Appendix A – Acronyms and Abbreviations

ACOE- Army Corps of Engineers

BFE- Base Flood Elevation
BMP- Best Management Practices

CAP- Continuing Authorities Program
CEES- Center for Earth and Environmental Science
CFO- Confined Feeding Operation
cfs- cubic feet per second
CFU- Colony Forming Units
CIWRP- Central Indiana Water Resources Partnership
CREP- Conservation Reserve Enhancement Program
CRP- Conservation Reserve Program
CSOs- Combined Sewer Overflows
CSP- Conservation Stewardship Program
CWA- Clean Water Act

DO- Dissolved Oxygen

EPA- Environmental Protection Agency
EPT- Ephemeroptera, Plecotera, Trichoptera
EQIP - Environmental Quality Incentives Program

FEMA- Federal Emergency Management Agency
FFA- Future Farmers of America
FIRM- Flood Insurance Rate Maps
FSA- Farm Service Agency

GWA- Geist Watershed Alliance

HBI- Hilsenhoff Family Biotic Index
HEL- Highly Erodible Land
HUC- Hydrologic Unit Code

IAC- Indiana Administrative Code
IBC- Impaired Biotic Communities
IBI- Index of Biotic Integrity
IDEM- Indiana Department of Environmental Management
IDNR- Indiana Department of Natural Resources
INDOT- Indiana Department of Transportation
IWF – Indiana Wildlife Federation
IUPUI- Indiana University Purdue University Indianapolis

LARE- Lake and River Enhancement Program

MCHD- Marion County Health Department
mg/L- milligrams per liter
mIBI- Macroinvertebrate Index of Biotic Integrity
MS4s- Municipal Separate Storm Sewer System

N- Total Nitrogen
NLCD- National Land Cover Data
NH3- Ammonia
NH4 - Ammonium
NO2- Nitrite
NO3- Nitrate
NOAA- National Oceanic and Atmospheric Administration
NPDES- National Pollutant Discharge Elimination System
NPS- Nonpoint Source
NRCS- Natural Resource Conservation Service
NTU- Nephelometric Turbidity Units

P- Total Phosphorus
PCB - Polychlorinated Biphenyls
PRD- Planned Residential Developments
PUD- Planned Unit Developments

QHEI- Qualitative Habitat Evaluation Index

STEPL- Spreadsheet Tool for Estimating Pollutant Load
SWCD- Soil & Water Conservation District

T&E- Threatened and Endangered
TDS- Total Dissolved Solids
TKN- Total Kjeldahl Nitrogen
TMDL- Total Maximum Daily Load
TSS- Total Suspended Solids

ug/L- Micrograms per Liter
USDA – United States Department of Agriculture
USGS-United States Geological Survey
USLE- Universal Soil Loss Equation
USWRC – United States Water Resources Council
UWRWA- Upper White River Watershed Alliance

WHIP- Wetland Habitat Incentive Program
WMP- Watershed Management Plan
WRP- Wetland Reserve Program
WWTP – Wastewater Treatment Plant

Appendix B – References

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Appendix C – Stakeholder Groups and Related Organizations

Stakeholder groups identified within the watershed as well as representatives from the groups that participated on the Steering Committee are listed below.

Ball State Facilities
- Kevin Kenyon

City of Anderson

City of Indianapolis

City of Lawrence

Delaware County Soil and Water Conservation District

Geist Lake Coalition

Geist Marina
- Kent Duckwall

Geist Watershed Alliance (GWA)
- Scott Rodgers

Hancock County Soil and Water Conservation District
- Cindy Newkirk

Hamilton County Soil and Water Conservation District
- Shaena Reinhart

Hamilton County Surveyor's Office
- Kenton C. Ward, Hamilton County Survey
- Robert Thompson

Henry County Soil and Water Conservation District
- Kellie Harding

Henry County Surveyor
- Richard Byers

Indiana Department of Environmental Management (IDEM)
- Bonny Elifritz
- Ernest Johnson

Indiana Department of Natural Resources (IDNR)

- Angela Sturdevant

Indiana University Purdue University Indianapolis (IUPUI) – Center for Earth and Environmental Science (CEES)

- Angela Cowan
- Lenore Tedesco

Indiana Wildlife Federation

- Marija Watson

Madison County Soil and Water Conservation District

- Stephen Schmidt

Madison County Surveyor

- Patrick Manship

Marion County Soil and Water Conservation District

- Glenn Lange
- Ron Lauster

Shorewalk Condo Associations Dredging Committee

- Sharon Ferguson

Sierra Club

- Bowden Quinn

Town of Fishers

- Jason Armour

Town of Fortville

Town of Ingalls

Town of Markleville

Town of McCordsville

Town of Middletown

Town of Pendleton

- Tim McClintick
- Doug McGee

Upper White River Watershed Alliance (UWRWA)

- Jill Hoffman
- Kelly Levengood

V3 Companies

- Ed Belmonte
- Jessica Dunn
- Carrie Pintar
- Jessica Spurlock
- Greg Wolterstorff

Veolia Water Indianapolis, LLC

- Paul Whitmore

Watershed Residents

- Jo Biggers
- Stephanie Box
- Glenn Brown
- William Ellingson
- Dean Farr
- Sarah Kempfer
- Jhani Laupus
- Matthew Newell
- Nina Sidibe
- Janice Snell
- Wendy Thanisch
- Victor Wakley

White River Watchers

- Crist Blassaras
- Judy DeLury

Appendix D Steering Committee Meeting Agendas, Sign-In Sheets and Minutes

Steering Committee Agendas, Sign-In Sheets and Minutes for the Steering Committee Meetings held on the following dates are included in this appendix.

- February 18, 2009
- March 18, 2009
- April 15, 2009
- August 19, 2009
- October 21, 2009
- November 10, 2009
- December 9, 2009

Geist/Fall Creek Watershed Alliance
STEERING COMMITTEE MEETING
6:30 to 8:30 pm Wednesday, February 18th 2009
Geist Lake Marina
11695 Fall Creek Road
Indianapolis, Indiana 46256
317-849-8455

AGENDA

1. Welcome and Introductions (approximately 6:30-6:45)
2. Discussion regarding Watershed Management Plan (approximately 6:45-7:25)
    - Upper Fall Creek Wastershed
    - Baseline/Benchmark Conditions

      Data Sets from IDEM and IUPUI Sampling Efforts
    - Identifying Problems/Causes, Sources, Critical Areas
3. Discussion Regarding Aquatic Vegetation Management Plan (approximately 7:25-7:30)
4. Break (approximately 7:30-7:35)
5. Project Timeframes and Schedule (approximately 7:35-7:45)
6. Project Commencement Press Release (approximately 7:45-7:55)
7. Initial Watershed Plan Public Meeting (approximately 7:55-8:05)
    - Date and Location
    - Introduction of the Study
    - Identifying Stakeholders
    - Obtaining Public Input

8. Steering Committee Meetings (approximately 8:05-8:15)
    - Approaching Desired Target Members
    - Recruitment from Public Meeting
    - Steering Committee Meeting Details (Locations, Times etc)
9. Geist Reservoir Watershed Events, Activities, and Misc. Topics (approximately 8:15-8:25)
    - Outreach
    - Geist Goes Green (Feb 27 to Mar 1) and (Mar 6 to 8)
    - FTP site
10. Closing and Adjournment (approximately 8:25-8:30)

Upper White River Watershed Alliance

GEIST

WATER QUALITY

GET ON BOARD

Geist/Fall Creek Watershed Alliance Steering Committee Meeting February 18, 2009 Sign-In Sheet

Name	Phone	Email or Address
Ed Belmonte	630-729-6160	EBelmonte@V3co.com
CARRIE PINTAR	630-729-6134	cpintar@v3co.com
WENDY THANISCH	317-579-9551	WENDY@OUTSOURCEDWRITING.COM
DEAN PARK	317-823-3980	deanofun@sbcglobal.net
Glenn Lange	317-786-1776	glenn-lange@dswcd.org
Shaena Smith	317-773-2181	shaena.smith@in.nacdnet.net
DICK BYERS	765 529 4802	rbyers@henryco.net
Jason Armour	317-595-3461	armourjt@fishers.in.us
BOB THOMPSON	776-8495	RCTE@CO.HAMILTON.IN.US
TIM McCLINTICK	765 778 3139	tmcclintick@town.pendleton.IN.US
Victor WAKLEY	317-590-1461	VictorWakley@HOTMAIL.COM
KEVIN DUCKWALL	849-8455	KDuckwall@MarinaLimited.com
SCOTT ROBBERS	826-9551	SCOTT@SCOTTR.COM
Jill Hoffmann	891-8820	jhoffmann@empowerresults.com
Paul Whitmore	2163-6517	paul.whitmore@veoliawaterna.com
Janice Snell	845-0994	snell57@AOL.com

Geist/Fall Creek Watershed Alliance
STEERING COMMITTEE MEETING
6:30 to 8:30 pm Wednesday, February 18th 2009
Geist Lake Marina

AGENDA with Notes

1. Welcome and Introductions – 16 people in attendance, see sign-in sheet.

2. Discussion regarding Watershed Management Plan – Carrie Pintar provided the attached presentation regarding the following: Upper Fall Creek Watershed Background Information, Baseline/Benchmark Conditions; Brief Presentation of the Data Sets from IDEM and IUPUI Sampling Efforts; Ed Belmonte discussed Project requirements of incorporating the existing study results and public input with respect to identifying problems, causes, sources and critical areas. Also discussed the Aquatic Vegetation Management Plan, the history of the Lake and River Enhancement Program with regards to the Aquatic Vegetation Management Plan and getting participation from the public and steering committee for field days.

3. Project Commencement Press Release – the group discussed need for press release to get public informed since the last press release was approximately last summer. Paul volunteered with Wendy's assistance to put this together and have for the next steering committee meeting. Wendy to put article in the At Geist publication. Paul also to research various media outlets to get as much exposure as possible. Discussed need to get local Senators and Representatives up to speed and involved with the Watershed Management Plan. Senator Gard has been involved in the past.

4. Initial Watershed Plan Public Meeting – the first public meeting is planned for April and may be held at the Yacht Club. The target group for the first meeting will be the urban and reservoir residents. The second public meeting is planned for June, and will target the upstream portions of the watershed with an emphasis on rural and agricultural areas. The two locations and times were determined based on the targeted groups and their concerns (i.e. reservoir folks – algae and farmers – flooding). Outreach options were discussed with regards to what is currently working for the communities within the watershed and what could be done now to get public informed of the project.

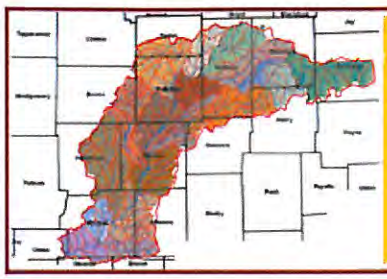
5. Steering Committee Meetings – the next steering committee meeting will be held on March 18th at 5:30pm. The preferred location will be to have the meeting in Fishers, although other locations are possible. Meetings will be moved to first Wednesday of each month with the locations varying each month to potentially reach more people. Discussed having each entity give brief update on what they are doing with regards to programs, public outreach, festivals…etc.

6. Geist Reservoir Watershed Events, Activities, and Misc. Topics – the Upper White River Watershed Alliance will soon have a website where our steering committee can access a password protected FTP site to share information easily. The Geist Lake Marina will be hosting a Geist Goes Green event on the weekends of both February 27 to March 1 and March 6 to 8.

Geist/Fall Creek Watershed Alliance
STEERING COMMITTEE MEETING
5:30pm – 7:30pm Wednesday, March 18th 2009
Holy Cross Lutheran Church
8115 Oaklandon Road
Indianapolis, Indiana 46236
317-823-5801

AGENDA

1. Welcome and Introductions
2. Current Agency/Organization Purpose, Programs & Objectives
3. Update on Geist Goes Green Event
4. Break
5. Update on Contract Tasks
    i. Compiling of Historical Information
    ii. Model Nonpoint Source Pollution In Lakes & Subwatersheds
    iii. Complete a Five-Year Aquatic Vegetation Management Plan
    iv. Create a Public Information Handout
        1. Update on Press Release Creation
        2. Discussion on Further Public Outreach Opportunities
6. April Steering Committee Meetings
    i. Pendleton Town Hall – April 15th, 2009 5:30pm
7. Discussion on Public Meeting
    i. Date, Location, Time…etc.
8. Closing and Adjournment



Upper White River Watershed Alliance

c/o IUPUI – Center for Earth & Environmental Science
723 West Michigan Street, SL118
Indianapolis, IN 46202
317-274-7154

GEIST
WATER QUALITY
GET ON BOARD

Geist/Fall Creek Watershed Alliance Steering Committee Meeting March 18, 2009 Sign-In Sheet

Name	Phone	Email or Address
WENDY THANISCH	579-9551	WENDY@OUTSOURCED-WRITING.COM
Cindy Newkirk	317-462-2283 #3	Cindy.newkirk@in.nacdnet.net
Paul Whitmore	317.263.6517	paul.whitmore@veoliawaterna.com
Ed Belmonte	630-729-6160	EBelmonte@V3co.com
Jason Armour	595-3461	armourjt@fishers.in.us
Victor Wakley	590-1461	VictorWakley@HOTMAIL.com
PATRICK MANSHIP	(765)641-9639	pmanship@madisoncty.com
Scott Rodgers	317-826-9551	SCOTT@SCOTTR.com
Dean Fair	317-823-3953	dean.fair@sbcglobal.net
CRIST BLASSARAS	765-644-5073	zorbisfat@comcast.net
Judy DeLury	765-713-5282	jadelury@comcast.net
Carrie Pintar	630-729-6134	cpintar@v3co.com
Lesceve Tedesco		
Thani Campus	317-694-1271	jhani@comcast.net

Geist/Fall Creek Watershed Alliance
STEERING COMMITTEE MEETING
6:30 to 8:30 pm Wednesday, March 18th 2009
Holy Cross Lutheran Church

AGENDA with Notes

1. Welcome and Introductions – 14 people in attendance, see sign-in sheet.

2. Current Agency/Organization Purpose, Programs & Objectives – Each Agency/Organization present discussed their objectives, programs and public outreach efforts.

3. Update on Geist Goes Green Event – Discussed the Geist Goes Green Event held at the Geist Marina on the last weekend in February and the first weekend in March. The event was not as well attended as hoped for. Planning is underway for next year's event focusing on only one weekend instead of two as well as marketing the event better for more exposure.

4. Break

5. Update on Contract Tasks

    i. Compiling of Historical Information – Updated group on the historical information that IDEM has available for the watershed and reservoir. IDEM is currently going through the QA/QC process with last years data and cannot provide that to us yet. Also working on obtaining the reports that were mentioned in the CEES 2003 report.

    ii. Model Nonpoint Source Pollution In Lakes & Subwatersheds – Discussed the three different models available for nonpoint source pollution and the pros and cons of each. It was recommended by V3 that a combination of two of the models be used due to the site specific information one model can provide and the ability to analyze BMPs with a different model. Both will benefit the watershed plan.

    iii. Complete a Five-Year Aquatic Vegetation Management Plan – Updated group on the timeframe for the first sampling efforts (May 15th – June 30th) and possibilities of getting some steering committee members involved. Emphasis on how the current vegetation in the reservoir interrelates with the health of the

reservoir should be taken into consideration during the plan preparation.

iv. Create Public Information Handout

1. Update on Press Release – Article on AtGeist.com. Veolia to use this as a base and create a draft press release to send to the group for review.

2. Discussion on Further Public Outreach Opportunities – The Geist Watershed Alliance is planning on putting together a committee separate from the steering committee to standardize the public outreach process for the group.

6. April Steering Committee Meeting – The April Steering Committee meeting with be at the Pendleton Town Hall on April 15, 2009 from 6:00pm to 8:00pm.

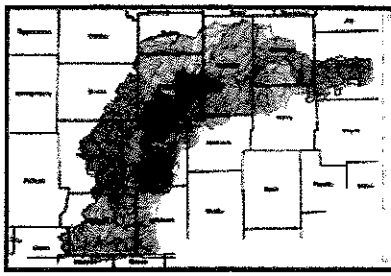
7. Discussion on Public Meeting – The first public meeting is in the planning process and timing will be determined based on the legislative session timeframe. It is anticipated that the meeting will be held sometime early to mid May.

8. Closing and Adjournment

Geist/Fall Creek Watershed Alliance
STEERING COMMITTEE MEETING
6:00pm – 8:00pm Wednesday, April 15th 2009
Pendleton Town Hall
100 West State Street
Pendleton, Indiana 46064

AGENDA

1. Welcome and Introductions
2. Current Agency/Organization Purpose, Programs & Objectives
3. Discussion of Website and Link to FTP Site
4. Update on Watershed Plan Tasks
5. Water Quality 101, informational / refresher
6. May Steering Committee Meetings
    i. Date, Location, Time…etc.
7. Discussion on Public Meeting, Pending Legislative Session
    i. Date, Location, Time…etc.
8. Miscellaneous Issues and Discussion
9. Closing and Adjournment



Upper White River Watershed Alliance
c/o IUPUI – Center for Earth & Environmental Science
723 West Michigan Street, SL118
Indianapolis, IN 46202
317-274-7154

GEIST
WATER QUALITY
GET ON BOARD

Geist/Fall Creek Watershed Alliance Steering Committee Meeting April 15, 2009 Sign-In Sheet

Name	Email	Phone
Ed Belmonte	EBelmonte@V3co.com	630-729-6160
Stephanie & Michael Box	steff_box@hotmail.com	(317) 915-8765
Jason Armour	armourjt@fishers.in.us	317-595-3461
Kelly Levengood	Klevengood@empowerresults.com	317-385-9652
Judy DeLury	jadelury@comcast.net	765-713-5782
Cbist Blassaras	2orbisfat@comcast.net	765-644-5073
Scott Rodgers	SCOTT@SCOTTR.com	317-826-9551
Ron Lauster	ron-lauster@iaswcd.org	317-786-1776
Dean Parr	dean.farrer@sbcglobal.net	317 823-3853
Kevin S. Kenyon	KSKENYON@MAC.COM	765-760-7791
tim McClintick	tmcclintick@town.pendleton.in.us	

Geist/Fall Creek Watershed Alliance
STEERING COMMITTEE MEETING
6:00pm – 8:00pm Wednesday, April 15th 2009
Pendleton Town Hall
100 West State Street
Pendleton, Indiana 46064

AGENDA

1. Welcome and Introductions – 11 people in attendance, see sign-in sheet

2. Current Agency/Organization Purpose, Programs & Objectives – Each Agency/Organization present discussed their objectives, programs and public outreach efforts. This activity will be shortened in subsequent meetings.

3. Discussion of Website and Link to FTP Site – Upper White River Watershed Alliance's website can be accessed by entering http://UWRWA.org then look to the middle of the page within the blue box underneath the large "Are You?" to see the Geist/Fall Creek Subwatershed.

4. Update on Watershed Plan Tasks – Updated group on the historical information gathered to date, including IDEM's Comparison of the Mid-Water Planktonic Invertebrate Communities, Indiana Clean Lakes Program, IDEM database data sets, IDEM's Distribution and Abundance of *Cylindrospermopsis raciborskii*, and also on obtaining other reports that were mentioned in the CEES 2003 report.

5. Water Quality 101, informational / refresher – Topics covered included watersheds, succession nature of lakes/sediment deposition, meandering nature of stream /sediment deposition, conductivity, pH, salinity, turbidity, total suspended solids / sediment deposition, nutrients, algae, bacteria, and flooding.

6. May and June Steering Committee Meetings – the next Steering committee meeting Wednesday May 20th from 6:00pm to 8:00pm. The May 20th meeting will be held at the Fishers Municipal Building, 1 Municipal Drive, Fishers 46038. (**This**

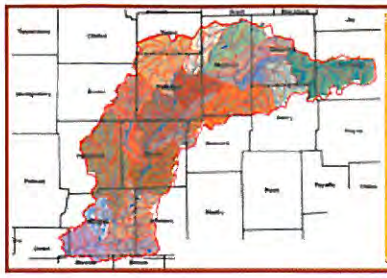
meeting may be postponed in light of the newly scheduled May 21st Public Meeting) The June meeting is scheduled for Wednesday June 17th at Holy Cross Lutheran Church, 8115 Oaklandon Road, Indianapolis 46236.

