud
FF -- Fishfly
Al - Alderfly
Ws – Watersnipe Fly

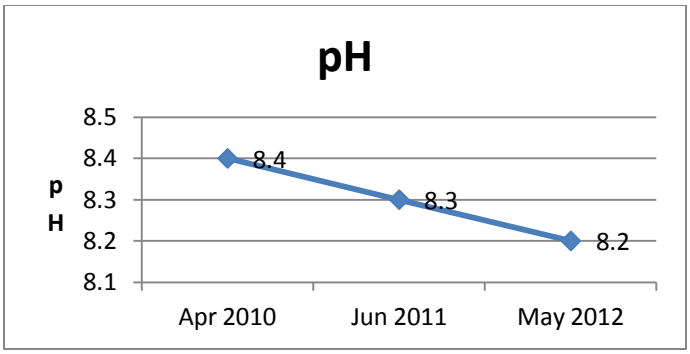
Tolerant

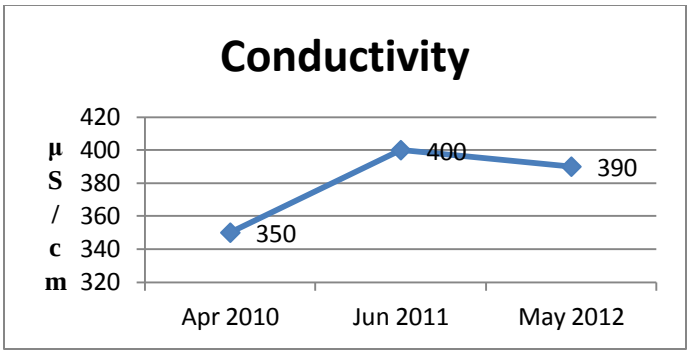
AW – Aquatic Worm
BF - Blackfly
Lc - Leech
Md - Midge
LS – Left Snail
OS – Other Snail

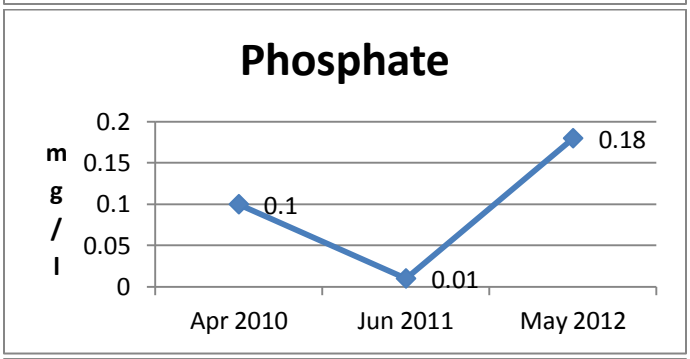


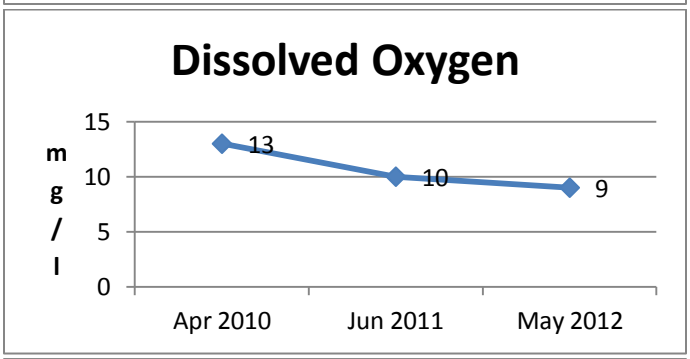
Chemical Sampling

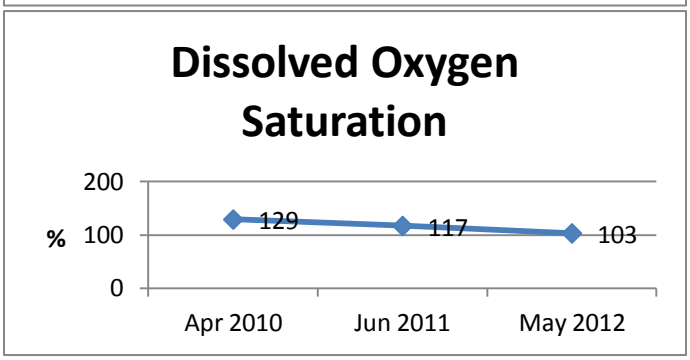
Date	Level	Air	Water	pH	Cond	Phosphate	Turbidity	DO/Sat	Nitrate
4/10/10	2	24°	15°	8.4	350	0.10	<10	13/129%	-
6/23/11	3	30°	23°	8.3	400	0.01	<10	10/117%	-
5/5/12	3	29°	22°	8.2	390	0.18	<10	9/103%	0.25

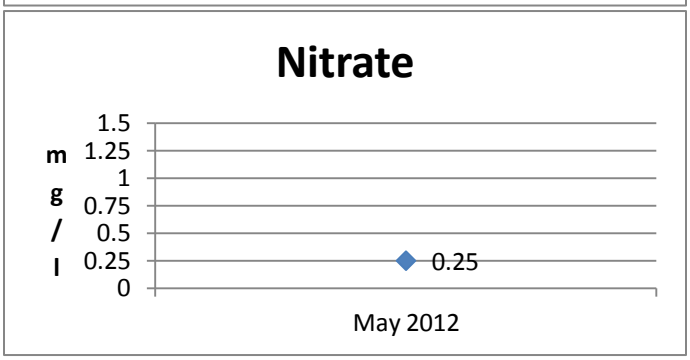












Site Notes and Journal:

Site 28

5.7 miles below Highway 95 Bridge
At Negro Ford, approx 300 ft us confluence of Trail Creek
Ozark County
36.74564°N, Long 92.31131°W

April 2010

June 2011

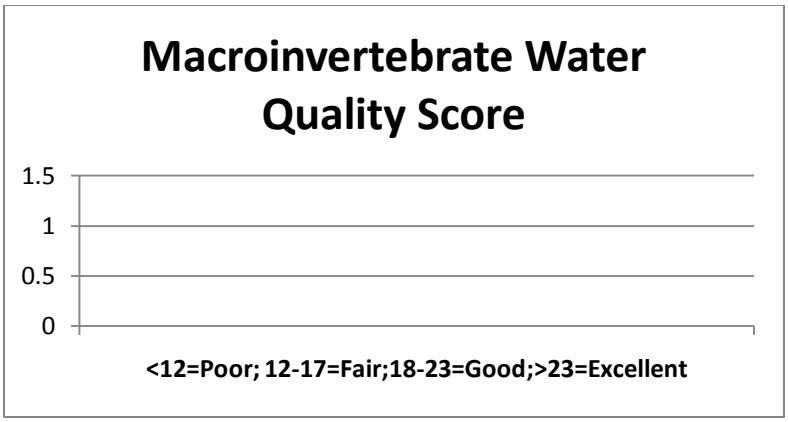
Biological Sampling

Date	Lvl	Cd	Db	My	RS	Rf	St	Pn	OB	Cm	Cr	Cy	Dr	Da	Sd	FF	Al	Ws	AW	BF	Lc	Md	LS	OS	Score

Sensitive
Cd – Caddisfly
Db – Dobsonfly
My- Mayfly
RS – Right Snail
Rf – Riffle Beetle
St – Stonefly
Pn – Water Penny

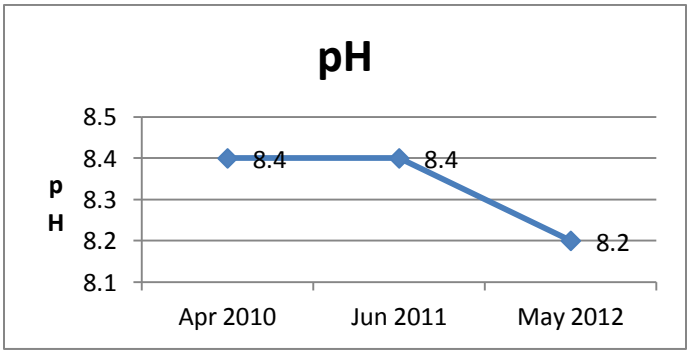
Somewhat Tolerant
OB – Other Beetle
Cm – Clam/Mussel
Cr – Cranefly
Cy – Crayfish
Dr – Dragonfly
Da – Damselfly
Sd -- Scud
FF -- Fishfly
Al - Alderfly
Ws – Watersnipe Fly

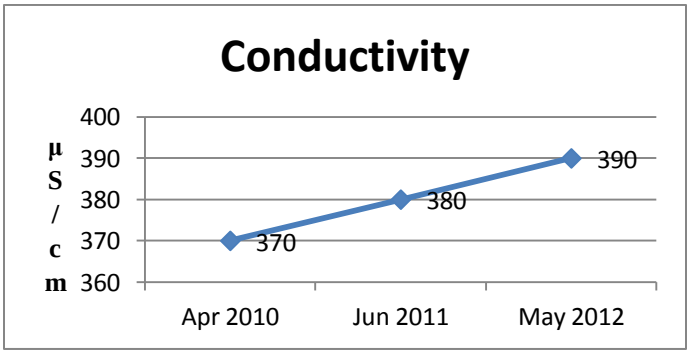
Tolerant
AW – Aquatic Worm
BF - Blackfly
Lc - Leech
Md - Midge
LS – Left Snail
OS – Other Snail

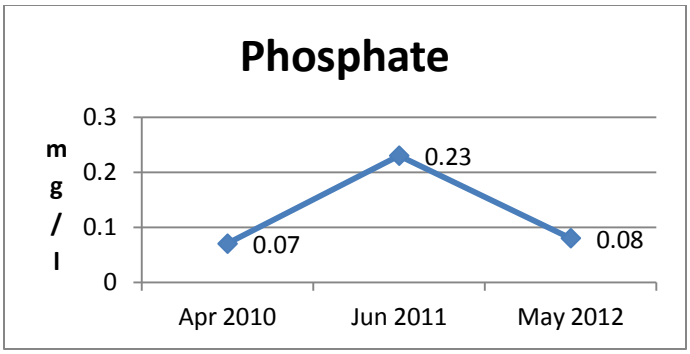


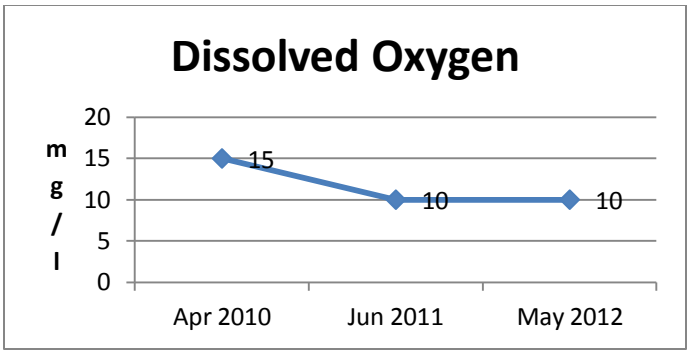
Chemical Sampling

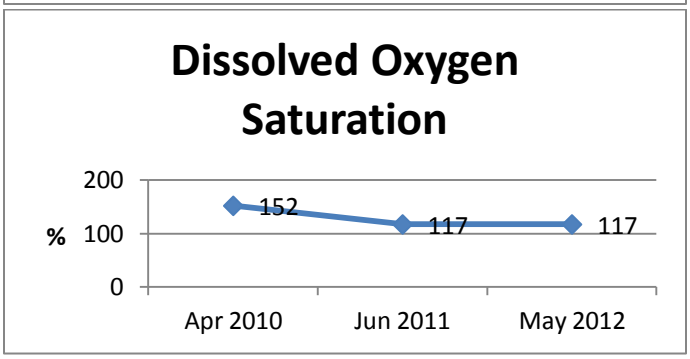
Date	Level	Air	Water	pH	Cond	Phosphate	Turbidity	DO/Sat	Nitrate
4/2/10	2	30°	16°	8.4	370	0.07	<10	15/152%	-
6/23/11	3	29°	23°	8.4	380	0.23	<10	10/117%	-
5/5/12	3	29°	23°	8.2	390	0.08	<10	10/117%	0.25

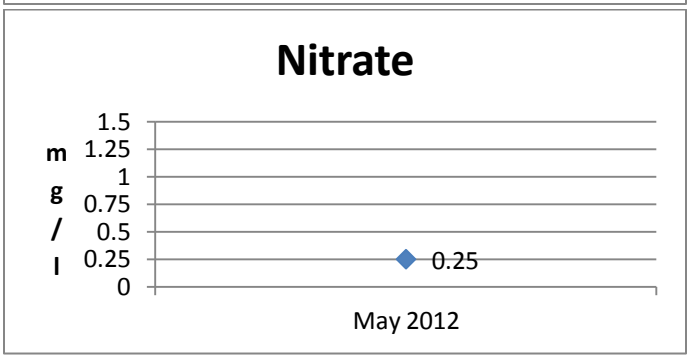












Site Notes and Journal:

Site 29

6.7 miles below Highway 95 Bridge
Approx 600 ft ds confluence with Hurricane Creek
Ozark County
Lat 36.73487°N, Long 92.30096°W

April 2010

June 2011

May 2012

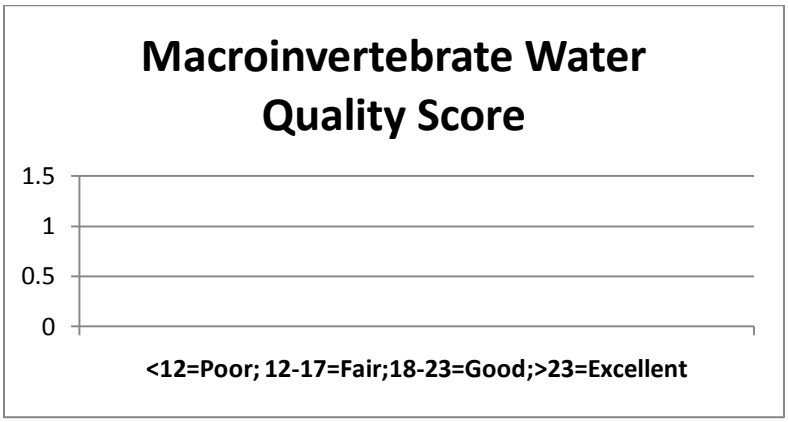
Biological Sampling

Date	Lvl	Cd	Db	My	RS	Rf	St	Pn	OB	Cm	Cr	Cy	Dr	Da	Sd	FF	Al	Ws	AW	BF	Lc	Md	LS	OS	Score

Sensitive
- Cd – Caddisfly
- Db – Dobsonfly
- My- Mayfly
- RS – Right Snail
- Rf – Riffle Beetle
- St – Stonefly
- Pn – Water Penny

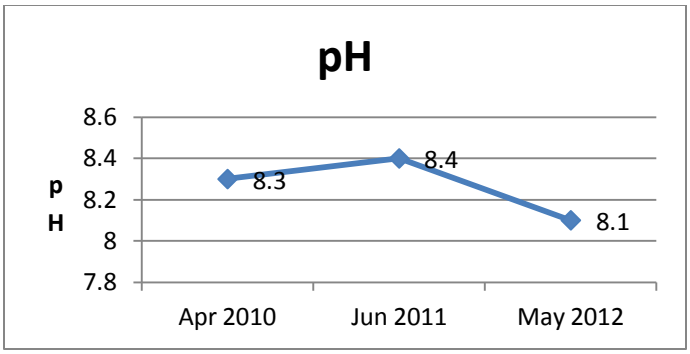
Somewhat Tolerant
- OB – Other Beetle
- Cm – Clam/Mussel
- Cr – Cranefly
- Cy – Crayfish
- Dr – Dragonfly
- Da – Damselfly
- Sd -- Scud
- FF -- Fishfly
- Al - Alderfly
- Ws – Watersnipe Fly

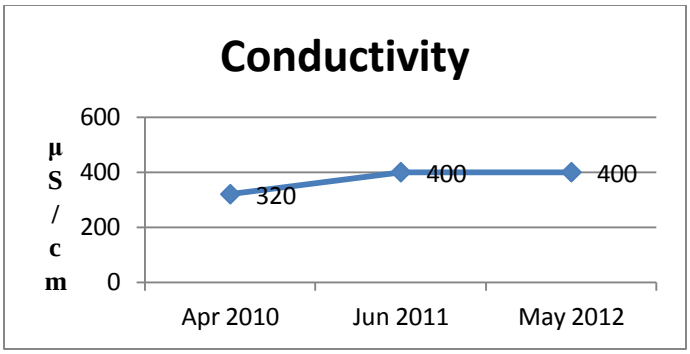
Tolerant
- AW – Aquatic Worm
- BF - Blackfly
- Lc - Leech
- Md - Midge
- LS – Left Snail
- OS – Other Snail

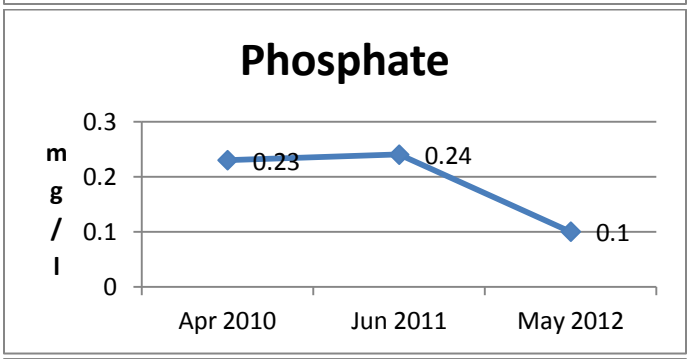


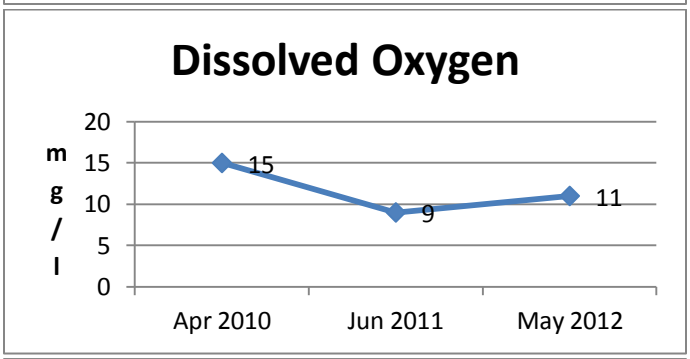
Chemical Sampling

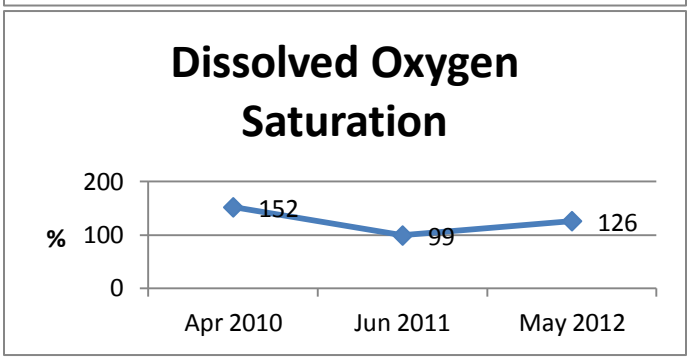
Date	Level	Air	Water	pH	Cond	Phosphate	Turbidity	DO/Sat	Nitrate
4/2/10	2	30°	16°	8.3	320	0.23	<10	15/152%	-
6/23/11	3	26°	20°	8.4	400	0.24	<10	9/99%	-
5/5/12	3	33°	22°	8.1	400	0.10	<10	11/126%	0.25

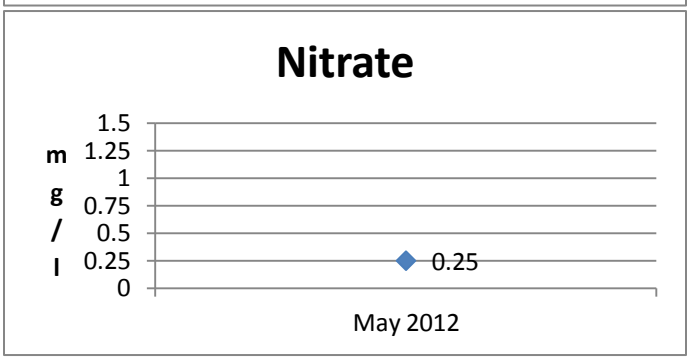












Site Notes and Journal:

Site 30

7.7 miles below Highway 95 Bridge
Approx .3 miles us confluence of Bollinger Branch
Ozark County
Lat 36.73525°N, Long 92.28698°W

April 2010

June 2011

May 2012

Biological Sampling

Date	Lvl	Cd	Db	My	RS	Rf	St	Pn	OB	Cm	Cr	Cy	Dr	Da	Sd	FF	Al	Ws	AW	BF	Lc	Md	LS	OS	Score
5/12	2	15	3	12	2	2	7	1		1		3													25

Sensitive

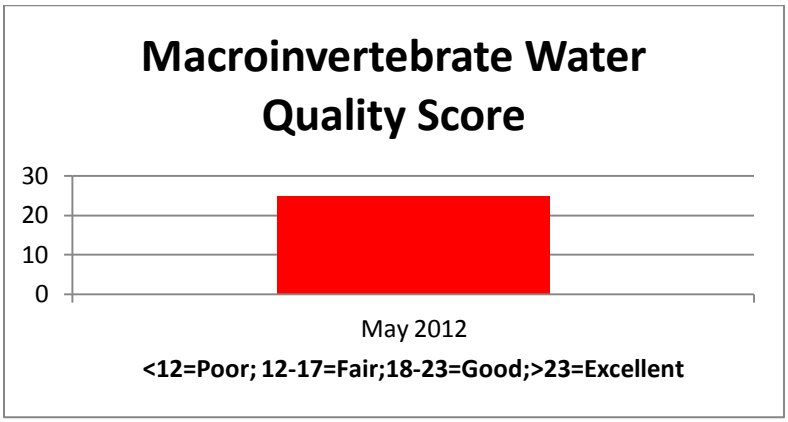
Cd – Caddisfly
Db – Dobsonfly
My- Mayfly
RS – Right Snail
Rf – Riffle Beetle
St – Stonefly
Pn – Water Penny

Somewhat Tolerant

OB – Other Beetle
Cm – Clam/Mussel
Cr – Cranefly
Cy – Crayfish
Dr – Dragonfly
Da – Damselfly
Sd -- Scud
FF -- Fishfly
Al - Alderfly
Ws – Watersnipe Fly

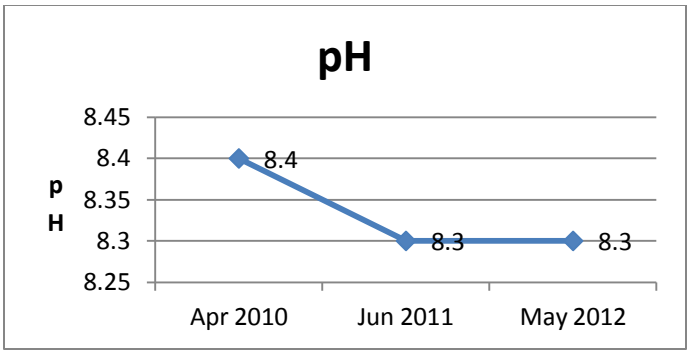
Tolerant

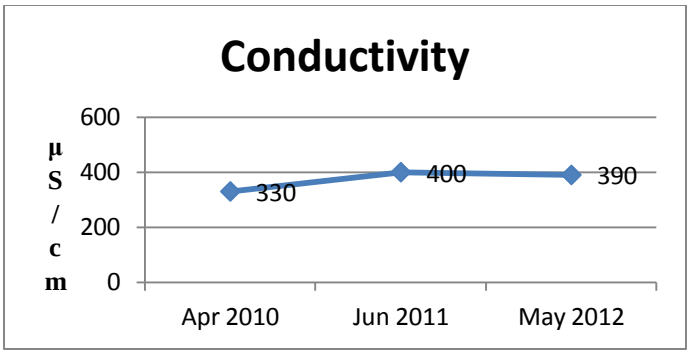
AW – Aquatic Worm
BF - Blackfly
Lc - Leech
Md - Midge
LS – Left Snail
OS – Other Snail

