UNIVERSITY OF WISCONSIN
Manitowoc
A Campus of the University of Wisconsin Colleges

Friends of Hika Bay
Calvin, Pine, Point, Fischer, Centerville Creeks

Monitoring of Pine, Calvin, Point, and Fischer Creeks in Southern Manitowoc County During the Summer of 2013

LAKESHORE NATURAL RESOURCE PARTNERSHIP, INC.
LNRP

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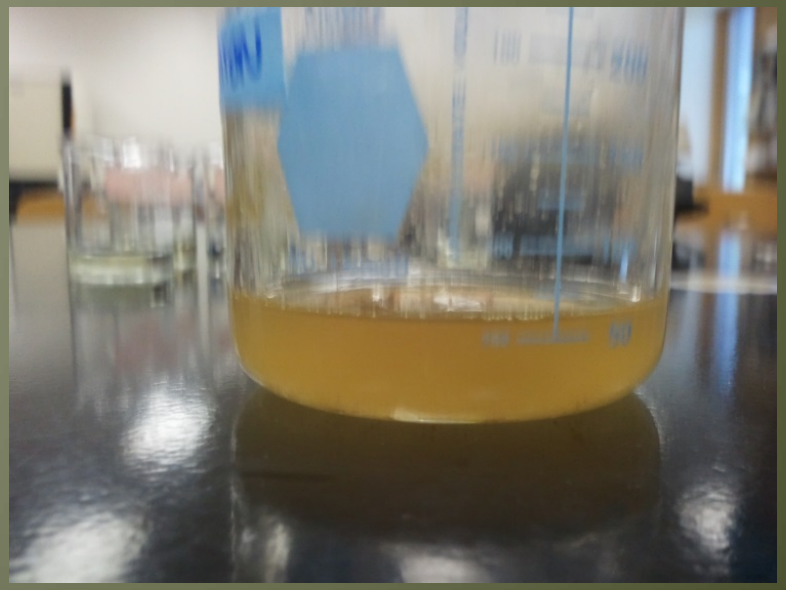
Student Intern Mentor: Ethan Poling

Faculty Advisors: Rebecca Abler and Rick Hein

- Weekly Sampling
- Physical Parameters
- Chemical Parameters
- Biological Parameters