7. Closing and Adjournment

Geist/Fall Creek Watershed Alliance
STEERING COMMITTEE MEETING
6:00 to 8:00 pm Wednesday, August 19th 2009
Fishers Town Hall Administration Conference Room
One Municipal Drive
Fishers, Indiana 46038

AGENDA

1. Welcome and Introductions
2. Review of Historical Data Collected
    i. Shoreline stabilization survey
    ii. CEES Survey Updates
3. Discussion of Pre-Treatment Tier II Aquatic Vegetation Results
4. Outreach
    i. Watershed Signage
    ii. Geist Reservoir/Fall Creek Clean-Up
5. Define Mission, Vision or Purpose Statement for the Watershed
6. Nonpoint Source Pollution Model
    i. Memo approval process
    ii. Preliminary modeling results
7. Windshield Survey Locations
    i. Discussion of suggested data sheet survey form
    ii. Discussion of suggested location survey points
    iii. Acquiring volunteers to implement windshield survey
8. Next Steering Committee Meetings
9. Miscellaneous Issues and Discussion
10. Closing and Adjournment



Upper White River Watershed Alliance
c/o IUPUI – Center for Earth & Environmental Science
723 West Michigan Street, SL118
Indianapolis, IN 46202
317-274-7154

GEIST
WATER QUALITY
GET ON BOARD

Geist/Fall Creek Watershed Alliance Steering Committee Meeting August 19, 2009 Sign-In Sheet

Name	Phone	Email or Address
Victor Wakley	590-1461	victorwakley@hotmail.com
Paul Whitmore	863-6517	paul.whitmore@vediawaterna.com
Jason Armour	317-485-2065	armourjt@fishers.in.us
Crist Blassaras	765-644-5073	zorbisfat@comcast.net
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Dean Farr	317-823-3853	dean.farr@sbcglobal.net
Shaena Smith	317-773-2181	shaena.smith@hamiltoncounty.in.gov
Lamont Fosbrook		
Holly Jones		~~holly~~ hjones@empowerresults.com
Kelly Levenjoel		

Geist/Fall Creek Watershed Alliance
STEERING COMMITTEE MEETING
6:00 to 8:00 pm Wednesday, August 19th 2009
Fishers Town Hall Administration Conference Room
One Municipal Drive
Fishers, Indiana 46038

AGENDA

1. Welcome and Introductions

2. Review of Historical Data Collected

   i. Shoreline stabilization survey

   Notes: Discussed concern regarding erosion along shoreline. Contact SWCD with erosion concerns. Construction violations have been identified by boat. Department owns 22' easement around the entire shore of the lake for those encroachments.

   ii. CEES Survey Updates

   Notes: Lenore reported about the high levels of algae recorded. Wet and cool weather is not helping. Still trying to identify the source of the spike in levels. Should incorporate locations of septic areas in Watershed plan.

3. Discussion of Pre-Treatment Tier II Aquatic Vegetation Results

   Notes: Eurasian Watermilfoil discussion - Communicate with Tom Flat regarding several treatments and locations as it relates to V3 inspection dates. May be overlap of treated areas to inspection zones. See what information Tom has on coverage prior to treatment. DNR considers this a private system and will not likely fund weed control activities. To some extent the milfoil is competing with algae for nutrients – so who do we want to win? Harvest and remove nutrients with the plants. Chemical treatment of milfoil only releases more nutrients for algae. Stormwater program (IDEM) - Any chemical in the reservoir would be an illegal discharge. Not likely okay with Fishers for widespread chemical treatment.

4. Outreach

   i. Watershed Signage

   Notes: All signage completed for Eagle Creek watershed. State roads are a problem because IDEM did not want future liability of potential $200 INDOT maintenance fee. Veolia donated sign designs at Eagle Creek. $15,000 estimated for signs and posts/hardware to get installed. 40 signs total ($350 a piece). Hamilton wanted posts and hardware – no others

required this. This signage provides a 24/7 outreach to the community. Can we include a "limit fertilizer" tag?

ii. Geist Reservoir/Fall Creek Clean-Up

5. Define Mission, Vision or Purpose Statement for the Watershed

Notes: Geist Watershed Alliance wrote a purpose statement that could be used along with the two presented. Shaena to provide to Ed and Greg. Steer away from land values – focus on Water Quality and Health of system. Not a lake – this is a reservoir. Management needs change as a potable water reservoir. Look at Grant Applications for purpose statement also.

6. Nonpoint Source Pollution Model

i. Memo approval process

ii. Preliminary modeling results

7. Windshield Survey Locations

i. Discussion of suggested data sheet survey form

ii. Discussion of suggested location survey points

iii. Acquiring volunteers to implement windshield survey

Notes: Discuss Empower Results input. Reviewed 100 in-stream data points. Look to also identify 50 upland locations in the watershed. Two visits to each location – vegetation down (winter) so we can see fences, livestock, erosion, pipes, etc. Might provide overview and explanation on survey form. Finalize at next meeting and send out locations for November/December visits.

8. Next Steering Committee Meetings

Next Steering Committee Meeting set for Wednesday October 21st from 6 – 8pm at the Fishers Town Hall Administrative Building.

9. Miscellaneous Issues and Discussion

Notes: How do we outreach the lake front reservoir community? They are a major impactor group. Work on commercial landscape firms to remove phosporus. Push organic and "green" landscape companies and education. 5,500 people on Homeowners Association to educate. Grass clipping and leaf raking problems. Need to get Rule 5 enforcement on Lake by SWCD. Education of landscape supplies to be Phosphorus free zone.

10. Closing and Adjournment

Geist/Fall Creek Watershed Alliance
STEERING COMMITTEE MEETING
6:00 to 8:00 pm Wednesday, October 21st, 2009
Fishers Town Hall Administration Conference Room
One Municipal Drive
Fishers, Indiana 46038

AGENDA

1. Welcome and Introductions

2. Old Business
   i. Review of WMP Process
   ii. Eurasian Watermilfoil vs. Treatment Locations
   iii. Mission & Vision Statement

3. Update on Project Schedule
   i. Timeframe for completion of Draft Report
   ii. Steering Committee Meeting Schedule
   iii. Public Meeting Timing/Location/Goals

4. Windshield Survey
   i. Discuss final survey field sheet
   ii. Discuss survey point locations
   iii. Coordination of volunteers and timeframes for completion

5. Education & Outreach
   i. UW Outreach Survey Discussion
   ii. Linking E&O to WMP
   iii. Action Items/Assignments

6. Developing Problem Statements
   i. Review of public concerns and baseline data
   ii. Critical Area Discussion
   iii. Linking Concerns, Problem Statements, Goals and Objectives Worksheet

7. Miscellaneous Issues and Discussion

8. Closing and Adjournment

<u>Future Meeting Topics</u>
Critical Area Identification
Causes & Sources
Goal Development
9 Minimum Elements

UWRWA
Upper White River Watershed Alliance

GEIST
WATER QUALITY
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Geist/Fall Creek Watershed Alliance Steering Committee Meeting October 21, 2009 Sign-In Sheet

Name	Phone	Email or Address
Dina Ozugener	317-826-0664	ninasidibe@gmail.com
ROBT BLASSAD	765-644-5073	zorbistat@ comcast.net
L Tedesco		
Kelly Levengood		KLevengood@empowerresults.com
Shaena (Smith) Reinhart	317-773-2181	shaena.reinhart@hamiltoncounty.in.gov
Jill Hoffman		
Paul Whitmore	317.263.6517	paul.whitmore@veoliawaterna.com
BOB THOMPSON	776-8495	RCT@CO.HAMILTON.IN.US
SCOTT RODGERS	317-201-5012	SCOTT@SCOTTR.COM
Jessica Spurlock	630-729-6310	jspurlock@V3co.com
Marie Lampus	317/694-1271	
Judy DeLuzy	765-374-3931	jadeluzy@comcast.net
Jason Armour	317-595-3461	armourjt@fishers.in.us

Geist/Fall Creek Watershed Alliance
STEERING COMMITTEE MEETING
6:00 to 9:00 pm Tuesday, November 10, 2009
Fishers Town Hall Administration Conference Room
One Municipal Drive
Fishers, Indiana 46038

AGENDA

1. Welcome and Introductions

2. Aquatic Vegetation Management Plan Update
    i. Public Meeting

3. Problem Statement Discussion
    i. Review Problem Statements & Combined Statements from Worksheets
    ii. Prioritize Based On: Urgency, Feasibility, Location

4. Causes & Sources Discussion
    i. What are some of the Causes of our Issues in the Watershed?
    ii. What are the Sources?

5. Goals, Objectives & Measurable Milestone Discussion
    i. Where Do We Want to Go and How Do We Want to Get There?
    ii. How Much Improvement do We Want to See?
    iii. How Long Will it Take?
    iv. How Will It Be Measured?

6. Critical Area Discussion

7. Miscellaneous Issues and Discussion

8. Next Meeting: December 9 – Pendleton Town Hall: 6:00p – 9:00p

9. Closing and Adjournment

UWRWA
Upper White River Watershed Alliance

GEIST
WATER QUALITY
GET ON BOARD

Geist/Fall Creek Watershed Alliance Steering Committee Meeting November 10, 2009 Sign-In Sheet

Name	Phone	Email or Address
Shaena Reinhart	317-773-2181	shaena.reinhart@hamiltoncounty.in.gov
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Jason Armour	317-595-3461	armourj@fishersin.us

Geist/Fall Creek Watershed Alliance
STEERING COMMITTEE MEETING
6:00 to 9:00 pm Tuesday, November 10, 2009
Fishers Town Hall Administration Conference Room
One Municipal Drive
Fishers, Indiana 46038

AGENDA

1. Welcome and Introductions

2. Aquatic Vegetation Management Plan Update - email presentation/draft 2-3 days prior to meeting
   i. Public Meeting 1st - 3rd whatever works best for school - summary now?

3. Problem Statement Discussion
   i. Review Problem Statements & Combined Statements from Worksheets
   ii. Prioritize Based On: Urgency, Feasibility, Location → Fishers / Hancock Co all outfalls mapped - Bee Camp WMP Bridge replacement at Olio

4. Causes & Sources Discussion
   i. What are some of the Causes of our Issues in the Watershed?
   ii. What are the Sources?

5. Goals, Objectives & Measurable Milestone Discussion
   i. Where Do We Want to Go and How Do We Want to Get There?
   ii. How Much Improvement do We Want to See?
   iii. How Long Will it Take?
   iv. How Will It Be Measured?

6. Critical Area Discussion

7. Miscellaneous Issues and Discussion

8. Next Meeting: December 9 – Pendleton Town Hall: 6:00p – 9:00p

9. Closing and Adjournment

GVW NOTES

Geist/Fall Creek Watershed Alliance
STEERING COMMITTEE MEETING
6:00 to 9:00 pm Tuesday, November 10, 2009
Fishers Town Hall Administration Conference Room
One Municipal Drive
Fishers, Indiana 46038

AGENDA

1. Welcome and Introductions

2. Aquatic Vegetation Management Plan Update
   i. Public Meeting - DRAFT - DEC 15TH
   - ELEMENTARY SCHOOL MEETING -
   SEND TO STEERING COMMITTEE

3. Problem Statement Discussion
   i. Review Problem Statements & Combined Statements from Worksheets
   ii. Prioritize Based On: Urgency, Feasibility, Location

4. Causes & Sources Discussion
   i. What are some of the Causes of our Issues in the Watershed?
   ii. What are the Sources?

5. Goals, Objectives & Measurable Milestone Discussion
   i. Where Do We Want to Go and How Do We Want to Get There?
   ii. How Much Improvement do We Want to See?
   iii. How Long Will it Take?
   iv. How Will It Be Measured?

6. Critical Area Discussion

7. Miscellaneous Issues and Discussion

8. Next Meeting: December 9 – Pendleton Town Hall: 6:00p – 9:00p

9. Closing and Adjournment

Linking Concerns, Problem Statements, Causes and Sources

What are the concerns in the watershed?	Problem Statement	Potential Causes (can be the same as the problem)	Potential Sources (will also help identify critical areas)
-Encourage and improve public perception of native landscaping -Changing actions/perceptions towards fertilizer use -Encourage public participation -Outreach that is solution based -Education to the public -Education to the recreational users at marinas -Legislative action on phosphorus ban -Recognition of problems at State level -Lack of regulations	Stakeholders in the Geist Reservoir/Upper Fall Creek Watershed are not knowledgeable about their daily impact on the watershed and its water quality.	-Lack of interest -Lack of time and commitment -Lack of media coverage/educational material -Lack of public awareness -Lack of unified approach - Lack of perceived benefit - understanding of their impacts	N/A – none needed for administrative or social problems
-Quality of drinking water -Quality of surface water runoff -Erosion control and enforcement – Rule 5 -Sediment from storm drains -Maintenance of culverts and roadways -Dredging in the reservoir -Enhance wildlife habitat and recreational uses of reservoir	Excessive soil erosion and sedimentation within the watershed is degrading the water quality and limiting the aesthetics, wildlife habitat, and aquatic health of the streams (and reservoir) within the watershed.	-TSS levels and turbidity levels exceed water quality standards -Poor habitat evaluation scores (macros) MIBI QHEI	-Agricultural land under conventional tillage practices -Construction sites/new development -Streambank erosion -Livestock access to streams -Areas with inadequate stream buffers
-Encourage and improve public perception of native landscaping -Enhance wildlife habitat and recreational uses of reservoir -Outreach that is solution based -Lack of funding sources for urban areas	There is a lack of funding for the implementation of Best Management Practices within urban areas.	-Lack of public awareness -Lack of unified approach ~~-No effort~~ to educate local officials, foundations and other funding sources on the importance of urban BMPs additional	N/A – none needed for administrative or social problems

		Causes ~~Concerns~~	Sources
-Enhance wildlife habitat and recreational uses of reservoir -Exotic species control (Eurasian Watermilfoil) ~~-Public concern over blue green algae~~ addressed in Nutrients	Excessive growth of exotic aquatic plants within the reservoir is negatively impacting the recreational uses of the reservoir and the survival of native species.	-lack of best boating practices -nuisance levels of Eurasian Watermilfoil impeding boating, swimming, fishing and degrading habitat and survival of native vegetation	-Uncontrolled growth in high density areas -Uncontrolled growth in recreational areas plants Vegetation
-Quality of drinking water -Organic debris entering waterways -Quality of surface water runoff -Changing actions/perceptions towards fertilizer use -Enhance wildlife habitat and recreational uses of reservoir -Public concern over blue green algae -Legislative action on phosphorus ban -Recognition of problems at State level -Lack of regulations	Nutrient concentrations within all subwatersheds frequently exceed the accepted water quality standards thereby aiding the growth of algae within the reservoir.	-Nitrate + nitrite levels and total phosphorus levels exceed water quality standards -Blue Green and Toxic algae levels	-Fertilizer application both urban and agricultural -Inadequately functioning septic systems -Combined sewer overflows -Residential lawns (particularly close to streams and reservoir) -Improper disposal of yard waste -Areas with inadequate buffers - pet waste - golf courses
-Quality of drinking water -Organic debris entering waterways -Quality of surface water runoff -Enhance wildlife habitat and recreational uses of reservoir	E. coli levels in the watershed regularly exceed the state standard, based on current and historical water quality data results, and often exceed safety standards for recreational use in streams.	-E. coli levels exceed water quality standards	-Inadequately functioning septic systems -Combined sewer overflows SSO's -Wildlife -Livestock access and manure management -Areas with inadequate buffers -Wastewater facilities (NPDES permits) -pet waste
-Quality of drinking water -Quality of surface water runoff	Concentrations of Atrazine in Geist Reservoir frequently exceed the USEPA standard of 3.0ug/L for drinking water supplies.	-Atrazine levels exceed water quality standards	-Agricultural areas utilizing Atrazine as a pesticide -Areas with inadequate buffers

Linking Concerns, Problem Statements, Causes and Sources

What are the concerns in the watershed?	Problem Statement	Potential Causes (can be the same as the problem)	Potential Sources (will also help identify critical areas)
-Encourage and improve public perception of native landscaping -Changing actions/perceptions towards fertilizer use -Encourage public participation -Outreach that is solution based -Education to the public -Education to the recreational users at marinas -Legislative action on phosphorus ban -Recognition of problems at State level -Lack of regulations	Stakeholders in the Geist Reservoir/Upper Fall Creek Watershed are not knowledgeable about their daily impact on the watershed and its water quality.	-LACK OF PERCEIVED BENEFIT/IMPACTS -Lack of interest -Lack of time and commitment -Lack of media coverage/educational material -Lack of public awareness -Lack of unified approach	N/A – none needed for administrative or social problems
-Quality of drinking water -Quality of surface water runoff -Erosion control and enforcement – Rule 5 -Sediment from storm drains -Maintenance of culverts and roadways -Dredging in the reservoir -Enhance wildlife habitat and recreational uses of reservoir	Excessive soil erosion and sedimentation within the watershed is degrading the water quality and limiting the aesthetics, wildlife habitat, and aquatic health of the streams (and reservoir) within the watershed.	-TSS levels and turbidity levels exceed water quality standards -Poor habitat evaluation scores MACRO	-Agricultural land under conventional tillage practices -Construction sites/new development -Streambank erosion -Livestock access to streams -Areas with inadequate stream buffers ~~-Septic Failure~~
-Encourage and improve public perception of native landscaping -Enhance wildlife habitat and recreational uses of reservoir -Outreach that is solution based -Lack of funding sources for urban areas	There is a lack of funding for the implementation of Best Management Practices within urban areas.	ADDITIONAL -Lack of public awareness -Lack of unified approach -~~No effort to~~ EFFORT educate local officials, foundations and other funding sources on the importance of urban BMPs	N/A – none needed for administrative or social problems

-Enhance wildlife habitat and recreational uses of reservoir -Exotic species control (Eurasian Watermilfoil) ~~-Public concern over blue green algae~~	Excessive growth of exotic aquatic plants within the reservoir is negatively impacting the recreational uses of the reservoir and the survival of native species.	-nuisance levels of Eurasian Watermilfoil impeding boating, swimming, fishing and degrading habitat and survival of native vegetation	LACK OF UNDERSTANDING OF - BEST BOATING PRACTICES -Uncontrolled growth in high density ~~areas~~ VEG AREAS -Uncontrolled growth in recreational areas
-Quality of drinking water -Organic debris entering waterways -Quality of surface water runoff -Changing actions/perceptions towards fertilizer use -Enhance wildlife habitat and recreational uses of reservoir -Public concern over blue green algae -Legislative action on phosphorus ban -Recognition of problems at State level -Lack of regulations	Nutrient concentrations within all subwatersheds frequently exceed the accepted water quality standards thereby aiding the growth of algae within the reservoir.	-Nitrate + nitrite levels and total phosphorus levels exceed water quality standards -Blue Green and Toxic algae levels	- PET WASTE - GOLF COURSES -Fertilizer application both urban and agricultural -Inadequately functioning septic systems -Combined sewer overflows -Residential lawns (particularly close to streams and reservoir) -Improper disposal of yard waste -Areas with inadequate buffers
-Quality of drinking water -Organic debris entering waterways -Quality of surface water runoff -Enhance wildlife habitat and recreational uses of reservoir	E. coli levels in the watershed regularly exceed the state standard, based on current and historical water quality data results, and often exceed safety standards for recreational use in streams.	-E. coli levels exceed water quality standards	-Inadequately functioning septic systems -Combined sewer overflows, SSO's -Wildlife -Livestock access and manure management SEPARATE -Areas with inadequate buffers -Wastewater facilities (NPDES permits)
-Quality of drinking water -Quality of surface water runoff	Concentrations of Atrazine in Geist Reservoir frequently exceed the USEPA standard of 3.0ug/L for drinking water supplies.	-Atrazine levels exceed water quality standards	- PET WASTE -Agricultural areas utilizing Atrazine as a pesticide -Areas with inadequate buffers

Linking Concerns, Problem Statements, Goals and Objectives

	What are the concerns in the watershed?	Problem Statement	What would you like to see for your watershed? (Goal Statements)	How will we measure progress towards measuring these goals? (Objectives/Indicators)
1	Public Participation/ Education and Outreach	Stakeholders in the Geist Reservoir/Upper Fall Creek Watershed are not knowledgeable about their daily impact on the watershed and its water quality.	Develop and implement an education and outreach program within the watershed.	-Effectively share/communicate past, current and future activities in the watershed -Educate stakeholders within the watershed on the function of a watershed and the impacts to water quality -Educate homeowners in urban communities about the use of fertilizers -Educate stakeholders using septic systems about the importance of septic system maintenance, -Coordinate efforts with the UWRWA, local MS4s and any other education/outreach efforts being conducted within the watershed, NRCS, SWCDs -Educate farmers about the use of Atrazine and its impacts to water quality
2	Erosion and Sedimentation/ Impacts to Habitat and Water Quality	~~Excessive~~ soil erosion and sedimentation within the watershed is degrading the water quality and limiting the aesthetics, wildlife habitat, and aquatic health of the streams (and reservoir) within the watershed.	Reduce sediment loads to meet the IDEM draft TMDL target of 30 mg/L. TSS	-Partner with NRCS, SWCDs and County Boards to ~~develop~~ cost share and/or education programs in order to reduce erosion from agricultural lands MS4s CREP promote -Encourage the use of conservation tillage practices -Encourage enforcement of erosion control practices associated with the issuance of Rule 5 permits -Stabilize eroded streambanks within the watershed FFA groups/high schoo -Reduce animal access to streambanks -December effluent limits at construction sites
3	Lack of Regulations and Funding Sources for Urban Areas	There is a lack of funding for the implementation of Best Management Practices within urban areas.	Identify and utilize existing BMP funding sources and encourage the development/ enhancement of additional and non-traditional funding sources.	-Educate homeowners/stakeholders on the benefits and importance of urban BMPs -Partner with MS4s, foundations, community groups, etc to identify/develop funding sources for urban BMP implementation -Encourage demonstration projects throughout the watershed -Identify low cost alternatives to traditional urban BMPs res and commercial -SWCD's -judicial, community services, high schools College -CREP funding