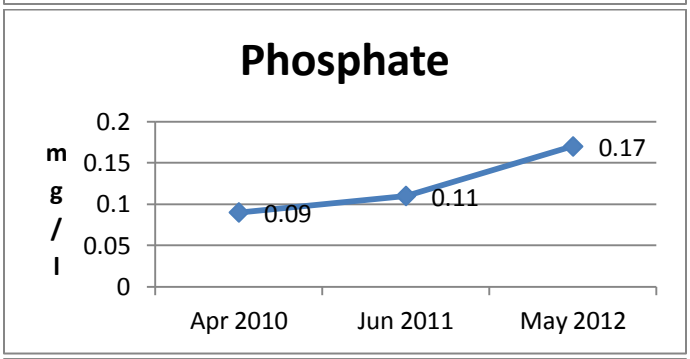


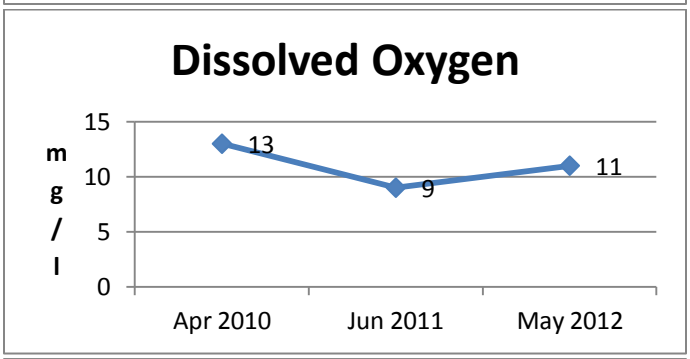
Chemical Sampling

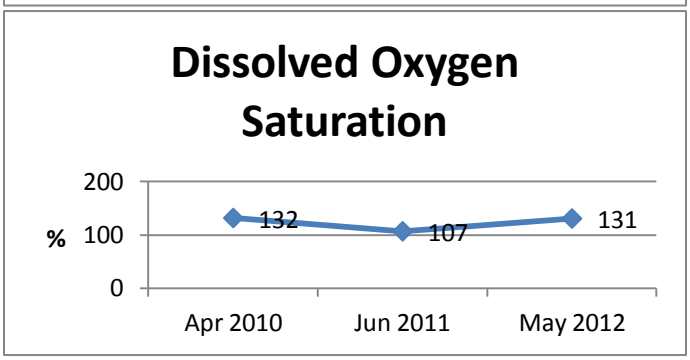
Date	Level	Air	Water	pH	Cond	Phosphate	Turbidity	DO/Sat	Nitrate
4/2/10	2	28°	16°	8.4	330	0.09	<10	13/132%	-
6/23/11	3	30°	24°	8.3	400	0.11	<10	9/107%	-
5/5/12	3	29°	24°	8.3	390	0.17	<10	11/131%	0.25

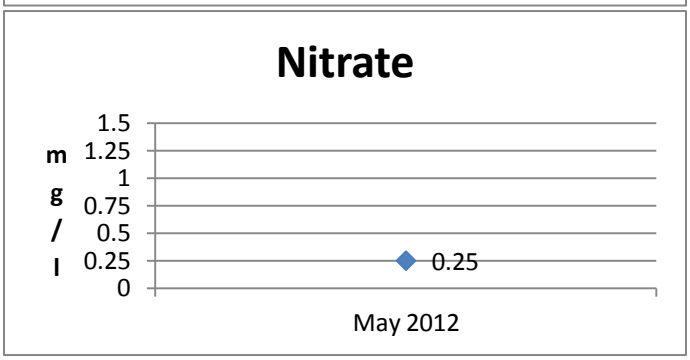












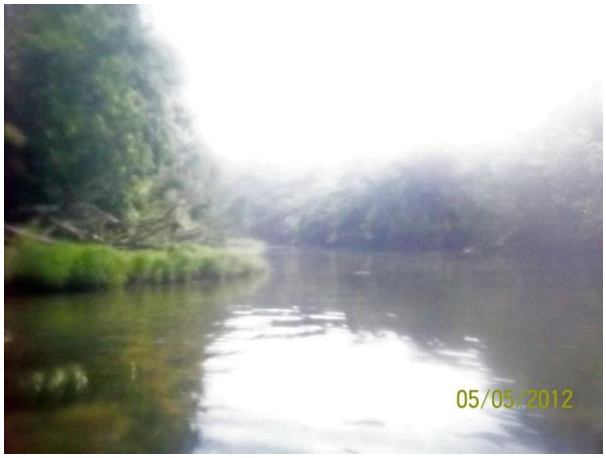
Site Notes and Journal:

Site 31

8.7 miles below Highway 95 Bridge
Approx .6 miles ds Bollinger Branch
Ozark County
Lat 36.72412°N, Long 92.28158°W

April 2010

June 2011



May 2012

Biological Sampling

Date	Lvl	Cd	Db	My	RS	Rf	St	Pn	OB	Cm	Cr	Cy	Dr	Da	Sd	FF	Al	Ws	AW	BF	Lc	Md	LS	OS	Score

Sensitive

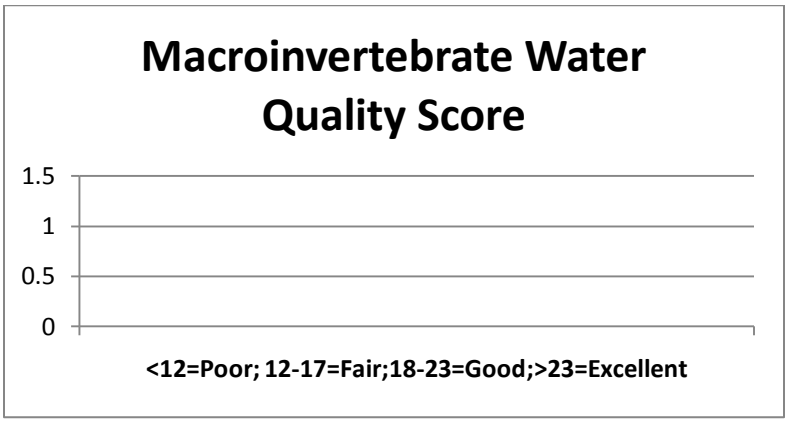
Cd – Caddisfly
Db – Dobsonfly
My- Mayfly
RS – Right Snail
Rf – Riffle Beetle
St – Stonefly
Pn – Water Penny

Somewhat Tolerant

OB – Other Beetle
Cm – Clam/Mussel
Cr – Cranefly
Cy – Crayfish
Dr – Dragonfly
Da – Damselfly
Sd -- Scud
FF -- Fishfly
Al - Alderfly
Ws – Watersnipe Fly

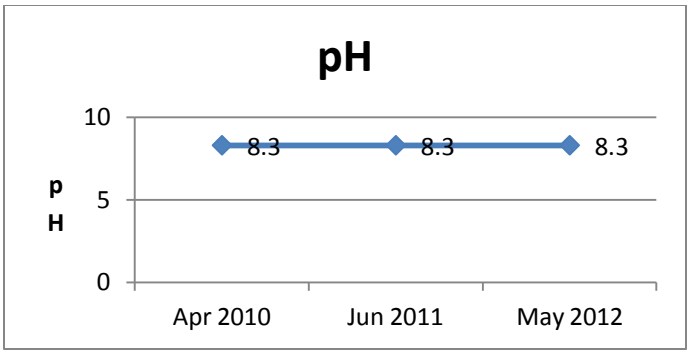
Tolerant

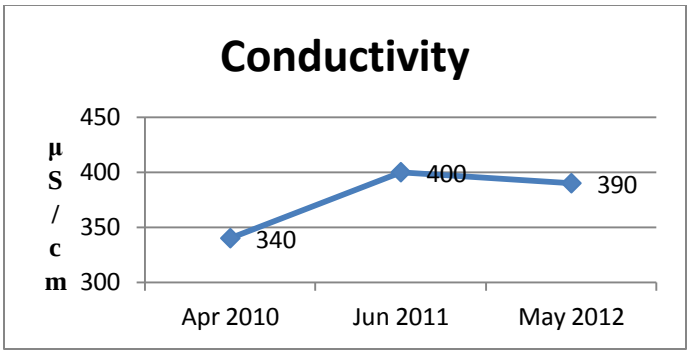
AW – Aquatic Worm
BF - Blackfly
Lc - Leech
Md - Midge
LS – Left Snail
OS – Other Snail

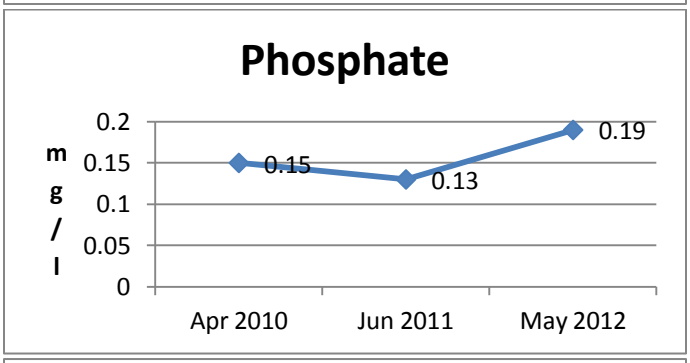


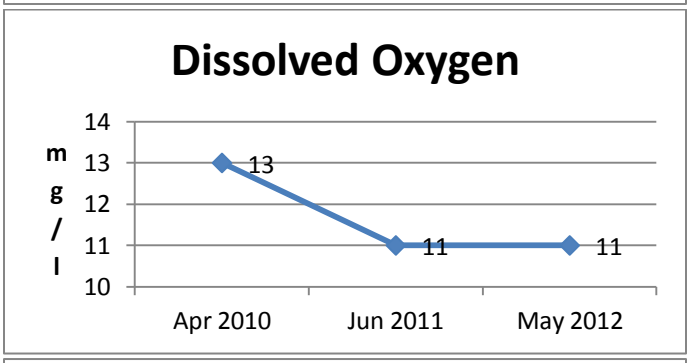
Chemical Sampling

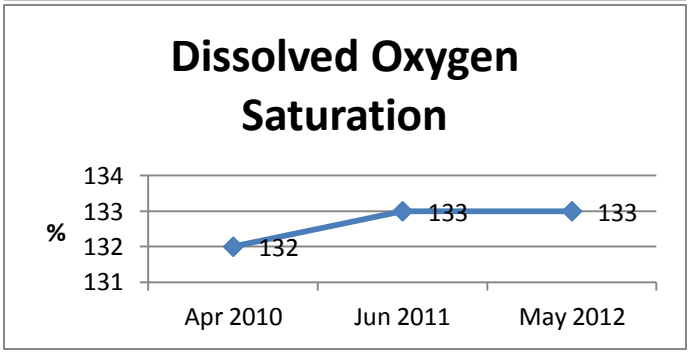
Date	Level	Air	Water	pH	Cond	Phosphate	Turbidity	DO/Sat	Nitrate
4/2/10	2	26°	16°	8.3	340	0.15	<10	13/132%	-
6/23/11	3	27°	25°	8.3	400	0.13	<10	11/133%	-
5/5/12	3	31°	25°	8.3	390	0.19	<10	11/133%	0.25

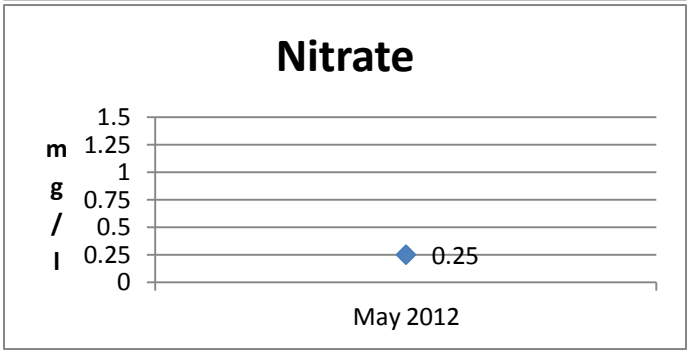












Site Notes and Journal:

Site 32

Sycamore MDC Access
130 ft ds Hodgson Mill Spring Branch
Ozark County
Lat 36.70754°N, Long 92.26466°W

March 2012

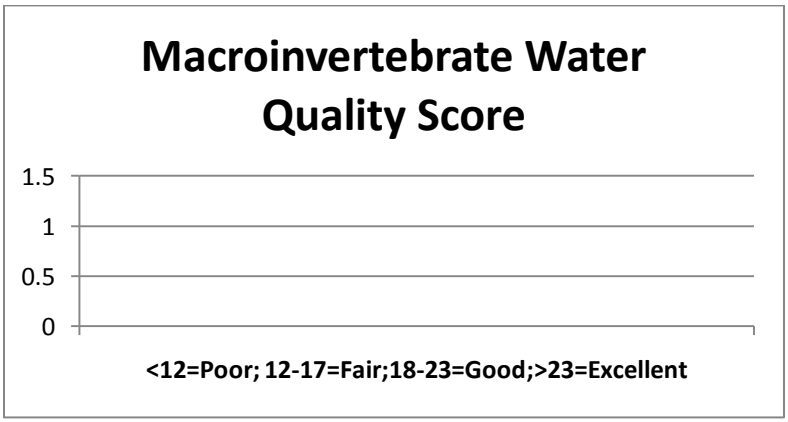
Biological Sampling

Date	Lvl	Cd	Db	My	RS	Rf	St	Pn	OB	Cm	Cr	Cy	Dr	Da	Sd	FF	Al	Ws	AW	BF	Lc	Md	LS	OS	Score

Sensitive
Cd – Caddisfly
Db – Dobsonfly
My- Mayfly
RS – Right Snail
Rf – Riffle Beetle
St – Stonefly
Pn – Water Penny

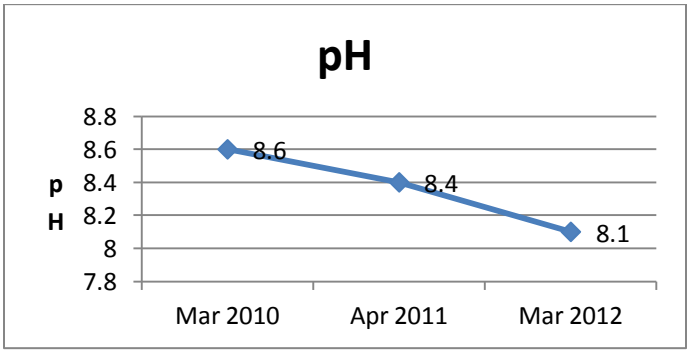
Somewhat Tolerant
OB – Other Beetle
Cm – Clam/Mussel
Cr – Cranefly
Cy – Crayfish
Dr – Dragonfly
Da – Damselfly
Sd -- Scud
FF -- Fishfly
Al - Alderfly
Ws – Watersnipe Fly

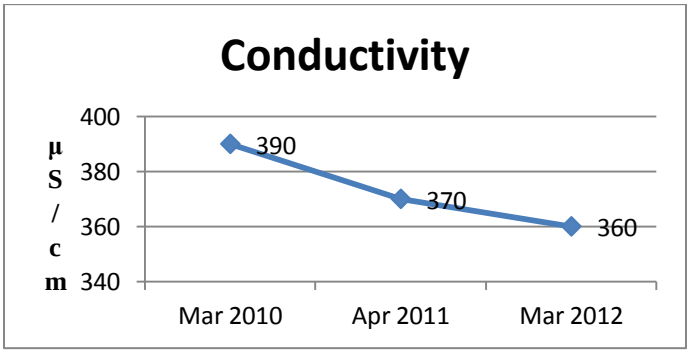
Tolerant
AW – Aquatic Worm
BF - Blackfly
Lc - Leech
Md - Midge
LS – Left Snail
OS – Other Snail

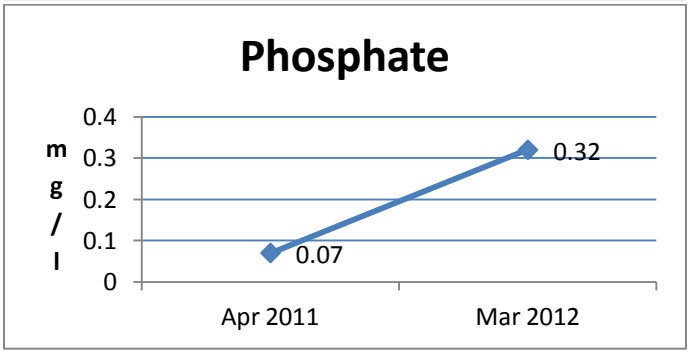


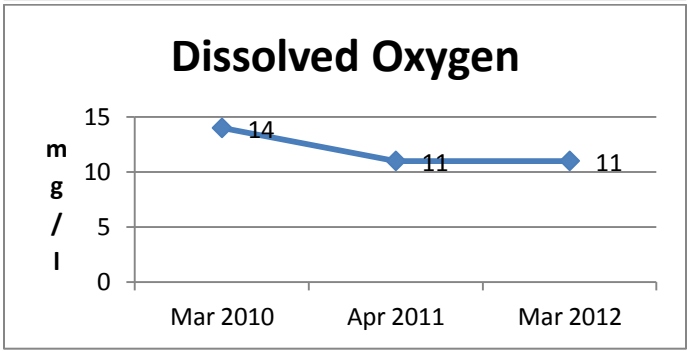
Chemical Sampling

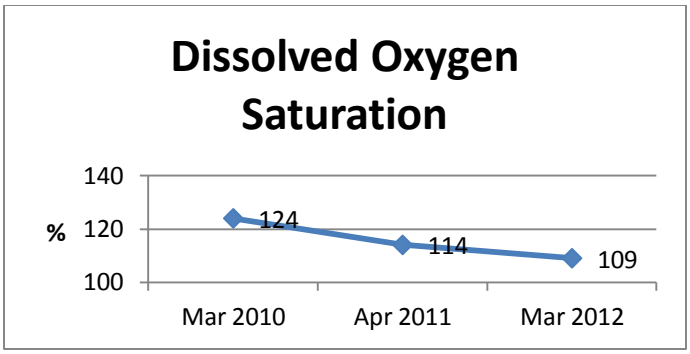
Date	Level	Air	Water	pH	Cond	Phosphate	Turbidity	DO/Sat	Nitrate
3/19/10	3	5°	10°	8.6	390	-	<10	14/124%	-
4/9/11	3	21°	17°	8.4	370	0.07	<10	11/114%	-
3/17/12	3	15°	15°	8.1	360	0.32	<10	11/109%	1.0

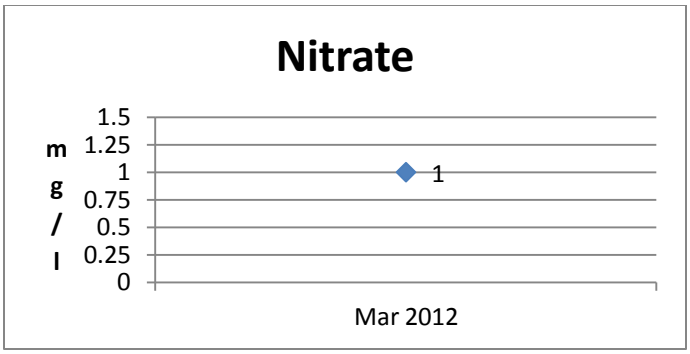












Site Notes and Journal:

Site 33

1.01 MILE BELOW SYCAMORE MDC ACCESS
.4 MILES DS LOTTIE HOLLOW & .5 MILES US RUSSEL FORD
OZARK COUNTY
LAT 36.69535°N, LONG 92.26440°W

March 2010

March 2012

Biological Sampling

Date	Lvl	Cd	Db	My	RS	Rf	St	Pn	OB	Cm	Cr	Cy	Dr	Da	Sd	FF	Al	Ws	AW	BF	Lc	Md	LS	OS	Score
4/10	3	2		96	4		50			1									16						15
3/12	2	8	2	52	12	4	11					4							2			2			22

Sensitive

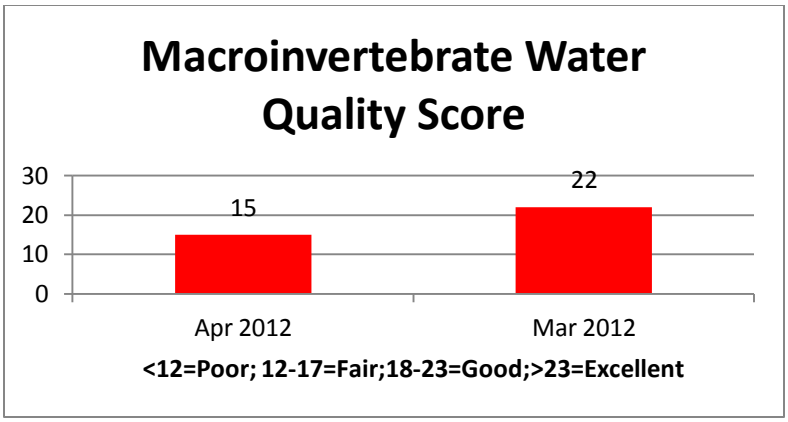
Cd – Caddisfly
Db – Dobsonfly
My- Mayfly
RS – Right Snail
Rf – Riffle Beetle
St – Stonefly
Pn – Water Penny

Somewhat Tolerant

OB – Other Beetle
Cm – Clam/Mussel
Cr – Cranefly
Cy – Crayfish
Dr – Dragonfly
Da – Damselfly
Sd -- Scud
FF -- Fishfly
Al - Alderfly
Ws – Watersnipe Fly

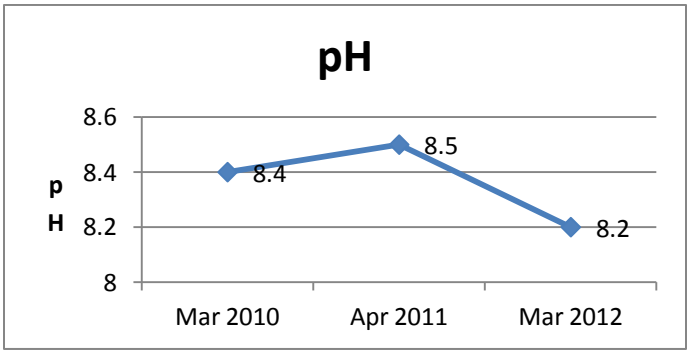
Tolerant

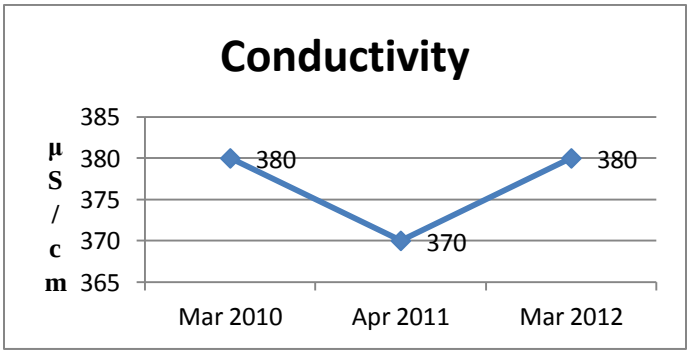
AW – Aquatic Worm
BF - Blackfly
Lc - Leech
Md - Midge
LS – Left Snail
OS – Other Snail