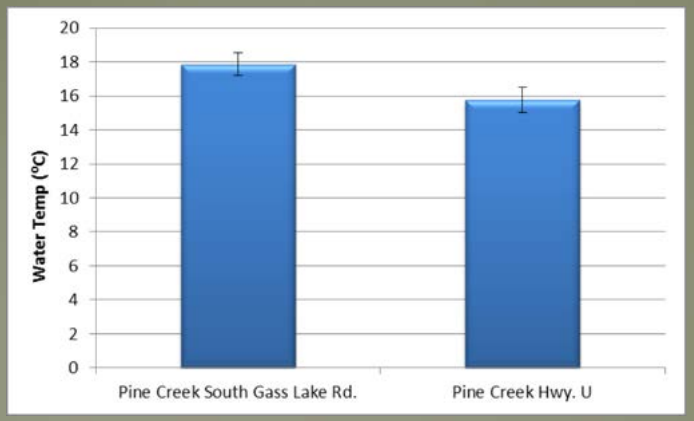


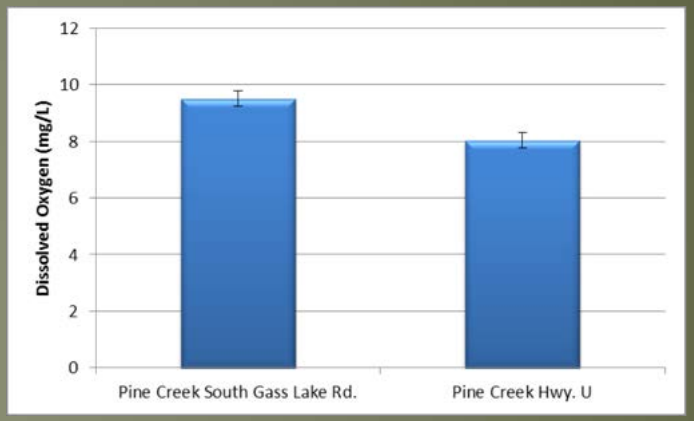
Pine Creek

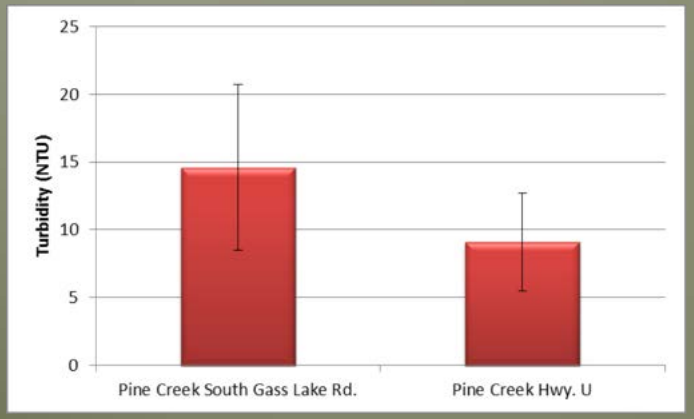
Sample Sites

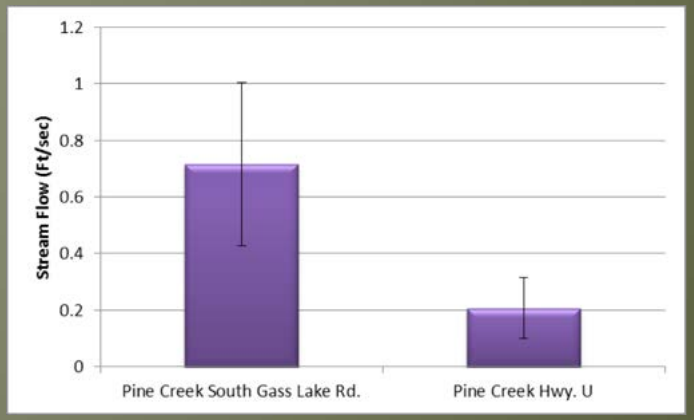
P107	S. Gass Lake Road
P106	Highway U

Pine Creek: Physical Comparisons

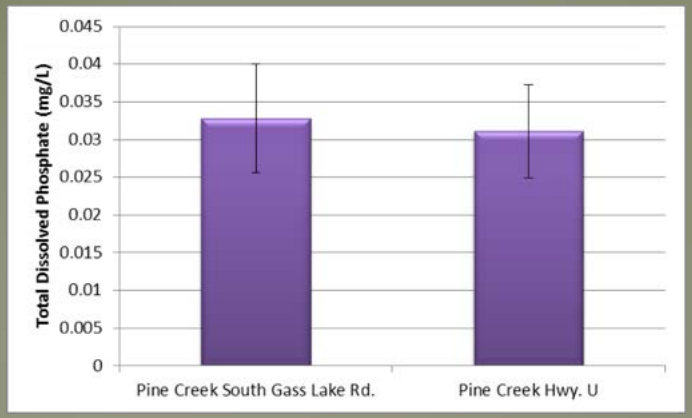


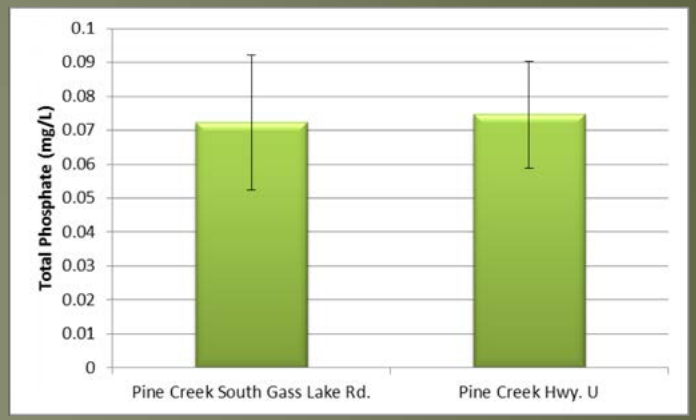


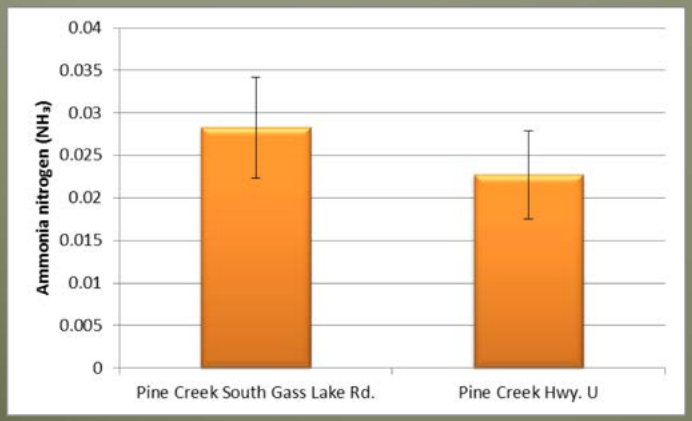


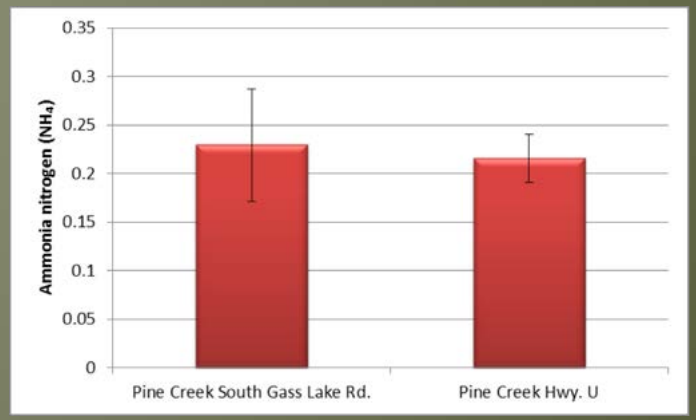


Pine Creek: Chemical Comparisons

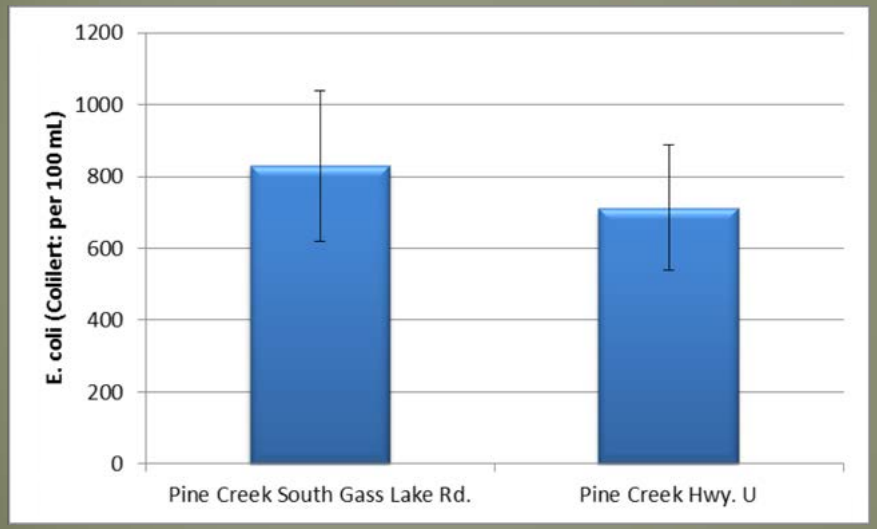




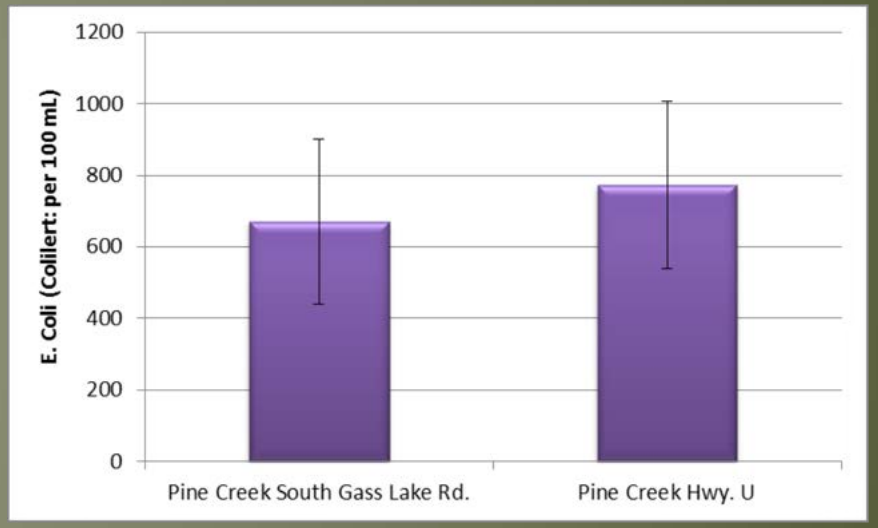




Pine Creek: Biological Comparisons



E. coli 2012



E. coli 2013

Pine Creek: Summary

- Agreeing with data from Summer 2012, phosphate levels do not follow the general trends seen in other streams of increasing downstream.