Indiana Wildlife Federation
-promoting Low/No-P fertilizer

4	Exotic Species in the Reservoir (Eurasian Watermilfoil) and the impacts to recreation and native species	Excessive growth of exotic aquatic plants within the reservoir is negatively impacting the recreational uses of the reservoir and the survival of native species.	Reduce/Control the growth of exotic aquatic plants within the reservoir.	-Educate public/stakeholders on how exotic species are introduced and ways to control the introduction -Partner with the marinas, fishing tournament groups, homeowner organizations, etc. to develop cost share and/or education programs -~~Complete~~ an AVMP and treat according to recommendations update on a regular basis
5	Nutrient Levels and Impacts to Algae in the Reservoir	Nutrient concentrations within all subwatersheds frequently exceed the accepted water quality standards thereby aiding the growth of algae within the reservoir.	Reduce the nutrient loads so that there are no exceedances of Nitrate plus Nitrite of 1.6 mg/L and Total Phosphorus of 0.076 mg/L.	-Educate the public/stakeholders (urban and agricultural) of the importance of reduced application of fertilizers or use of Low-P/No-P Fertilizers -Increase the riparian buffer zones using filter strips and grassed waterways -Increase the use of BMPs such as cover crops, conservation tillage, etc, pond shoreli planting -Educate/work with point dischargers (CFOs, NPDES facilities) to reduce their nutrient loads MS4s -Partner with NRCS, SWCDs and County Boards to ~~develop~~ promote cost share and/or education programs -Educate local/regional/state officials on the need for regulations for urban areas (specifically for Phosphorus) -septic systems
6	E. Coli samples often exceed safety standards for fishable and swimmable waters	E. coli levels in the watershed regularly exceed the state standard, based on current and historical water quality data results, and often exceed safety standards for recreational use in streams.	Reduce *E. coli* concentrations to meet state standard of 235 CFU/100mL	-Reduce the amount of E. coli runoff from agricultural lands through the encouragement of exclusionary fencing installation CFOs, CSOs -Educate public/stakeholders and implement manure management practices -Educate/work with point dischargers to reduce the amount of E. coli runoff from point sources, failed septic systems, and package plants -Partner with NRCS, SWCDs and County Boards to develop cost share and/or education programs -Increase the riparian buffer zones using filter strips and grassed waterways -pet waste/wildlife out
7	Atrazine levels in watershed streams	Concentrations of Atrazine in Geist Reservoir frequently exceed the USEPA standard of 3.0ug/L for drinking water supplies.	Reduce Atrazine concentrations within Geist Reservoir to not exceed the USEPA standard of 3.0ug/L.	-Reduce the use of Atrazine with education on alternative practices and/or pesticides -Increase riparian buffer zones using filter strips and grassed waterways -Partner with NRCS, SWCDs and County Boards to develop cost share and/or education programs

Linking Concerns, Problem Statements, Goals and Objectives

What are the concerns in the watershed?	Problem Statement	What would you like to see for your watershed? (Goal Statements)	How will we measure progress towards measuring these goals? (Objectives/Indicators)
			- WORK WITH INDIANA ~~STATE~~ WILDLIFE FEDERATION FOR NON-FERTILIZER
1 Public Participation/ Education and Outreach	Stakeholders in the Geist Reservoir/Upper Fall Creek Watershed are not knowledgeable about their daily impact on the watershed and its water quality.	Develop and implement an education and outreach program within the watershed.	-Effectively share/communicate past, current and future activities in the watershed -Educate stakeholders within the watershed on the function of a watershed and the impacts to water quality -Educate homeowners in urban communities about the use of fertilizers -Educate stakeholders using septic systems about the importance of septic system maintenance, -Coordinate efforts with the UWRWA, local MS4s and any other education/outreach efforts being conducted within the watershed -Educate farmers about the use of Atrazine and its impacts to water quality
2 Erosion and Sedimentation/ Impacts to Habitat and Water Quality	~~Excessive~~ Soil erosion and sedimentation within the watershed is degrading the water quality and limiting the aesthetics, wildlife habitat, and aquatic health of the streams (and reservoir) within the watershed.	~~AVA~~ = 17.7 ONE WATER Reduce sediment loads to meet the IDEM draft TMDL target of 30 mg/L. OF TSS	CREP WATERSHED -Partner with NRCS, SWCDs and County Boards ~~to develop~~ PROMOTE, HIGH SCHOOLS & FFA PROGRAMS cost share and/or education programs in order to reduce erosion from agricultural lands -Encourage the use of conservation tillage practices -Encourage enforcement of erosion control practices associated with the issuance of Rule 5 permits & MS4's -Stabilize eroded streambanks within the watershed -Reduce animal access to streambanks - EFFLUENT LIMITATIONS FOR CONSTRUCTION SITES
3 Lack of Regulations and Funding Sources for Urban Areas	There is a lack of funding for the implementation of Best Management Practices within urban areas.	Identify and utilize existing BMP funding sources and encourage the development/ enhancement of additional and non-traditional funding sources.	-Educate homeowners/stakeholders on the benefits and importance of urban BMPs / SWCD's -Partner with MS4s, foundations, community groups, etc to identify/develop funding sources for urban BMP implementation -Encourage demonstration projects throughout the watershed -Identify low cost alternatives to traditional urban BMPs - IDENTIFY EXISTING SOURCES OF FUNDING (VOLUNTEERS)

4	Exotic Species in the Reservoir (Eurasian Watermilfoil) and the impacts to recreation and native species	Excessive growth of exotic aquatic plants within the reservoir is negatively impacting the recreational uses of the reservoir and the survival of native species.	Reduce/Control the growth of exotic aquatic plants within the reservoir.	-Educate public/stakeholders on how exotic species are introduced and ways to control the introduction -Partner with the marinas, fishing tournament groups, homeowner organizations, etc. to develop cost share and/or education programs ~~-Complete an~~ AVMP and treat according to recommendations REVIEW/UPDATE OF
5	Nutrient Levels and Impacts to Algae in the Reservoir	Nutrient concentrations within all subwatersheds frequently exceed the accepted water quality standards thereby aiding the growth of algae within the reservoir.	Reduce the nutrient loads so that there are no exceedances of Nitrate plus Nitrite of 1.6 mg/L and Total Phosphorus of 0.076 mg/L.	-Educate the public/stakeholders (urban and agricultural) of the importance of reduced application of fertilizers or use of Low-P/No-P Fertilizers -Increase the riparian buffer zones using filter strips and grassed waterways -Increase the use of BMPs such as cover crops, conservation tillage, etc -Educate/work with point dischargers (CFOs, NPDES facilities) to reduce their nutrient loads ADD URBAN -Partner with NRCS, SWCDs and County Boards to ~~develop~~ PROMOTE cost share and/or education programs MS4s -Educate local/regional/state officials on the need for regulations for urban areas (specifically for Phosphorus) - SEPTIC SYSTEMS
6	E. Coli samples often exceed safety standards for fishable and swimmable waters	E. coli levels in the watershed regularly exceed the state standard, based on current and historical water quality data results, and often exceed safety standards for recreational use in streams.	Reduce *E. coli* concentrations to meet state standard of 235 CFU/100.	-Reduce the amount of E. coli runoff from agricultural lands through the encouragement of exclusionary fencing installation -Educate public/stakeholders and implement manure management practices -Educate/work with point dischargers to reduce the amount of E. coli runoff from point sources, ~~failed septic systems~~, and package plants -Partner with NRCS, SWCDs and County Boards to develop cost share and/or education programs -Increase the riparian buffer zones using filter strips and grassed waterways - SEPTIC SYSTEMS - PET WASTE ADD CFOs & CSO
7	Atrazine levels in watershed streams	Concentrations of Atrazine in Geist Reservoir frequently exceed the USEPA standard of 3.0ug/L for drinking water supplies.	Reduce Atrazine concentrations within Geist Reservoir to not exceed the USEPA standard of 3.0ug/L.	-Reduce the use of Atrazine with education on alternative practices and/or pesticides -Increase riparian buffer zones using filter strips and grassed waterways -Partner with NRCS, SWCDs and County Boards to develop cost share and/or education programs

Geist Reservoir/Upper Fall Creek Critical Area Identification

Data was separated out into 2 criteria: Current Water Quality Impairment and Susceptibility to Future Water Quality Impairment

Current Water Quality Impairment

The current water quality impairment data includes actual/quantitative data that is available for the watershed. This data is easily compared to standard water quality limits and used to gage the current health of the subwatersheds. A list of the data used for this comparison is below.

- IDEM 303(d) list
- CIWRP 2003 Study (10 stations)
    - Dissolved Oxygen
    - E. coli
    - pH
    - Nitrate + Nitrite
    - Total Phosphorus
    - Total Suspended Solids
    - Turbidity
- IDEM Water Quality Data (1996-2009: 93 stations)
    - Dissolved Oxygen
    - E. coli
    - pH
    - Nitrate + Nitrite
    - Total Phosphorus
    - Total Suspended Solids
    - Turbidity
- IDEM Biological Data (1992-2008)
    - mIBI (macroinvertebrates)
    - IBI (fish)
    - QHEI (habitat)

Each subwatershed was ranked based on each data set and then an overall Current Water Quality Impairment ranking was assigned.

Example:

	IDEM 303(d)	CIWRP	IDEM WQ	IDEM Bio	OVERALL
Sub 1	2	3	2	1	**2**
Sub 2	1	2	1	2	**1**
Sub 3	3	1	3	3	**3**

Susceptibility to Future Water Quality Impairment

The susceptibility to future water quality impairment data includes land use/social based data that is available for the watershed. This data is not easily compared to water quality limits but can be helpful in determining the chances of ongoing or future water quality problems. A list of the data used for this comparison is below.

- Windshield Survey (should we include stream cover for habitat?)
    - Streambank Erosion
    - Stream Buffers
    - In-Stream Debris
    - Livestock Access

Riparian Cover/Habitat

    - Fields under Conventional Till
- Nonpoint Source Pollution Modeling Results
    - Nitrogen Loading
    - Phosphorus Loading
    - Sediment Loading
- NPDES Permits
    - CFOs
    - Facilities/pipes

Each subwatershed was ranked based on each data set and then an overall Susceptibility to Future Water Quality Impairment ranking was assigned.

Example:

	Windshield Survey	NPS Modeling	NPDES Permits	OVERALL
Sub 1	3	2	3	**3**
Sub 2	2	1	1	**1**
Sub 3	1	3	2	**2**

Final Critical Area Identification

Once subwatersheds were ranked based on the 2 criteria, an overall ranking was assigned with highest priority being given to current impairments. The 3 top ranked subwatersheds were then identified as the critical areas.

Example:

	Current WQ Impairment	Susceptibility to Future WQ Impairment	OVERALL CRITICAL AREA RANKING
Sub 1	2	3	**2**
Sub 2	1	1	**1**
Sub 3	3	2	**3**

Additional Critical Areas

Critical areas can also be defined as specific sources anywhere within the project area that are contributing a pollutant of concern. Below is a list of suggested additional "critical areas" to identify in the Watershed Management Plan.

- ~~Residential areas immediately adjacent to a stream or the reservoir~~
- All areas where livestock have direct access to a stream
- All areas where stream buffers are absent or insufficient
- All areas where excessive streambank erosion is occurring
- All agricultural areas where conventional till is practiced extensively

LAND USE CHANGE - LISA BEAL (LAYER FOR UPWR

Geist Reservoir/Upper Fall Creek Critical Area Identification

Data was separated out into 2 criteria: Current Water Quality Impairment and Susceptibility to Future Water Quality Impairment

Current Water Quality Impairment

The current water quality impairment data includes actual/quantitative data that is available for the watershed. This data is easily compared to standard water quality limits and used to gage the current health of the subwatersheds. A list of the data used for this comparison is below.

- IDEM 303(d) list
- CIWRP 2003 Study (10 stations)
    - Dissolved Oxygen
    - E. coli
    - pH
    - Nitrate + Nitrite
    - Total Phosphorus
    - Total Suspended Solids
    - Turbidity
- IDEM Water Quality Data (1996-2009: 93 stations)
    - Dissolved Oxygen
    - E. coli
    - pH
    - Nitrate + Nitrite
    - Total Phosphorus
    - Total Suspended Solids
    - Turbidity
- IDEM Biological Data (1992-2008)
    - mIBI (macroinvertebrates)
    - IBI (fish)
    - QHEI (habitat)

Each subwatershed was ranked based on each data set and then an overall Current Water Quality Impairment ranking was assigned.

Example:

	IDEM 303(d)	CIWRP	IDEM WQ	IDEM Bio	OVERALL
Sub 1	2	3	2	1	**2**
Sub 2	1	2	1	2	**1**
Sub 3	3	1	3	3	**3**

Susceptibility to Future Water Quality Impairment

The susceptibility to future water quality impairment data includes land use/social based data that is available for the watershed. This data is not easily compared to water quality limits but can be helpful in determining the chances of ongoing or future water quality problems. A list of the data used for this comparison is below.

- Windshield Survey (should we include stream cover for habitat?)
    - Streambank Erosion
    - Stream Buffers
    - In-Stream Debris
    - Livestock Access

- future development threat talk to Lisa @ Empower

    - Fields under Conventional Till
- Nonpoint Source Pollution Modeling Results
    - Nitrogen Loading
    - Phosphorus Loading
    - Sediment Loading
- NPDES Permits
    - CFOs
    - Facilities/pipes

Each subwatershed was ranked based on each data set and then an overall Susceptibility to Future Water Quality Impairment ranking was assigned.

Example:

	Windshield Survey	NPS Modeling	NPDES Permits	OVERALL
Sub 1	3	2	3	**3**
Sub 2	2	1	1	**1**
Sub 3	1	3	2	**2**

Final Critical Area Identification

Once subwatersheds were ranked based on the 2 criteria, an overall ranking was assigned with highest priority being given to current impairments. The 3 top ranked subwatersheds were then identified as the critical areas.

Example:

	Current WQ Impairment	Susceptibility to Future WQ Impairment	OVERALL CRITICAL AREA RANKING
Sub 1	2	3	**2**
Sub 2	1	1	**1**
Sub 3	3	2	**3**

Additional Critical Areas

Critical areas can also be defined as specific sources anywhere within the project area that are contributing a pollutant of concern. Below is a list of suggested additional "critical areas" to identify in the Watershed Management Plan.

- ~~Residential areas immediately adjacent to a stream or the reservoir~~
- All areas where livestock have direct access to a stream
- All areas where stream buffers are absent or insufficient
- All areas where excessive streambank erosion is occurring
- All agricultural areas where conventional till is practiced extensively
- Headwaters?
- Mining | Golf Courses | Schools
- Social indicators?

Geist/Fall Creek Watershed Alliance
STEERING COMMITTEE MEETING
6:00 to 9:00 pm Wednesday, December 9th, 2009
Pendleton Town Hall
100 West State Street
Pendleton, Indiana 46064

AGENDA

1. Welcome and Introductions
2. U.S. EPA's 9 Elements of Watershed Plans
3. Project Schedule Update
4. Steering Committee Meeting Schedule
5. Ag & AVMP Public Meetings
6. Grant Applications & Deadlines
7. Geist WMP Comment Discussion
8. Miscellaneous Issues and Discussion
9. Closing and Adjournment

UWRWA
Upper White River Watershed Alliance

GEIST
WATER QUALITY
GET ON BOARD

Geist/Fall Creek Watershed Alliance Steering Committee Meeting December 9, 2009 Sign-In Sheet

Name	Phone	Email or Address
Carrie Pintar	630.729.6134	cpintar@v3co.com
Jessica Spurlock	630-729-6310	jspurlock@v3co.com
Tim McClintick	765 778 8370	tmcclintick@town.pendleton.in.us
Paul Whitmore	317 263 6517	paul.whitmore@veoliawaterna.com
Shaena Reinhart	317 773 2181	shaena.reinhart@hamiltoncounty.in.gov
PATRICK MANSHIP	(765) 641-9638	pmanship@madisoncty.com
Jhan Lampe	317/694-1271	jhain@comcast.net
KEVIN S. KENYON	765 760-7791	KSKENYON@MAC.COM
SHARON GIBSON	317-459-1740	sjfcpa@sharonfergusoncpa.com
Janice Snell	317-845-0994	snell57@AOL.COM
Judy DeLury	765-713-5782	jadelury@comcast.net
Kelly Levengood	317-385-9652	KLevengood@empowerresults.com
CHRIST BLASSARAS	765-644-5073	zorbisfat@comcast.net

Geist/Fall Creek Watershed Alliance
STEERING COMMITTEE MEETING
6:00 to 9:00 pm Wednesday, December 9th, 2009
Pendleton Town Hall
100 West State Street
Pendleton, Indiana 46064

AGENDA

1. Welcome and Introductions
2. U.S. EPA's 9 Elements of Watershed Plans
3. Project Schedule Update - Draft to DNR Dec 16
4. Steering Committee Meeting Schedule
5. Ag & AVMP Public Meetings
6. Grant Applications & Deadlines
7. Geist WMP Comment Discussion
8. Miscellaneous Issues and Discussion
9. Closing and Adjournment

Ag Public Meeting - Jan 20
Pendleton Library 6-8 pm
- Flyers for website etc.
Final Public Meeting
end Feb / Early March

Jan 27 AVMP public meeting

2 Lake Grants - can submit for both
319 grants

Tree Planting - Fall Creek
Madison Ave - Dr. Shirley

- Grant timelines in milestones

Focus on $ for education
"money talks"

* homeowner info - IDEM on ftp site

Inviting fishing groups (mastheads) to Steering Com. meetings?

IMI dredging? WQ of Lakes? upcoming permit renewal

Conservation officers?
John Geno - Crist knows him

Appendix E – Public Meeting Agendas and Sign-In Sheets

Agendas and Sign-In Sheets for the Public Meetings held on the following dates are included in this appendix.