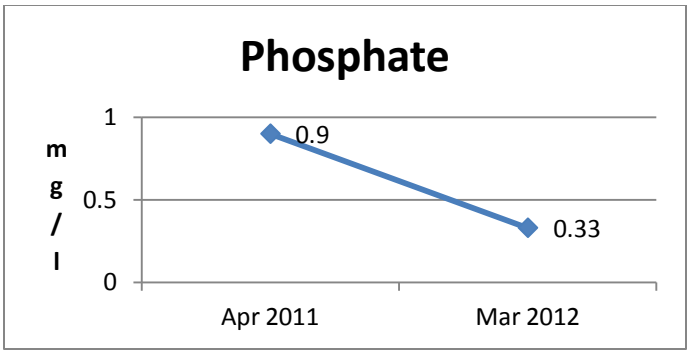


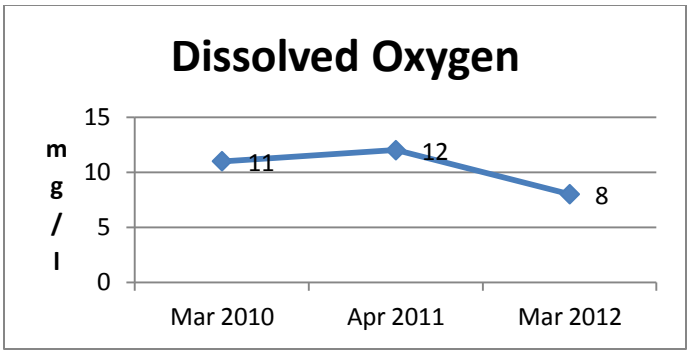
Chemical Sampling

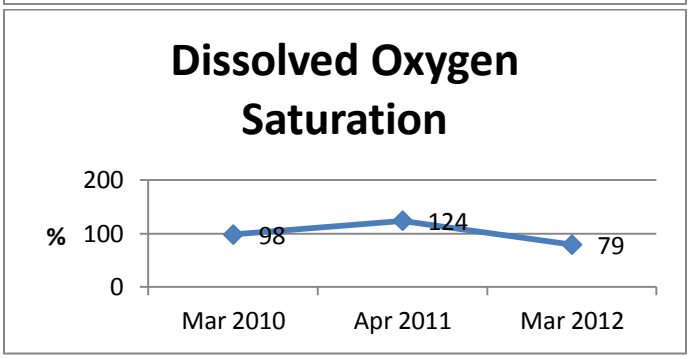
Date	Level	Air	Water	pH	Cond	Phosphate	Turbidity	DO/Sat	Nitrate
3/19/10	3	10.5°	10°	8.4	380	-	<10	11/98%	-
4/9/11	3	22.5°	17°	8.5	370	0.9	<10	12/124%	-
3/17/12	3	19°	15°	8.2	380	0.33	<10	8/79%	1.0

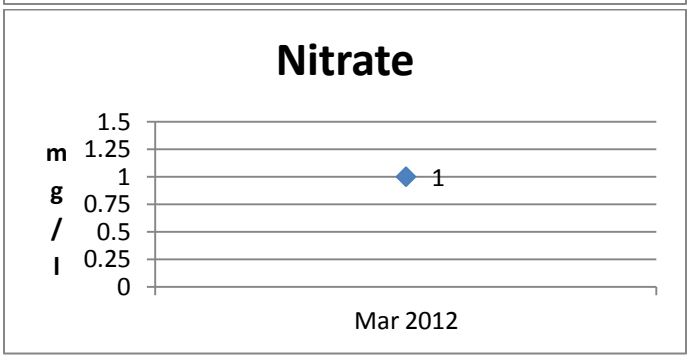












Site Notes and Journal:

Site 34

2.1 miles below Sycamore MDC access
At Job Hollow, immediately us confluence of Job Hollow trib
Ozark County
Lat 36.68901°N, Long 92.27448°W

March 2012

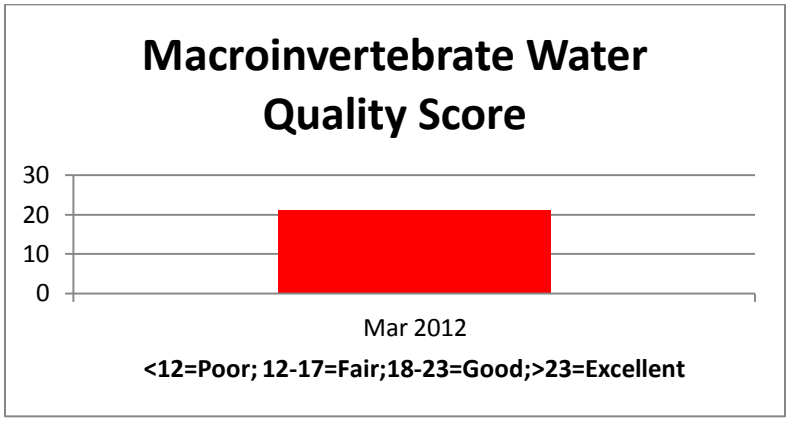
Biological Sampling

Date	Lvl	Cd	Db	My	RS	Rf	St	Pn	OB	Cm	Cr	Cy	Dr	Da	Sd	FF	Al	Ws	AW	BF	Lc	Md	LS	OS	Score
3/12	2	3	1	42	3		2				2	1							1				3		21

Sensitive
Cd – Caddisfly
Db – Dobsonfly
My- Mayfly
RS – Right Snail
Rf – Riffle Beetle
St – Stonefly
Pn – Water Penny

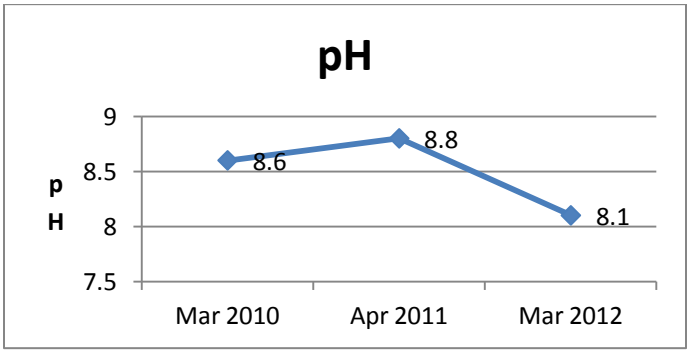
Somewhat Tolerant
OB – Other Beetle
Cm – Clam/Mussel
Cr – Cranefly
Cy – Crayfish
Dr – Dragonfly
Da – Damselfly
Sd -- Scud
FF -- Fishfly
Al - Alderfly
Ws – Watersnipe Fly

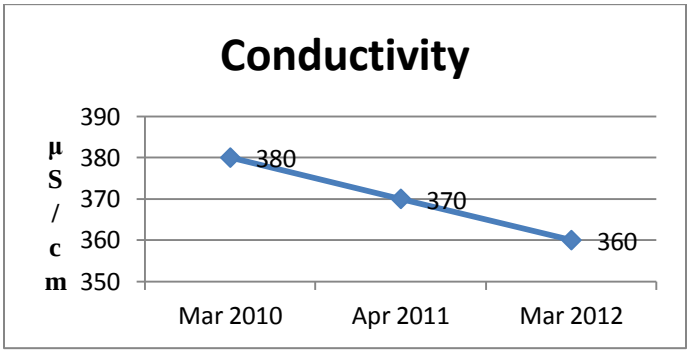
Tolerant
AW – Aquatic Worm
BF - Blackfly
Lc - Leech
Md - Midge
LS – Left Snail
OS – Other Snail

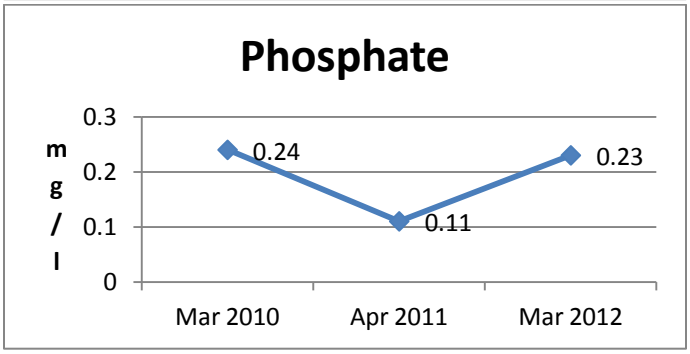


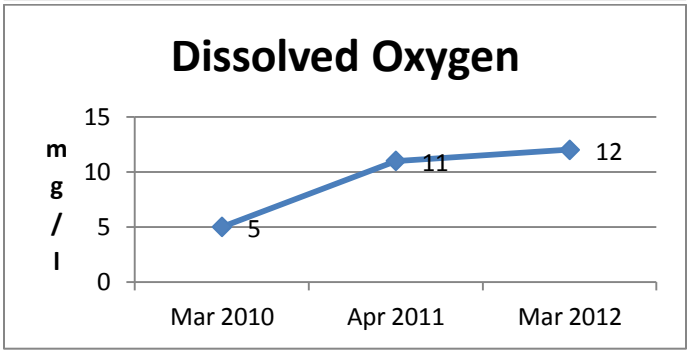
Chemical Sampling

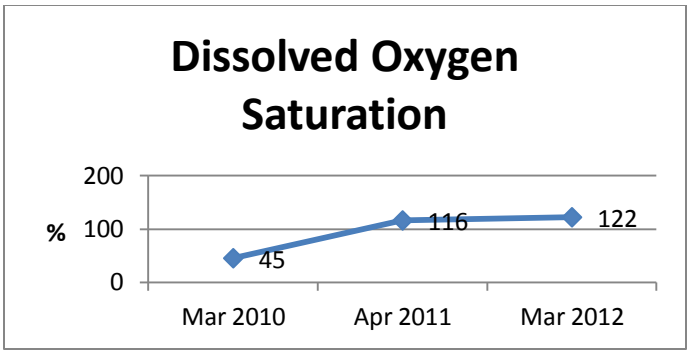
Date	Level	Air	Water	pH	Cond	Phosphate	Turbidity	DO/Sat	Nitrate
3/19/10	3	14°	10.5°	8.6	380	0.24	<10	5/45%	-
4/9/11	3	28.5°	18°	8.8	370	0.11	<10	11/116%	-
3/17/12	3	19°	16°	8.1	360	0.23	<10	12/122%	1.0

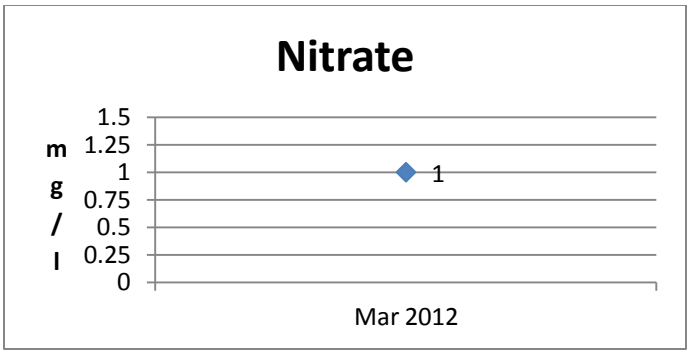








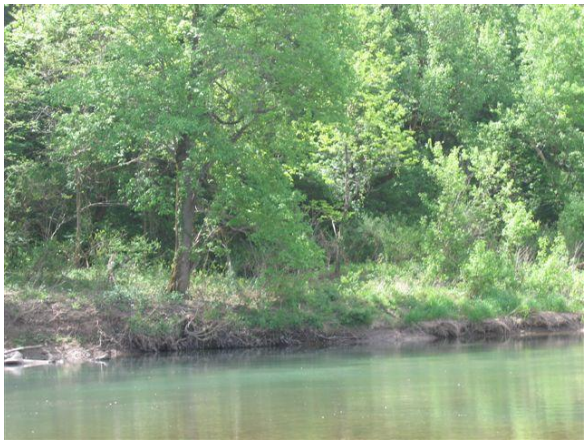




Site Notes and Journal:

Site 35

3.12 miles below Sycamore MDC access
At The Narrows, approx .4 miles ds confluence of trib at Osburn Ford
Ozark County
Lat 36.67875°N, Long 92.26788°W



March 2010

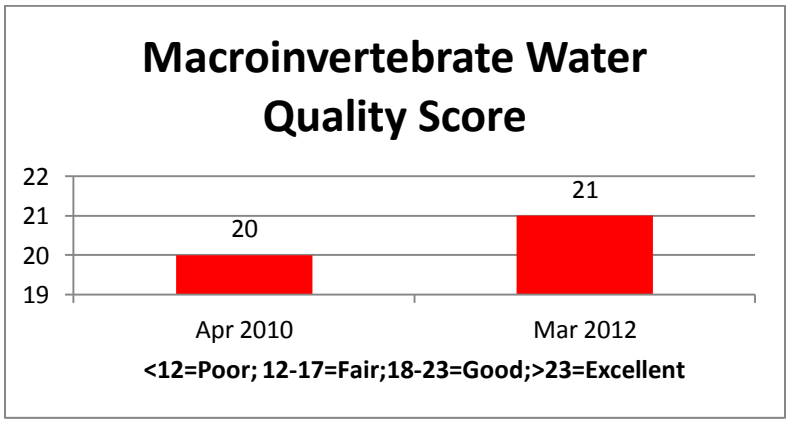
Biological Sampling

Date	Lvl	Cd	Db	My	RS	Rf	St	Pn	OB	Cm	Cr	Cy	Dr	Da	Sd	FF	Al	Ws	AW	BF	Lc	Md	LS	OS	Score
4/10	3	2		131		4	26	4	26	4									1						20
5/12	2	2	7	23	14		3			2	1	9													21

Sensitive
- Cd – Caddisfly
- Db – Dobsonfly
- My- Mayfly
- RS – Right Snail
- Rf – Riffle Beetle
- St – Stonefly
- Pn – Water Penny

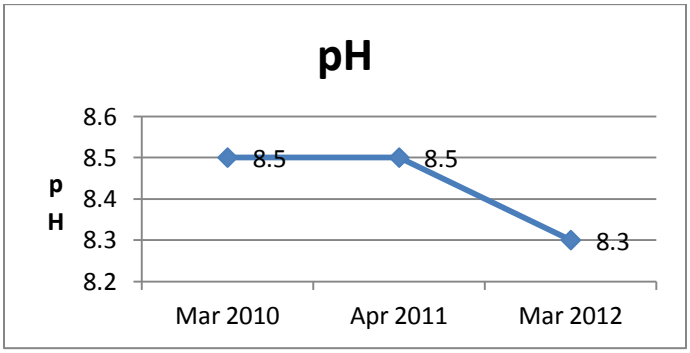
Somewhat Tolerant
- OB – Other Beetle
- Cm – Clam/Mussel
- Cr – Cranefly
- Cy – Crayfish
- Dr – Dragonfly
- Da – Damselfly
- Sd -- Scud
- FF -- Fishfly
- Al - Alderfly
- Ws – Watersnipe Fly

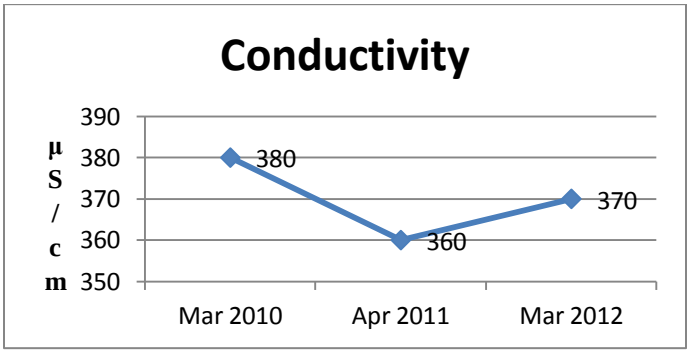
Tolerant
- AW – Aquatic Worm
- BF - Blackfly
- Lc - Leech
- Md - Midge
- LS – Left Snail
- OS – Other Snail

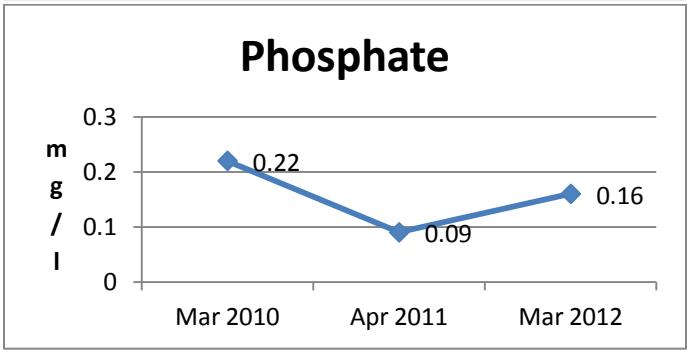


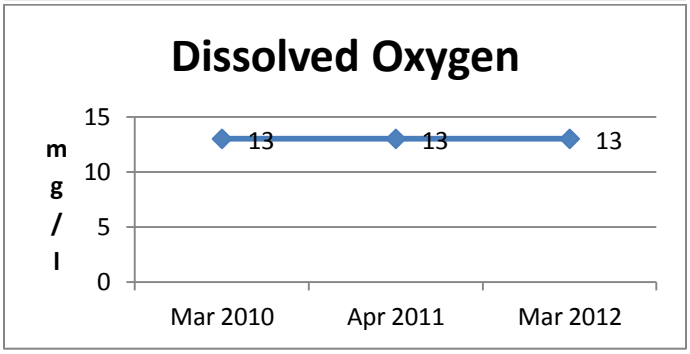
Chemical Sampling

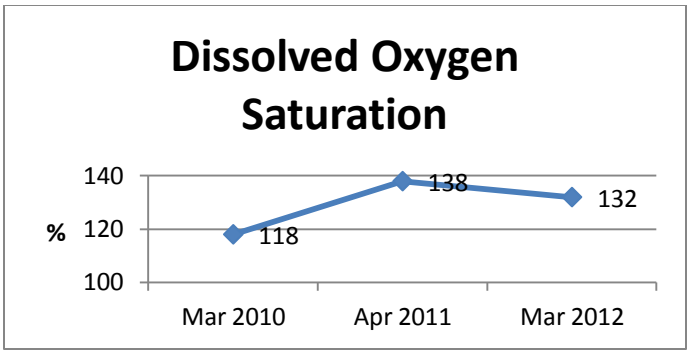
Date	Level	Air	Water	pH	Cond	Phosphate	Turbidity	DO/Sat	Nitrate
3/19/10	3	14.5°	11°	8.5	380	0.22	<10	13/118%	-
4/9/11	3	28°	18°	8.5	360	0.09	<10	13/138%	-
3/17/12	3	25°	16°	8.3	370	0.16	<10	13/132%	0.5

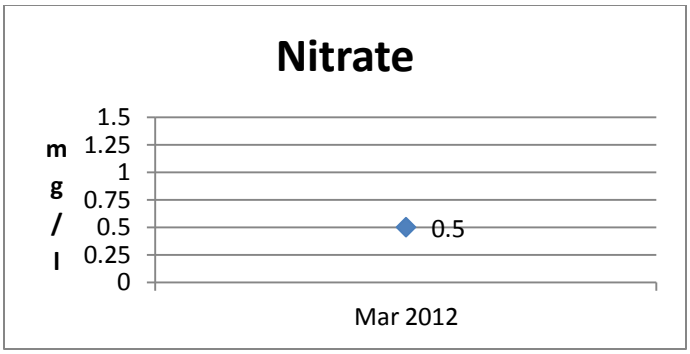












Site Notes and Journal:

Site 36

3.99 miles below Sycamore MDC access
Just us Upper Muleshoe Bend, approx .13 miles us trib at upper bend of Muleshoe Bend
Ozark County
Lat 36.67936°N, Long 92.27891°W

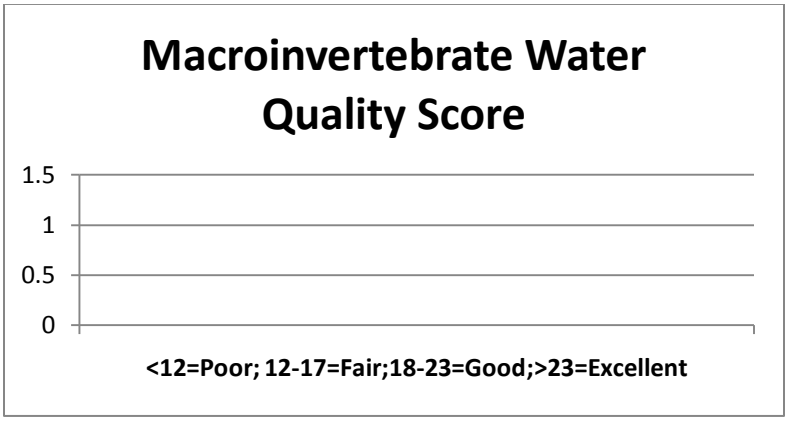
Biological Sampling

Date	Lvl	Cd	Db	My	RS	Rf	St	Pn	OB	Cm	Cr	Cy	Dr	Da	Sd	FF	Al	Ws	AW	BF	Lc	Md	LS	OS	Score

Sensitive
Cd – Caddisfly
Db – Dobsonfly
My- Mayfly
RS – Right Snail
Rf – Riffle Beetle
St – Stonefly
Pn – Water Penny

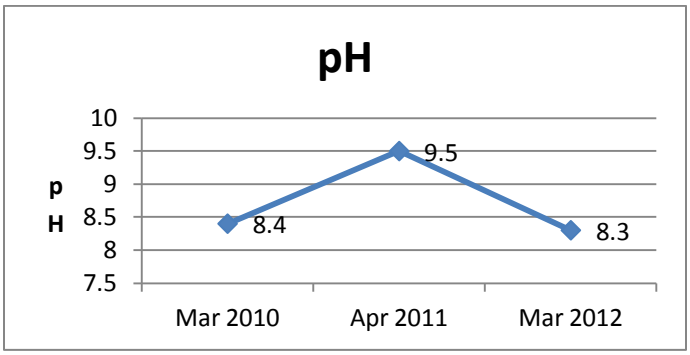
Somewhat Tolerant
OB – Other Beetle
Cm – Clam/Mussel
Cr – Cranefly
Cy – Crayfish
Dr – Dragonfly
Da – Damselfly
Sd -- Scud
FF -- Fishfly
Al - Alderfly
Ws – Watersnipe Fly

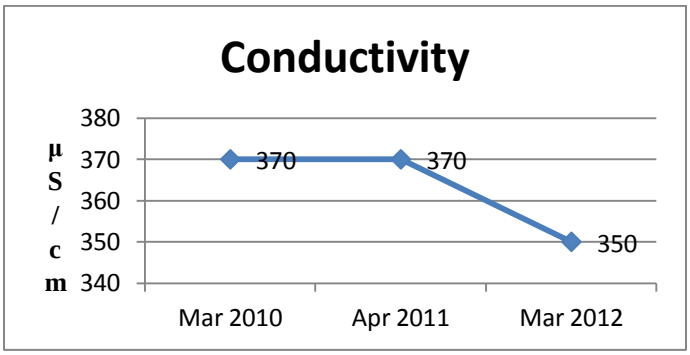
Tolerant
AW – Aquatic Worm
BF - Blackfly
Lc - Leech
Md - Midge
LS – Left Snail
OS – Other Snail