- A difference in the data of Summer 2013, compared to the data of Summer 2012, *E. coli* increased downstream.
- Agreeing with the data of Summer 2012, most physical parameters followed trends of decreasing downstream in Summer 2013.
  - However, in 2012, turbidity was observed to increase instead of decrease .

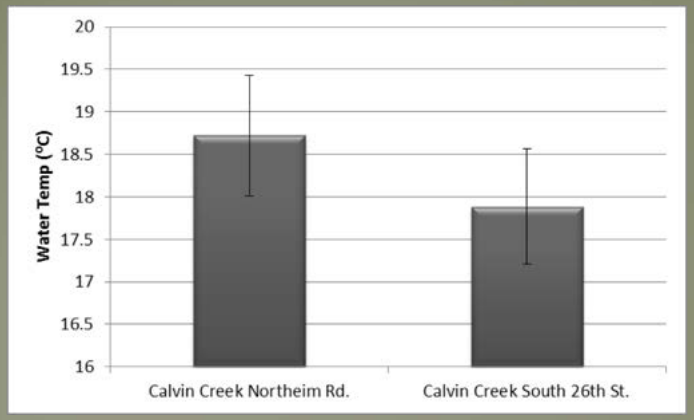
Averages for All Creek Sample Points,	Summer 2012	Summer 2013	Difference
Water temperature (°C)	17.50	16.82	-0.68
pH	8.31	8.50	+0.19
Turbidity (NTU)	10.35	11.85	+1.5
Stream flow (M/sec)	0.3	0.5	+0.2
Conductivity (µS)	841	858	+17
Dissolved oxygen (mg/L)	7.34295	8.76923	+1.42628
Total Dissolved Phosphate (mg/L)	0.01695	0.03197	+0.01502
Total Phosphate (mg/L)	0.08541	0.07344	-0.01197
Ammonia nitrogen (NH3) (mg/L)	0.01901	0.02548	+0.00679
Ammonia nitrogen (NH4) (mg/L)	0.23933	0.22241	-0.01692
E. coli (MPN/100 ml)	770.975	722.204	-48.771