- May 21, 2009
- January 20, 2010

Geist/Fall Creek Watershed Alliance
INITIAL PUBLIC MEETING
7:00 to 9:00 pm Thursday, May 21, 2009
Red Bridge Community Building

AGENDA

1. Welcome and Introductions, Jill Hoffman of Upper Whiter River Watershed Alliance & Ed Belmonte of V3 Companies (7:00-7:05)

2. Geist Reservoir and Fall Creek Watershed Management Plan, Ed Belmonte of V3 Companies (7:05-7:25)

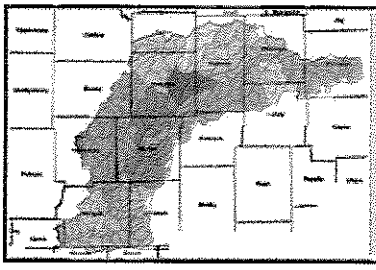
3. Harmful Algal Blooms and the Morse Reservoir, Dr. Lenore Tedesco – Director of the Center for Earth and Environmental Science, Indiana University – Purdue University Indianapolis / Upper Whiter River Watershed Alliance (7:25-7:50)

4. Questions and Discussion (7:50-8:00)

5. Break (8:00-8:05)

6. Public Participation – Water Quality Issues and Concerns from Stakeholder's within the Watershed, Ed Belmonte and Jessica Spurlock – V3 & Jill Hoffman of Upper Whiter River Watershed Alliance (8:05-8:55)

7. Thank you for your Participation, Closing and Adjournment (8:55-9:00)

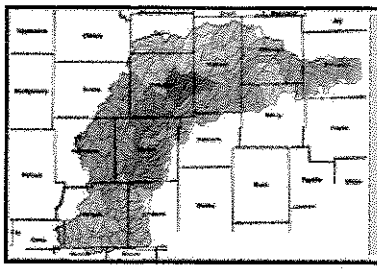


Upper White River Watershed Alliance
c/o IUPUI – Center for Earth & Environmental Science
723 West Michigan Street, SL118
Indianapolis, IN 46202
317-274-7154

GEIST
WATER QUALITY
GET ON BOARD

Geist/Fall Creek Watershed Alliance Public Meeting May 21, 2009 Sign-In Sheet

Name	Phone	Email or Address
Paul Whitmore	263 6517	paul.whitmore@veoliawaterna.com
Gwen White	234-4407 281-9445	gwhite@dnr.in.gov
Scott Rodgers	201-5012	scott@scottR.com
Ed Belmonte	630-229-6160	EBelmonte@V3co.com
LouAnn Baker	263.6572	louannbaker@veoliawaterna.com



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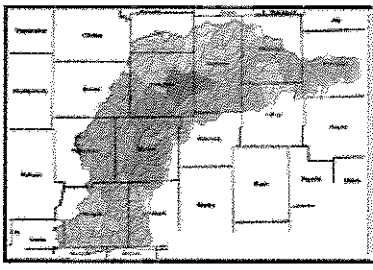
Indianapolis, IN 46202
317-274-7154

GEIST
WATER QUALITY
GET ON BOARD

Geist/Fall Creek Watershed Alliance Public Meeting May 21, 2009 Sign-In Sheet

Name	Phone	Email or Address
Glenn Lange	317-786-1776	glenn-lange@iaswcd.org
Bruno Pigott	317/233-2550	bpigott@idem.in.gov
David Isaacs	812-497-2[illegible]	david.i@aquaticcatrd.com
Jim Merritt	317 849-6310	jmerritt31@yahoo.com
J. Duckwall	317 894-8455	kduckwall@marinaunited.com
Stephanie Box	317 915-8765	steff_box@hotmail.com

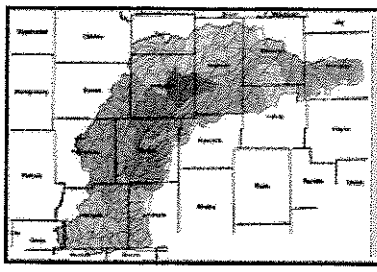


Upper White River Watershed Alliance
c/o IUPUI – Center for Earth & Environmental Science
723 West Michigan Street, SL118
Indianapolis, IN 46202
317-274-7154

GEIST
WATER QUALITY
GET ON BOARD

Geist/Fall Creek Watershed Alliance Public Meeting May 21, 2009 Sign-In Sheet

Name	Phone	Email or Address
Ernie Johnson	317 374 7712	ejohnson@Idem.in.gov
BEVERLY GARD	317-232-9493	bgard@iga.in.GOV
Shaena Smith	317-773-2181	ses@co.hamilton.in.us
WENDY THANSON	317/579-9551	WENDY@OUTSOURCED-WRITING.COM
PATRICK MANSHIP	(765) 620-7585	pmanship@madisoncty.com
Rod Sawyer	576-0576	rod.sawyer@comcast.net
Janice Snell	845-0994	snell57@AOL.com
Robert Slomka	317-826-4213	diane_slomka@yahoo.com
Ed Malone	317 264-7703	ed.malone@veolia water na.com
Jessica Spurlock		jspurlock@V3CO.com



Upper White River
Watershed Alliance
c/o IUPUI – Center for Earth &
Environmental Science
723 West Michigan Street, SL118
Indianapolis, IN 46202
317-274-7154

GEIST
WATER QUALITY
GET ON BOARD

Geist/Fall Creek Watershed Alliance
Public Meeting
May 21, 2009 Sign-In Sheet

Name	Phone	Email or Address
Brad Baughn	446-6773	bbaughn@idem.in.gov
Judy DeLury		jadelury@comcast.net
Crist Blassaras		zorbisfat@comcast.net
Diane Slomka		diane_slomka@yahoo.com
Kevin S. Kenyon	765-778-0166	KSKENYON@MAC.com

Geist/Fall Creek Watershed Alliance
PUBLIC MEETING
6:00 to 7:30 pm Wednesday, January 20th, 2010
Pendleton Community Public Library
595 East Water Street
Pendleton, Indiana 46064

AGENDA

1. Welcome and Introductions

2. Geist Reservoir/Upper Fall Creek Watershed Management Plan Summary

3. Your Watershed and Agricultural Land – What's the Connection?

4. Madison County Soil & Water Conservation District – On-Going Programs

5. Conservation Reserve Enhancement Program Info & Opportunities

6. Questions and Discussion

UWRWA
Upper White River Watershed Alliance

GEIST
WATER QUALITY
GET ON BOARD

Geist/Fall Creek Watershed Alliance
Public Meeting
January 20, 2010 Sign-In Sheet

Name	Phone	Email or Address	Company/Affiliation
Judy Delaney	765 713 5782	jadelaney@comcast.net	White River Watchers
Steve Schmidt	765-644-4249	stephen.schmidt@in.nacdnet.net	Mad. County SWCD
KEVIN KENYON	765-760-7791	KSKENYON@MAC.COM	RESIDENT WHITE RIVER WATCHERS
Jim NORRIS	765-584-4505	jnorris@isda.in.gov	ISDA
SCOTT RODGERS	317-826-9551	SCOTT@SCOTTR.COM	GWA
CRIST BLASSARAS	765-644-5073	zonbisfat@comcast.net	White River Watchers
DEAN PARR	317-823-5953	dean.fine@sbcglobal.net	GWA
Jamie Snell	317 845 0994	snell57@AOL.com	GWA
Mark McCauley	317-773-2181	mark_mccauley_2000@Yahoo.com	Ham. Co. SWCD

Appendix F – IDEM Data

A summary of the data obtained from IDEM within the Geist Reservoir/Upper Fall Creek watershed is provided within this Appendix. The summary contains the mean value of the parameters from all available studies. The raw data is provided on CD at the end of this report. The IDEM studies with the number of data points within the watershed are listed below.

- 1991 Fish Tissue - 3
- 1992 Macroinvertebrates - 7
- 1996 Fish Tissue – 1
- 1996 Macroinvertbrates - 4
- 1996 Sediment Bio - 1
- 1996 Synoptic - 4
- 1996 Watershed - 2
- 1999-2009 Fixed Station - 1
- 2001 Corvallis - 2
- 2001 Corvallis Biological - 1
- 2001 E. Coli – Upper WFWR - 6
- 2001 Fish Tissue - 2
- 2001 Macroinvertebrate – 1
- 2001 Pesticides - 1
- 2001 Sediment Bio – 1
- 2002-2006 Clean Sampling and Ultra-Clean Analyses -1
- 2006 Corvallis - 1
- 2006 Corvallis E. Coli - 1
- 2006 Fish Tissue – 2
- 2006 Macroinvertebrate – 1
- 2008 Fall Creek IBC Study - 66
- 2008-2009 Upper Fall Creek WQ Monitoring Program - 17

Available Data Summary

		Honey Creek	Sly Fork	Deer Creek	Prairie Creek	Headwaters Lick Creek	Foster Branch	McFadden Ditch	Flatfork Creek	Thorpe Creek	Watershed Total
IDEM Studies	303d Impaired	E. Coli	E. Coli	E. Coli	E. Coli	E. Coli	E. Coli	E. Coli	E. Coli	Algae, Taste/Odor, PCBs in fish tissue	
	1991 Fish Tissue				1				1	1	3
	1992 Macro	1		2	1			1	2		7
	1996 Fish Tissue									1	1
	1996 Macro	1		1					2		4
	1996 Sediment Bio									1	1
	1996 Synoptic			2				1	1		4
	1996 Watershed				1				1		2
	1999-2009 Fixed Station								1		1
	2001 Corvallis			1					1		2
	2001 Corvallis Biological			1							1
	2001 E. coli-Upper WFWR	1			1	1		1	2		6
	2001 Fish Tissue									2	2
	2001 Macro			1							1
	2001 Pesticides								1		1
	2001 Sediment Bio									1	1
	2002-2006 Clean Sampling and Ultra-Clean Analyses								1		1
	2006 Corvallis					1					1
	2006 Corvallis E. coli					1					1
	2006 Fish Tissue								1	1	2
	2006 Macro					1					1
	2008 Fall Creek IBC Study	11	5	14	5	8	3	5	5	10	66
	2008-2009 Upper Fall Creek WQ Monitoring Program	2	1	4	2	2	1	2	3		17

	IDEM Biological Evaluation						IDEM Water Quality Data															
	Macros mIBI		Fish IBI		Habitat QHEI		DO		E. Coli		pH		Nitrate+Nitrite		Total P		TSS		Turbidity		Atrazine	
Honey Creek	1	2	11	11	12	13	12	73	3	20	12	74	11	55	11	25	11	40	12	72		
	5.5		41.8		59.8		8.45		1645.5		7.85		3.4		0.098		13.6		36.8		N/A	
Sly Fork			5	5	5	5	5	30	1	5	5	31	5	27	5	17	5	25	5	31	3	4
	N/A		35.6		44.8		8.88		5854.7		7.91		2.12		0.065		13.7		26.4		4.03	
Deer Creek	3	4	15	15	17	19	18	122	6	28	18	126	16	91	18	79	18	66	18	123	4	4
	4.4		42.9		64.5		8.93		3325.9		7.97		2.51		0.214		31.9		24.9		1.93	
Prairie Creek	1	1	6	6	7	7	7	53	4	16	7	55	5	39	6	19	6	34	7	54	2	2
	3.8		39		55.3		9.1		3646		8.01		1.36		0.062		19.9		32.2		1.9	
Headwaters Lick Creek			8	9	8	9	9	66	4	20	9	68	8	51	8	34	8	34	9	66	3	4
	N/A		41.3		60		8.91		3771.1		7.95		1.78		0.069		15.2		27.6		2	
Foster Branch			3	3	3	3	3	24	1	5	3	25	3	20	3	12	3	15	3	25	2	2
	N/A		35.3		37.3		9.18		5669.4		7.95		2.35		0.064		5.7		15.9		2.6	
McFadden Ditch	1	1	5	5	6	6	7	40	2	15	7	40	5	26	6	17	6	23	7	40	2	3
	3.6		45.2		71.8		9.48		1435.5		8.09		1.77		0.081		17.1		29.5		1.7	
Flatfork Creek	2	4	6	6	8	10	10	222	6	133	10	222	7	172	8	154	8	148	10	218	3	14
	4.2		37		65.9		9.35		486.6		8.08		2.55		0.083		21.3		23		1.2	
Thorpe Creek			9	9	9	9	10	24			10	24	10	26	7	15	9	25	10	23	5	5
	N/A		33.6		58.4		7.3		N/A		7.87		4.09		0.848		20.8		41.9		1.6	
Limits	mIBI: 0-2 Severely Impaired; 2-4 Moderately Impaired; 4-6 Slightly Impaired; 6-8 Not Impaired		IBI: <12 No Fish; 12-22 Very Poor; 28-34 Poor; 40-44 Fair; 48-52 Good; 57-60 Excellent		QHEI: <30 Very Poor; 31-42 Poor; 43-54 Fair; 55-69 Good; 70-100 Excellent		Min 4.0mg/L Max 12.0mg/L		Max 235CFU/100mL		Min 6.0 Max 9.0		Max 1.6mg/L		Max 0.3mg/L		Max 30.0mg/L		Max 10.4 NTU			

Legend:

# of Sampling Sites	Total # of Samples
Average Value of All Samples	

Honey Creek

IDEM WQ

2001 E. coli-Upper WFWR

		FallCrFieldData.xls					FallCrGenChem.xls		
	Sample Date	Dissolved Oxygen (mg/L)	Water Temperature (C)	pH (SU)	Specific Conductance (uS/cm)	Turbidity (NTU)	Coliforms (Total) (MPN/100mL)	E_ Coli (MPN/100 mL)	E coli
WWU100-0022	6/6/2001 13:15	7.77	17.04	7.86	519	209	> 2419.2	> 2419.2	2419.2
	6/13/2001 10:25	8.02	20	7.8	350	567			
	6/20/2001 10:00	7.98	19.73	8.02	664	9	> 2419.2	461.1	461.1
	6/27/2001 9:55	9	19.14	8.1	709	10	> 2419.2	579.4	579.4
	7/4/2001 10:05	8.16	17.43	7.88	660	7	> 2419.2	2419.17	2419.17
	7/10/2001 13:20	8.86	22.52	8.03	641	8	> 2419.2	> 2419.2	2419.2

2008 Fall Creek IBC Study

		FallCrFieldData.xls					FallCrGenChem.xls															
	Sample Date	Dissolved Oxygen (mg/L)	Water Temperature (C)	Saturation PerCent (%)	pH (SU)	Specific Conductance (uS/cm)	Turbidity (NTU)	Alkalinity (as CaCO3) (mg/L)	Chloride (mg/L)	COD (mg/L)	Cyanide (Total) (mg/L)	Fluoride (mg/L)	Hardness (as CaCO3) (mg/L)	Nitrogen, Ammonia (mg/L)	Nitrogen, Nitrate+Nitrite (mg/L)	Phosphorus, Total (mg/L)	Sulfate (mg/L)	TDS (mg/L)	TKN (mg/L)	TOC (mg/L)	TS (mg/L)	TSS (mg/L)
WWU100-0041	6/16/2008 10:28	8.13	16.67	86.5	7.93	503	83.4	180	15	< 4	< 0.005	0.16	260	< 0.1	8.3	0.11	20	270	0.82	2.6	320	18
	8/11/2008 16:45	6.82	18.33	70	7.82	545	46	300	21	< 4	< 0.005	0.17	350	< 0.1	1.3	< 0.05 (QJ)	49	360	0.8 (fDJ QJ	3.1	400	11 (fDJ)
	10/8/2008 10:43	3.05	14.94	31.2	7.74	687	6.7	300	19	15	< 0.005	0.2	370	0.25	1.4	0.16	46 (fDJ)	330	0.93	7.1	410	6
WWU100-0046	6/16/2008 11:10	8.23	17.89	89.3	7.98	509	89.7	160	14	13	< 0.005	0.16	280	< 0.1	6.3	0.13	26	270	0.68	2.6	340	31
	8/11/2008 17:45	9.48	21.33	104.4	8.26	505	67.1	290	17	< 4	< 0.005	0.2	330	< 0.1	0.77	< 0.05 (QJ)	48	340	0.36 (fDJ Q	2.1	390	6 (fDJ)
	10/8/2008 9:48	7.95	15.29	52	5.06	593	44.9	260	17	11	< 0.005	0.18	340	< 0.1	0.23	0.09	51 (fDJ)	310	0.54	4.4	400	27
WWU100-0047	6/16/2008 12:40	8.02	18.79	86.3	7.82	514	8.9	200	12	9	< 0.005	0.16	280	< 0.1	8.2	0.07	14	270	0.33	1.9	320	9
	8/11/2008 14:45	2.68	18.73	43.4	7.42	473	65.1	260	19	< 4	< 0.005	0.17	300	< 0.1	0.46	< 0.05 (QJ)	9.5	280	0.55 (fDJ Q	3.6	310	4 (fDJ)
	10/8/2008 12:33	3.3	15.94	34.2	7.67	789	201	300	36	240	< 0.005	0.54	420	< 0.1	0.06	0.13	8.1 (fDJ)	450	6.7	59	670	110
WWU100-0104	5/7/2008 11:45	10.14	15.16	106.3	8.01	591	0															
	6/16/2008 12:05	8.3	18.74	91.9	7.91	537	45.6	200	15	9	< 0.005	0.16	280	< 0.1	5.2	0.11	23	280	0.46	2.7	330	29
	8/11/2008 10:30	7.72	15.91	76.4	7.79	534	27.5	300	15	< 4	< 0.005	0.17	350	< 0.1	2.1	< 0.05 (QJ)	32	350	0.71	1.9	400	3 (fDJ)
	10/8/2008 9:02	5.87	15.02	59.3	7.73	622	23.1	290	16	< 4	< 0.005	0.17	360	< 0.1	1.9	< 0.05	36 (fDJ)	340	< 0.3	3.1	390	3
WWU100-0110	6/16/2008 10:20	8.5	17.99	92.7	7.98	511	135	170	17	8	< 0.005	0.18	270	< 0.1	6.2	0.15	22	280	0.67	2.9	350	36
	8/11/2008 17:15	10.06	19.38	103.7	8	510	3.9	320	21	< 4	< 0.005	0.21	300	< 0.1	2.5	< 0.05 (QJ)	27	350	0.37 (fDJ Q	2.1	390	2 (fDJ)
	10/8/2008 11:07	5.72	15.38	58.7	7.94	614	5.8	270	17	6	< 0.005	0.21	360	< 0.1	3	< 0.05	31 (fDJ)	290	< 0.3	3.6	380	12
WWU100-0112	6/16/2008 10:08	8.54	17.93	92.7	7.86	516	44.8	190	19	< 4	< 0.005	0.16	260	< 0.1	7.6	0.09	18	270	0.75	3.2	330	12
	8/11/2008 16:00	8.42	21.06	98	7.95	460	11.2	230	34	< 4	< 0.005	0.17	280	< 0.1	0.1	< 0.05 (QJ)	17	290	0.53 (fDJ Q	4.4	330	3 (fDJ)
	10/8/2008 11:32	1.05	16.3	11.8	7.7	731	40.6	340	40	26	< 0.005	0.29	380	< 0.1	0.02	0.16	14 (fDJ)	390	1.6	10	460	17
WWU100-0113	6/16/2008 10:15	8.77	17.62	99.9	7.45	529	17.4	190	19	< 4	< 0.005	0.16	260	< 0.1	8.4	0.09	16	270	0.98	2.7	320	15
	8/11/2008 15:40	7.84	19.47	83.5	7.67	527	82.4	300	38	< 4	< 0.005	0.16	310	< 0.1	0.27	< 0.05 (QJ)	12	330	0.57 (fDJ Q	4	370	3 (fDJ)
	10/8/2008 12:05	5.9	16.56	63.8	7.85	3160	99.6	280	1000	450 (fDJ)	< 0.005	0.49	310	0.55	0.12	0.25	5 (fDJ)	1800	3.6	12	1900	13
WWU100-0114	5/7/2008 11:17	12.18	15.3	125.6	8.26	573	0															
	6/16/2008 11:00	9.04	18.39	99.2	8.11	529	94.2	190	16	13	< 0.005	0.17	270	< 0.1	5.6	0.12	21	280	0.54	2.7	380	27
	8/11/2008 17:30	9.87	19.59	108	7.98	514	25.4	310	17	< 4	< 0.005	0.2	330	< 0.1	3.4	< 0.05 (QJ)	30	350	< 0.3 (fDJ Q	1.8	360	3 (fDJ)
	10/8/2008 10:00	6.51	15.14	66.5	8.21	614	9.3	290	18	< 4	< 0.005	0.2	350	< 0.1	3.6	< 0.05	34 (fDJ)	310	0.43	2.6	370	1
WWU100-0115	5/7/2008 10:55	13.35	13.79	133.3	8.4	522	12.6															
	6/16/2008 9:45	8.69	17.45	93.3	7.62	472	15.5	180	18	5	< 0.005	0.16	240	< 0.1	7.3	0.12	16	230	0.67	3.6	300	9
	8/11/2008 16:30	11.69	20.8	127.3	8.16	498	13.1	270	35	< 4	< 0.005	0.69	320	< 0.1	0.18	< 0.05 (QJ)	32	360	< 0.3 (fDJ Q	3.1	390	22 (fDJ)
WWU100-0116	6/16/2008 10:40	9.44	17.7	102.1	7.98	514	64.3	190	15	5	< 0.005	0.16	270	< 0.1	7	0.11	24	270	0.5	2.3	350	16
	8/11/2008 18:00	9.05	20.23	105.9	7.98	518	8.7	310	17	< 4	< 0.005	0.22	340	< 0.1	0.66	< 0.05 (QJ)	49	390	0.66 (fDJ Q	2	390	8 (fDJ)
	10/8/2008 10:16	6.28	15.05	63.5	7.93	629	8.5	280	17	10	< 0.005	0.2	370	< 0.1	0.32	< 0.05	54 (fDJ)	310	0.54	3.1	360	4
WWU100-0117	6/16/2008 10:00	6.64	17.32	71	6.64	471	16.7	180	21	11	< 0.005	0.14	230	< 0.1	6.4	0.18	15	260	0.88	4.3	300	17
	8/11/2008 15:15	9.8	19.29	104.1	7.71	585	23.1	300	51	< 4	< 0.005	0.13	320	< 0.1	4.2	< 0.05 (QJ)	17	380	0.43 (fDJ Q	2	380	3 (fDJ)