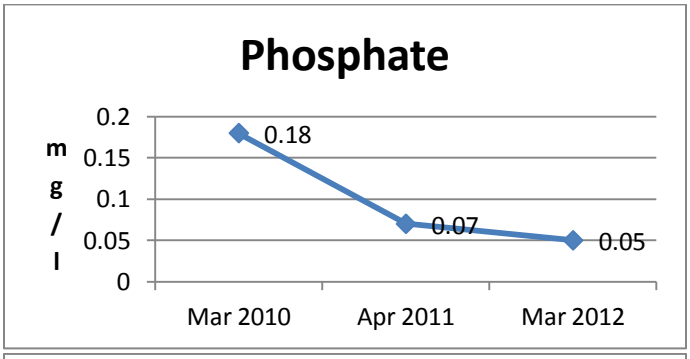


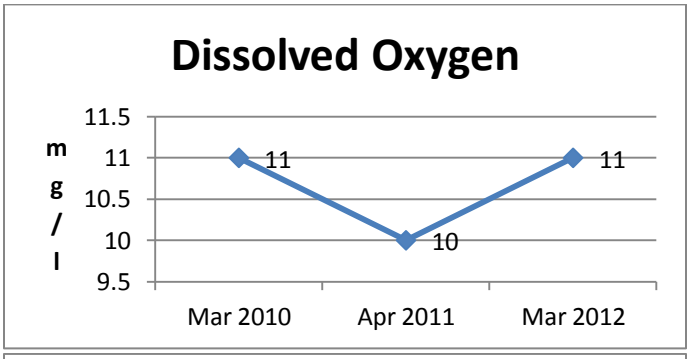
Chemical Sampling

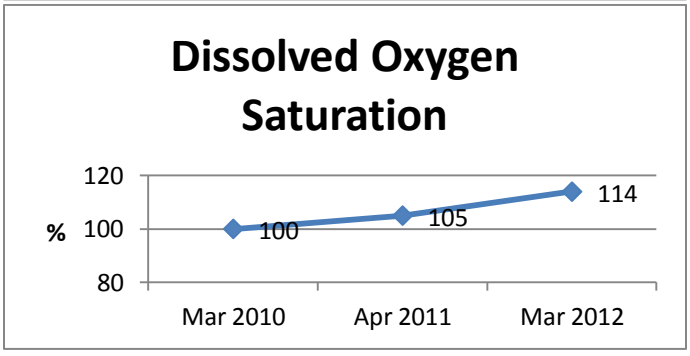
Date	Level	Air	Water	pH	Cond	Phosphate	Turbidity	DO/Sat	Nitrate
3/19/10	3	19.5°	11°	8.4	370	0.18	<10	11/100%	-
4/9/11	3	31°	18°	9.5	370	0.07	<10	10/105%	-
3/17/12	3	26°	17°	8.3	350	0.05	<10	11/114%	0.5

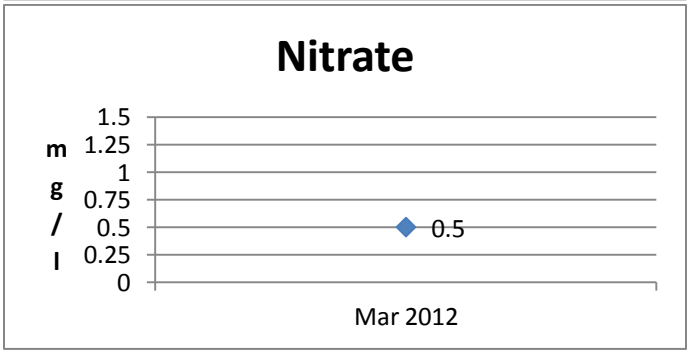












Site Notes and Journal:

Site 37

5.02 miles below Sycamore MDC access
Approx 500 ft ds Lower Muleshoe Bend
Ozark County
Lat 36.67468°N, Long 92.27879°W

March 2010

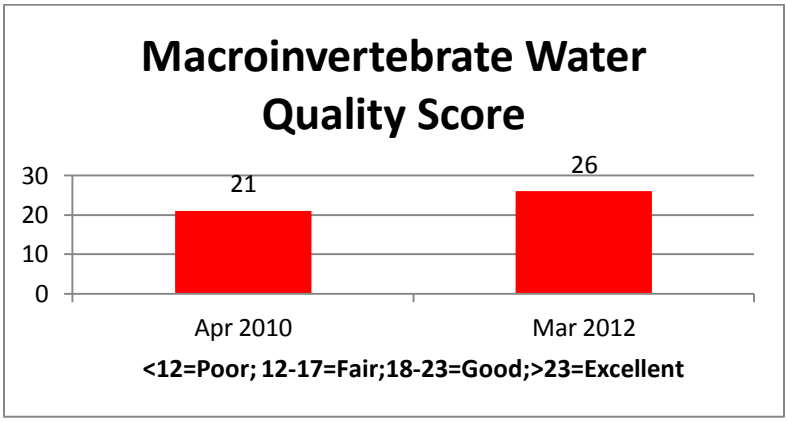
Biological Sampling

Date	Lvl	Cd	Db	My	RS	Rf	St	Pn	OB	Cm	Cr	Cy	Dr	Da	Sd	FF	Al	Ws	AW	BF	Lc	Md	LS	OS	Score
4/10	3	2		177	4	19	39	1				5							15						21
3/12	2	8	10	15	7	2	1	1		2		2							5						26

Sensitive
- Cd – Caddisfly
- Db – Dobsonfly
- My- Mayfly
- RS – Right Snail
- Rf – Riffle Beetle
- St – Stonefly
- Pn – Water Penny

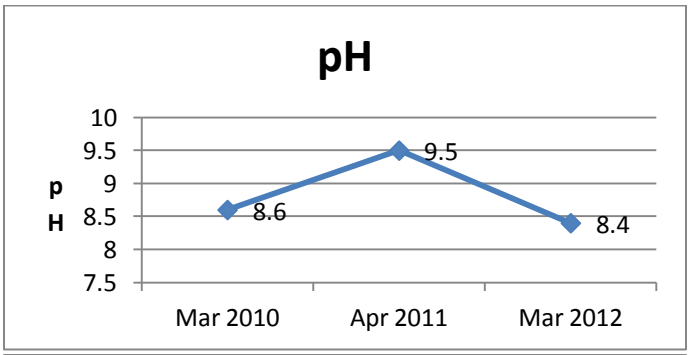
Somewhat Tolerant
- OB – Other Beetle
- Cm – Clam/Mussel
- Cr – Cranefly
- Cy – Crayfish
- Dr – Dragonfly
- Da – Damselfly
- Sd -- Scud
- FF -- Fishfly
- Al - Alderfly
- Ws – Watersnipe Fly

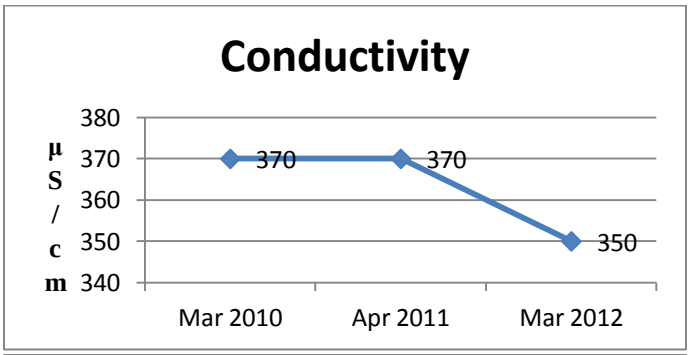
Tolerant
- AW – Aquatic Worm
- BF - Blackfly
- Lc - Leech
- Md - Midge
- LS – Left Snail
- OS – Other Snail

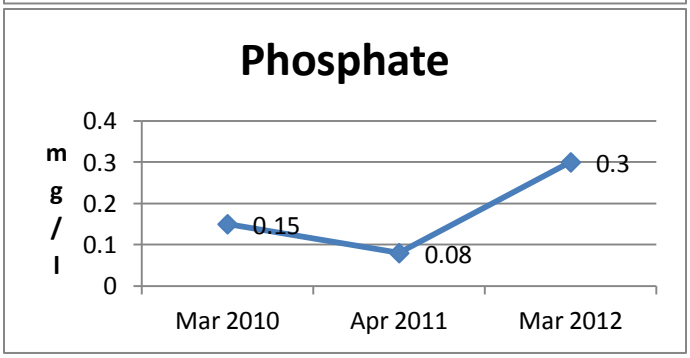


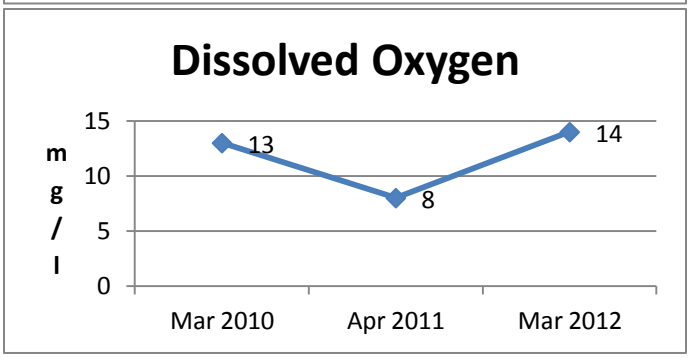
Chemical Sampling

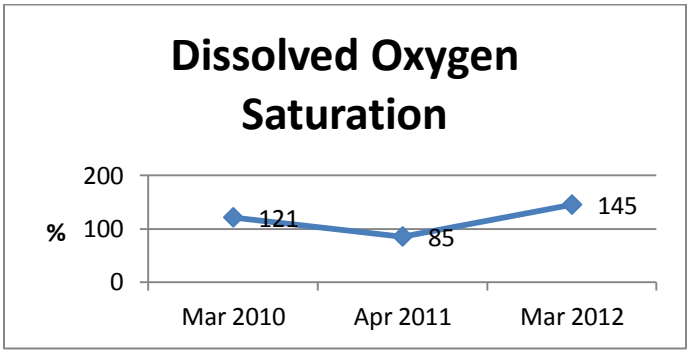
Date	Level	Air	Water	pH	Cond	Phosphate	Turbidity	DO/Sat	Nitrate
3/19/10	3	21°	12°	8.6	370	0.15	<10	13/121%	-
4/9/11	3	32.5°	18°	9.5	370	0.08	<10	8/85%	-
3/17/12	3	29°	17°	8.4	350	0.30	<10	14/145%	0.5

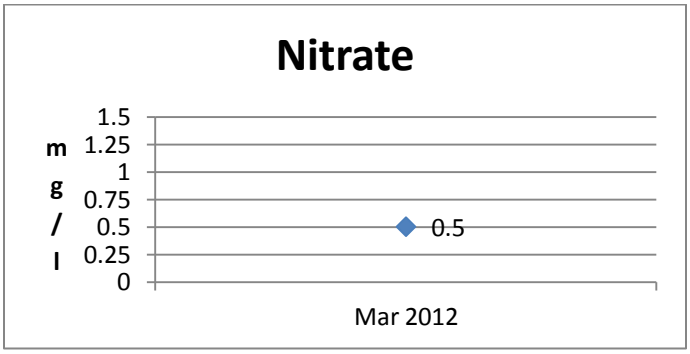












Site Notes and Journal: 3/17/2012: Dead and bloated cow in stream immediately upstream, about 100' from sampling site.

Site 38

6.0 miles below Sycamore MDC access
Approx 35 ft us confluence of trib on the upper curve of Horseshoe Bend
Ozark County
Lat 36.67311°N, Long 92.26338°W

Date	Lvl	Cd	Db	My	RS	Rf	St	Pn	OB	Cm	Cr	Cy	Dr	Da	Sd	FF	Al	Ws	AW	BF	Lc	Md	LS	OS	Score
3/12	2		4	13	7		4					9							1			2			16

Sensitive

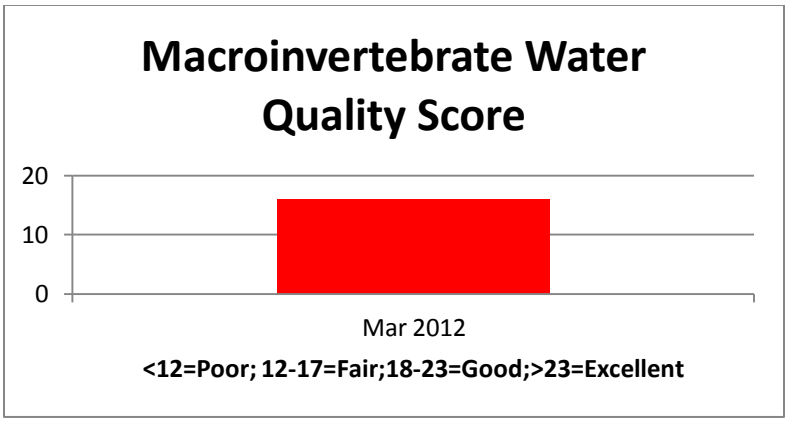
Cd – Caddisfly
Db – Dobsonfly
My- Mayfly
RS – Right Snail
Rf – Riffle Beetle
St – Stonefly
Pn – Water Penny

Somewhat Tolerant

OB – Other Beetle
Cm – Clam/Mussel
Cr – Cranefly
Cy – Crayfish
Dr – Dragonfly
Da – Damselfly
Sd -- Scud
FF -- Fishfly
Al - Alderfly
Ws – Watersnipe Fly

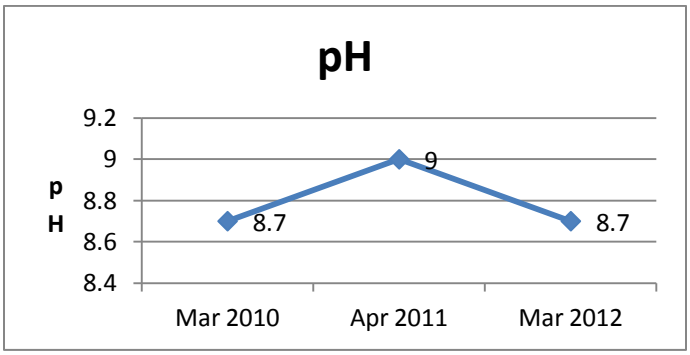
Tolerant

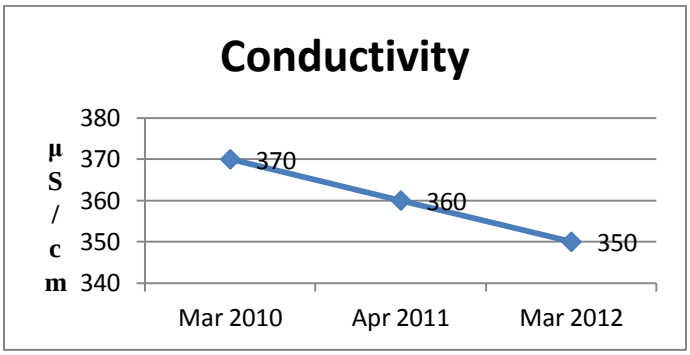
AW – Aquatic Worm
BF - Blackfly
Lc - Leech
Md - Midge
LS – Left Snail
OS – Other Snail

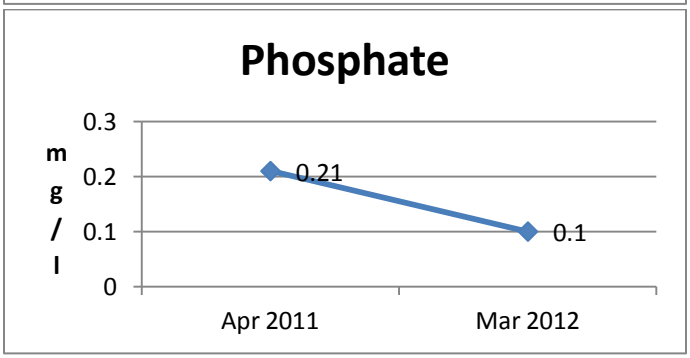


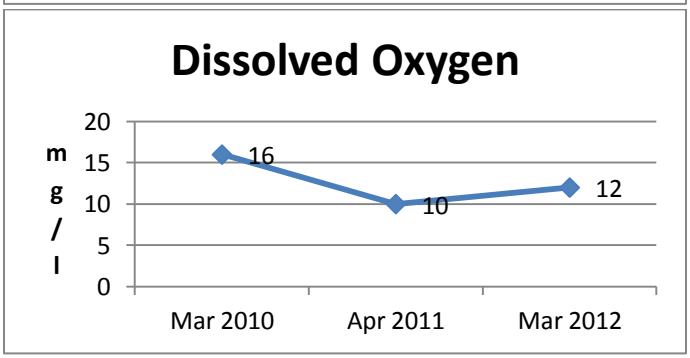
Chemical Sampling

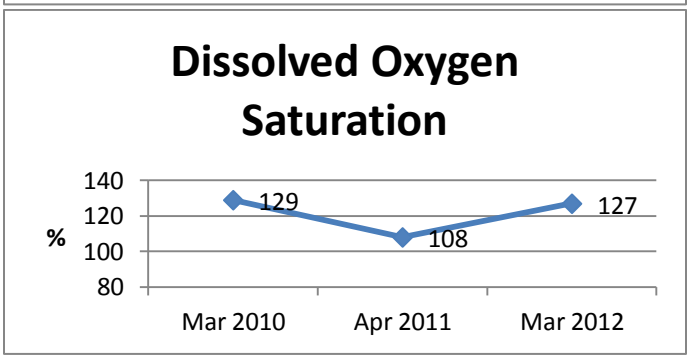
Date	Level	Air	Water	pH	Cond	Phosphate	Turbidity	DO/Sat	Nitrate
3/19/10	3	18°	12°	8.7	370	-	<10	16/149%	-
4/9/11	3	31°	19°	9.0	360	0.21	<10	10/108%	-
3/1/12	3	30°	18°	8.7	350	0.10	<10	12/127%	.5

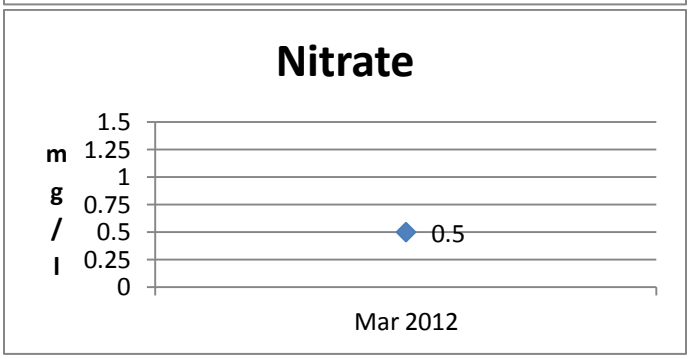












Site Notes and Journal:

Site 39

7.05 miles below Sycamore MDC access
Approx .3 miles ds Brixey Spring
Ozark County
Lat 36.66297°N, Long 92.27131°W

March 2010

Biological Sampling

Date	Lvl	Cd	Db	My	RS	Rf	St	Pn	OB	Cm	Cr	Cy	Dr	Da	Sd	FF	Al	Ws	AW	BF	Lc	Md	LS	OS	Score
4/10	3		3	113	4	1	33			1															17

5/12	2	11	4	20	13	1	4			4								1	1					23

Sensitive

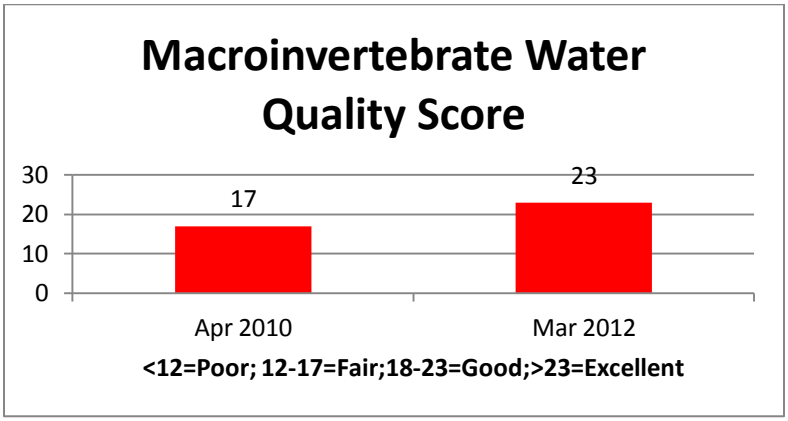
Cd – Caddisfly
Db – Dobsonfly
My- Mayfly
RS – Right Snail
Rf – Riffle Beetle
St – Stonefly
Pn – Water Penny

Somewhat Tolerant

OB – Other Beetle
Cm – Clam/Mussel
Cr – Cranefly
Cy – Crayfish
Dr – Dragonfly
Da – Damselfly
Sd -- Scud
FF -- Fishfly
Al - Alderfly
Ws – Watersnipe Fly

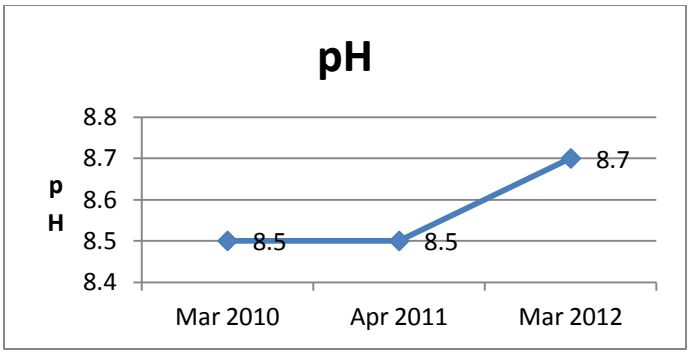
Tolerant

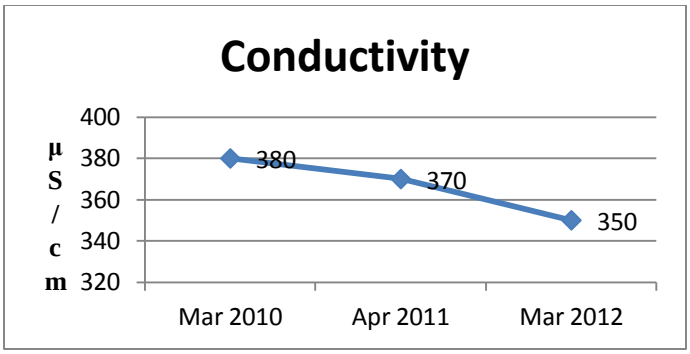
AW – Aquatic Worm
BF - Blackfly
Lc - Leech
Md - Midge
LS – Left Snail
OS – Other Snail

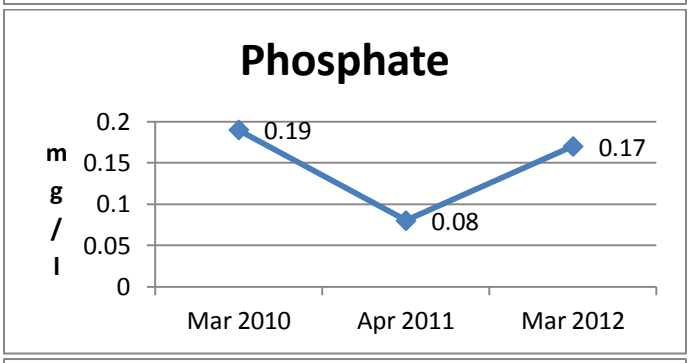


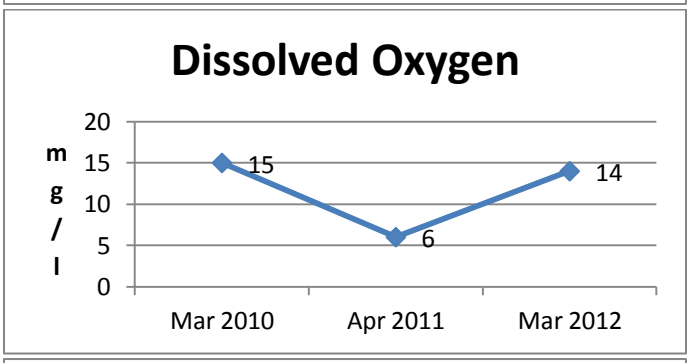
Chemical Sampling

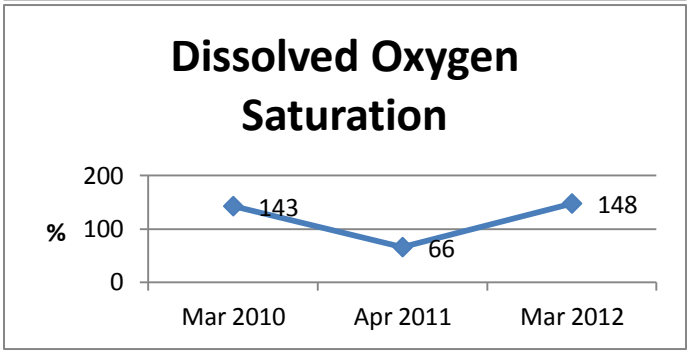
Date	Level	Air	Water	pH	Cond	Phosphate	Turbidity	DO/Sat	Nitrate
3/19/10	3	20°	19°	8.5	380	0.19	<10	15/143%	-
4/9/11	3	33.9°	20°	8.5	370	0.08	<10	6/66%	-
3/17/12	3	24°	18°	8.7	350	0.17	<10	14/148%	0.5