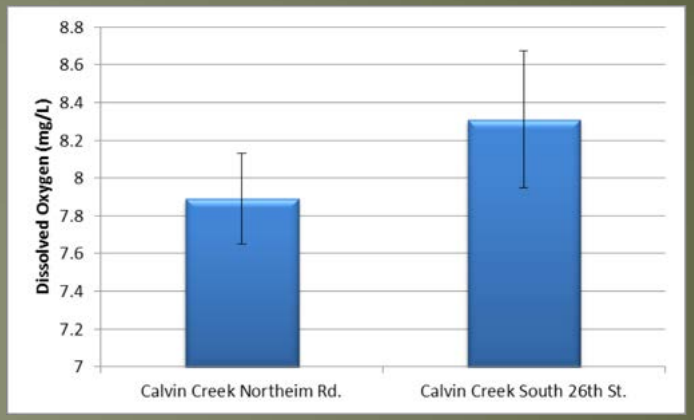
Calvin Creek

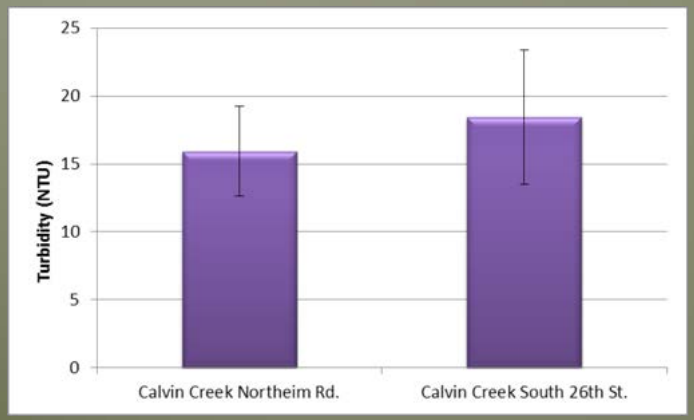
Sample Sites

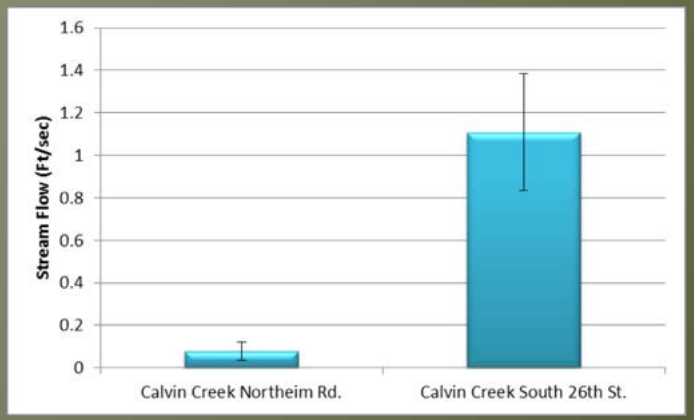
CA02	Northeim Road
CA01	S. 26th Street

Calvin Creek: Physical Comparisons

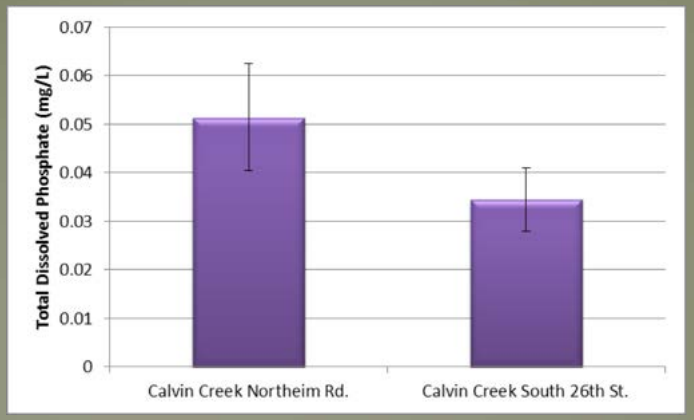


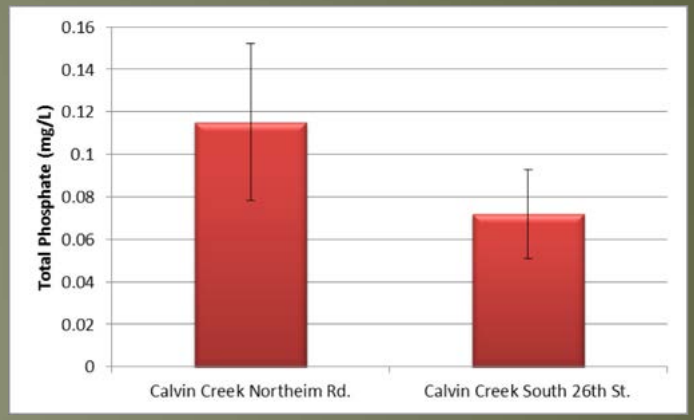


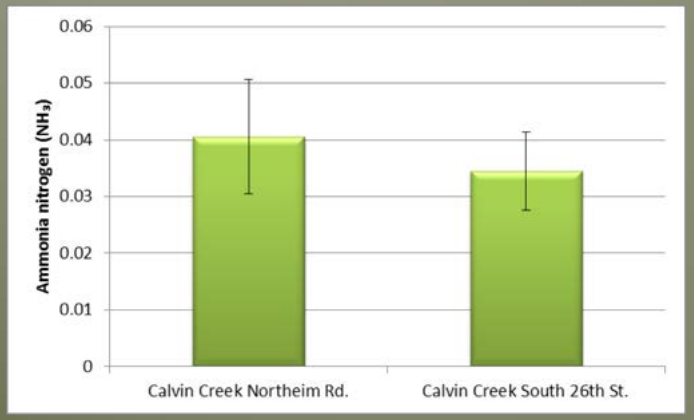


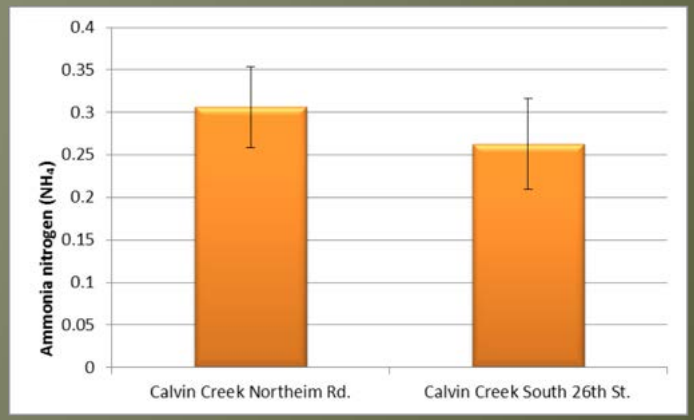


Calvin Creek: Chemical Comparisons

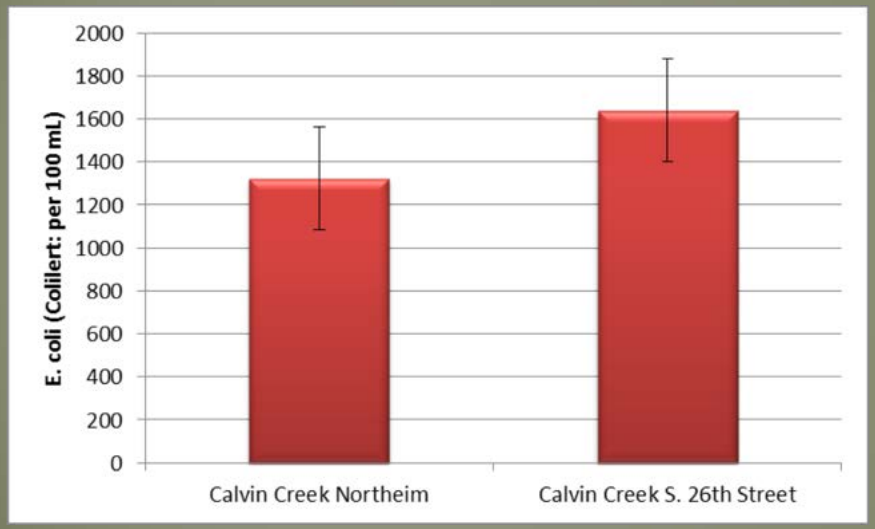




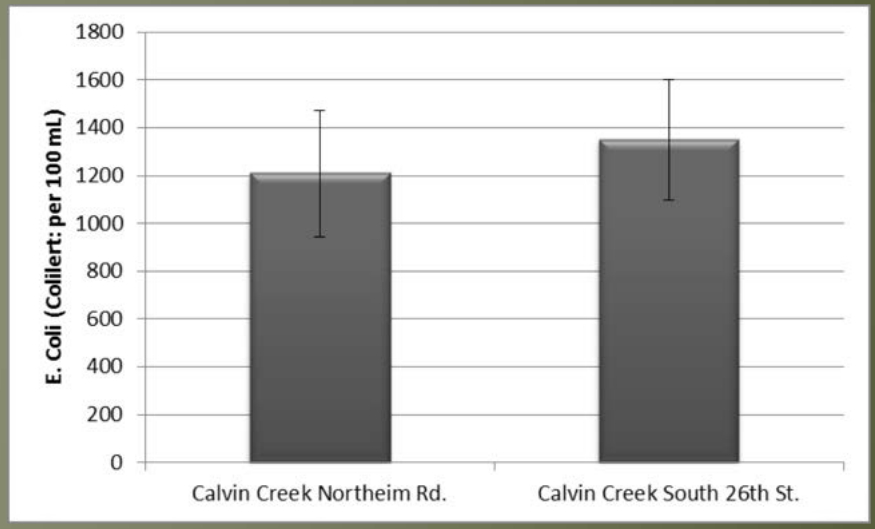




Calvin Creek: Biological Comparisons



E. coli 2012



E. coli 2013

Calvin Creek: Summary

- Data agreeing with Summer 2012:
  - Turbidity and phosphate levels were above the normal range.
  - *E. coli* levels were very high.
  - *E. coli*, dissolved oxygen, and turbidity increased downstream.
  - Ammonia nitrogen decreased downstream
- A difference in the data with Summer 2012:
  - Phosphate decreased downstream.