2008 Upper Fall Creek WQ Monitoring Program

		FallCrFieldData.xls					FallCrGenChem.xls															
	Sample Date	Dissolved Oxygen (mg/L)	Water Temperature (C)	Saturation PerCent (%)	pH (SU)	Specific Conductance (uS/cm)	Turbidity (NTU)	Alkalinity (as CaCO3) (mg/L)	CBOD5 (mg/L)	Chloride (mg/L)	COD (mg/L)	Coliforms (Total) (MPN/100 mL)	E_ Coli (MPN/100 mL)	E coli	Fluoride (mg/L)	Hardness (as CaCO3) (mg/L)	Nitrogen, Ammonia (mg/L)	Nitrogen, Nitrate+Nitrite (mg/L)	Phosphorus, Total (mg/L)	Sulfate (mg/L)	TDS (mg/L)	TKN (mg/L)
WWU100-0104	6/18/2008 9:10	8.26	15.56	85.1	7.95	6.15	11.7	254	< 1	16	7.8				0.2	342	< 0.1	4.7	0.05	26	350	0.3
	6/23/2008 14:30	9.36	18.46	102.6	8.03	612	2.8	282		15	6.9				< 0.1		< 0.1	3.7	0.03	31	366	0.4
	7/8/2008 9:10		19.57		7.88	617	10.7					> 2420	1553.1	1553.1								
	7/15/2008 9:20	8.74	18.36	92.3	7.88	565	14.3					> 2420	1553.1	1553.1								
	7/16/2008 9:35	7.52	19.5	83.8	7.87	598	12.5	255	< 1	15	10.2				0.2	326	< 0.1	3.3	0.08	27	363	0.5
	7/22/2008 9:40	7.92	19.67	86.9	7.53	578	14.4					> 2420	> 2420	2420								
	7/28/2008 13:40	8.19	20.75	94.5	7.92	631	4.2	306 (QJ)		15	8.4				0.2		< 0.1	2.4	0.04	33	379	0.4
	7/29/2008 9:05	8.23	18.43	87.3	7.71	661	5.1					> 2420	1046.2	1046.2								
	8/5/2008 10:10	7.94	19.48	87.1	7.73	550	18.4					> 2420	> 2420	2420								
	8/27/2008 9:18	6.92	16.88	73.5	7.85	664	8.9	297	< 1	15	6.9				0.2	375	< 0.1	2.3	0.03	36	402	0.3
	9/8/2008 15:00	8.69	18.16	94.3	7.9	662	12.2	307		15	5.3				0.2		< 0.1	2.3	< 0.03	37	393	0.2
	9/24/2008 9:55	7.14	15.28	72.5	7.74	673	11.1	298	< 1	14	6.5				0.2	382	< 0.1	2.2	< 0.03	34	390	0.2
	10/22/2008 9:20	8.68	7.51	73.7	7.83	679	9	295	< 1	15	7.4				< 0.1	393	< 0.1	2	< 0.03	33	404	0.3
	11/19/2008 9:30	10.48	3.7	80.6	8.17	694	3.5	302	< 1	17	6.9				< 0.1	364	< 0.1	2.4	< 0.03	40	401	0.3 (DJ)
	12/17/2008 9:45	11.71	2.21	85.9	8.05	639	63	275	< 1	20	6.6				0.1	396	< 0.1	2.2	< 0.03	41	401	0.2
WWU100-0114	6/18/2008 8:50	8.98	15.82	92.9	8.02	60.4	7.3	249	< 1	16	8.2				0.2	334	< 0.1	5.7	0.03	21	347	< 0.1
	6/23/2008 12:00	9.44	17.59	102	8.11	602	2.2	276		15	7.3				< 0.1		< 0.1	4.7	< 0.03	23	362	< 0.1
	7/8/2008 8:45	8.27	20.17		7.84	604	7.1					19863	1169	1169								
	7/15/2008 9:10	8.9	18.91	96.4	7.73	583	29.7					> 2420	770.1	770.1								
	7/16/2008 9:00	8.2	19.66	91.7	8.01	611	6.3	260	< 1	17	6.5				0.2	337	< 0.1	4.2	0.04	22	359	0.3
	7/22/2008 9:25	8.46	20	93.8	7.46	557	27.1					> 2420	> 2420	2420								
	7/28/2008 11:00	8.17	19.45	91.8	8	615	2.3	298 (QJ)		16	7.2				0.2		< 0.1	3.4	< 0.03	25	366	0.3
	7/29/2008 8:55	8.75	19.34	96.1	7.7	639	3.8					> 2420	613.1	613.1								
	8/5/2008 9:55	9.57	19.6	104.7	7.8	549	16.5					> 2420	> 2420	2420								
	8/27/2008 8:45	7.86	16.78	83.3	7.96	661	6.1	295	< 1	13	6.1				0.2	377	< 0.1	4.2	< 0.03	30	399	0.2
	9/8/2008 10:00	8.57	15.97	88.6	7.94	659	1.7	303		13	< 5				0.2		< 0.1	4.2	< 0.03	34	395	0.2
	9/24/2008 9:20	8.15	15.36	83	7.87	665	1.7	293	< 1	12	< 5				0.2	370	< 0.1	4.2	< 0.03	34	388	0.3
	10/22/2008 8:50	9.24	7.59	78.4	7.97	679	0	290	< 1	14	< 5				< 0.1	369	< 0.1	4.2	< 0.03	29	404	0.2
	11/19/2008 8:55	10.82	3.88	83.9	8.14	699	7.1	302	< 1	16	9				< 0.1	377	< 0.1	3.9	< 0.03	36	403	0.4 (DJ)
	12/17/2008 9:10	12.06	2.06	88.3	8.09	711	4	270	< 1	26	5.8				0.1	394	< 0.1	3.7	< 0.03	35	408	< 0.1

2009 Upper Fall Creek WQ Monitoring Program

		FallCrFieldData.xls					FallCrGenChem.xls															
	Sample Date	Dissolved Oxygen (mg/L)	Water Temperature (C)	Saturation PerCent (%)	pH (SU)	Specific Conductance (uS/cm)	Turbidity (NTU)	Alkalinity (as CaCO3) (mg/L)	CBOD5 (mg/L)	Chloride (mg/L)	COD (mg/L)	Fluoride (mg/L)	Hardness (as CaCO3) (mg/L)	Nitrogen, Ammonia (mg/L)	Nitrogen, Nitrate+Nitrite (mg/L)	Phosphorus, Total (mg/L)	Sulfate (mg/L)	TDS (mg/L)	TKN (mg/L)	TOC (mg/L)	TS (mg/L)	TSS (mg/L)
WWU100-0104	2/18/2009 9:25	11.42	4.63	90.7	8	547	12.03	218	< 1	18	7.1	< 0.1	275	< 0.1	3.9	0.05	28	317	0.4	1.8	351	8
	3/11/2009 10:05	10.56	8.26	91.7	8.05	585	12	252	< 1	20	8.7	0.2	343	< 0.1	2.2	< 0.03	35	338	0.3	2.6	382	8
WWU100-0114	2/18/2009 8:52	11.97	4.18	94.1	8.04	523	9.7	202	< 1	21	6.3	0.1	274	< 0.1	4.8	0.04	23	301	0.4	1.8	334	< 4
	3/11/2009 9:40	11.19	8.05	96.6	8.03	568	6.1	235	< 1	23	7.9	0.2	310	< 0.1	3.3	< 0.03	28	326	0.4	2.5	365	5

FallCrMetals.xls

Tss	Aluminum (Total) (ug/L)	Antimony (Total) (ug/L)	Arsenic (Total) (ug/L)	Barium (Total) (ug/L)	Beryllium (Total) (ug/L)	Cadmium (Total) (ug/L)	Calcium (mg/L)	Chromium (Total) (ug/L)	Cobalt (ug/L)	Copper (Total) (ug/L)	Iron (Total) (mg/L)	Lead (Total) (ug/L)	Magnesium (mg/L)	Manganese (Total) (ug/L)	Nickel (Total) (ug/L)	Potassium (mg/L)	Selenium (Total) (ug/L)	Silicon (ug/L)	Silver (Dissolved) (ug/L)	Silver (Total) (ug/L)	Sodium (mg/L)	Thallium (Total) (ug/L)	Zinc (Total) (ug/L)
18	720	< 1	< 5	59	< 1	< 2	64	< 3	0.47	2.3	0.87	< 2	23	35	2.8	2.2	< 4	5600		< 0.3	5.4	< 1	< 6
11	210	< 1	< 5	100	< 1	< 2	84	< 3	< 0.5	< 2	0.32	< 2	33	40	1.9	3.4	< 4	3500		< 0.3	8.6	< 1	< 6
6	110	< 1	< 5	79	< 1	< 2	90	< 3	< 0.5	2.8	0.27	< 2	36	100	2.4	14	< 4	4500		< 0.3	7.7	< 1	7.7
31	1000	< 1	< 5	71	< 1	< 2	70	< 3	0.6	2.6	1.2	< 2	25	55	3.2	2.2	< 4	6000		< 0.3	5	< 1	< 6
3	130	< 1	< 5	97	< 1	< 2	80	< 3	< 0.5	< 2	0.38	< 2	32	41	1.7	1.9	< 4	3800		< 0.3	6.4	< 1	< 6
27	550	< 1	< 5	100	< 1	< 2	84	< 3	< 0.5	2.6	1.1	< 2	33	72	1.9	4.4	< 4	4500		< 0.3	5.4	< 1	7.8
9	170	< 1	< 5	43	< 1	< 2	69	< 3	0.29	< 2	0.2	< 2	25	22	2.2	1.1	< 4	4100		< 0.3	4.8	< 1	< 6
4		< 1	< 5	52	< 1	< 2	72	< 3	< 0.5	< 2		< 2	31		2.2		< 4			< 0.3		< 1	< 6
110	1000	< 1	14	160	< 1	< 2	94	< 3	1.9	4.1	4.8	2.2	45	1300	5.6	26	< 4	12000		< 0.3	13	< 1	14
29	800	< 1	< 5	72	< 1	< 2	73	< 3	0.55	2.3	1	< 2	25	42	3.1	2.2	< 4	5900		< 0.3	5.8	< 1	< 6
3		< 1	< 5	94	< 1	< 2	88	< 3	< 0.5	< 2		< 2	32		1.6		< 4			< 0.3		< 1	< 6
3	71	< 1	< 5	100	< 1	< 2	90	< 3	< 0.5	< 2	0.33	< 2	33	46	< 1.5	3.7	< 4	4900		< 0.3	6.6	< 1	< 6
36	2000	< 1	< 5	67	< 1	< 2	68	< 3	0.73	3.8	1.8	< 2	24	40	3.6	3.1	< 4	8100		< 0.3	6.6	< 1	9.8
2	30	< 1	< 5	79	< 1	< 2	75	< 3	< 0.5	< 2	0.11	< 2	29	13	< 1.5	2.2	< 4	3200		< 0.3	8.4	< 1	< 6
12	98	< 1	< 5	100	< 1	< 2	87	< 3	< 0.5	< 2	0.28	< 2	33	24	< 1.5	4.8	< 4	4600		< 0.3	7.3	< 1	8.6
12	450	< 1	< 5	52	< 1	< 2	66	< 3	0.39	2.1	0.56	< 2	23	36	2.6	2	< 4	4700		< 0.3	7.2	< 1	< 6
3	85	< 1	< 5	62	< 1	< 2	64	< 3	< 0.5	< 2	0.22	< 2	30	36	1.8	2.5	< 4	1500		< 0.3	14	< 1	< 6
17	450	< 1	9.3	110	< 1	< 2	88	< 3	0.5	2.3	0.84	< 2	40	430	2.9	14	< 4	2700		< 0.3	19	< 1	7
15	420	< 1	< 5	47	< 1	< 2	67	< 3	0.42	2	0.55	< 2	24	42	2.6	1.9	< 4	4600		< 0.3	7	< 1	< 6
3		< 1	< 5	48	< 1	< 2	76	< 3	< 0.5	< 2		< 2	30		1.9		< 4			< 0.3		< 1	< 6
13	110	< 1	8.1	160	< 1	< 2	66	< 3	0.57	2.6	0.75	< 2	36	320	3.2	16	< 4	890		< 0.3	660	< 1	9
27	1000	< 1	< 5	65	< 1	< 2	69	< 3	0.57	2.6	1.2	< 2	24	32	3.2	2.4	< 4	5700		< 0.3	6.1	< 1	6
3	60	< 1	< 5	86	< 1	< 2	82	< 3	< 0.5	< 2	0.099	< 2	31	9.3	1.5	2.2	< 4	4000		< 0.3	6.7	< 1	< 6
1	< 20	< 1	< 5	91	< 1	< 2	87	< 3	< 0.5	< 2	0.079	< 2	33	7.9	< 1.5	3.5	< 4	4500		< 0.3	5	< 1	< 6
9	430	< 1	< 5	45	< 1	< 2	59	< 3	0.33	2.2	0.51	< 2	21	24	2.5	2.1	< 4	5300		< 0.3	7.4	< 1	< 6
22	880	< 1	< 5	71	< 1	< 2	78	< 3	0.64	2.6	1.2	< 2	29	63	2.9	2	< 4	4600		< 0.3	18	< 1	< 6
16	620	< 1	< 5	64	< 1	< 2	69	< 3	0.44	2.7	0.81	< 2	25	35	2.8	2.1	< 4	5600		< 0.3	5.1	< 1	< 6
8	140	< 1	< 5	110	< 1	< 2	84	< 3	< 0.5	< 2	0.38	< 2	33	31	1.6	1.8	< 4	3800		< 0.3	5.8	< 1	< 6
4	60	< 1	< 5	120	< 1	< 2	89	< 3	< 0.5	< 2	0.24	< 2	35	29	< 1.5	4.1	< 4	4100		< 0.3	5.3	< 1	< 6
17	540	< 1	< 5	43	< 1	< 2	58	< 3	0.46	2.6	0.68	< 2	21	48	2.7	2.2	< 4	5400		< 0.3	10	< 1	< 6
3		< 1	< 5	55	< 1	< 2	82	< 3	< 0.5	< 2		< 2	28		1.7		< 4			< 0.3		< 1	< 6

FallCrMetals.xls

TOC (mg/L)	TS (mg/L)	TSS (mg/L)	Antimony (Total) (ug/L)	Arsenic (Total) (ug/L)	Barium (Total) (ug/L)	Beryllium (Total) (ug/L)	Cadmium (Total) (ug/L)	Chromium (Total) (ug/L)	Cobalt (ug/L)	Copper (Total) (ug/L)	Iron (Total) (ug/L)	Lead (Total) (ug/L)	Manganese (Total) (ug/L)	Nickel (Total) (ug/L)	Potassium (mg/L)	Selenium (Total) (ug/L)	Silver (Total) (ug/L)	Sodium (mg/L)	Thallium (Total) (ug/L)	Zinc (Total) (ug/L)
3.4	399	10	< 1.8	1.26	76.3	< 1.6	< 1	< 1.2	< 1	1.38	354	< 1	29.3	< 1.4	1.79	< 2.2	< 1	6.73	< 1	6.37
2.5	398	< 4																		
2.6	393	13	< 1.8	1.24	78.3	< 1.6	< 1	< 1.2	< 1		332	< 1	29.7		1.69	< 2.2	< 1	6.64	< 1	< 6
3.3	411	5																		
1.5	429	8	< 1.8	1.42	104	< 1.6	< 1	< 1.2	< 1	1.09	312	< 1	41.1	< 1.4	1.74	< 2.2	< 1	6.18	< 1	< 6
1.8	428	< 4																		
1.9	427	5	< 1.8	1.27	108	< 1.6	< 1	< 1.2	< 1	1.01	302	< 1	46.2	< 1.4	1.87	< 2.2	< 1	5.92	< 1	< 6
2.5	431	< 4	< 1.8	< 1.2	105	< 1.6	< 1	< 1.2	< 1	< 1	344	< 1	42.2	< 1.4	1.95	< 2.2	< 1	6.09	< 1	< 6
2.7	427	< 4	< 1.8	< 1.2	110	< 1.6	< 1	< 1.2	< 1	1.13	414	< 1	41.2	< 1.4	2.91	< 2.2	< 1	6.75	< 1	< 6
2.1	424	< 4	< 1.8	< 1.2	102	< 1.6	< 1	< 1.2	< 1	< 1	341	< 1	49.8	< 1.4	1.51	< 2.2	< 1	8.38	< 1	< 6
3.1	391	< 4	< 1.8	< 1.2	66.3	< 1.6	< 1	< 1.2	< 1	1.3	186	< 1	14.5	< 1.4	1.98	< 2.2	< 1	6.68	< 1	< 6
2.6	389	< 4																		
2.1	394	4	< 1.8	< 1.2	70.4	< 1.6	< 1	< 1.2	< 1		123	< 1	12		1.71	< 2.2	< 1	6.82	< 1	< 6
3.1	399	< 4																		
1	429	< 4	< 1.8	< 1.2	96.8	< 1.6	< 1	< 1.2	< 1	1	84.8	< 1	8.95	< 1.4	1.98	< 2.2	< 1	5.08	< 1	< 6
1.2	423	< 4																		
1.5	420	< 4	< 1.8	< 1.2	99.9	< 1.6	< 1	< 1.2	< 1	< 1	56	< 1	6.54	< 1.4	2.04	< 2.2	< 1	5.15	< 1	< 6
1.9	430	< 4	< 1.8	< 1.2	94.8	< 1.6	< 1	< 1.2	< 1	< 1	46	< 1	5.03	< 1.4	2.08	< 2.2	< 1	5.51	< 1	< 6
2.4	430	< 4	< 1.8	< 1.2	100	< 1.6	< 1	< 1.2	< 1	1.08	80.5	< 1	8.1	< 1.4	3.81	< 2.2	< 1	5.63	< 1	< 6
2.1	429	< 4	< 1.8	< 1.2	92.4	< 1.6	< 1	< 1.2	< 1	1	89.1	< 1	10.4	< 1.4	2	< 2.2	< 1	11.1	< 1	< 6

FallCrMetals.xls

Antimony (Total) (ug/L)	Arsenic (Total) (ug/L)	Barium (Total) (ug/L)	Beryllium (Total) (ug/L)	Cadmium (Total) (ug/L)	Chromium (Total) (ug/L)	Cobalt (ug/L)	Copper (Total) (ug/L)	Iron (Total) (ug/L)	Lead (Dissolved) (ug/L)	Lead (Total) (ug/L)	Manganese (Total) (ug/L)	Nickel (Total) (ug/L)	Potassium (mg/L)	Selenium (Dissolved) (ug/L)	Selenium (Total) (ug/L)	Silver (Total) (ug/L)	Sodium (mg/L)	Thallium (Total) (ug/L)	Zinc (Total) (ug/L)
< 1.8	< 1.2	67.4	< 1.6	< 1	< 1.2	< 1	1.58	326		< 1	35.4	< 1.4	1.58		< 2.2	< 1	7.27	< 1	< 6
< 1.8	< 1.2	82	< 1.6	< 1	< 1.2	< 1	1.45	307		< 1	43	< 1.4	1.58		< 2.2	< 1	8.12	< 1	< 6
< 1.8	< 1.2	53.2	< 1.6	< 1	< 1.2	< 1	1.68	217		< 1	14.4	< 1.4	1.5		< 2.2	< 1	7.97	< 1	< 6
< 1.8	< 1.2	67.1	< 1.6	< 1	< 1.2	< 1	1.5	163		< 1	14.7	< 1.4	1.58		< 2.2	< 1	9.48	< 1	< 6

Sly Fork

IDEM WQ

2008 Fall Creek IBC Study

		FallCrFieldData.xls						FallCrGenChem.xls								
	Sample Date	Dissolved Oxygen (mg/L)	Water Temperature (C)	Saturation PerCent (%)	pH (SU)	Specific Conductance (uS/cm)	Turbidity (NTU)	Alkalinity (as CaCO3) (mg/L)	Chloride (mg/L)	COD (mg/L)	Cyanide (Total) (mg/L)	Fluoride (mg/L)	Hardness (as CaCO3) (mg/L)	Nitrogen, Ammonia (mg/L)	Nitrogen, Nitrate+Nitrite (mg/L)	Phosphorus, Total (mg/L)
WWU100-0084	5/7/2008 14:40	11.09	15.39	113.9	8.08	662	23.7									
	6/16/2008 15:15	7.7	19.72	86.6	7.79	620	35	250	30	< 4	< 0.005	0.15	320	< 0.1	2.4	0.12
	8/12/2008 10:24							280	30	< 4 (fDJ)	< 0.005 (Q	0.17	360	< 0.1	1.4	< 0.05 (QJ
	10/7/2008 12:23	8.02	14.4	80.2	8.02	678	35	300	30	< 4	< 0.005	0.15	370	< 0.1	1.2	< 0.05 (QJ
WWU100-0088	6/16/2008 15:05	7.51	19.93	85	7.83	632	41.5	250	32	5	< 0.005	0.12	320	< 0.1	2.4	0.1
	8/12/2008 10:52							260	31	< 4 (fDJ)	< 0.005 (Q	0.16	350	< 0.1	1.5	< 0.05 (QJ
	10/7/2008 12:47	8.36	14.73	86.1	8	671	24.4	270	30	< 4	< 0.005	0.16	360	< 0.1	1.3	< 0.05
WWU100-0090	6/16/2008 11:40	8.15	18.3	88.8	7.86	625	15.5	250	35	14	< 0.005	0.16	310	< 0.1	3	0.07
	8/12/2008 13:13							260	36	4 (fDJ)	< 0.005 (Q	0.16	330	< 0.1	2.1	< 0.05 (QJ
	10/7/2008 15:37	7.63	15.77	77.3	8.01	648	41.7	240	34	< 4	< 0.005	0.14	340	< 0.1	2.4	< 0.05
WWU100-0091	5/7/2008 14:25	10.09	15.33	103.5	8.09	672	18.7									
	5/8/2008 12:55	8.44	13.54	83.7	7.74	607	39.7									
	6/16/2008 14:55	7.86	19.94	89	7.81	634	22.6	250	34	10	< 0.005	0.1	310	< 0.1	2.6	0.11
	8/12/2008 12:37							260	38	< 4 (fDJ)	< 0.005 (Q	0.17	360	< 0.1	1.7	< 0.05 (QJ
	10/7/2008 16:00	7.42	15.07	75.6	7.96	681	26.8	260	38	< 4	< 0.005	0.14	350	< 0.1	1.6	< 0.05
WWU100-0097	5/7/2008 13:40	11.67	12.15	113.8	7.64	645	9.6									
	6/16/2008 11:25	8.41	16.27	87.6	7.42	603	17.9	260	18	6	< 0.005	0.18	320	< 0.1	4.4	0.06
	8/12/2008 13:52							250	15	< 4 (fDJ)	< 0.005 (Q	0.17	360	< 0.1	4.1	< 0.05 (QJ
	10/7/2008 15:18	9.72	16.4	102.4	7.85	653	23.8	270	16	< 4	< 0.005	0.16	370	< 0.1	4.9	< 0.05