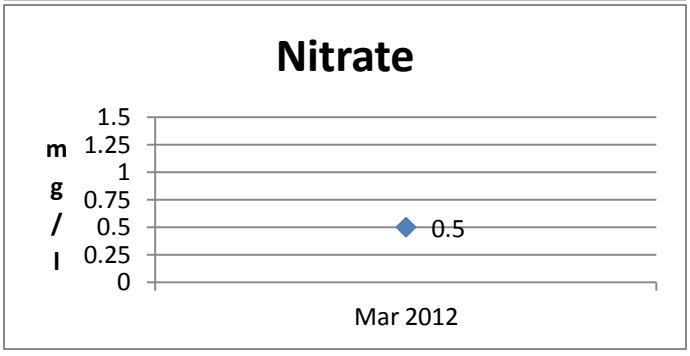












Site Notes and Journal:

Site 40

Warren Bridge
Access at County Road 328
Ozark County
Lat 36.66817°N, Long 92.28105°W

April 2011

Biological Sampling

Date	Lvl	Cd	Db	My	RS	Rf	St	Pn	OB	Cm	Cr	Cy	Dr	Da	Sd	FF	Al	Ws	AW	BF	Lc	Md	LS	OS	Score

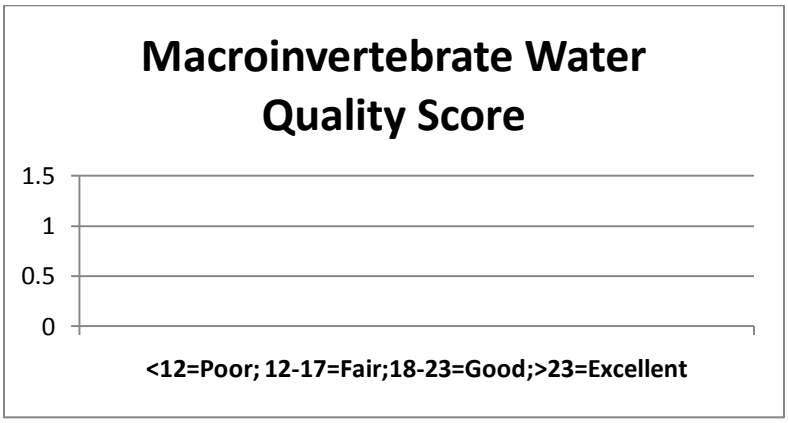
Sensitive Somewhat Tolerant Tolerant

Cd – Caddisfly
Db – Dobsonfly
My- Mayfly
RS – Right Snail
Rf – Riffle Beetle
St – Stonefly
Pn – Water Penny

OB – Other Beetle
Cm – Clam/Mussel
Cr – Cranefly
Cy – Crayfish
Dr – Dragonfly

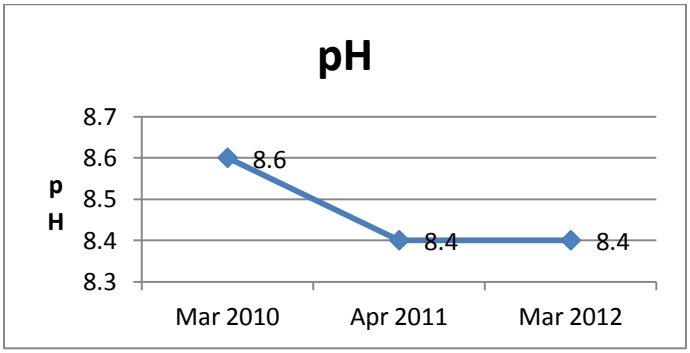
Da – Damselfly
Sd -- Scud
FF -- Fishfly
Al - Alderfly
Ws – Watersnipe Fly

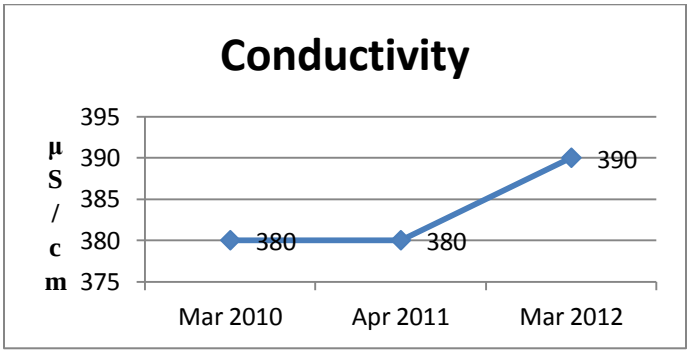
AW – Aquatic Worm
BF - Blackfly
Lc - Leech
Md - Midge
LS – Left Snail
OS – Other Snail

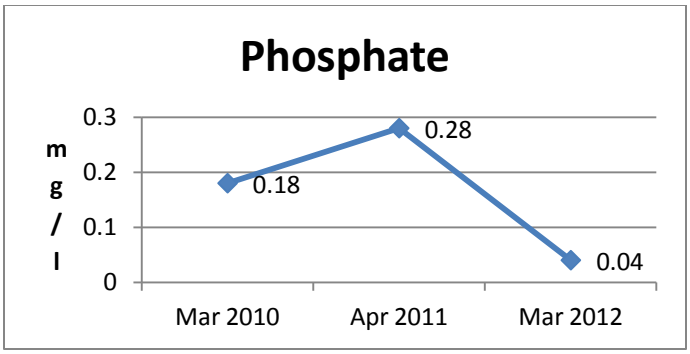


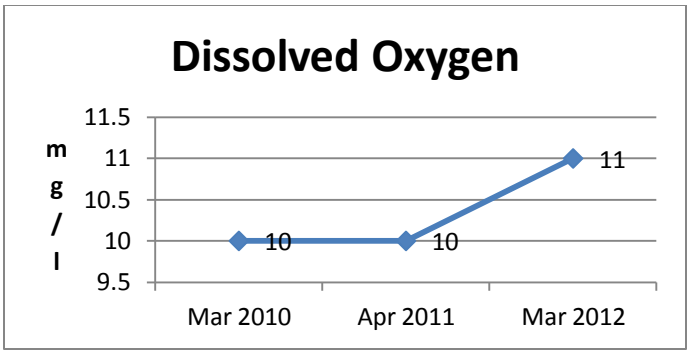
Chemical Sampling

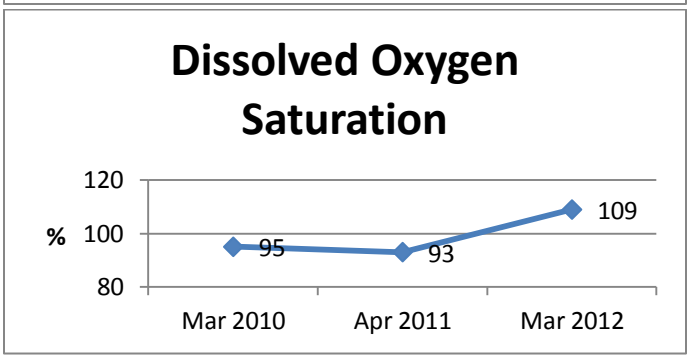
Date	Level	Air	Water	pH	Cond	Phosphate	Turbidity	DO/Sat	Nitrate
3/19/10	3	19.5°	13°	8.6	380	0.18	<10	10/95%	-
4/3/11	2	19°	12°	8.4	380	0.28	<10	10/93%	-
3/17/12	2	13°	15°	8.4	390	0.04	<10	11/109%	0.25

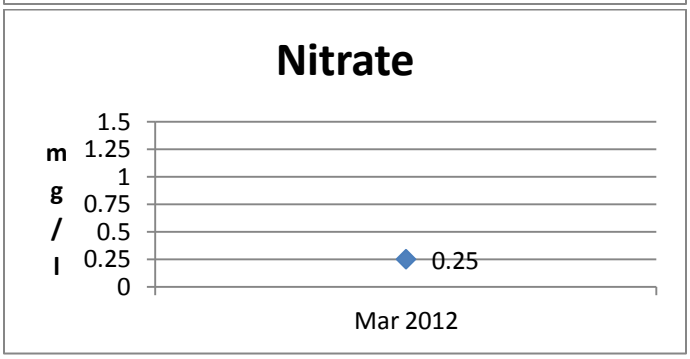












Site Notes and Journal:

Site 41

1.03 mile below Warren Bridge
Approx .25 miles us confluence of trib at Sanfield Ford
Ozark County
Lat 36.65697°N, Long 92.28265°W

April 2011

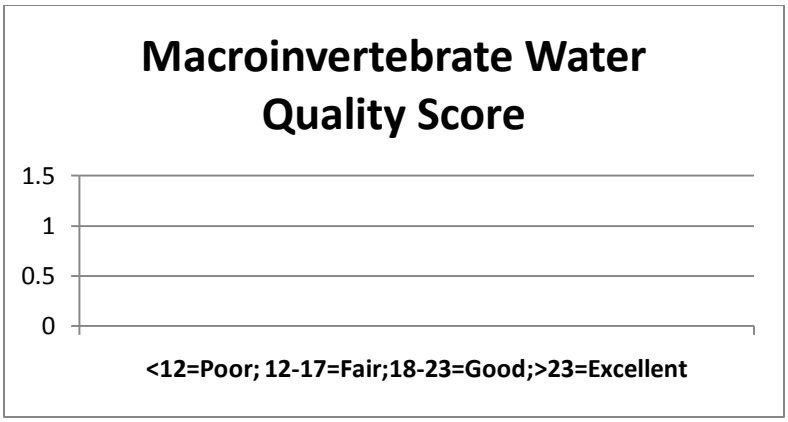
Biological Sampling

Date	Lvl	Cd	Db	My	RS	Rf	St	Pn	OB	Cm	Cr	Cy	Dr	Da	Sd	FF	Al	Ws	AW	BF	Lc	Md	LS	OS	Score

Sensitive
Cd – Caddisfly
Db – Dobsonfly
My- Mayfly
RS – Right Snail
Rf – Riffle Beetle
St – Stonefly
Pn – Water Penny

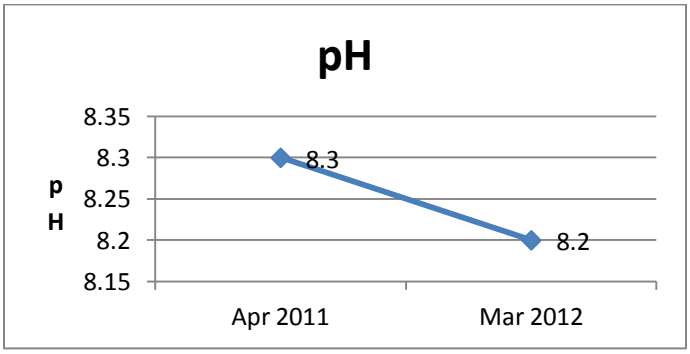
Somewhat Tolerant
OB – Other Beetle
Cm – Clam/Mussel
Cr – Cranefly
Cy – Crayfish
Dr – Dragonfly
Da – Damselfly
Sd -- Scud
FF -- Fishfly
Al - Alderfly
Ws – Watersnipe Fly

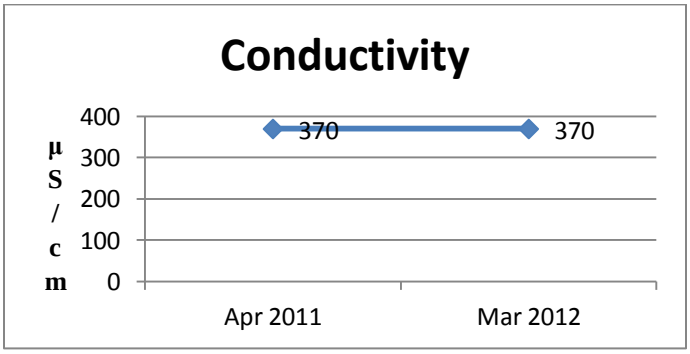
Tolerant
AW – Aquatic Worm
BF - Blackfly
Lc - Leech
Md - Midge
LS – Left Snail
OS – Other Snail

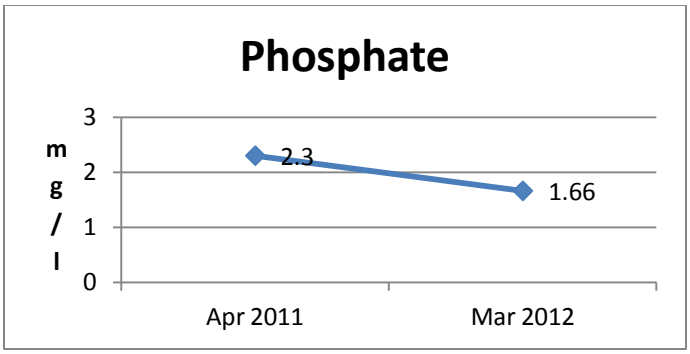


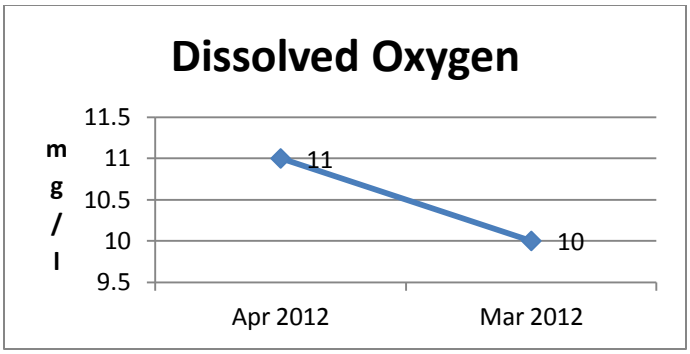
Chemical Sampling

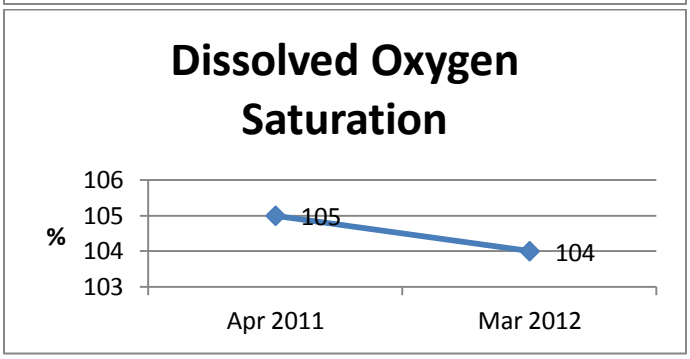
Date	Level	Air	Water	pH	Cond	Phosphate	Turbidity	DO/Sat	Nitrate
4/3/11	2	18°	13°	8.3	370	2.3	<10	11/105%	-
3/19/12	2	22°	17°	8.2	370	1.66	<10	10/104%	0.25

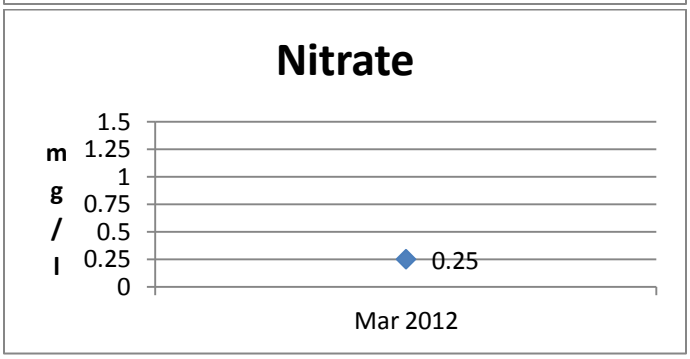












Site Notes and Journal:

Site 42

3.15 miles below Warren Bridge
.6 miles due west of junction CR 326 & CR 319 (1.8 miles us Pine Creek)
Ozark County
Lat 36.63735°N, Long 92.28903°W

April 2011

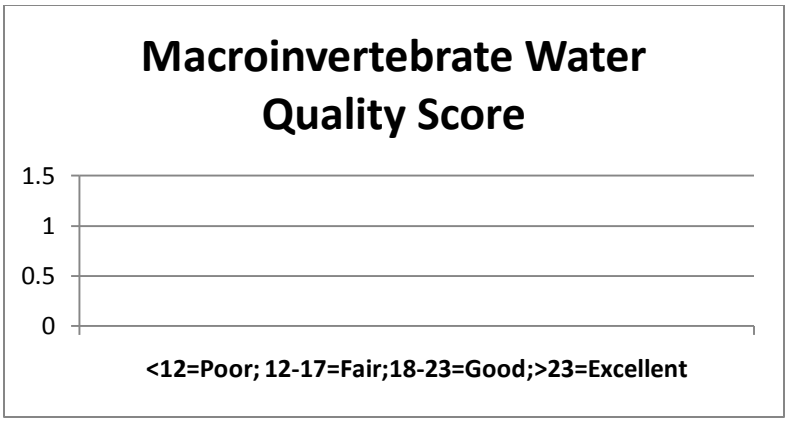
Biological Sampling

Date	Lvl	Cd	Db	My	RS	Rf	St	Pn	OB	Cm	Cr	Cy	Dr	Da	Sd	FF	Al	Ws	AW	BF	Lc	Md	LS	OS	Score

Sensitive
- Cd – Caddisfly
- Db – Dobsonfly
- My- Mayfly
- RS – Right Snail
- Rf – Riffle Beetle
- St – Stonefly
- Pn – Water Penny

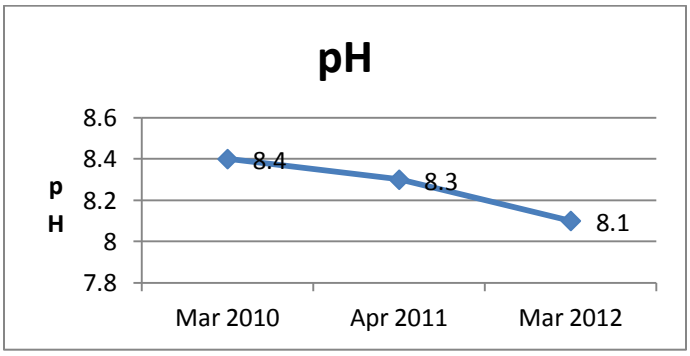
Somewhat Tolerant
- OB – Other Beetle
- Cm – Clam/Mussel
- Cr – Cranefly
- Cy – Crayfish
- Dr – Dragonfly
- Da – Damselfly
- Sd -- Scud
- FF -- Fishfly
- Al - Alderfly
- Ws – Watersnipe Fly

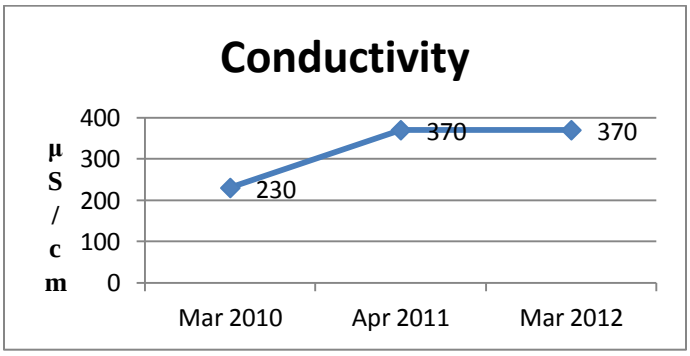
Tolerant
- AW – Aquatic Worm
- BF - Blackfly
- Lc - Leech
- Md - Midge
- LS – Left Snail
- OS – Other Snail

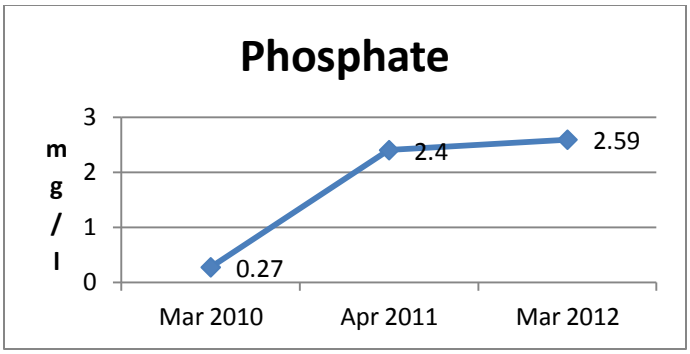


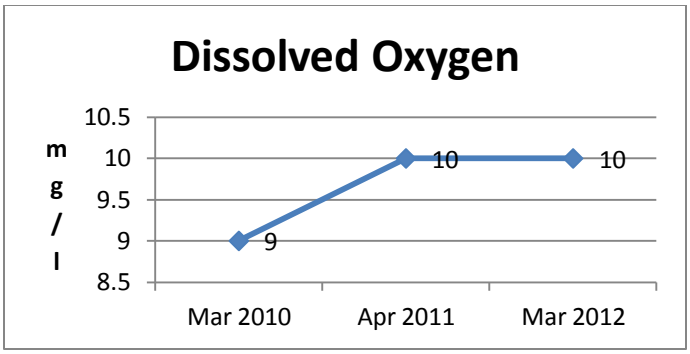
Chemical Sampling

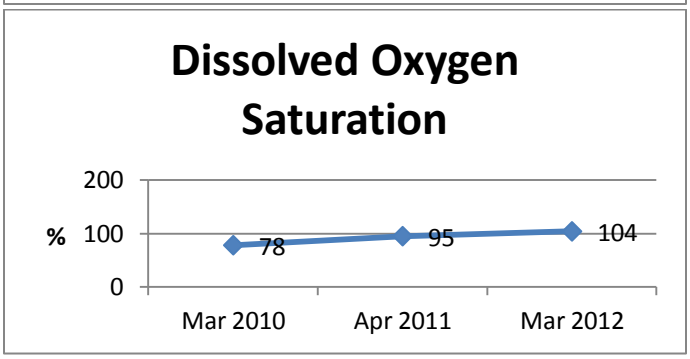
Date	Level	Air	Water	pH	Cond	Phosphate	Turbidity	DO/Sat	Nitrate
3/26/10	2	9°	9°	8.4	230	0.27	50	9/78%	-
4/3/11	2	20°	13°	8.3	370	2.4	<10	10/95%	-
3/19/12	2	26°	17°	8.1	370	2.59	<10	10/104%	0.50