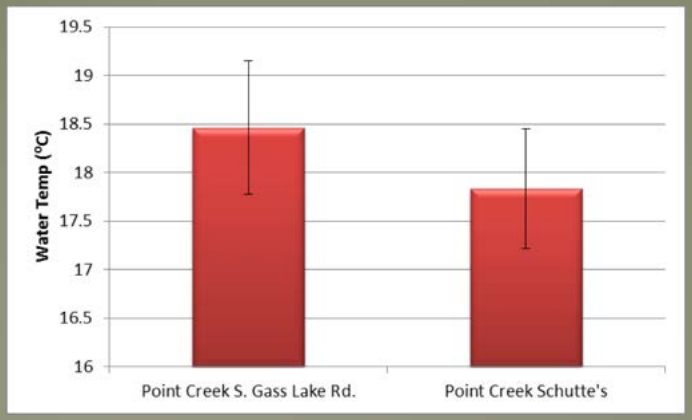
Averages for All Creek Sample Points	Summer 2012	Summer 2013	Difference
Water temperature (°C)	18.55	18.30	-0.25
pH	8.37	8.57	+0.2
Turbidity (NTU)	12.46	17.18	+4.72
Stream flow (M/sec)	0.1	0.6	+0.5
Conductivity (µS)	674	695	+21
Dissolved oxygen (mg/L)	6.77061	8.09961	+1.32900
Total Dissolved Phosphate (mg/L)	0.03873	0.04292	+0.00419
Total Phosphate (mg/L)	0.10408	0.09352	-0.01056
Ammonia nitrogen (NH3) (mg/L)	0.02850	0.03748	+0.00898
Ammonia nitrogen (NH4) (mg/L)	0.39064	0.28440	-0.10624
E. coli (MPN/100 ml)	1396.349	1279.581	-116.768

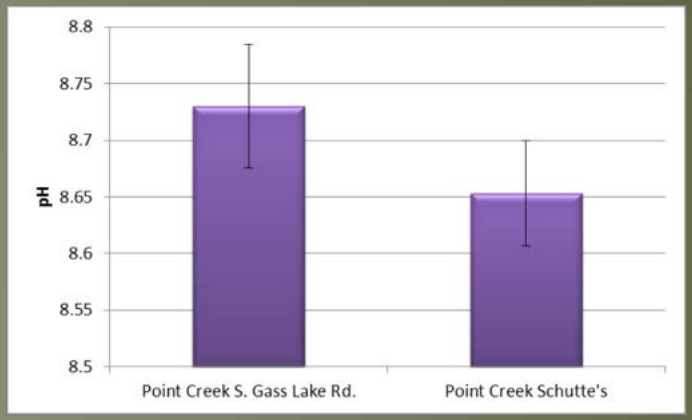
Point Creek

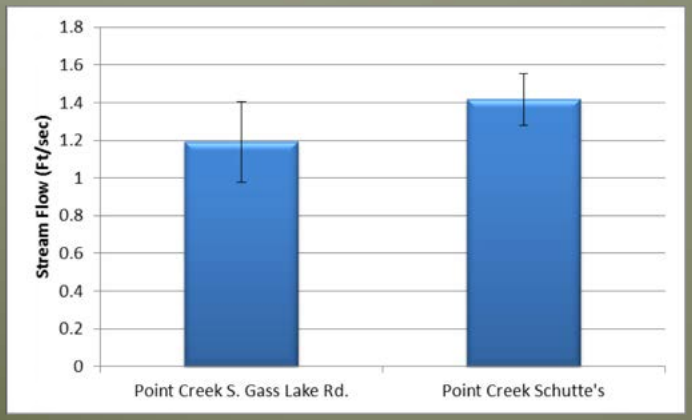
Sample Sites

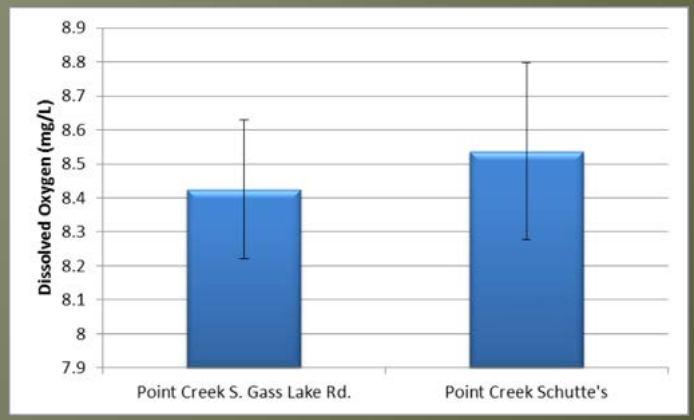
PO03	S. Gass Lake Road
PO02	Schutte's Property