2008 Upper Fall Creek WQ Monitoring Program

		FallCrFieldData.xls															FallCr
	Sample Date	Dissolved Oxygen (mg/L)	Water Temperature (C)	Saturation PerCent (%)	pH (SU)	Specific Conductance (uS/cm)	Turbidity (NTU)	Alkalinity (as CaCO3) (mg/L)	CBOD5 (mg/L)	Chloride (mg/L)	COD (mg/L)	Coliforms (Total) (MPN/100 mL)	E_ Coli (MPN/100 mL)	Fluoride (mg/L)	Hardness (as CaCO3) (mg/L)	Nitrogen, Ammonia (mg/L)
WWU100-0084	6/18/2008 10:45	8.02	15.81	83.2	7.98	675	26.8	266	< 1	30	11.4			0.2	338	< 0.1
	6/25/2008 8:00	7.5	17.38	79.8	7.99	678	25	290		31	11.4			< 0.1		< 0.1
	7/8/2008 10:55		19.97		7.88	679	16.5					> 2420	920.8			
	7/15/2008 10:45	8.76	19.1	96.3	7.72	621	43.1					> 2420	816.4			
	7/16/2008 11:15	7.58	19.66	84.6	7.97	657	33.5	265	< 1	28	12.2			0.2	345	< 0.1
	7/22/2008 11:05	8.29	20.52	92.2	7.43	454	95.9					> 24200	24192			
	7/29/2008 10:20	8.86	19.65	97.2	7.71	709	8.7					> 2420	435.2			
	7/30/2008 8:00	6.5	20.32	74.3	7.89	695	14.8	312 (QJ)		31	10			0.2		< 0.1
	8/5/2008 11:30	8.87	19.86	97.4	7.79	562	84.8					> 24200	2909			
	8/27/2008 10:40	8.31	17.8	90.1	8.13	707	9.2	293	< 1	31	8.5			0.1	376	< 0.1
	9/9/2008 8:30	7.15	17.36	76.3	7.89	658	18.9	273		29	10.5			0.1		< 0.1
	9/24/2008 11:30	7.68	16.96	80.8	8.05	707	11.2	290	1	29	8.1			0.1	394	< 0.1
	10/22/2008 10:41	8.78	7.63	74.6	8.12	722	8.1	296	1	28	9.1			< 0.1	394	< 0.1
	11/19/2008 10:50	12.14	2.5	90.3	8.33	740	9.5	292	< 1	29	10.6			< 0.1	390	< 0.1
	12/17/2008 11:10	13.19	1.03	94	8.2	738	9.4	267	< 1	32	7.8			0.1	382	< 0.1

2009 Upper Fall Creek WQ Monitoring Program

		FallCrFieldData.xls														FallCrGenChem.xls
	Sample Date	Dissolved Oxygen (mg/L)	Water Temperature (C)	Saturation PerCent (%)	pH (SU)	Specific Conductance (uS/cm)	Turbidity (NTU)	Alkalinity (as CaCO3) (mg/L)	CBOD5 (mg/L)	Chloride (mg/L)	COD (mg/L)	Fluoride (mg/L)	Hardness (as CaCO3) (mg/L)	Nitrogen, Ammonia (mg/L)	Nitrogen, Nitrate+Nitrite (mg/L)	Phosphorus, Total (mg/L)
WWU100-0084	2/18/2009 10:47	11.07	5.06	89.3	8	626	12.6	242	< 1	30	8.6	< 0.1	336	< 0.1	2.5	0.04
	3/11/2009 11:17	11.59	8.64	101.5	8.23	685	15.3	274	< 1	38	12.3	0.1	378	< 0.1	1.4	0.04

DO	8.878666667
E. Coli	5854.68
pH	7.907
Nitrate+Niti	2.118518519
Total P	0.065294118
TSS	13.72
Turbidity	26.42580645
Atrazine	4.025

Sulfate (mg/L)	TDS (mg/L)	TKN (mg/L)	TOC (mg/L)	TS (mg/L)	TSS (mg/L)	Atrazine (Aatrex) (ug/L)
30	340	0.88	3.5	410	42	1.7 (QJ)
35	370	0.63 (QJ)	2.3	420	8	
41	410	0.63 (QJ fI	2.4	460	9	
30	350	0.53	3.4	420	31	
37	400	0.54	2.1	400	3	
43	370	0.42	2.2	440	5	
32	340	0.68	2.3	390	18	
40	380	< 0.3	1.8	430	4	
48	380	0.5	2	420	22	
						9.9 (QJ)
31	340	0.78	3.5	410	31	2 (QJ)
39	410	0.66	2.2	420	1	
44	400	0.54	2.3	440	7	
39	300	0.82	1.9	370	8	2.5 (QJ)
50	380	< 0.3	< 1	380	2	
54	390	0.35	1	440	7	

GenChem.xls

Nitrogen, Nitrate+Nitrite (mg/L)	Phosphorus, Total (mg/L)	Sulfate (mg/L)	TDS (mg/L)	TKN (mg/L)	TOC (mg/L)	TS (mg/L)	TSS (mg/L)
2.6	0.08	29	392	0.5	3.8	447	29
2.1	0.07	34	405	0.5	2.4	475	31
2.5	0.06	33	391	0.4	2.7	440	24
1.8	0.06	39	418	0.5	3.6	462	4
1.4	0.04	39	438	0.2	1.7	454	7
1.4	0.08	40	392	0.4	2.6	452	20
1.3	0.05	42	416	0.3	2.2	443	8
0.9	0.06	35	423	0.3	3.2	453	5
1.1	0.04	49	433	0.4 (DJ)	3.3	465	< 4
1.2	0.03	48	434	0.3	3.1	457	< 4

Sulfate (mg/L)	TDS (mg/L)	TKN (mg/L)	TOC (mg/L)	TS (mg/L)	TSS (mg/L)
39	360	0.4	2.2	396	8
40	398	0.4	2.9	437	9

Deer Creek

IDEM WQ

1996 Synoptic

FallCrFieldData.xls

	Sample Date	Dissolved Oxygen (mg/L)	Water Temperature (C)	pH (SU)	Specific Conductance (uS/cm)	Turbidity (NTU)	Alkalinity (as CaCO3) (mg/L)
WWU100-0C02	2/21/1996 15:21	13	7.09	8	281.6	12.6	270
	4/23/1996 14:30	10.7	8.89	7.8	101.76	0.68	90
	5/30/1996 14:05	10.19	17.04	7.92	593.75	24.7	220 (Q)
	7/9/1996 15:30	8.91	21.26	7.98	686	15.69	270
	10/2/1996 13:17	7.01	18.81	7.71		36.7	310
	11/13/1996 10:51	11.22	4.01	7.88	668	19.1	290 (Q)
WWU100-0C03	2/21/1996 15:45	13.1	6.3	8.3	269.399	12.5	260
	4/23/1996 13:54	10	9	7.8	106.199	580	100
	5/30/1996 14:30	10.97	16.79	8.27	573	12.19	220 (JQ)
	7/9/1996 15:15	9.36	20.63	8.19	644	5.69	270
	10/2/1996 13:30	9.26	18.27	8.09	632	7.69	280
	11/13/1996 11:00	12.3	3.21	8.13	613.099	15.3	270 (JQ)

FallCrGenChem.xls

	Sample Date	Chloride (mg/L)	E_Coli (CFU/100 mL)	E Coli	Hardness (as CaCO3) (mg/L)	Phosphorus, Total (mg/L)	P	Sulfate (mg/L)	TDS (mg/L)	TKN (mg/L)	TOC (mg/L)	TPH - IR (mg/L)	TS (mg/L)	TSS (mg/L)
WWU100-0C02	2/21/1996 15:21	30.50 (JH)		50	410	0.059		0.059	52	370 0.7 (B)		2.2 < 1 (U)		410 < 4 (U)
	4/23/1996 14:30	13			165 1 (B)			1	18	200 4.4 (B)		8.8 < 1 (U)		880 710
	5/30/1996 14:05	23 200 (JH)		200	310	0.068		0.068 39 (B)		360 1 (B)		3		390 8
	7/9/1996 15:30	29			370	0.12		0.12	49	390 0.38 (JH)		1.8		430 7
	10/2/1996 13:17	33	200	200	370	0.12		0.12	52	430 0.5		3		480 22
	11/13/1996 10:51	29	550	550	330	0.071		0.071	49	400 0.73		2.8		410 < 4 (U)
WWU100-0C03	2/21/1996 15:45	24 90 (JH)		90	360	0.049		0.049	62	350 0.36 (B)		2 < 1 (U)		390 < 4 (U)
	4/23/1996 13:54	13			280 0.55 (B)			0.55	19	200 5.3 (B)		15 < 1 (U)		1000 680
	5/30/1996 14:30	20 60 (JH)		60	270	0.04		0.04 54 (B)		370 0.96 (B)		3		410 < 4 (U)
	7/9/1996 15:15	20			360	0.068		0.068	72	390 0.23 (JH)		1.6		420 < 4 (U)
	10/2/1996 13:30	22	250	250	350	0.051		0.051	56	370 0.31		2.6		420 < 4 (U)
	11/13/1996 11:00	24	310	310	310	0.051		0.051	49	390 0.49		2.1		400 < 4 (U)

2001 Corvallis

FallCrFieldData.xls

	Sample Date	Dissolved Oxygen (mg/L)	Water Temperature (C)	Saturation PerCent (%)	pH (SU)	Specific Conductance (uS/cm)	Turbidity (NTU)
WWU100-0C13	5/23/2001 17:00	9.3	15.3	98.19	8.25	663	27.89
	7/24/2001 8:15	7.18	22.05	85.59	8.02	671	15
	9/18/2001 9:00	8.02	16.15	84.4	7.84	706	6.19

FallCrGenChem.xls

	Sample Date	AFDM (g/M2)	Alkalinity (as CaCO3) (mg/L)	Chloride (mg/L)	Chlorophyll a - Periphyton (mg/M2)	Chlorophyll a - Phytoplankton (ug/L)	COD (mg/L)	Cyanide (Total) (mg/L)	Hardness (as CaCO3) (mg/L)	Nitrogen, Ammonia (mg/L)	Nitrogen, Nitrate+Nitrite (mg/L)	Phaeophyton - Periphyton (attached) (mg/M2)	Phaeophyton - Phytoplankton (suspended) (ug/L)	Phosphorus, Total (mg/L)
WWU100-0C13	5/23/2001 17:00		240	30			6.6	< 0.005	332	< 0.1		10		0.051
	7/24/2001 8:15	29.63333	270	27	56.04	1.54	12	< 0.005 (Q	329	< 0.1	2.2 (DJ)	68.71333	1.653333	0.057
	9/18/2001 9:00	26.5	310	27	14.79667	0.843333	< 5	< 0.005	344	< 0.1		2	2.046667	1.22	0.063

2008 Fall Creek IBC Study

FallCrFieldData.xls

	Sample Date	Dissolved Oxygen (mg/L)	Water Temperature (C)	Saturation PerCent (%)	pH (SU)	Specific Conductance (uS/cm)	Turbidity (NTU)
WWU100-0C87	5/7/2008 14:51	11.11	15.97	115.7	8.31	577	7.5
	6/16/2008 15:30	8.45	20.46	96.9	8.07	542	20
	8/12/2008 9:41						
	10/7/2008 12:33	7.76	13.98	75.7	8.23	678	12.7
WWU100-0C92	6/16/2008 14:35	8.95	24.35	110.8	8.42	453	22.5
	8/12/2008 11:19						
	10/7/2008 13:00	5.86	17.75	63.7	8.41	453	11.2
WWU100-0C94	5/7/2008 9:51	10.46	13.07	102.7	8.06	576	5.6
	6/16/2008 11:30	8.16	17.91	89	5.7	525	27.5
	8/12/2008 11:20						
	10/7/2008 13:37	5.03	14.75	50.5	8.12	605	113
WWU100-0C95	6/16/2008 11:15	7.52	17.62	86.4	7.75	542	79.3
	8/12/2008 12:50						
	10/6/2008 13:54	0.5	13.97	5.2	8.39	1970	5999
WWU100-0C98	6/16/2008 1:35	7.66	18.88	82.7	7.89	557	67
	8/11/2008 9:20	6.34	16.07	68.1	7.75	559	57.7
	10/8/2008 8:20	5.23	15.38	53.5	7.52	732	7
WWU100-0C99	5/7/2008 13:10	9.99	13.74	99.6	8.06	607	
	6/16/2008 14:10	8.73	17.33	93.7	7.95	550	14.2
	8/11/2008 8:30	8.7	14.86	86.5	7.81	573	4.7
	10/7/2008 13:18	7.78	13.81	77.5	7.88	701	13.6
WWU100-0100	6/16/2008 12:50	8.79	18.8	97.1	7.95	548	59
	8/11/2008 10:15	8.6	16.45	89.8	7.78	607	8.5
	10/8/2008 8:43	7.2	15.96	74.7	7.94	712	15.1
WWU100-0101	6/16/2008 1:20	9.39	18.8	103.8	8.12	503	13.6
	8/11/2008 11:30	9.94	17.62	105.7	8.21	533	16
	10/8/2008 13:39	6.82	15.83	69.2	8.09	615	15.7
WWU100-0103	6/16/2008 11:00	7.71	17.59	83.3	7.54	503	16
	8/11/2008 13:00	10.18	17.63	106.4	8.01	552	
	10/8/2008 14:45	6.75	16.08	100.8	8.03	647	7
WWU100-0105	5/7/2008 12:16	11.08	16.17	115.9	8.33	559	60.1
	6/16/2008 13:05	10.1	20.73	114	8.05	501	82.4
	8/11/2008 10:50	6.75	17.11	70.4	7.79	542	18.5
	10/8/2008 13:24	5.1	15.87	51.9	7.86	652	23.7
WWU100-0106	5/7/2008 12:48	10.57	15.54	109.5	8.1	607	1.3
	6/16/2008 13:50	8.09	19.31	90.2	7.92	563	59.8
	8/11/2008 9:08	7.19	16.64	75.4	7.81	556	24.3
	10/7/2008 14:52	8.41	14.68	84.7	8.06	723	18.3
WWU100-0107	6/16/2008 10:30	10.35	17.23	117.7	7.55	539	53.6
	8/11/2008 12:00	9.13	18.26	99.9	8.21	562	7.2
	10/8/2008 13:56	3.16	15.56	25.1	7.79	680	13.6
WWU100-0108	5/7/2008 10:36	11.27	12.68	109.8	7.98	592	8.5
	6/16/2008 10:45	8	16.5	83.9	7.63	553	13.4
	8/11/2008 12:30	8.32	16.96	89.4	7.74	560	9.6
	10/8/2008 14:16	7.56	15.61	73.9	7.93	663	21.3
WWU100-0109	6/16/2008 12:15	7.1	17.46	77.5	7.62	541	17.9
	8/12/2008 11:50						
	10/8/2008 14:32	6.15	16.28	63.5	8.06	640	14.1

FallCrGenChem.xls

	Sample Date	Alkalinity (as CaCO3) (mg/L)	Chloride (mg/L)	COD (mg/L)	Cyanide (Total) (mg/L)	Fluoride (mg/L)	Hardness (as CaCO3) (mg/L)	Nitrogen, Ammonia (mg/L)	Nitrogen, Nitrate+Nitrite (mg/L)	Phosphorus, Total (mg/L)	P	Sulfate (mg/L)	TDS (mg/L)	TKN (mg/L)
WWU100-0C87	5/7/2008 14:51													
	6/16/2008 15:30	230	18	< 4	< 0.005	0.19	290	< 0.1		4	0.09	0.09	24	300 0.6
	8/12/2008 9:41	260	21	< 4 (fDJ)	< 0.005 (Q	0.26	340	< 0.1		1.6	< 0.05 (QJ)		31	360 0.61
	10/7/2008 12:33	300	30	< 4	< 0.005	0.21	360	< 0.1		1.7	< 0.05 (QJ)		38	380 0.54 (QJ fD
WWU100-0C92	6/16/2008 14:35	180	21	8	< 0.005	0.13	230	< 0.1		4	0.1	0.1	16	240 0.81
	8/12/2008 11:19	180	22	23 (fDJ)	< 0.005 (Q	0.17	220	< 0.1		0.15	0.09 (QJ)	0.09	16	230 2.4
	10/7/2008 13:00	190	26	42	< 0.005	0.19	230	< 0.1		0.01	0.15	0.15	18	260 1.1
WWU100-0C94	5/7/2008 9:51													
	6/16/2008 11:30	180	27	14	< 0.005	0.18	260	< 0.1		8.1	0.12	0.12	17	260 0.56
	8/12/2008 11:20	280	27	< 4 (fDJ)	< 0.005 (Q	0.27	350	< 0.1		1.8	< 0.05 (QJ)		20	370 0.58
	10/7/2008 13:37	300	22	46	< 0.005	0.42	330	< 0.1		0.01	1.9 (QJ)	1.9 <		350 1.8 (QJ fDJ
WWU100-0C95	6/16/2008 11:15	160	37	18	< 0.005	0.15	250	< 0.1		8.9	0.18	0.18	16	270 0.63
	8/12/2008 12:50	280	76	4 (fDJ)	< 0.005 (Q	0.21	340	< 0.1		0.21	0.07 (QJ)	0.07	14	440 1.9 (fDJ)
	10/6/2008 13:54	140	100	540	< 0.005	0.46	800		80	0.03	4.5 (QJ)	4.5 <		880 81
WWU100-0C98	6/16/2008 1:35	190	20	9	< 0.005	0.15	290	< 0.1		5.3	0.18	0.18	26	300 0.91
	8/11/2008 9:20	330	23	< 4	< 0.005	0.18	< 1	< 0.1		2.6	< 0.05 (QJ)		37	350 0.69
	10/8/2008 8:20	270	44	6	< 0.005	0.22	360		0.12	2.9	0.13	0.13	39 (fDJ)	380 1.1
WWU100-0C99	5/7/2008 13:10													
	6/16/2008 14:10	230	17	< 4	< 0.005	0.16	290	< 0.1		3.7	0.07	0.07	24	290 0.51
	8/11/2008 8:30	340	24	< 4	< 0.005	0.25	390	< 0.1		0.87	< 0.05 (QJ)		38	390 0.31 (fDJ)
	10/7/2008 13:18	320	27	< 4	< 0.005	0.22	390	< 0.1		1.2	< 0.05		41	470 0.35
WWU100-0100	6/16/2008 12:50	180	16	8	< 0.005	0.19	280	< 0.1		5.2	0.14	0.14	23	290 0.76
	8/11/2008 10:15	310	35	< 4	< 0.005	0.22	370	< 0.1		3.9	< 0.05 (QJ)		44	390 0.45
	10/8/2008 8:43	260	46	5	< 0.005	0.29	330	< 0.1		3.4	0.28	0.28	40 (fDJ)	370 < 0.3
WWU100-0101	6/16/2008 1:20	200	14	9	< 0.005	0.19	270	< 0.1		4.5	0.08	0.08	26	280 0.65
	8/11/2008 11:30	280	21	< 4	< 0.005	0.35	360	< 0.1		0.68	< 0.05 (QJ)		44	360 0.35
	10/8/2008 13:39	230	26	5	< 0.005	0.38	340	< 0.1		0.41	0.12	0.12	55 (fDJ)	330 < 0.3
WWU100-0103	6/16/2008 11:00	190	12	4	< 0.005	0.23	260	< 0.1		4.6	0.11	0.11	27	270 0.52
	8/11/2008 13:00	310	17	< 4	< 0.005	0.38	370	< 0.1		0.73	< 0.05 (QJ)		49	410 < 0.3
	10/8/2008 14:45	290	17	< 4	< 0.005	0.43	380	< 0.1		0.02	< 0.05		59 (fDJ)	370 < 0.3
WWU100-0105	5/7/2008 12:16													
	6/16/2008 13:05	170	19	12	< 0.005	0.19	260	< 0.1		7.1	0.15	0.15	22	260 1.1
	8/11/2008 10:50	290	33	< 4	< 0.005	0.2	340	< 0.1		0.61	< 0.05 (QJ)		32	350 0.69
	10/8/2008 13:24	260	35	7	< 0.005	0.19	350	< 0.1		0.92	< 0.05		36 (fDJ)	340 < 0.3
WWU100-0106	5/7/2008 12:48													
	6/16/2008 13:50	200	19	5	< 0.005	0.14	310	< 0.1		5.1	0.14	0.14	25	310 0.75
	8/11/2008 9:08	320	24	< 4	< 0.005	0.18	360	< 0.1		2.4	< 0.05 (QJ)		38	350 0.63 (fDJ)
	10/7/2008 14:52	290	37	< 4	< 0.005	0.21	370	< 0.1		2.5	< 0.05		41 (fDJ)	390 < 0.3
WWU100-0107	6/16/2008 10:30	180	20	5	< 0.005	0.19	280	< 0.1		8.9	0.13	0.13	23	280 0.54
	8/11/2008 12:00	330	35 (HJ QJ)	< 4	< 0.005	0.27	350	< 0.1		0.58	< 0.05 (QJ)		35	370 0.37
	10/8/2008 13:56	300	35	28	< 0.005	0.49	330	< 0.1		0.01	0.2	0.2	15 (fDJ)	360 0.5
WWU100-0108	5/7/2008 10:36													
	6/16/2008 10:45	230	14	< 4	< 0.005	0.24	290	< 0.1		5.3	0.06	0.06	30	270 0.35
	8/11/2008 12:30	290	18	< 4	< 0.005	0.4	390	< 0.1		0.7	< 0.05 (QJ)		54	390 0.33 (fDJ C
	10/8/2008 14:16	290	16	< 4	< 0.005	0.47	380	< 0.1		0.05	< 0.05		59 (fDJ)	360 < 0.3
WWU100-0109	6/16/2008 12:15	240	14	9	< 0.005	0.16	290	< 0.1		7.3	0.06	0.06	20	280 0.4
	8/12/2008 11:50	270	18	< 4 (fDJ)	< 0.005 (Q	0.15	350	< 0.1		3.1	< 0.05 (QJ)		31	340 0.3
	10/8/2008 14:32	250	22	8	< 0.005	0.14	360	< 0.1		4	< 0.05		37 (fDJ)	340 1.4