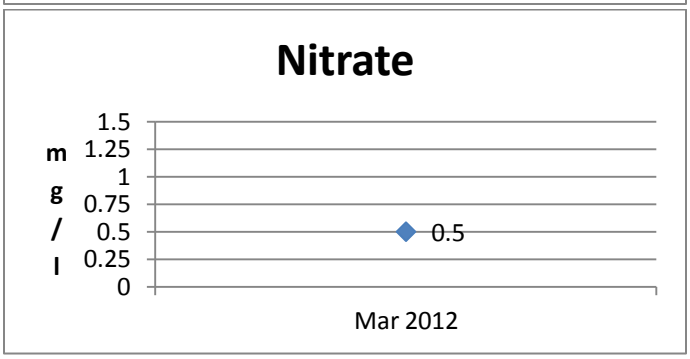








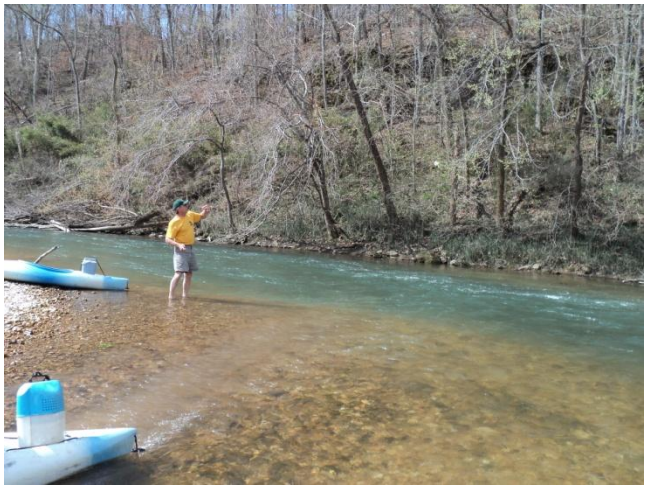




Site Notes and Journal:

Site 43

3.56 miles below Warren Bridge
Approx 100 ft ds line between Sections 28 & 33 and 1.5 miles us Pine Creek
Ozark County
Lat 36.63377°N, Long 92.28723°W



April 2011

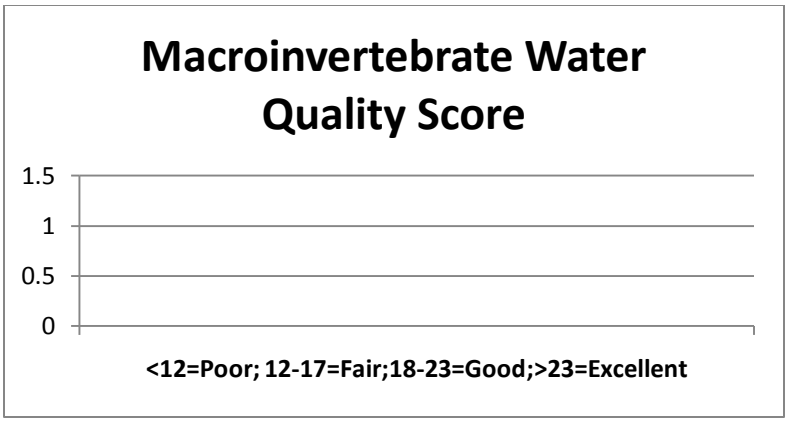
Biological Sampling

Date	Lvl	Cd	Db	My	RS	Rf	St	Pn	OB	Cm	Cr	Cy	Dr	Da	Sd	FF	Al	Ws	AW	BF	Lc	Md	LS	OS	Score

Sensitive
Cd – Caddisfly
Db – Dobsonfly
My- Mayfly
RS – Right Snail
Rf – Riffle Beetle
St – Stonefly
Pn – Water Penny

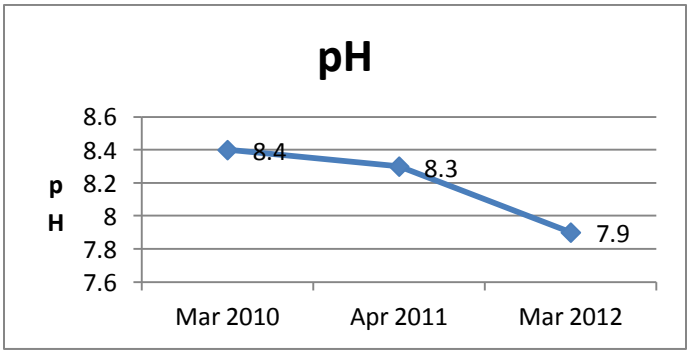
Somewhat Tolerant
OB – Other Beetle
Cm – Clam/Mussel
Cr – Cranefly
Cy – Crayfish
Dr – Dragonfly
Da – Damselfly
Sd -- Scud
FF -- Fishfly
Al - Alderfly
Ws – Watersnipe Fly

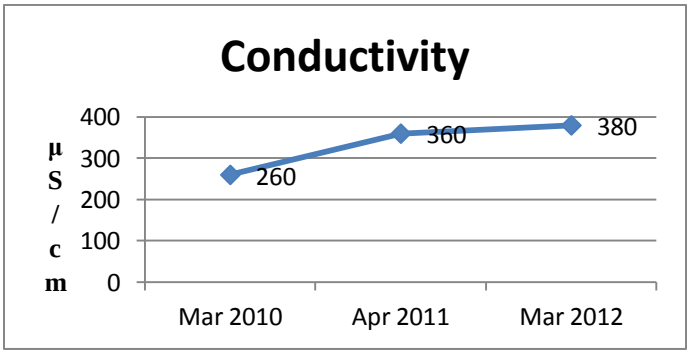
Tolerant
AW – Aquatic Worm
BF - Blackfly
Lc - Leech
Md - Midge
LS – Left Snail
OS – Other Snail

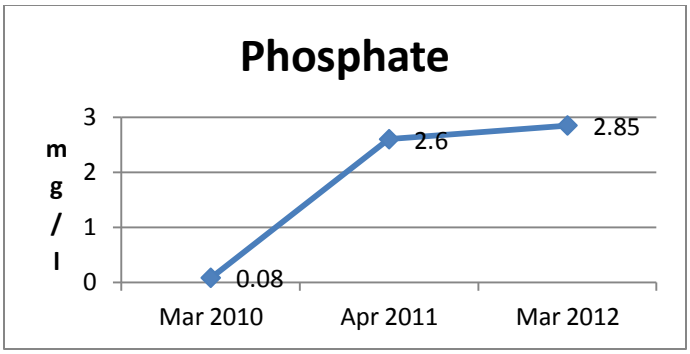


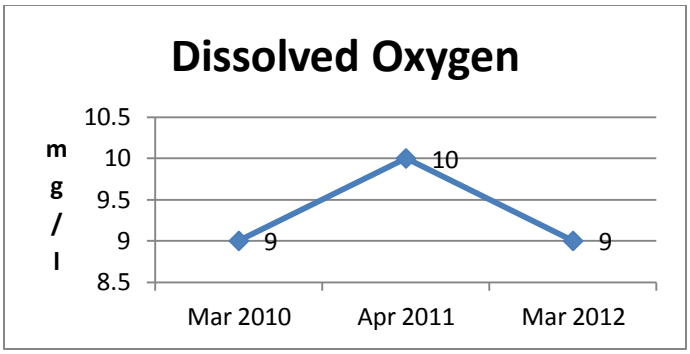
Chemical Sampling

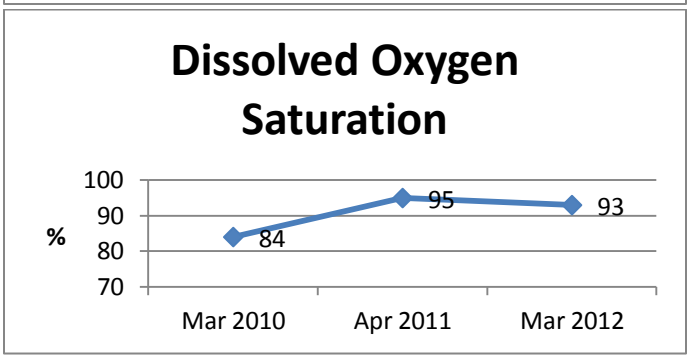
Date	Level	Air	Water	pH	Cond	Phosphate	Turbidity	DO/Sat	Nitrate
3/26/10	2	12°	10°	8.4	260	0.08	40	9/84%	-
4/3/11	2	25°	13°	8.3	360	2.6	<10	10/95%	-
3/19/12	2	23°	17°	7.9	380	2.85	<10	9/93%	0.5

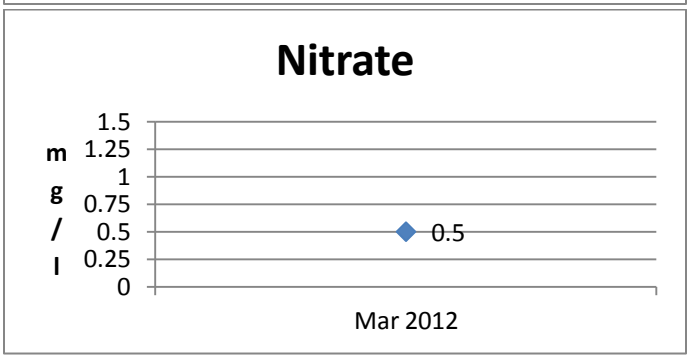












Site Notes and Journal:

Site 44

4.38 miles below Warren Bridge
1 miles upstream confluence of Pine Creek & .2 miles us line between Sections 33 & 22
Ozark County
Lat 36.62775°N, Long 92.29045°W

April 2011

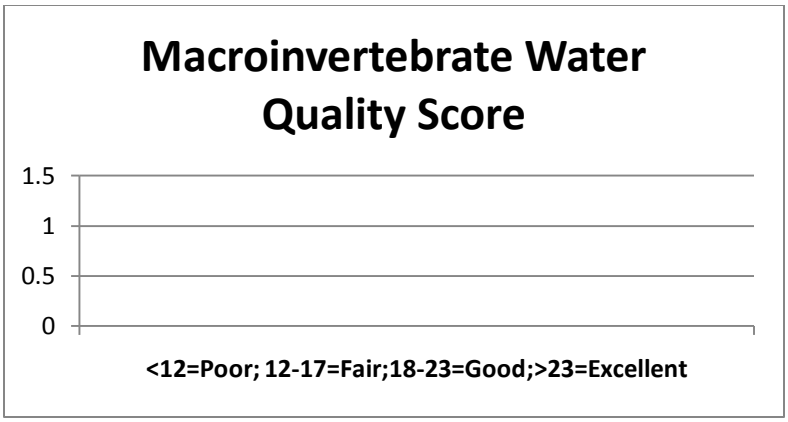
Biological Sampling

Date	Lvl	Cd	Db	My	RS	Rf	St	Pn	OB	Cm	Cr	Cy	Dr	Da	Sd	FF	Al	Ws	AW	BF	Lc	Md	LS	OS	Score

Sensitive
Cd – Caddisfly
Db – Dobsonfly
My- Mayfly
RS – Right Snail
Rf – Riffle Beetle
St – Stonefly
Pn – Water Penny

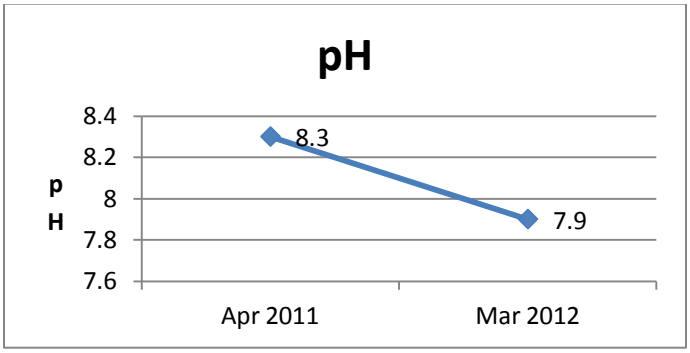
Somewhat Tolerant
OB – Other Beetle
Cm – Clam/Mussel
Cr – Cranefly
Cy – Crayfish
Dr – Dragonfly
Da – Damselfly
Sd -- Scud
FF -- Fishfly
Al - Alderfly
Ws – Watersnipe Fly

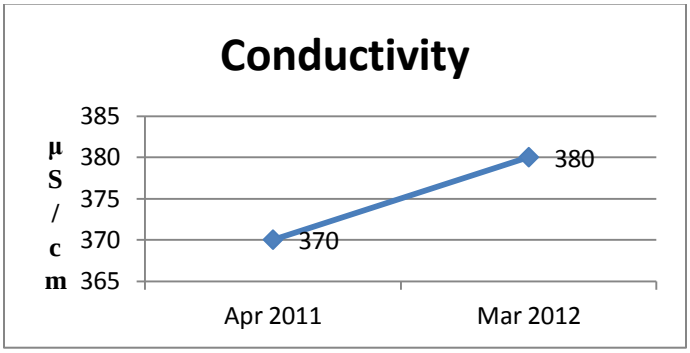
Tolerant
AW – Aquatic Worm
BF - Blackfly
Lc - Leech
Md - Midge
LS – Left Snail
OS – Other Snail

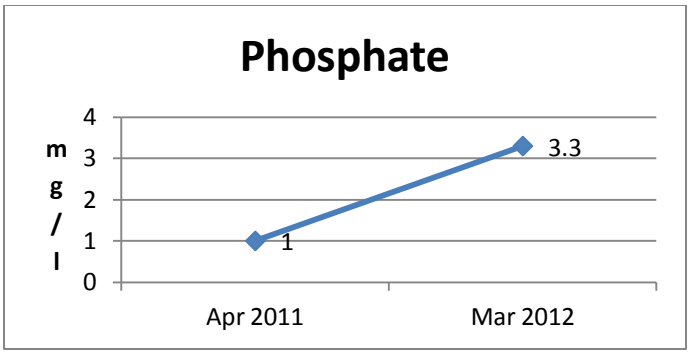


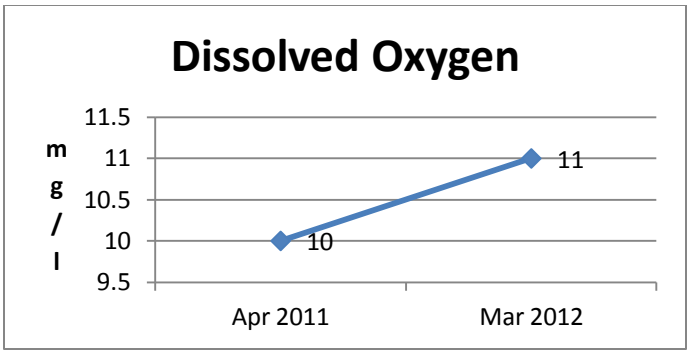
Chemical Sampling

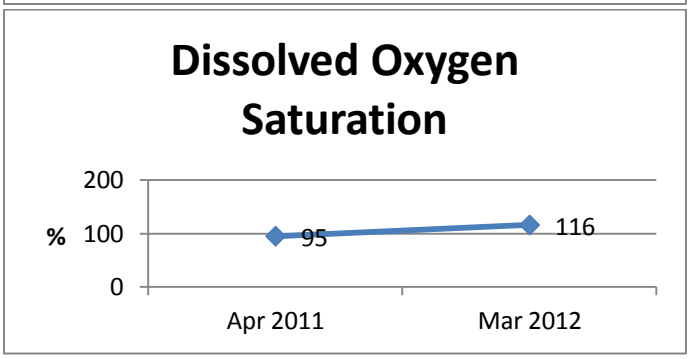
Date	Level	Air	Water	pH	Cond	Phosphate	Turbidity	DO/Sat	Nitrate
4/3/11	2	27°	13°	8.3	370	1.0	<10	10/95%	-
3/19/12	2	25°	18°	7.9	380	3.3	<10	11/116%	0.25

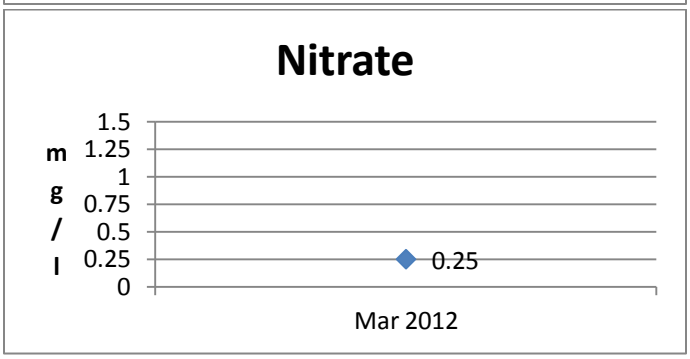












Site Notes and Journal:

Site 45

6.42 miles below Warren Bridge
Approx 450 yards ds USGS Gauging Station 07058000
Ozark County
Lat 36.62530°N, Long 92.30194°W

April 2011

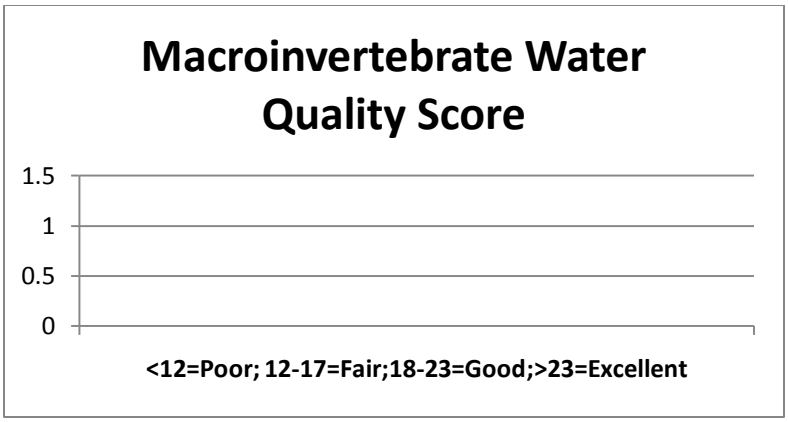
Biological Sampling

Date	Lvl	Cd	Db	My	RS	Rf	St	Pn	OB	Cm	Cr	Cy	Dr	Da	Sd	FF	Al	Ws	AW	BF	Lc	Md	LS	OS	Score

Sensitive
Cd – Caddisfly
Db – Dobsonfly
My- Mayfly
RS – Right Snail
Rf – Riffle Beetle
St – Stonefly
Pn – Water Penny

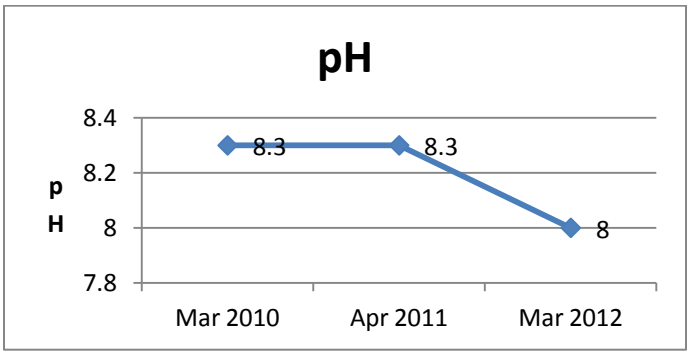
Somewhat Tolerant
OB – Other Beetle
Cm – Clam/Mussel
Cr – Cranefly
Cy – Crayfish
Dr – Dragonfly
Da – Damselfly
Sd -- Scud
FF -- Fishfly
Al - Alderfly
Ws – Watersnipe Fly

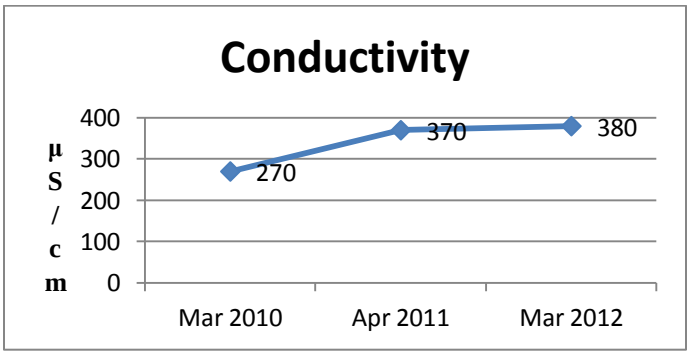
Tolerant
AW – Aquatic Worm
BF - Blackfly
Lc - Leech
Md - Midge
LS – Left Snail
OS – Other Snail

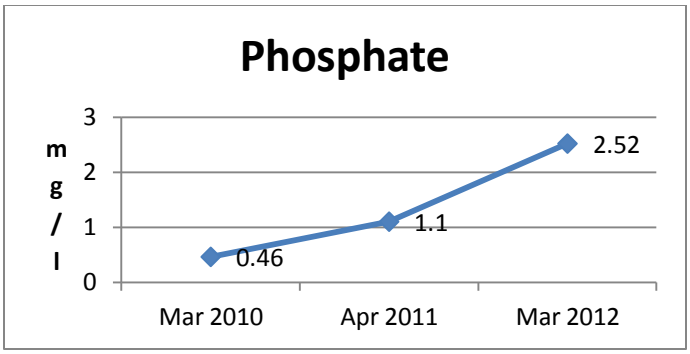


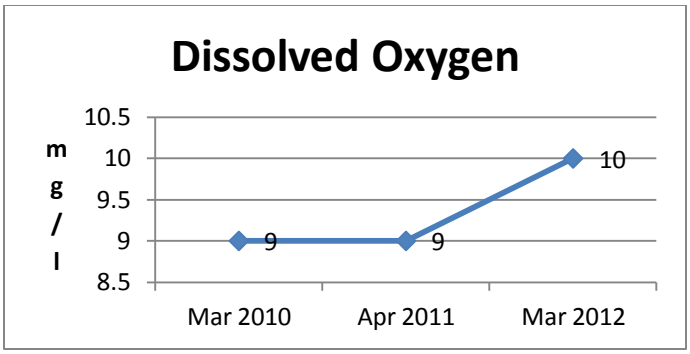
Chemical Sampling

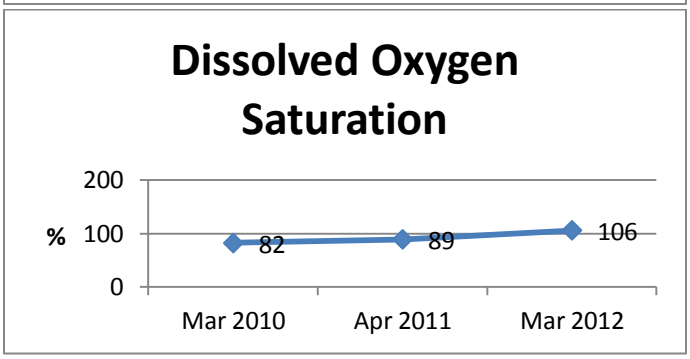
Date	Level	Air	Water	pH	Cond	Phosphate	Turbidity	DO/Sat	Nitrate
3/26/10	2	15°	11°	8.3	270	0.46	30	9/82%	-
4/3/11	2	26°	15°	8.3	370	1.1	<10	9/89%	-
3/19/12	2	23°	18°	8.0	380	2.52	<10	10/106%	0.25

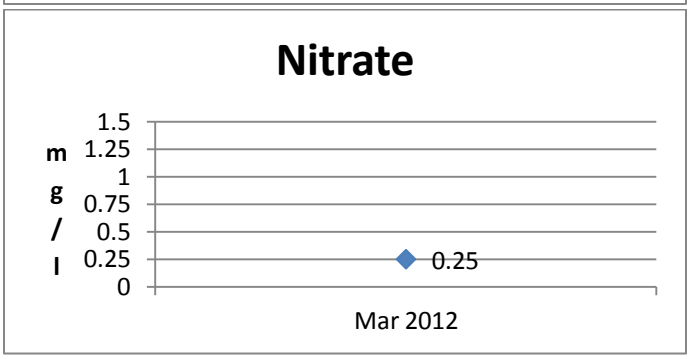












Site Notes and Journal:

Site 46

7.92 miles below Warren Bridge
Approx 300 yards us confluence of Little Pine Creek
Ozark County
Lat 36.61531°N, Long 92.29269°W