Point Creek: Physical Comparisons

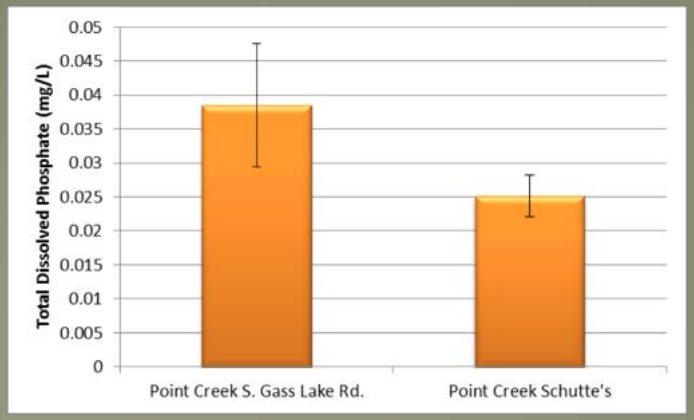


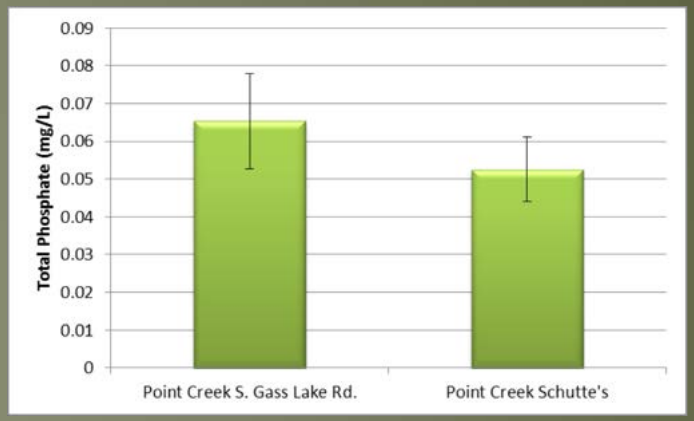


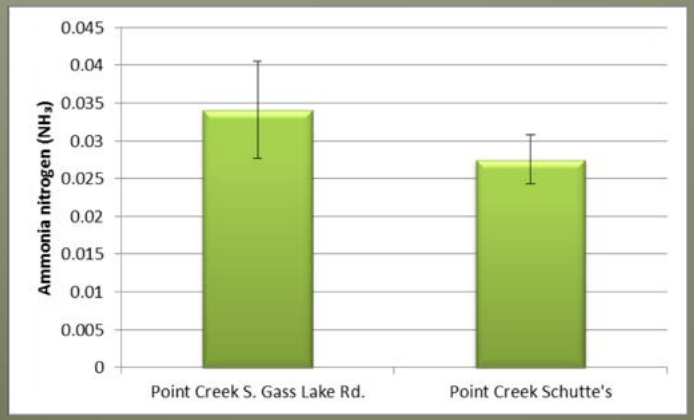


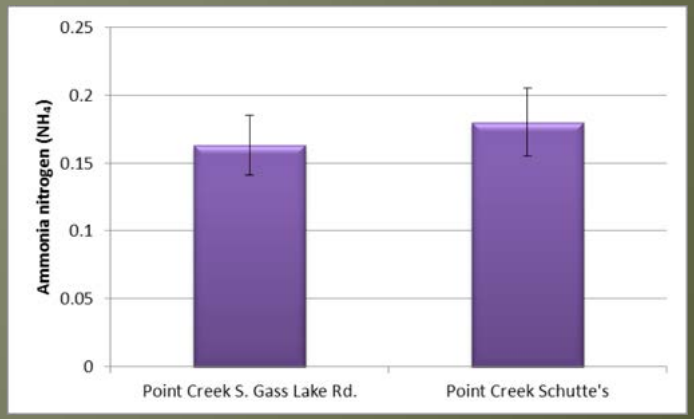


Point Creek: Chemical Comparisons

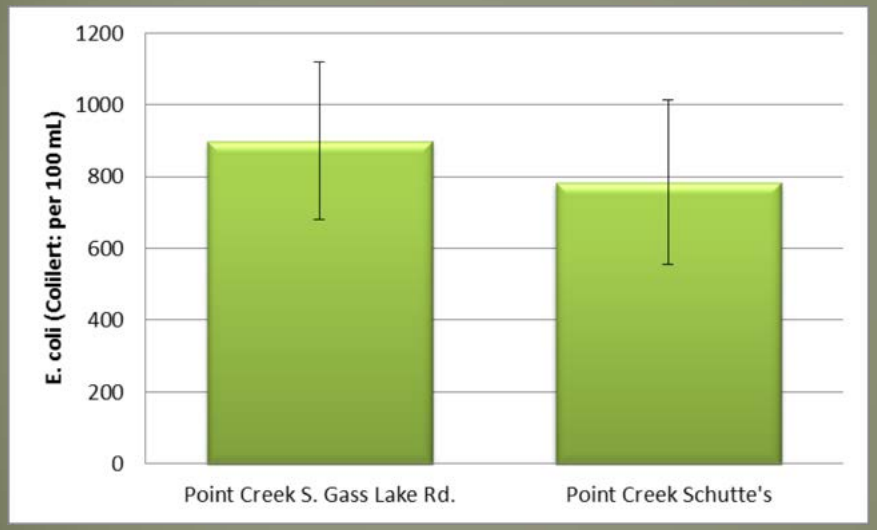




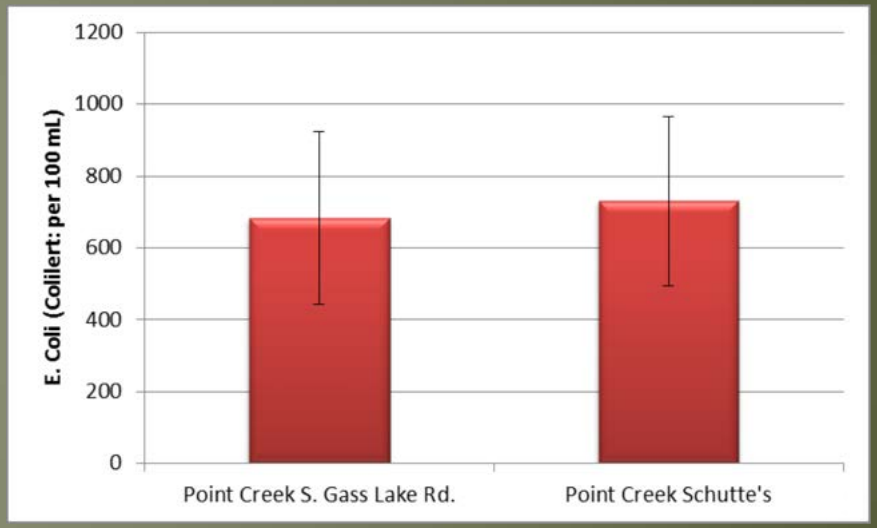




Point Creek: Biological Comparisons



E. coli 2012



E. coli 2013

Point Creek:

- Just as Summer 2012, phosphates decreased downstream and dissolved oxygen increased.
- *E. coli* trends were inversed and increased downstream rather than decreased.
- Phosphate levels continue to be above what is considered the acceptable range within the watershed. (In accordance with sample standards used.)