2008 Upper Fall Creek WQ Monitoring Program

		FallCrFieldData.xls						FallCrGenChem.xls													
	Sample Date	Dissolved Oxygen (mg/L)	Water Temperature (C)	Saturation PerCent (%)	pH (SU)	Specific Conductance (uS/cm)	Turbidity (NTU)	Alkalinity (as CaCO3) (mg/L)	CBOD5 (mg/L)	Chloride (mg/L)	COD (mg/L)	Coliforms (Total) (MPN/100 mL)	E. Coli (MPN/100 mL)	Fluoride (mg/L)	Hardness (as CaCO3) (mg/L)	Nitrogen, Ammonia (mg/L)	Nitrogen, Nitrate+Nitrite (mg/L)	Phosphorus, Total (mg/L)	P		Sulfate (mg/L)
WWU100-0087	6/18/2008 10:25	8.57	16.39	89.9	8.13	607	11.7	251	< 1	18	9			0.2	306	< 0.1		3.8	0.05	0.05	26
	6/25/2008 10:00	7.67	17.87	83.7	8.11	622	5.4	282		20	6.5			0.1		< 0.1		2.7	0.03	0.03	31
	7/8/2008 10:40		20.57		7.99	605	9.5					> 2420	488.4								
	7/15/2008 10:35	9.4	19.7	102.9	7.83	565	17.2					> 2420	686.7								
	7/16/2008 11:00	8.1	20.33	91.7	8.12	600	10.6	254	< 1	19	9			0.2	324	< 0.1		2.8	0.06	0.06	24
	7/22/2008 10:55	8.18	21.65	92.7	7.46	394	75.5					> 24200	> 24200								
	7/29/2008 10:15	8.8	20.13	97	7.75	638	16.4					> 2420	488.4								
	7/30/2008 10:00	6.44	20.56	74	8	636	16.4	303 (QJ)		21	8			0.2		< 0.1		1.9	0.05	0.05	29
	8/5/2008 11:20	8.66	19.99	95.5	7.84	553	30.2					> 24200	3654								
	8/27/2008 10:25	7.8	17.85	84.6	8.14	669	13.5	292	< 1	22	5.7			0.2	361	< 0.1		1.8	0.04	0.04	34
	9/9/2008 10:30	7.35	17.28	78.2	8	636	12.2	281		22	9.7			0.2		< 0.1		1.8	0.06	0.06	35
	9/24/2008 11:10	7.64	16.22	79.3	7.99	693	4.7	296	< 1	24	< 5			0.3	383	< 0.1		1.7	0.04	0.04	39
	10/22/2008 10:30	9.13	8.06	78.5	8.02	709	3.2	294	< 1	26	6.6			0.2	391	< 0.1		1.5	< 0.03		35
	11/19/2008 10:33	11.82	3.13	89.5	8.41	686	3.1	293	< 1	23	6.1			0.1	382	< 0.1		2.2	< 0.03		36
	12/17/2008 11:00	13.17	1.54	95.1	8.3	683	7	267	< 1	24	5.8			0.4	372	< 0.1		1.8	< 0.03		35
WWU100-0099	6/18/2008 10:05	8.75	14.76	88.6	8.04	626	5.7	260	< 1	18	7.3			0.2	347	< 0.1		3	0.03	0.03	28
	6/24/2008 15:00	8.44	16.31	88.5	8.05	647	1.7	294		20	5.3			0.2		< 0.1		2.2	< 0.03		32
	7/8/2008 10:25		19.08		7.98	611	4.9					> 2420	365.4								
	7/15/2008 10:20	9.28	17.98	94.6	7.75	605	4.2					> 2420	146.4								
	7/16/2008 10:35	8.21	18.67	89.8	8.02	640	5.5	278	< 1	19	5.7			0.2	345	< 0.1		2	0.04	0.04	31
	7/22/2008 10:40	8.81	19.65	96.3	7.47	338	155					> 24200	8164								
	7/29/2008 10:00	7.64	18.24	84.1	7.93	675	2.6					> 2420	178.5								
	7/29/2008 11:30	9.17	18.57	98.1	7.71	684	3.7	316 (QJ)		22	5.6			0.3		< 0.1		1.2	0.03	0.03	36
	8/5/2008 11:05	9	19.43	97.8	7.84	505	72.6					> 24200	6867								
	8/27/2008 10:05	8.42	15.79	87.4	8.02	717	5.9	309	< 1	26	6.1			0.2	387	< 0.1		1.2	< 0.03		40
	9/9/2008 15:30	8.46	16.14	88	7.89	692	3.6	304		26	6.5			0.2		< 0.1		1	< 0.03		43
	9/24/2008 10:55	8.26	10.83	83	7.83	732	7.2	312	< 1	26	< 5			0.3	402	< 0.1		1.3	< 0.03		44
	10/22/2008 10:10	9.03	8.04	77.4	7.85	740	0.6	310	< 1	27	5.4			0.2	392	< 0.1		1.2	< 0.03		36
	11/19/2008 10:14	10.03	4.69	83.9	8.17	743	7.4	312	< 1	28	< 5			0.1	399	< 0.1		1.2	< 0.03		42
	12/17/2008 10:40	12.17	2.48	90.2	8.14	737	4.5	283	< 1	27	9.1			0.2	385	< 0.1		1.5	< 0.03		50
WWU100-0105	6/18/2008 9:25	8.55	16.17	89.3	8.01	603	14.5	229	< 1	23	9.4			0.2	317	< 0.1		6.4	0.06	0.06	22
	6/24/2008 9:20	8.13	16.77	86.3	7.97	611	4.6	261		24	8.2			0.1		< 0.1		4.4	0.04	0.04	24
	7/8/2008 9:45		21.11		7.91	621	8.7					> 2420	1203.3								
	7/15/2008 9:50	8.55	18.99	92.3	7.71	554	36.2					> 2420	1119.9								
	7/16/2008 9:50	7.87	20.57	90.1	7.95	600	11.8	241	< 1	22	9			0.2	320	< 0.1		3.7	0.07	0.07	26
	7/22/2008 10:10	8.42	20.14	93.3	7.6	325	100.2					> 24200	17329								
	7/28/2008 15:50	10.45	25.17	131.1	8.34	599	8.4	274 (QJ)		29	12			0.2		< 0.1		1.5	0.04	0.04	27
	7/29/2008 9:35	8.32	20.93	93.9	7.67	662	14.3					> 2420	686.7								
	8/5/2008 10:35	8.92	20.5	99.2	7.71	559	29.2					> 24200	6488								
	8/27/2008 9:35	4.93	18.4	54.1	7.72	683	15.1	278	< 1	32	8.5			0.2	360	< 0.1		1	< 0.03		37
	9/8/2008 13:00	11.19	19.39	124.3	8.03	690	1.4	293		33	6.9			0.2		< 0.1		1.2	< 0.03		39
	9/24/2008 10:15	6.18	16.5	64.5	7.71	710	10.4	286	< 1	32	6.9			0.2	380	< 0.1		1.3	< 0.03		39
	10/22/2008 9:38	7.71	8.38	66.7	7.88	719	3.6	284	< 1	33	5.4			0.1	394	< 0.1		1.4	< 0.03		36
	11/19/2008 9:43	10.7	2.51	79.7	8.2	751	3.2	293	< 1	40	9		< 0.1		390	< 0.1		1.3	< 0.03		41
	12/17/2008 10:00	12.44	1.12	88.7	8.09	756	2.7	268	< 1	43	7.8			0.2	387	< 0.1		1.5	< 0.03		42
WWU100-0121	6/18/2008 9:45	9.2	17.81	99.6	8.27	596	3.2	239	< 1	14	9.4			0.2	318	< 0.1		3.1	0.06	0.06	30
	6/24/2008 12:30		19.78		8	604	10.4	274		15	7.8			0.2		< 0.1		2.4	0.04	0.04	31
	7/8/2008 10:10	9.46	18.6	103	7.77	609	7.7					> 2420	488.4								
	7/15/2008 10:10	8.55	19.81	95.8	8.22	623	6.9					> 2420	613.1								
	7/16/2008 10:15	8.65	19.83	95.1	7.44	341	193.9	267	< 1	16	6.1			0.2	349	< 0.1		2.3	0.04	0.04	35
	7/22/2008 10:25	7.46	19.36	83.6	8.05	634	4.2					> 24200	15531								
	7/29/2008 9:00	8.74	19.41	95	7.76	649	6.1	297 (QJ)		17	6.4			0.3		< 0.1		1	< 0.03		37
	7/29/2008 9:45	8.68	20.27	96.1	7.84	513	66					> 2420	365.4								
	8/5/2008 10:50	8.1	18.22	88.6	8.13	657	5.2					> 24200	2351								
	8/27/2008 9:50	9.03	18.25	98.1	8.13	622	4.7	280	< 1	20	6.1			0.3	347	< 0.1		0.4	< 0.03		42
	9/9/2008 13:00	7.82	17.2	82.7	8	668	3.5	270		20	8.9			0.3		< 0.1		0.2	< 0.03		49
	9/24/2008 10:35	9.31	8.14	80.1	8.06	702	2	280	1.2	21	6.9			0.3	386	< 0.1		0.1	< 0.03		49
	10/22/2008 9:57	12.12	2.72	90.7	8.44	6.81	3.4	292	< 1	23	5.4			0.2	398	< 0.1	< 0.1		< 0.03		44
	11/19/2008 10:00	14.03	0.94	99.8	8.38	684	3.7	284	< 1	23	6.9			0.2	392	< 0.1	< 0.1		< 0.03		48
	12/17/2008 10:25	8.87	16.03	92.3	8.2	574	11.7	259	< 1	23	5.8			0.2	384	< 0.1		0.4	< 0.03		53

2009 Upper Fall Creek WQ Monitoring Program

		FallCrFieldData.xls						FallCrGenChem.xls														
	Sample Date	Dissolved Oxygen (mg/L)	Water Temperature (C)	Saturation PerCent (%)	pH (SU)	Specific Conductance (uS/cm)	Turbidity (NTU)	Alkalinity (as CaCO3) (mg/L)	CBOD5 (mg/L)	Chloride (mg/L)	COD (mg/L)	Fluoride (mg/L)	Hardness (as CaCO3) (mg/L)	Nitrogen, Ammonia (mg/L)	Nitrogen, Nitrate+Nitrite (mg/L)	Phosphorus, Total (mg/L)	P		Sulfate (mg/L)	TDS (mg/L)	TKN (mg/L)
WWU100-0087	2/18/2009 10:35	11.6	4.91	93.1	8.2	564	12.7	224	< 1	21	9.8	0.1	301	< 0.1		3.4	0.05		0.05	32	324	0.4
	3/11/2009 11:04	12.21	9.02	108	8.41	602	16	257	< 1	24	7.1	0.2	350	< 0.1		2.1	< 0.03			36	350	0.3
WWU100-0099	2/18/2009 10:17	11.83	4.85	94.7	8.19	552	6.1	218	< 1	21	5.5	0.2	302	< 0.1		3.6	< 0.03			33	315	0.3
	3/11/2009 10:50	12.02	7.6	102.6	8.26	616	7.1	262	< 1	23	7.1	0.2	366	< 0.1		1.9	< 0.03			39	360	0.2
WWU100-0105	2/18/2009 9:40	11.9	4.35	94.2	8.07	537	9.8	200	< 1	24	8.2	0.1	288	< 0.1		4.4	0.05		0.05	30	311	0.4
	3/11/2009 10:17	11.73	7.79	100.7	8.23	575	8.7	227	1.3	31	10.3	0.2	320	< 0.1		2.8	< 0.03			33	335	0.3
WWU100-0121	2/18/2009 10:00	12.11	4.67	96.6	8.27	538	19.5	210	< 1	18	7.8	0.2	298	< 0.1		3.4	0.05		0.05	38	317	0.4
	3/11/2009 10:35	12.42	7.88	106.8	8.46	607	11.1	254	< 1	22	6.7	0.3	366	< 0.1		1.8	< 0.03			44	351	0.3

Sultate (mg/L)	TDS (mg/L)	TKN (mg/L)	TOC (mg/L)	Total POC (mg/L)	TS (mg/L)	TSS (mg/L)
16 (QJ)	400	0.5 (QJ)	2.4		380	7
42	390	0.62	2.7	1.612	410	9
44	390 (DJ)	0.32	2.1	0.365	410	< 4

TOC (mg/L)	TS (mg/L)	TSS (mg/L)	TSS	Atrazine (Aatrex) (ug/L)
2.6	360	23	23	1.6 (QJ)
1.8	380	4	4	
1.9	430	3	3	
3.8	300	10	10	
5	260	11	11	
6.4	310	5	5	
3.2	310	19	19	2.5 (QJ)
2.8	410	17	17	
13	420	45	45	
2.8	350	28	28	
5.6	500	21	21	
2.9	2100	1500 (HJ)		
2.6	380	30	30	
1.9	410	4 (fDJ)	4	
4.3	460	5	5	
2.4	330	5	5	< 0.28 (QJ)
2	440	1 (fDJ)	1	
1.5	440	< 1		
2.8	340	36	36	
2.1	430	3 (fDJ)	3	
3.4	430	5	5	
2.8	320	15	15	
1.8	390	2 (fDJ)	2	
5	370	5	5	
2.8	340	11	11	
1.6	400	1 (fDJ)	1	
2.8	410	2	2	
3.4	340	39	39	2.3 (QJ)
2.6	390	< 1 (fDJ)		
3.5	390	1	1	
2.6	360	32	32	< 0.28 (QJ)
2	450	15 (fDJ)	15	
1.9	470	9	9	
3	370	33	33	
2.9	430	2 (fDJ)	2	
14	390	6	6	
1.8	370	12	12	1.3 (QJ)
1.6	420	< 1 (fDJ)		
2	420	4	4	
1.8	330	12	12	
1.9	400	14	14	
4.7	410	8	8	

TDS (mg/L)	TKN (mg/L)	TOC (mg/L)	TS (mg/L)	TSS (mg/L)
348	0.4	3.2	400	9
369	0.2	2.7	400	6
357	0.2	2.4	393	10
394	0.2	2.8	421	17
403	0.2	1.3	424	4
380	0.4	2.4	415	17
400	0.2	1.8	431	< 4
414	0.2	2.8	442	< 4
391	0.2 (DJ)	1.8	417	< 4
395	0.1	2	412	< 4
358	0.3	2.9	401	< 4
385	0.2	2.2	412	< 4
378	0.3	1.8	406	< 4
409	0.2	2.7	445	4
443	0.1	1.2	461	< 4
420	0.2	1.7	436	< 4
430	0.1	1.5	458	< 4
439	0.1	1.9	469	4
423	0.1 (DJ)	1.3	456	< 4
435	< 0.1	1.6	452	< 4
346	0.5	3.5	397	8
364	0.2	3.2	393	< 4
356	0.5	2.6	400	22
370	0.4	4	411	10
396	0.3	1.7	430	< 4
402	0.3	1.8	436	< 4
404	0.3	2	440	< 4
419	0.2	2.5	450	< 4
425	0.3 (DJ)	2.6	452	< 4
431	0.2	2.8	457	< 4
340	0.3	3.2	384	7
365	0.4	2.9	390	< 4
373	0.3	2	405	6
385	0.3	2.5	426	4
395	0.2	1.2	419	< 4
374	0.2	2	409	5
393	0.2	1.8	423	< 4
417	0.2	2.4	448	< 4
393	0.2 (DJ)	1.9	416	< 4
397	0.2	1.9	422	< 4

TOC (mg/L)	TS (mg/L)	TSS (mg/L)
2	358	7
2.2	380	5
1.6	345	< 4
2	403	< 4
2	341	4
2.9	375	5
2	347	7
2.2	392	4

Prairie Creek

IDEM WQ

1996 Watershed

FallCrFieldData.xls / FallCrGenChem.xls

	Sample Date	Dissolved Oxygen (mg/L)	Water Temperature (C)	pH (SU)	Specific Conductance (uS/cm)	Turbidity (NTU)	Alkalinity (as CaCO3) (mg/L)	Chloride (mg/L)	E_Coli (CFU/100 mL)	Hardness (as CaCO3) (mg/L)	Phosphorus Total (mg/L)	Sulfate (mg/L)	TDS (mg/L)	TKN (mg/L)	TOC (mg/L)	TS (mg/L)	TSS (mg/L)
WWU100-0029	8/5/1996 12:00	9.53	20.57	8.07	668	2.09	290	27	600 (JH)	330	0.047	46	440	0.16 (Q)	1.5	440	< 4 (U)

2001 E. coli-Upper WFWR

FallCrFieldData.xls / FallCrGenChem.xls

	Sample Date	Dissolved Oxygen (mg/L)	Water Temperature (C)	pH (SU)	Specific Conductance (uS/cm)	Turbidity (NTU)	Coliforms (Total) (MPN/100mL)	E_Coli (MPN/100 mL)
WWU100-0023	8/6/2001 13:35	8.57	18.67	8.01	614	143	> 2419.2	> 2419.2
	6/13/2001	7.82	20.51	7.82	556	392		
	6/20/2001 10:20	7.92	20.03	8.03	693	15	> 2419.2	613.1
	6/27/2001 10:15	8.47	19.42	8.07	733	11	> 2419.2	816.4
	7/4/2001 10:30	8.65	17.62	7.98	668	12	> 2419.2	> 2419.2
	7/10/2001 13:40	8.4	22.68	7.96	645	12	> 2419.2	1046.24