April 2011

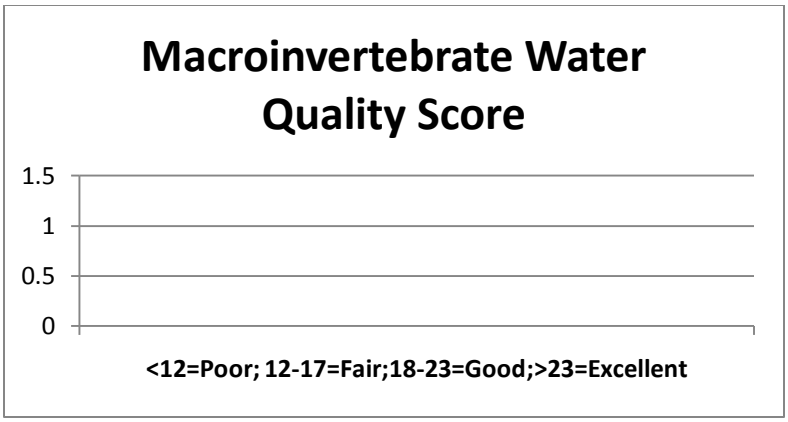
Biological Sampling

Date	Lvl	Cd	Db	My	RS	Rf	St	Pn	OB	Cm	Cr	Cy	Dr	Da	Sd	FF	Al	Ws	AW	BF	Lc	Md	LS	OS	Score

Sensitive
Cd – Caddisfly
Db – Dobsonfly
My- Mayfly
RS – Right Snail
Rf – Riffle Beetle
St – Stonefly
Pn – Water Penny

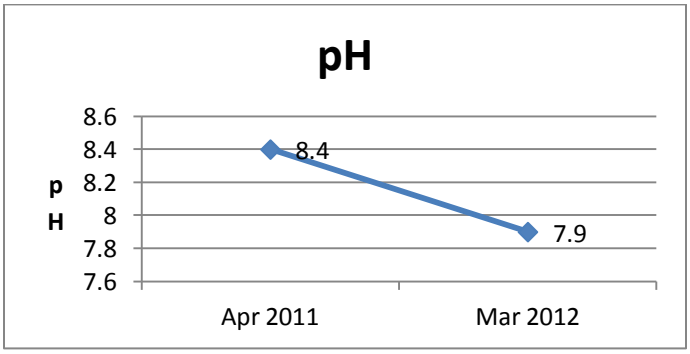
Somewhat Tolerant
OB – Other Beetle
Cm – Clam/Mussel
Cr – Cranefly
Cy – Crayfish
Dr – Dragonfly
Da – Damselfly
Sd -- Scud
FF -- Fishfly
Al - Alderfly
Ws – Watersnipe Fly

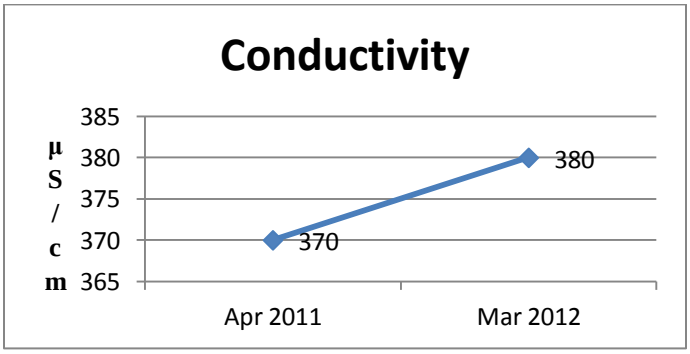
Tolerant
AW – Aquatic Worm
BF - Blackfly
Lc - Leech
Md - Midge
LS – Left Snail
OS – Other Snail

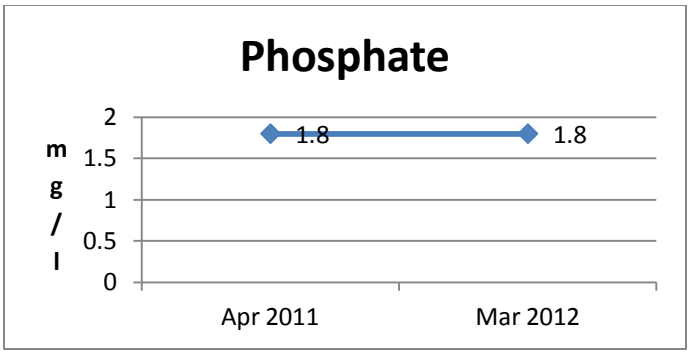


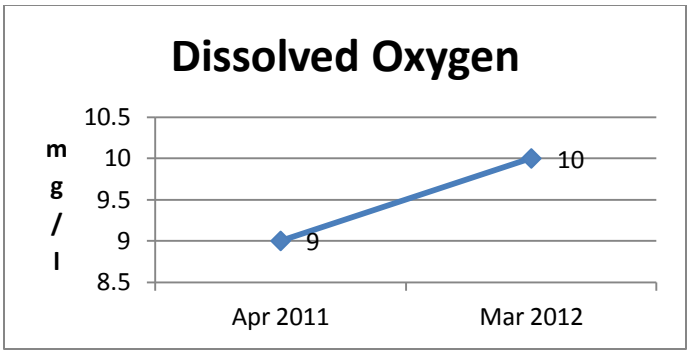
Chemical Sampling

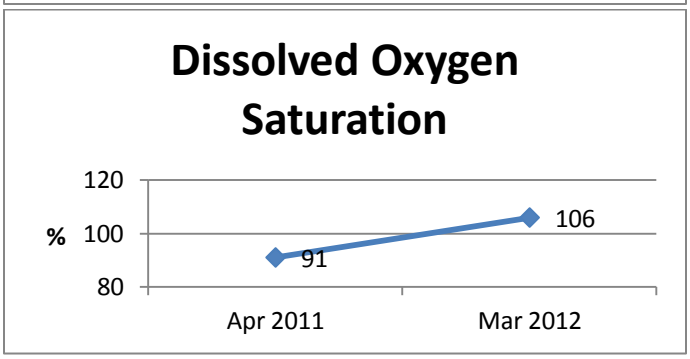
Date	Level	Air	Water	pH	Cond	Phosphate	Turbidity	DO/Sat	Nitrate
4/3/11	2	26°	16°	8.4	370	1.8	<10	9/91%	-
3/19/12	2	23°	18°	7.9	380	1.8	<10	10/106%	0.50

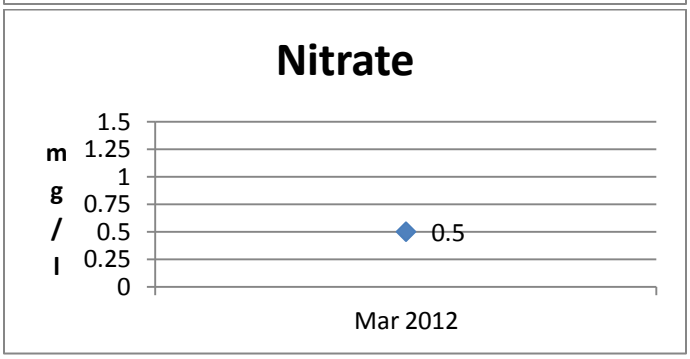












Site Notes and Journal:

Site 47

9.57 miles below Warren Bridge
Approx 650 yards ds MDC Cook (Flo) access
Ozark County
Lat 36.60129°N, Long 92.31007°W

April 2011

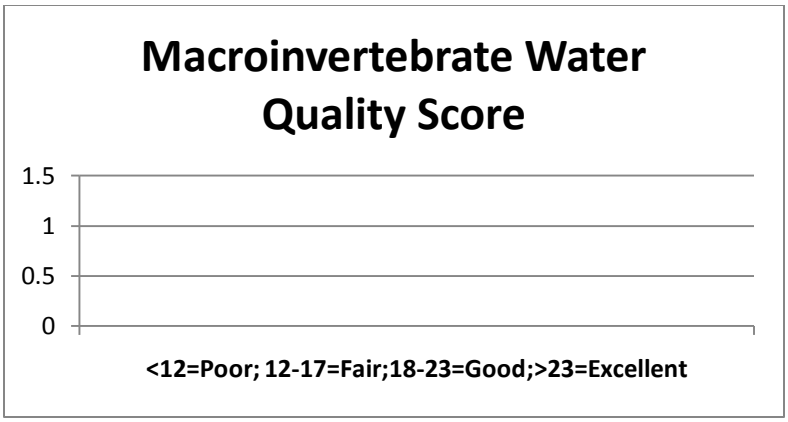
Biological Sampling

Date	Lvl	Cd	Db	My	RS	Rf	St	Pn	OB	Cm	Cr	Cy	Dr	Da	Sd	FF	Al	Ws	AW	BF	Lc	Md	LS	OS	Score

Sensitive
Cd – Caddisfly
Db – Dobsonfly
My- Mayfly
RS – Right Snail
Rf – Riffle Beetle
St – Stonefly
Pn – Water Penny

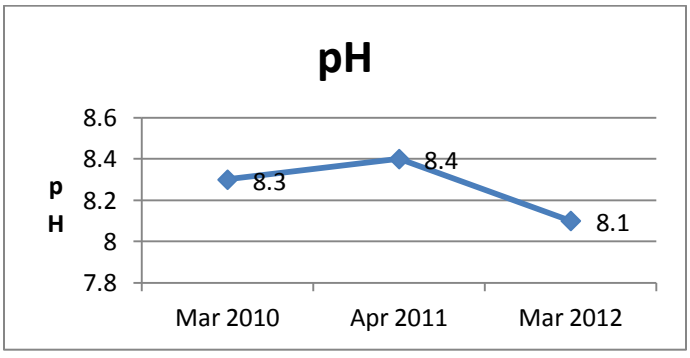
Somewhat Tolerant
OB – Other Beetle
Cm – Clam/Mussel
Cr – Cranefly
Cy – Crayfish
Dr – Dragonfly
Da – Damselfly
Sd -- Scud
FF -- Fishfly
Al - Alderfly
Ws – Watersnipe Fly

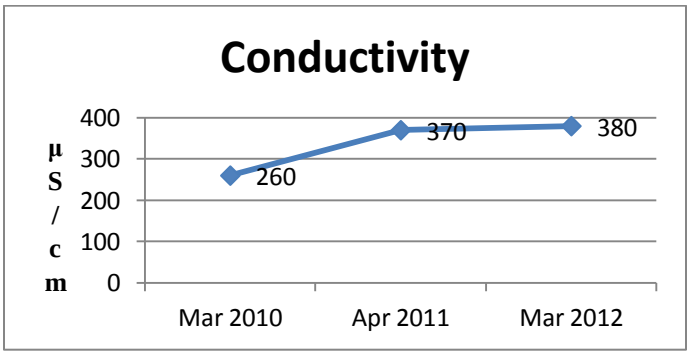
Tolerant
AW – Aquatic Worm
BF - Blackfly
Lc - Leech
Md - Midge
LS – Left Snail
OS – Other Snail

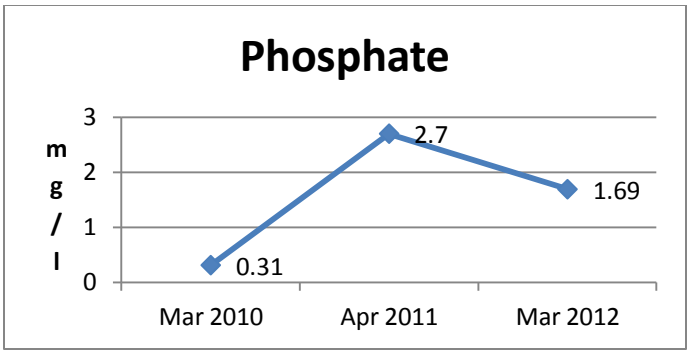


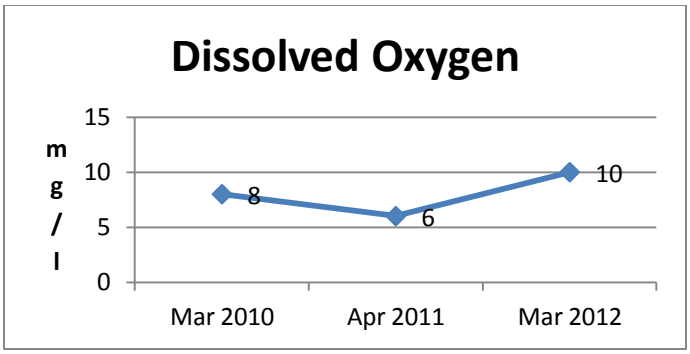
Chemical Sampling

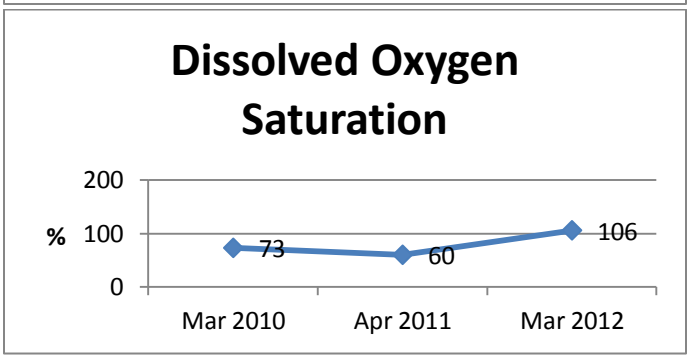
Date	Level	Air	Water	pH	Cond	Phosphate	Turbidity	DO/Sat	Nitrate
3/26/10	2	13°	11°	8.3	260	0.31	50	8/73%	-
4/3/11	2	29°	15°	8.4	370	2.7	<10	6/60%	-
3/19/12	2	22°	18°	8.1	380	1.69	<10	10/106%	0.25

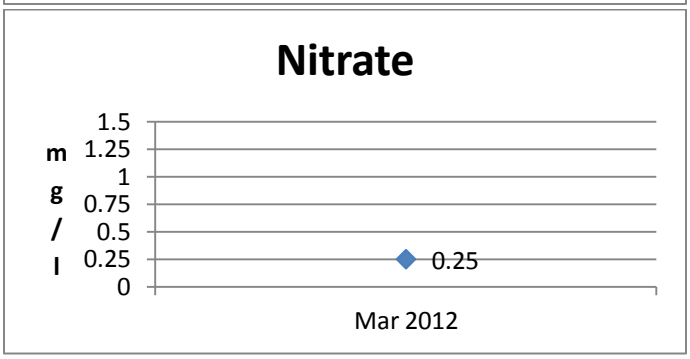












Site Notes and Journal:

Site 48

10.8 miles below Warren Bridge
Approx .4 miles us confluence with North Fork of the White River
Ozark County
Lat 36.59792°N, Long 92.29357°W

April 2011

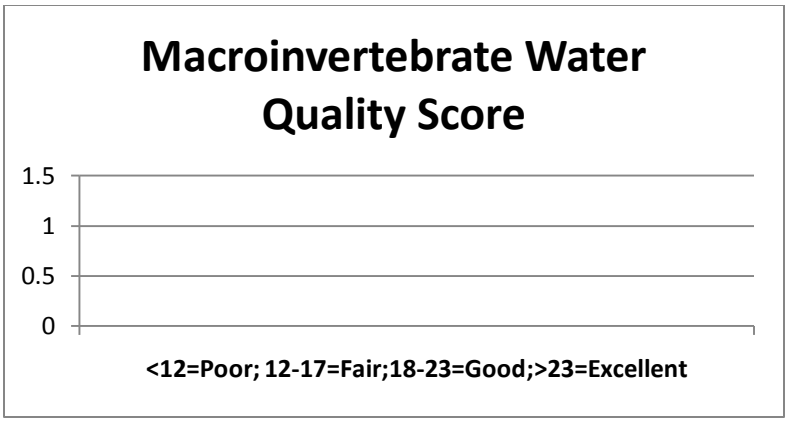
Biological Sampling

Date	Lvl	Cd	Db	My	RS	Rf	St	Pn	OB	Cm	Cr	Cy	Dr	Da	Sd	FF	Al	Ws	AW	BF	Lc	Md	LS	OS	Score

Sensitive
Cd – Caddisfly
Db – Dobsonfly
My- Mayfly
RS – Right Snail
Rf – Riffle Beetle
St – Stonefly
Pn – Water Penny

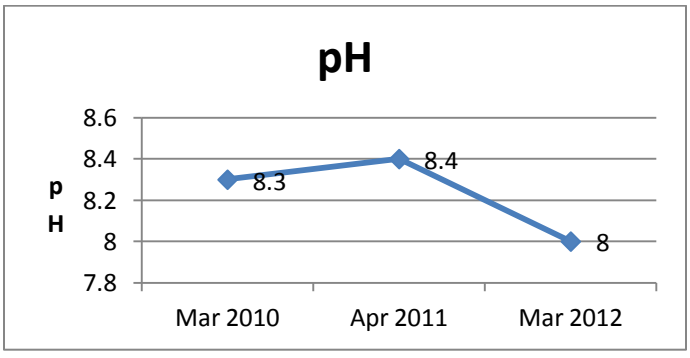
Somewhat Tolerant
OB – Other Beetle
Cm – Clam/Mussel
Cr – Cranefly
Cy – Crayfish
Dr – Dragonfly
Da – Damselfly
Sd -- Scud
FF -- Fishfly
Al - Alderfly
Ws – Watersnipe Fly

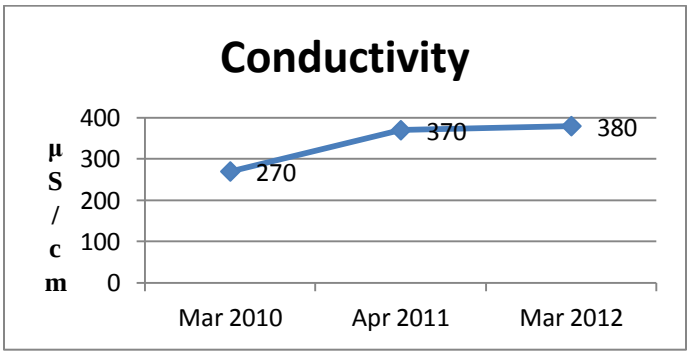
Tolerant
AW – Aquatic Worm
BF - Blackfly
Lc - Leech
Md - Midge
LS – Left Snail
OS – Other Snail

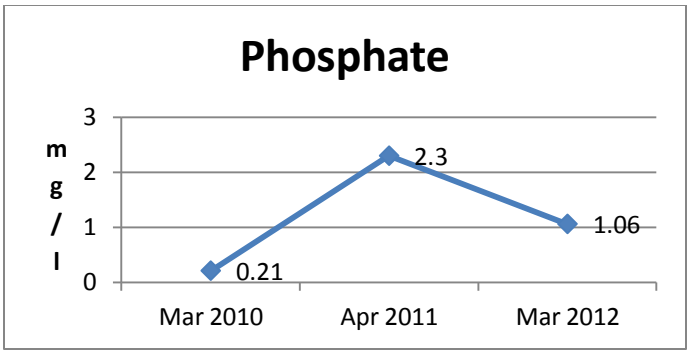


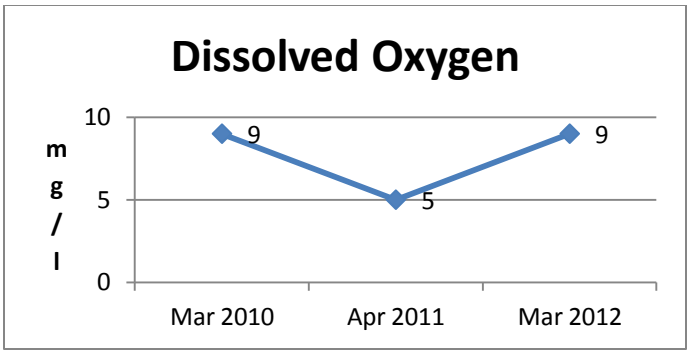
Chemical Sampling

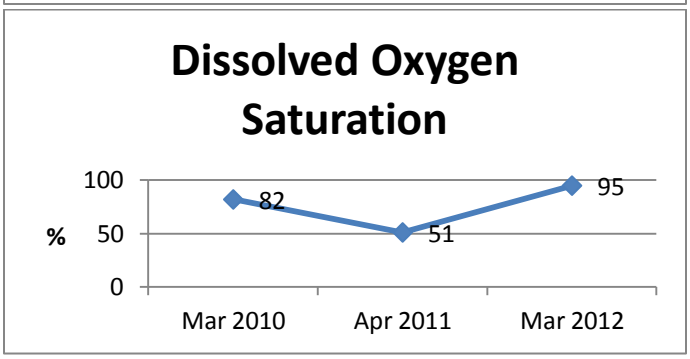
Date	Level	Air	Water	pH	Cond	Phosphate	Turbidity	DO/Sat	Nitrate
3/26/10	2	14°	11°	8.3	270	0.21	40	9/82%	-
4/3/11	2	29°	16°	8.4	370	2.3	<10	5/51%	-
3/19/11	2	23°	18°	8.0	380	1.06	<10	9/95%	0.25

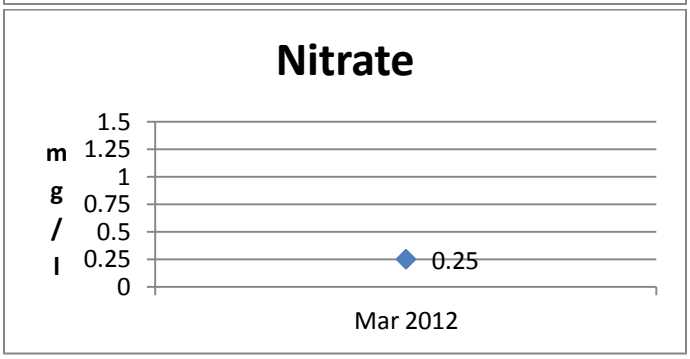








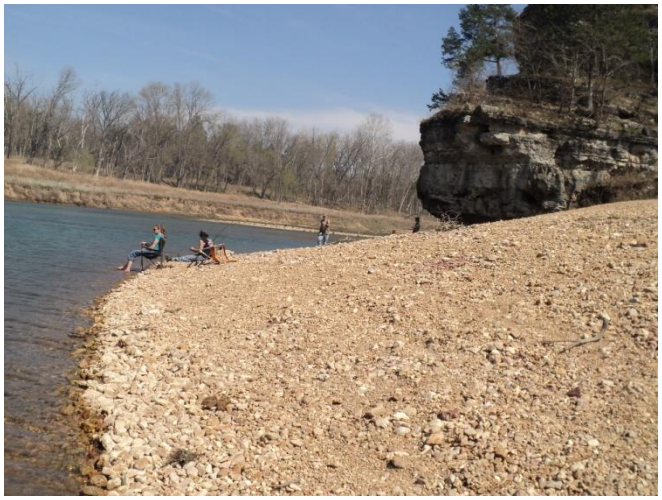




Site Notes and Journal:

Site 49

North Fork of the White River
Approx 300 ft us confluence Bryant Creek and North Fork of the White River
Ozark County
Lat 36.59633°N, Long 92.28887°W



April 2011

Biological Sampling

Date	Lvl	Cd	Db	My	RS	Rf	St	Pn	OB	Cm	Cr	Cy	Dr	Da	Sd	FF	Al	Ws	AW	BF	Lc	Md	LS	OS	Score

Sensitive
Cd – Caddisfly
Db – Dobsonfly
My- Mayfly
RS – Right Snail
Rf – Riffle Beetle
St – Stonefly
Pn – Water Penny