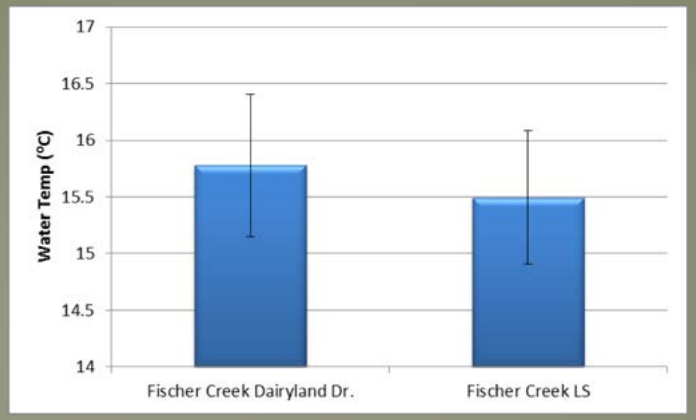
Averages for All Creek Sample Points	Summer 2012	Summer 2013	Difference
Water temperature (°C)	19.21	18.15	-1.06
pH	8.51	8.69	+0.18
Turbidity (NTU)	14.14	6.61	-7.53
Stream flow (M/sec)	0.4	1.3	+0.9
Conductivity (µS)	717.2	748.1	+30.9
Dissolved oxygen (mg/L)	7.86765	8.48153	+0.61388
Total Dissolved Phosphate (mg/L)	0.03407	0.03182	-0.00225
Total Phosphate (mg/L)	0.08035	0.05895	-0.0214
Ammonia nitrogen (NH3) (mg/L)	0.03275	0.03081	-0.00194
Ammonia nitrogen (NH4) (mg/L)	0.27734	0.17162	-0.10572
E. coli (MPN/100 ml)	841.665	706.062	-136.603

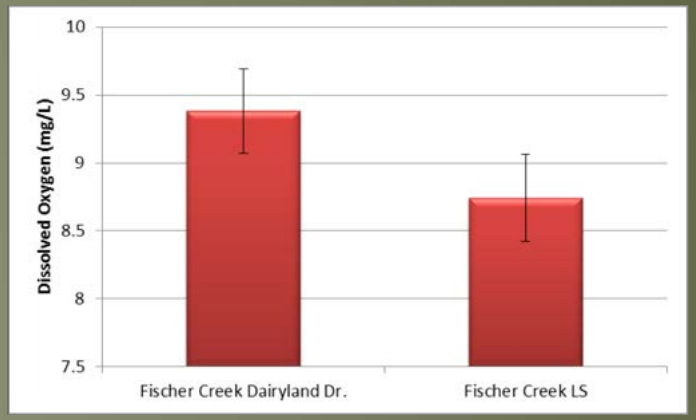
Fischer Creek

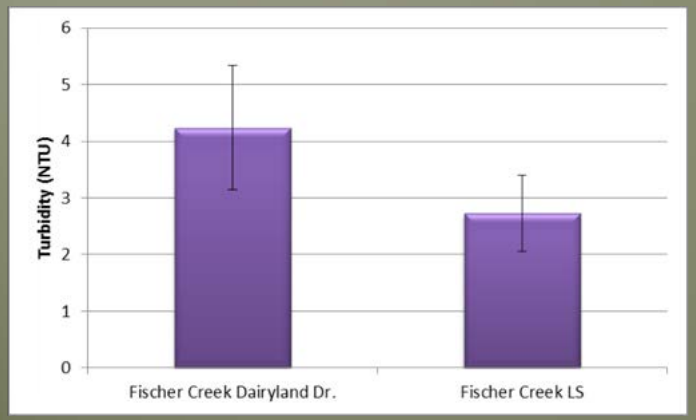
Sample Sites

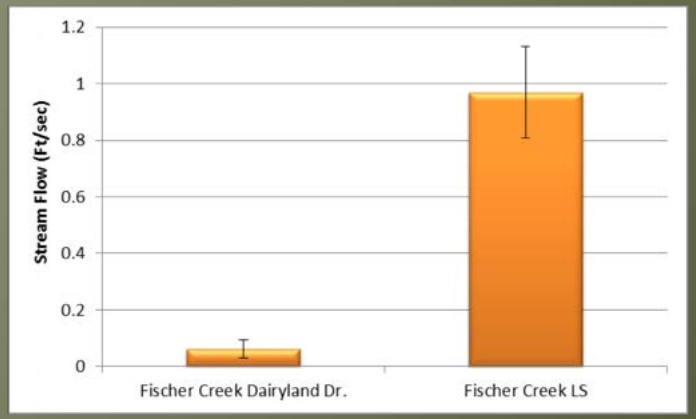
FI03	Dairyland Drive
FI02	County Road LS