Somewhat Tolerant
OB – Other Beetle
Cm – Clam/Mussel
Cr – Cranefly
Cy – Crayfish
Dr – Dragonfly
Da – Damselfly
Sd -- Scud
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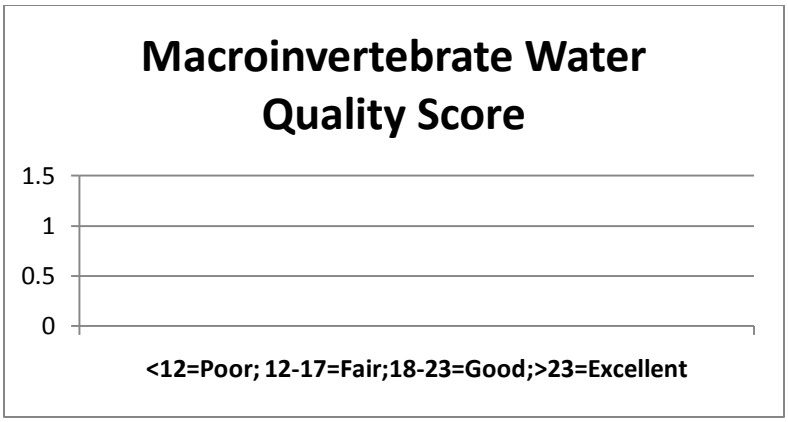
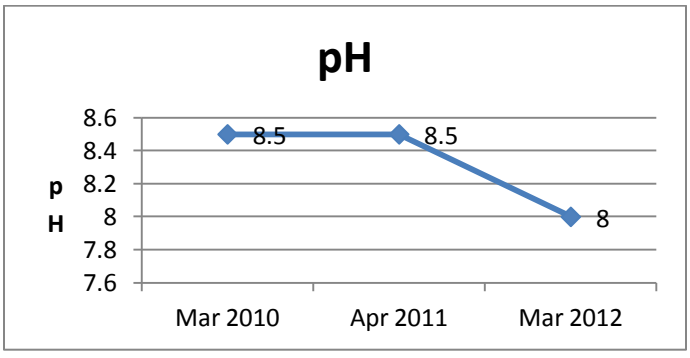
Al - Alderfly
Ws – Watersnipe Fly

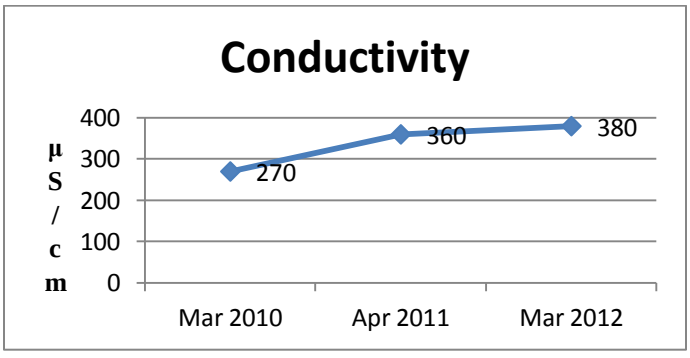
Tolerant
AW – Aquatic Worm
BF - Blackfly
Lc - Leech
Md - Midge
LS – Left Snail
OS – Other Snail

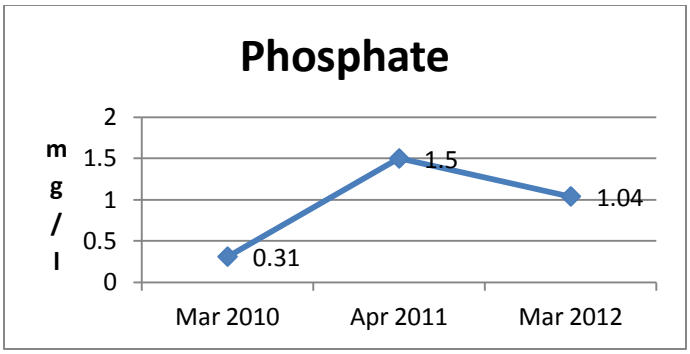


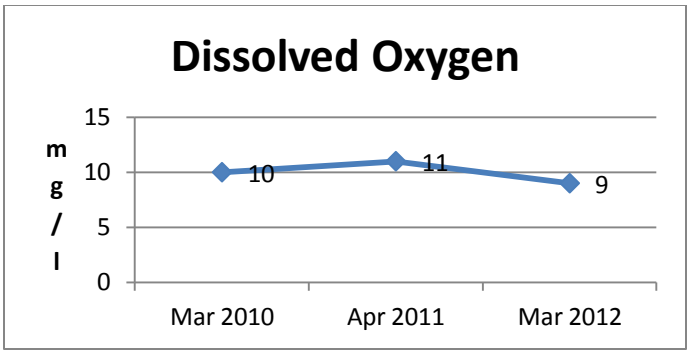
Chemical Sampling

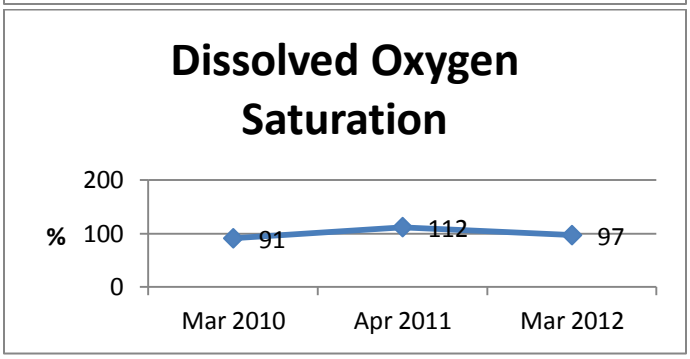
Date	Level	Air	Water	pH	Cond	Phosphate	Turbidity	DO/Sat	Nitrate
3/26/10	2	13°	11°	8.5	270	0.31	40	10/91%	-
4/3/11	2	25°	16°	8.5	360	1.5	<10	11/112%	-
3/19/12	2	24°	19°	8.0	380	1.04	<10	9/97%	0.50

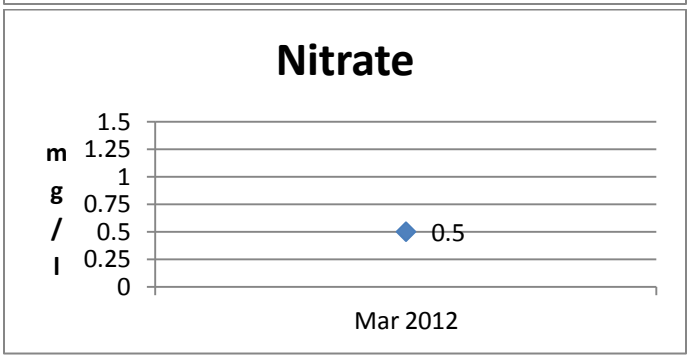






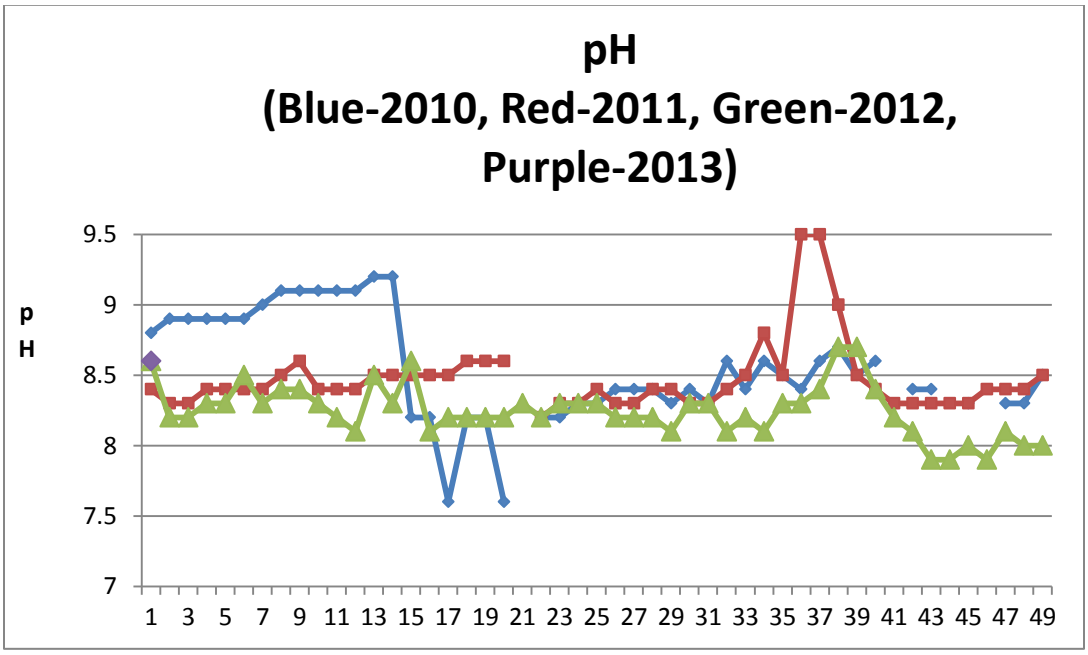


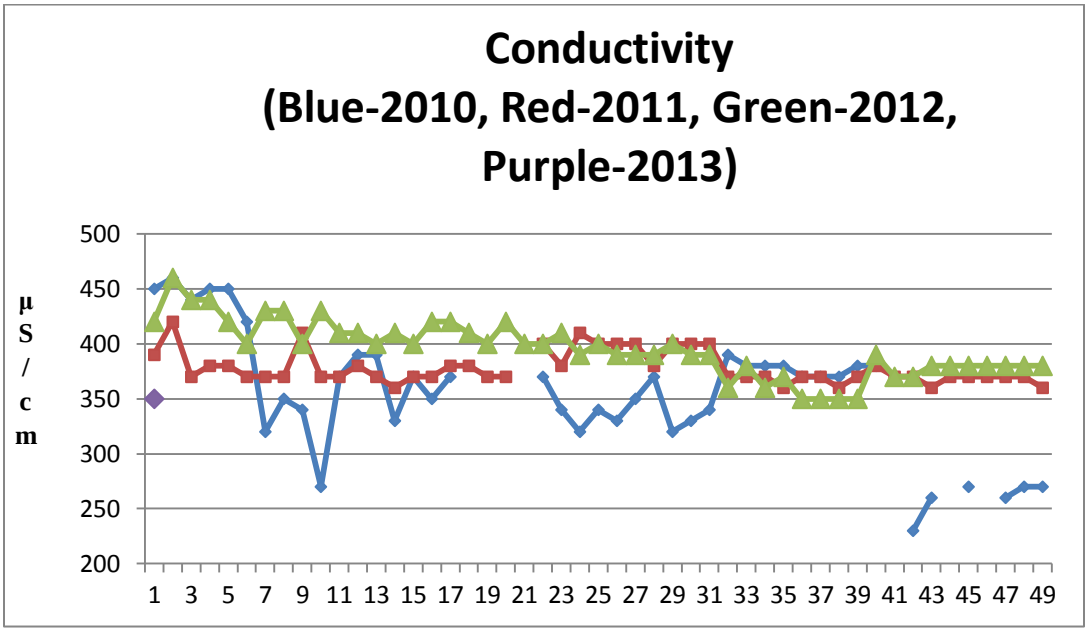


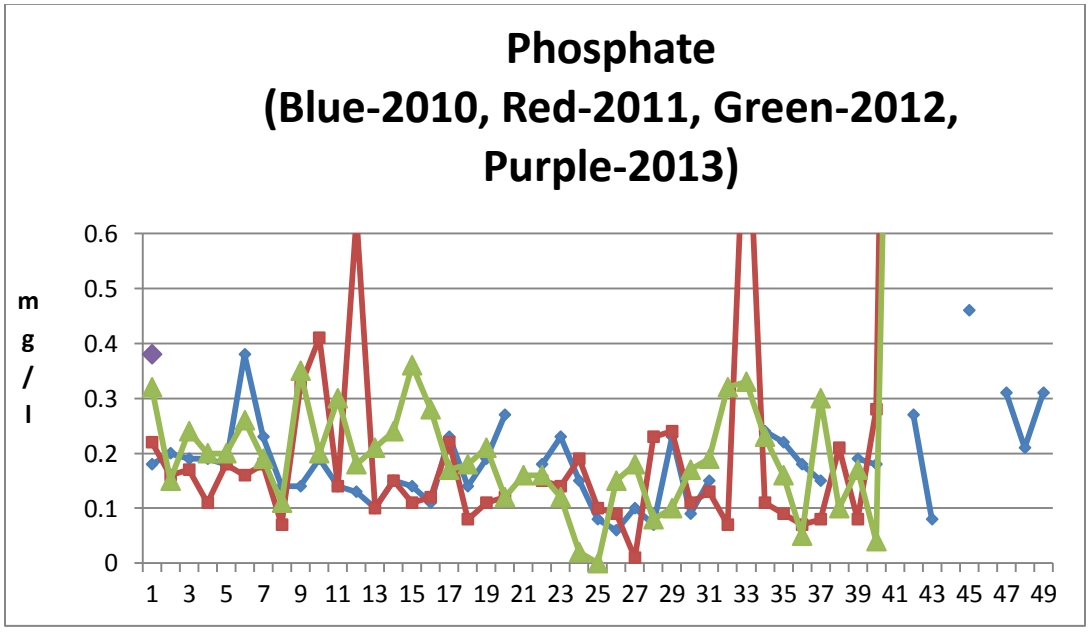


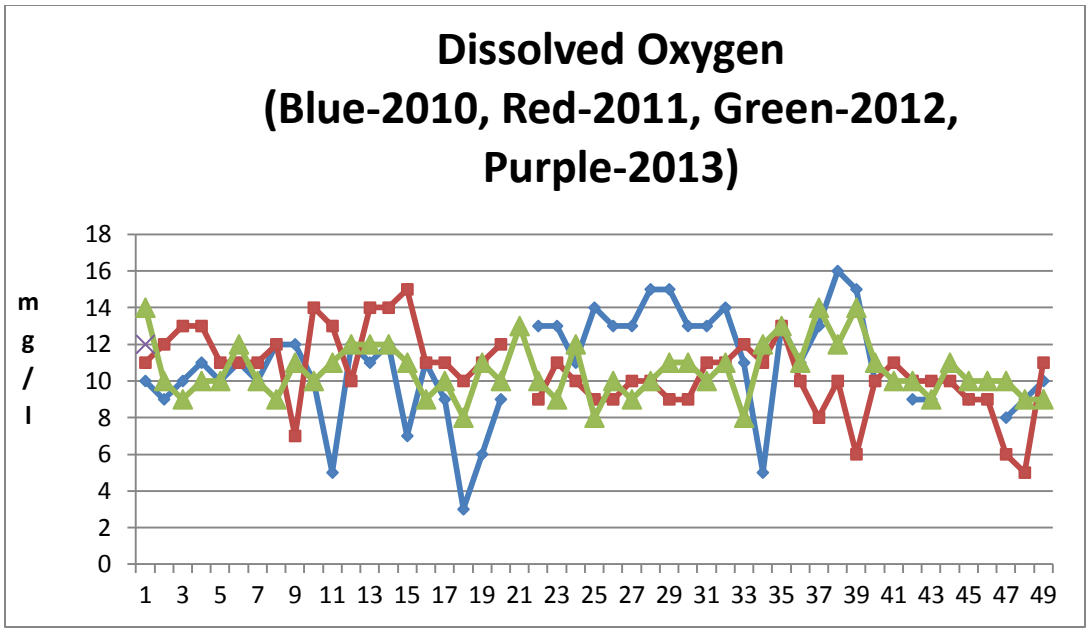
Site Notes and Journal:

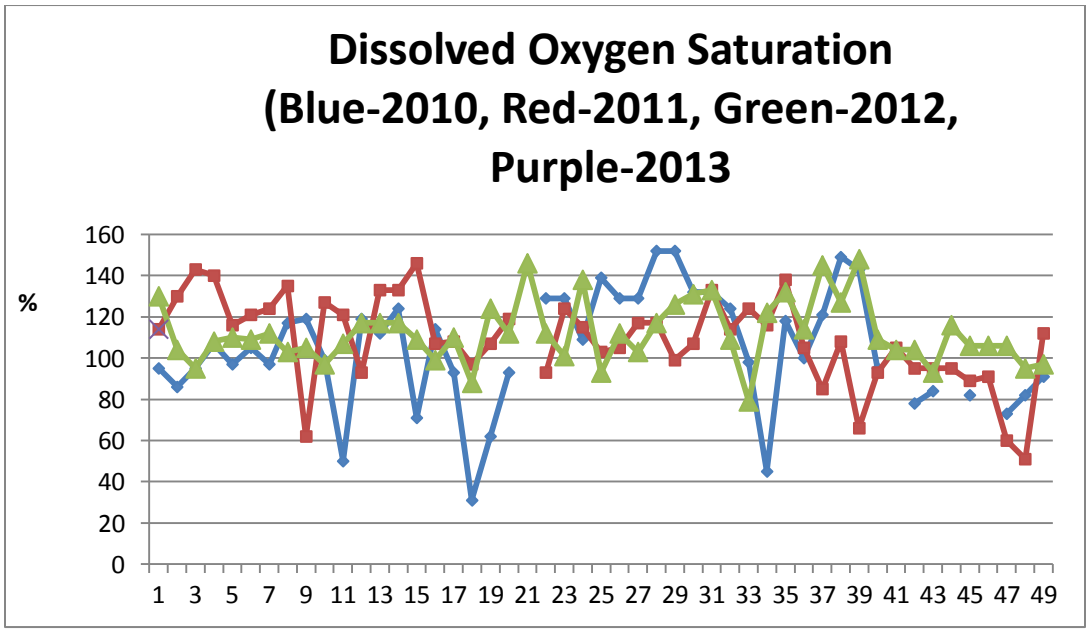
Summary Graphs by Season

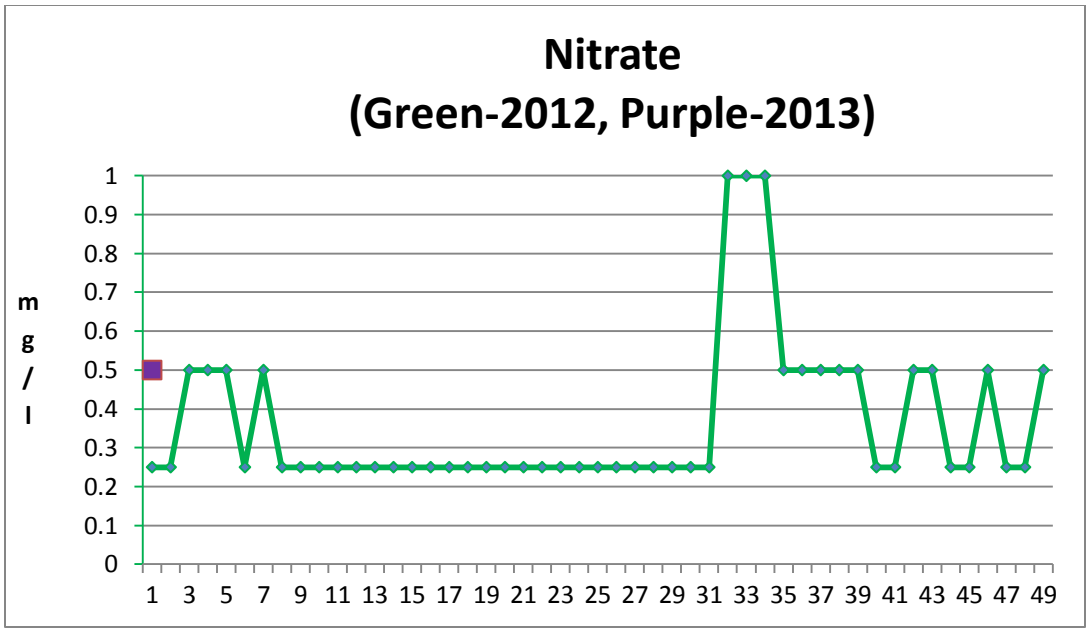


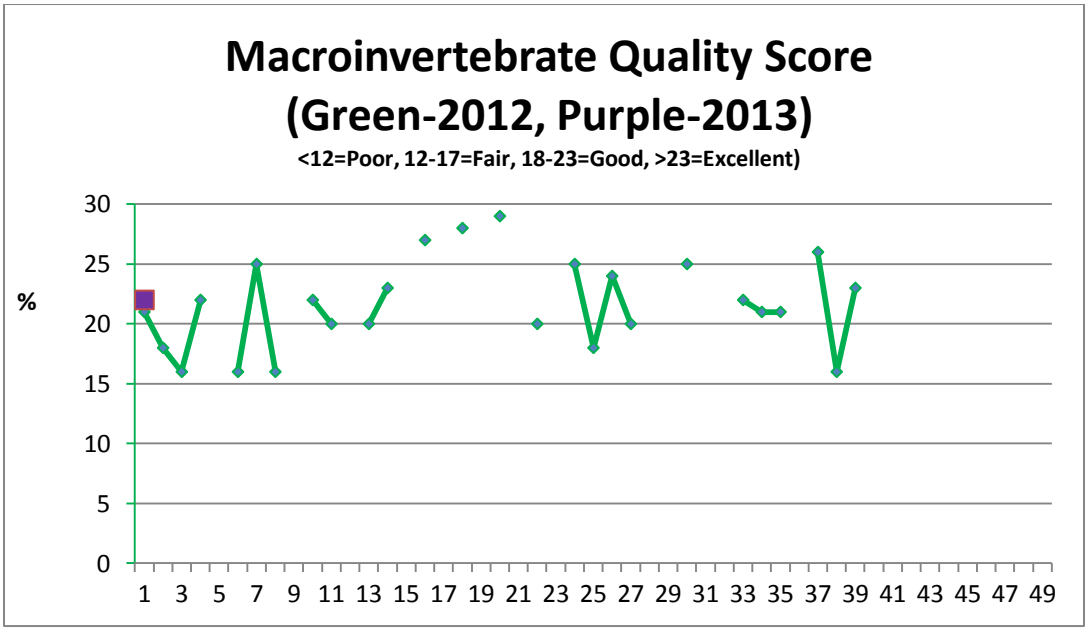

Conductivity
(Blue-2010, Red-2011, Green-2012,
Purple-2013)
µS/cm
500
450
400
350
300
250
200
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47 49


Phosphate
(Blue-2010, Red-2011, Green-2012,
Purple-2013)
mg/l
0.6
0.5
0.4
0.3
0.2
0.1
0
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47 49


Dissolved Oxygen
(Blue-2010, Red-2011, Green-2012,
Purple-2013)
mg/l
18
16
14
12
10
8
6
4
2
0
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47 49


Dissolved Oxygen Saturation
(Blue-2010, Red-2011, Green-2012,
Purple-2013
%
160
140
120
100
80
60
40
20
0
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47 49


Nitrate
(Green-2012, Purple-2013)
mg/l
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47 49


Macroinvertebrate Quality Score
(Green-2012, Purple-2013)
<12=Poor, 12-17=Fair, 18-23=Good, >23=Excellent)
%
30
25
20
15
10
5
0
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47 49

Any questions, comments, corrections, additions or suggestions should be addressed to:

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Route 2, Box 237-3
Mansfield, Missouri 65705-9564
(417) 554-1682
georgesims@hotmail.com
March 29, 2013

References

Bryant Creek Watershed Project. (n.d.). *Bryant Creek Watershed.* Retrieved February 14, 2010, from www.watersheds.org/places/images/bigmap2.gif

Ozark Chapter, Missouri Master Naturalists. (2010). *A Biological and Chemical Assessment of Bryant Creek in Douglas and Ozark Counties, Missouri.* Mansfield, Missouri: Ozark Chapter, Missouri Master Naturalists.

McCafferty, W. P. (1998). *Aquatic Entomology: The Fishermen's and Ecologists' Illustrated Guide to Insects and Their Relatives.* Sudbury, Massachusetts: Jones and Bartlett.

McKee, J. (Ed.). *A Paddler's Guide to Missouri.* Jefferson City: Missouri Department of Conservation.