Fischer Creek: Physical Comparisons

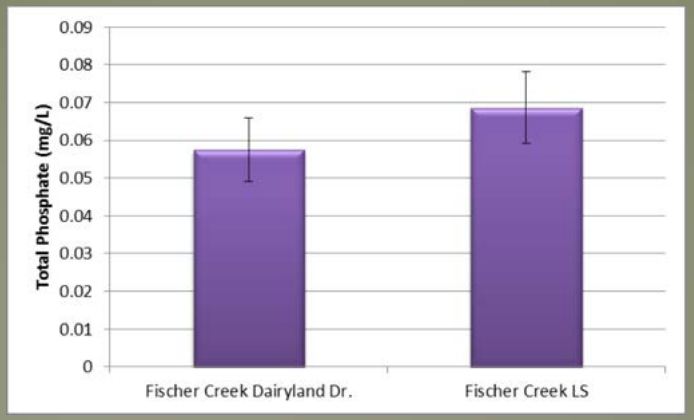


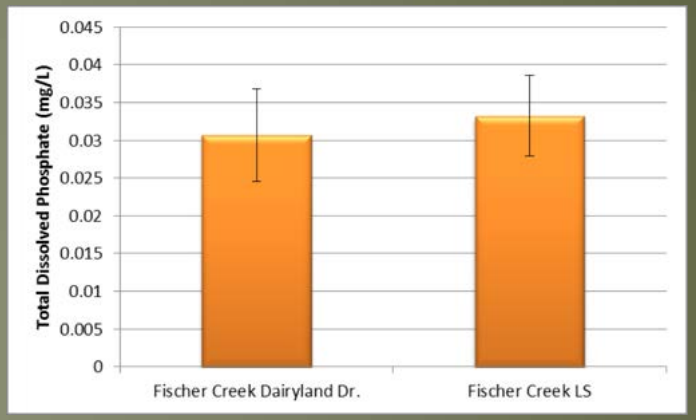


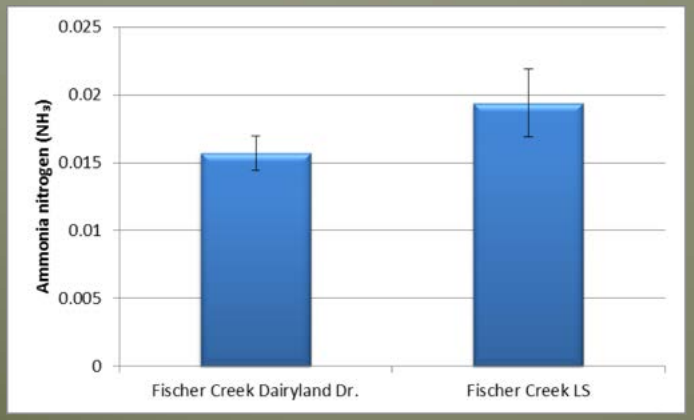


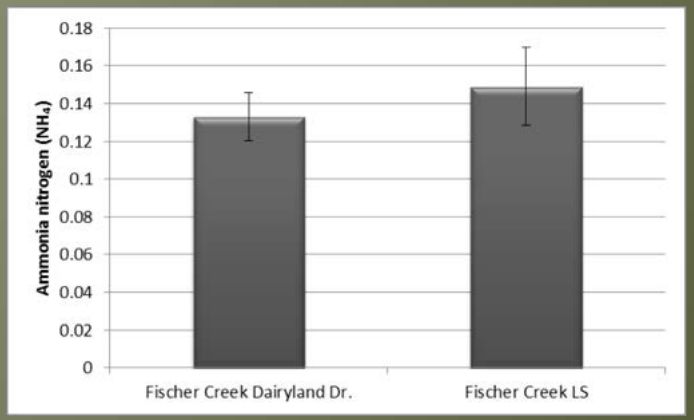


Fischer Creek: Chemical Comparisons

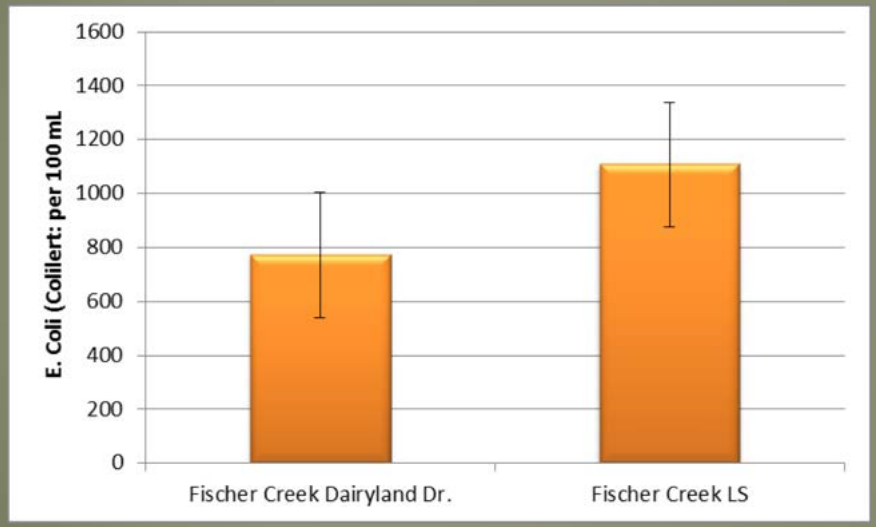




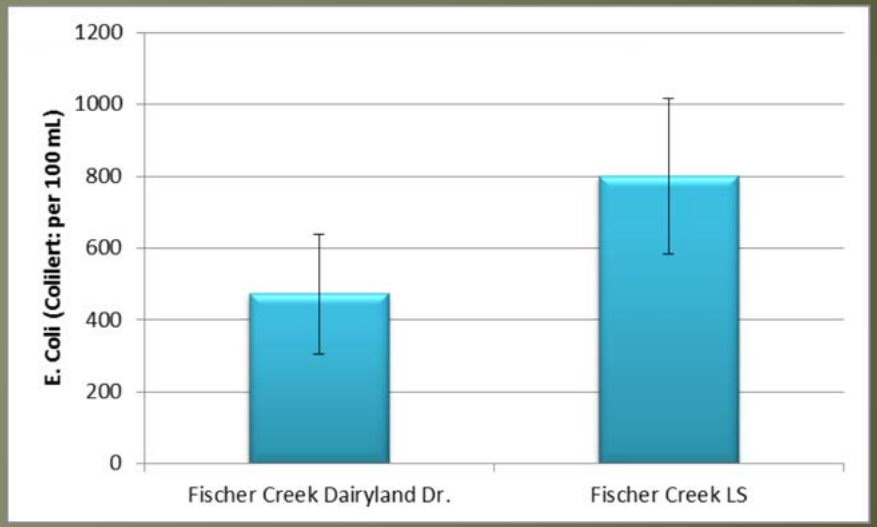




Fischer Creek: Biological Comparisons



2012



2013

Fischer Creek

- A difference in data from Summer 2012, was a decrease in nutrient levels in data of Summer 2013.
- *E. coli* trends were consistent with those of Summer 2012 by increasing downstream.

Averages for All Creek Sample Points	Summer 2012	Summer 2013	Difference
Water temperature (°C)	17.33	15.63	-1.7
pH	8.43	8.63	+0.2
Turbidity (NTU)	9.27	3.48	-5.79
Stream flow (M/sec)	0.4	0.5	+0.1
Conductivity (µS)	792.5	793.4	+.09
Dissolved oxygen (mg/L)	8.38853	9.06231	+0.67378
Total Dissolved Phosphate (mg/L)	0.03289	0.03195	-0.00094
Total Phosphate (mg/L)	0.08765	0.06307	-0.02458
Ammonia nitrogen (NH3) (mg/L)	0.03489	0.01756	-0.01733
Ammonia nitrogen (NH4) (mg/L)	0.30705	0.14098	-0.16607
E. coli (MPN/100 ml)	940.363	635.646	-304.717

Suggestions for Future Research:

- The addition of sample sites to the creeks with a stronger emphasis on sampling farther inland to assess land use.

- Reduce the standard 1.0 inches “rain event” to 0.5 inches or more.

Additional Variables

Pine Creek S. Gass Lake Road