2008 FallCreek IBC Study

FallCrFieldData.xls / FallCrGenChem.xls

	Sample Date	Dissolved Oxygen (mg/L)	Water Temperature (C)	Saturation PerCent (%)	pH (SU)	Specific Conductance (uS/cm)	Turbidity (NTU)	Alkalinity (as CaCO3) (mg/L)	Chloride (mg/L)	COD (mg/L)	Cyanide (Total) (mg/L)	Fluoride (mg/L)	Hardness (as CaCO3) (mg/L)	Nitrogen, Ammonia (mg/L)	Nitrogen, Nitrate+Nitrite (mg/L)	Phosphorus Total (mg/L)	Sulfate (mg/L)	TDS (mg/L)	TKN (mg/L)	TOC (mg/L)	TS (mg/L)	TSS (mg/L)	Atrazine (Aatrex) (ug/L)
WWU100-0072	5/7/2008	7.87	17.69	75.4	7.96	920	59.5																
	6/17/2008 11:10	6.7	19.1	74.8	7.71	727	49.3	240	52	18	< 0.005	0.18	340	0.15	0.89	0.11	88	420	0.85	4.8	530	46	
	8/11/2008 12:16							200	76	8 (IDJ)	< 0.005 (Q	0.22	370	< 0.1	0.75	< 0.05 (QJ	110	530	0.84 (QJ)	3.1	560	3	
	10/7/2008 8:05	7.08	15.41	72.8	8.21	1077	82.9	220	150	< 4	< 0.005	0.23	410	< 0.1	0.38	< 0.05 (QJ	120	630	0.86 (QJ IE	3.5	720	42	
WWU100-0076	5/7/2008	7.75	17.57	82.8	7.86	1049	5999																
	6/17/2008 10:45	4.9	18.18	53.6	7.43	807	28.7	270	68	27	< 0.005	0.16	350	0.29	0.38	0.12	67	480	1.3	5.8	580	31	
	8/11/2008 16:00							280	130	14 (IDJ)	< 0.005 (Q	0.16	400	< 0.1	0.2	< 0.05 (QJ	84	610	0.81 (QJ)	4.1	720	86 (IDJ)	
	10/7/2008 9:26	7.78	15.14	82.2	7.8	1495	57.6	300	150	24	< 0.005	0.16	470	0.1	0.15	< 0.05 (QJ	120	850	0.96 (QJ IE	4.1	950	26	
WWU100-0078	5/7/2008	10.7	15.98	114.7	8.15	616	13.1																
	6/16/2008 16:05	8.26	20.85	94.6	7.94	572	26	250	25	12	< 0.005	0.18	300	< 0.1	3.3	0.1	24	330	0.58	2.9	380	32	1.7 (QJ)
	8/11/2008 16:54							250	28	10 (IDJ)	< 0.005 (Q	0.2	350	< 0.1	1.2	0.07 (QJ)	35	360	0.52 (QJ)	2.3	490	94 (IDJ)	
	10/7/2008 9:56	7.72	13.36	75.8	8.1	680	5.5	300	34	< 4	< 0.005	0.21	370	< 0.1	1.4	< 0.05 (QJ	37	360	0.59 (QJ IE	1.9	450	8	
WWU100-0080	5/7/2008	10.17	16.15	108.7	8.21	620	3.3																
	6/17/2008 11:30	8.77	17.78	95	8	588	23.4	250	27	12	< 0.005	0.18	310	< 0.1	3.2	0.1	27	330	0.55	2.8	360	23	2.1 (QJ)
	8/11/2008 11:00							270	29	< 4 (IDJ)	< 0.005 (Q	0.18	340	< 0.1	1.5	< 0.05 (QJ	34	380	0.74 (QJ)	2.2	400	< 1 (IDJ)	
	10/7/2008 7:45	9.04	13.8	87.6	8.19	663	1.6	270	32	< 4	< 0.005	0.21	360	< 0.1	1.4	< 0.05 (QJ	38	380	0.35 (QJ IE	1.9	430	5	
WWU100-0083	6/16/2008 15:50	8.44	20.4	96.3	7.98	565	26.7	220	21	5	< 0.005	0.21	310	< 0.1	3.6	0.1	25	300	0.65	2.8	410	32	
	8/12/2008 8:35							280	24	< 4 (IDJ)	< 0.005 (Q	0.21	330	< 0.1	1.4	< 0.05 (QJ	32	360	0.99 (QJ)	2	410	5	
	10/7/2008 12:05	8.96	13.87	88.8	8.17	672	11.5	310	30	< 4	< 0.005	0.23	360	< 0.1	1.4	< 0.05 (QJ	40	400	0.81 (QJ IE	2	440	4	

2008 Upper Fall Creek WQ Monitoring Program

FallCrFieldData.xls / FallCrGenChem.xls

	Sample Date	Dissolved Oxygen (mg/L)	Water Temperature (C)	Saturation PerCent (%)	pH (SU)	Specific Conductance (uS/cm)	Turbidity (NTU)	Alkalinity (as CaCO3) (mg/L)	CBOD5 (mg/L)	Chloride (mg/L)	COD (mg/L)	Coliforms (Total) (MPN/100 mL)	E_Coli (MPN/100 mL)	Fluoride (mg/L)	Hardness (as CaCO3) (mg/L)	Nitrogen, Ammonia (mg/L)	Nitrogen, Nitrate+Nitrite (mg/L)	Phosphorus Total (mg/L)	Sulfate (mg/L)	TDS (mg/L)	TKN (mg/L)	TOC (mg/L)	TS (mg/L)	TSS (mg/L)
WWU100-0072	6/18/2008 13:00	6.8	19.2	75.7	7.79	782	45.4	234	< 1	55	18.4			0.2	362	0.1	1	0.08	81	468	0.8	5.2	587	43
	8/25/2008 14:00	7.1	22.29	84.1	7.87	836	15.6	254		71	11.8		< 0.1		< 0.1		0.7	0.03	91	540	0.5	3.4	578	20
	7/8/2008 13:10		23.48	51.2	7.79	868	10.7					> 2420	261.3											
	7/15/2008 12:30	8.6	22.93	100.6	7.77	813	34.1					> 2420	613.1											
	7/16/2008 13:15	6.98	23.6	84.3	7.94	853	29.5	249	< 1	69	12.2			0.1	405	< 0.1	0.7	0.04	97	523	0.4	3	582	21
	7/22/2008 12:40	6.79	22.73	77.5	7.43	466	83					> 24200	12997											
	7/29/2008 12:05	7.14	24.9	89.1	7.77	793	9.3					> 2420	191.8											
	7/29/2008 15:50	7.91	23.24	92.9	7.74	837	10.2	251 (QJ)		63	12			0.2		< 0.1	0.6	< 0.03	96	500	0.4	4.2	588	8
	8/5/2008 13:25	8.39	22.09	96.6	7.88	722	20.5					> 24200	7701											
	8/27/2008 12:35	7.75	22	91.4	8.01	853	4.2	195	< 1	98	10.5			0.2	329	< 0.1	0.3	< 0.03	94	499	0.3	2.5	557	6
	9/15/2008 12:30	6.6	19.05	73.6	7.82	907	29.1	237		100	9.7			0.3		< 0.1	0.8	< 0.03		625	0.5 (DJ)	2.6	694	27
	9/24/2008 13:35	8.12	20.98	92.9	7.94	880	14.8	185	< 1	102	8.5			0.2	343	< 0.1	0.6	< 0.03	101	535	0.5	2.6	572	13
	10/22/2008 12:25	9.74	10.23	88.2	8.15	921	26.9	213	< 1	97	7.8			0.2	380	< 0.1	0.5	< 0.03	100	551	0.3	2.6	590	4
	11/19/2008 12:40	14.02	3.78	108.1	8.84	819	17.6	209	< 1	59	11			0.1	352	< 0.1	0.6	< 0.03	99	486	0.3 (DJ)	2.4	529	5
	12/17/2008 13:00	14.57	1.15	104.4	8.35	1029	14.6	247	< 1	93	9.9			0.1	436	< 0.1	0.8	0.03	126	611	0.5	2.8	658	6
WWU100-0080	6/18/2008 13:20	8.48	17.5	91	8.12	635	22	254	< 1	26	13.5			0.2	333	< 0.1	3	0.07	25	363	0.4	3.6	415	17
	6/25/2008 16:00	9.17	19.96	103.6	8.19	639	4	280		27	7.8		< 0.1			< 0.1	2.3	0.03	35	383	0.3	2.3	419	5
	7/8/2008 12:50		21.22	55.3	7.97	639	11.5					> 2420	613.1											
	7/15/2008 12:05	9.07	20.48	101.5	7.84	592	8.98					> 2420	727											
	7/16/2008 13:35	8.63	21.44	99.8	8.22	627	14	258	< 1	26	9			0.2	356	< 0.1	2.6	0.06	31	377	0.2	2.3	417	14
	7/22/2008 12:15	7.91	21.8	90.2	7.34	384	111.2					> 24200	24192											
	7/29/2008 11:40	8.35	21.04	96.8	8.1	656	12.8					> 2420	214.1											
	7/29/2008 14:00	9.12	20.82	102.1	7.81	671	5.7	300 (QJ)		28	7.2			0.2		< 0.1	1.9	0.04	34	401	0.2	2.7	437	10
	8/5/2008 13:05	8.42	20.86	94.4	7.87	568	44.5					> 24200	2909											
	8/27/2008 13:00	10.18	19.68	114.7	8.33	674	5.5	283	< 1	29	7.7			0.2	373	< 0.1	1.4	0.03	33	426	0.2	1.4	435	5
	9/10/2008 14:00	9.4	17.38	100.2	8.18	657	5.4	273		29	7.7			0.2		< 0.1	1.5	0.04	34	387	0.3	2	414	< 4
	9/24/2008 14:00	9.57	16.6	104.3	8.27	689	1.6	286	< 1	28	6.5			0.2	367	< 0.1	1.5	0.04	34	403	0.3	1.9	434	4
	10/22/2008 12:45	11.59	9.18	102.4	8.34	689	1.2	284	< 1	30	7.8			0.2	374	< 0.1	1	< 0.03	33	408	0.2	3	439	< 4
	11/19/2008 13:03	13.76	3.12	104.2	8.67	697	5	284	< 1	29	< 5			0.1	375	< 0.1	1.7	< 0.03	41	399	0.3 (DJ)	2.4	430	< 4
	12/17/2008 13:20	14.83	0.8	105.1	8.46	713	8	260	< 1	32	7.8			0.1	393	< 0.1	1.6	< 0.03	40	414	0.3	2.1	436	< 4

2009 Upper Fall Creek WQ Monitoring Program

FallCrFieldData.xls / FallCrGenChem.xls

	Sample Date	Dissolved Oxygen (mg/L)	Water Temperature (C)	Saturation PerCent (%)	pH (SU)	Specific Conductance (uS/cm)	Turbidity (NTU)	Alkalinity (as CaCO3) (mg/L)	CBOD5 (mg/L)	Chloride (mg/L)	COD (mg/L)	Fluoride (mg/L)	Hardness (as CaCO3) (mg/L)	Nitrogen, Ammonia (mg/L)	Nitrogen, Nitrate+Nitrite (mg/L)	Phosphorus Total (mg/L)	Sulfate (mg/L)	TDS (mg/L)	TKN (mg/L)	TOC (mg/L)	TS (mg/L)	TSS (mg/L)
WWU100-0072	2/18/2009 12:28	11.55	5.26	93.7	8.02	871	22.7	251	< 1	66	13.3	< 0.1	390	< 0.1	1.3	< 0.03	114	518	0.5	2.9	561	9
	3/11/2009 13:05	12.59	9.82	113.4	8.21	1007	20.5	293	< 1	92	11.5	0.2	447	0.2	0.8	< 0.03	108	607	0.7	3.3	654	8
WWU100-0080	2/18/2009 12:48	11.9	5.38	96.5	8.2	612	14.8	238	< 1	29	11.8	< 0.1	338	< 0.1	2.9	0.05	35	349	0.4	1.9	387	8
	3/11/2009 13:25	13.75	9.61	123.3	8.55	647	8.4	260	1	34	7.9	0.2	358	< 0.1	1.6	< 0.03	38	368	0.4	2.3	414	6

Lick Creek
IDEM WQ
2001 E. coli-Upper WFWR

	Sample Date	Dissolved Oxygen (mg/L)	Water Temperature (C)	pH (SU)	Specific Conductance (uS/cm)	Turbidity (NTU)	Coliforms (Total) (MPN/100mL)	E_Coli (MPN/100 mL)
WWU100-0007	6/6/2001 13:55	8.78	16.95	7.82	609	88	> 2419.2	2419.2
	6/13/2001	9.01	20.89	7.96	632	105		
	6/20/2001 10:35	7.98	19.77	8.01	725	18	> 2419.2	727
	6/27/2001 10:30	9.72	20.72	8.18	752	14	> 2419.2	980.4
	7/4/2001 10:50	7.88	18.11	7.78	659	26	> 2419.2	> 2419.2
	7/10/2001 13:55	9.37	23.27	8.05	646	9	> 2419.2	517.2

2006 Corvallis

	Sample Date	Dissolved Oxygen (mg/L)	Water Temperature (C)	Saturation PerCent (%)	pH (SU)	Specific Conductance (uS/cm)	Turbidity (NTU)	Alkalinity (as CaCO3) (mg/L)	Chloride (mg/L)	COD (mg/L)	Cyanide (Total) (mg/L)	Hardness (as CaCO3) (mg/L)	Nitrogen, Ammonia (mg/L)	Nitrogen, Nitrate+Nitrite (mg/L)	Phosphorus, Total (mg/L)	Sulfate (mg/L)	TDS (mg/L)	TKN (mg/L)	TOC (mg/L)	TS (mg/L)	TSS (mg/L)
WWU100-0038	5/8/2006 10:15	11.33	13.31	110.1	7.81	605	2.85	250	27	< 5	< 0.02	320	< 0.1	3.1	0.06	24	350	0.9	1.81	360	< 10
	7/10/2006 16:30	10.62	21.44	129.7	8.16	601	2.9	260	21	< 10	< 0.02	300	< 0.1	3.3	< 0.05	26	330	< 0.5 (QJ)	1.9	360	< 10
	9/5/2006 17:30	9.61	18.9	106.3	8.06	609	1.8	257	20	< 10 (Q)	< 0.02	320	< 0.1	1.8	0.13	38	320		1.64	360	< 10

2006 Corvallis E. coli

	Sample Date	Dissolved Oxygen (mg/L)	Water Temperature (C)	Saturation PerCent (%)	pH (SU)	Specific Conductance (uS/cm)	Turbidity (NTU)	Coliforms (Total) (MPN/100 mL)	E_Coli (MPN/100 mL)
WWU100-0038	4/10/2006 14:15	13.83	12.88	131.3	8.09	675	0	> 2420	325.5
	4/17/2006 14:15	9.41	15.83	95.2	7.74	457	62.1	> 24200	1553.1
	4/24/2006 14:35	14.53	16.44	149	8.21	672	5	> 2420	178.9
	5/1/2006 14:15	11.64	13.63	112.2	8.09	695	6.2	> 2420	285.1
	5/8/2006 14:25	13.6	16.83	140.4	8.32	612	4	> 2420	307.6

2008 Fall Creek IBC Study

	Sample Date	Dissolved Oxygen (mg/L)	Water Temperature (C)	Saturation PerCent (%)	pH (SU)	Specific Conductance (uS/cm)	Turbidity (NTU)	Alkalinity (as CaCO3) (mg/L)	Chloride (mg/L)	COD (mg/L)	Cyanide (Total) (mg/L)	Fluoride (mg/L)	Hardness (as CaCO3) (mg/L)	Nitrogen, Ammonia (mg/L)	Nitrogen, Nitrate+Nitrite (mg/L)	Phosphorus Total (mg/L)	Sulfate (mg/L)	TDS (mg/L)	TKN (mg/L)	TOC (mg/L)	TS (mg/L)	TSS (mg/L)	Atrazine (Aatrex) (ug/L)
WWU100-0038	6/16/2008 14:30	7.57	20.96	89.5	7.65	531	108	160	27	< 4	< 0.005	0.14	260	< 0.1		4.7	0.12	25	270	0.67	3	330	17
	8/12/2008 10:15							270	24	< 4 (IDJ)	< 0.005 (Q	0.2	340	< 0.1		1.7	< 0.05 (QJ	29	340	< 0.3	1.7	350	10
	10/7/2008 10:41	3.63	12.19	32.6	7.6	672	306	330	36	15	< 0.005	0.17	380	1.3		0.21	0.16 (QJ)	22	410	2.4 (QJ ID.	4.2	570	140
WWU100-0075	5/7/2008	10.4	15.75	106.4	7.64	596	10.8																1.2 (QJ)
	6/17/2008 12:30	6.4	18.36	91.9	7.94	550	22.4	230	23	10	< 0.005	0.17	280	< 0.1		2.9	0.09	24	320	0.62	3.1	330	21.2 (QJ)
	8/11/2008 14:40							310	24	< 4 (IDJ)	< 0.005	0.17	320	< 0.1		1.5	< 0.05 (QJ	31	320	0.44	2	390	3 (IDJ)
	10/6/2008 14:26	9.16	15.03	93.3	8.21	605	23.3	260	24	< 4 (IDJ)	< 0.005	0.22	340	< 0.1		1.2	< 0.05	36	320		2.3	400	2
WWU100-0077	6/16/2008 16:30	6.09	22.08	72.5	7.77	539	34.8	200	23	13	< 0.005	0.17	280	< 0.1		2.8	0.14	24	280	0.79	3.4	360	33
	8/11/2008 15:35							290	26	< 4	< 0.005	0.18	320	< 0.1		1.5	< 0.05 (QJ	32	320	< 0.3 (IDJ)	2.1	400	5 (IDJ)
	10/6/2008 14:43	9.93	17.34	106.7	8.13	612	47.4	270	26	9 (IDJ)	< 0.005	0.23	340	< 0.1		1.3	< 0.05	37	340		2.2	400	5
WWU100-0079	5/7/2008	10.02	16.01	105	7.59	615	6.1																< 0.28 (QJ)
	6/16/2008 16:00	6.11	22.14	75.4	7.83	546	14.5	210	25	7	< 0.005	0.17	290	< 0.1		2.5	0.12	24	280	0.79	3.5	360	13.2 (QJ)
	8/11/2008 16:30							290	26	< 4	< 0.005	0.18	330	< 0.1		1.3	< 0.05 (QJ	31	380	0.31 (IDJ)	2.1	400	3 (IDJ)
	10/6/2008 15:00	7.18	13.44	70.1	7.99	638	18.5	290	27	8 (IDJ)	< 0.005	0.23	350	< 0.1		0.94	< 0.05	36	340		2.3	420	13
WWU100-0081	6/16/2008 15:45	7.56	22.18	89.4	7.79	548	14.5	200	26	10	< 0.005	0.16	270	< 0.1		2.4	0.11	23	270	0.44	3.8	350	16
	8/12/2008 9:00							270	30	< 4 (IDJ)	< 0.005 (Q	0.19	320	< 0.1		1.1	0.06 (QJ)	30	370	0.46	2	370	9
	10/6/2008 15:17	11.82	17.49	126.1	8.31	634	36.3	290	30	< 4 (IDJ)	< 0.005	0.24	340	< 0.1		0.88	< 0.05	33	330		2.3	410	3
WWU100-0082	5/7/2008	10.26	14.45	104.3	7.52	634	1.6																< 0.28 (QJ)
	6/16/2008 15:30	6.04	19.74	68	7.55	564	16	230	26	12	< 0.005	0.17	280	< 0.1		3	0.08	25	280	0.82	3.1	350	11 < 0.28 (QJ)
	8/11/2008 13:45	7.68	18.66	80.7	7.74	558	3.4	320	30	< 4	< 0.005	0.2	330	< 0.1		1.1	< 0.05 (QJ	36	370	< 0.3 (IDJ)	1.8	430	2 (IDJ)
	10/7/2008 10:18	5.51	13.4	53.6	8.19	716	20.6	300	44	8 (IDJ)	< 0.005	0.26	380	< 0.1		0.77	0.05	43	410		2.1	480	13
WWU100-0086	5/7/2008	9.5	13.16	93.3	7.97	554	0																
	6/16/2008 15:00	7.73	20.07	87.3	7.59	524	4.8	220	17	< 4	< 0.005	0.11	290	< 0.1		3.2	0.08	19	270	0.57	2.9	310	8 2.8 (QJ)
	8/12/2008 10:45							260	28	< 4 (IDJ)	< 0.005 (Q	0.18	340	< 0.1		0.59	0.05 (QJ)	28	340	1	1.9	380	15
	10/7/2008 11:10	3.33	13.35	30.9	7.84	862	20.8	320	74	15	< 0.005	0.14	390	0.11		0.04	0.08 (QJ)	40	480	0.85 (QJ IE	4.9	580	24
WWU100-0089	6/16/2008 14:00	8.42	20.56	96.9	7.98	565	13.5	190	33	5	< 0.005	0.15	280	< 0.1		5.6	0.06	30	300	0.59	3	340	6
	8/12/2008 13:30							230	42	6 (IDJ)	< 0.005 (Q	0.25	300	< 0.1		0.53	< 0.05 (QJ	25	320	0.58 (IDJ)	2.9	340	2

2008 Upper Fall Creek WQ Monitoring Program

	Sample Date	Dissolved Oxygen (mg/L)	Water Temperature (C)	Saturation PerCent (%)	pH (SU)	Specific Conductance (uS/cm)	Turbidity (NTU)	Alkalinity (as CaCO3) (mg/L)	CBOD5 (mg/L)	Chloride (mg/L)	COD (mg/L)	Coliforms (Total) (MPN/100 mL)	E_Coli (MPN/100 mL)	Fluoride (mg/L)	Hardness (as CaCO3) (mg/L)	Nitrogen, Ammonia (mg/L)	Nitrogen Nitrate+Nitrite (mg/L)	Phosphorus, Total (mg/L)	Sulfate (mg/L)	TDS (mg/L)	TKN (mg/L)	TOC (mg/L)	TS (mg/L)	TSS (mg/L)	
WWU100-0075	6/18/2008 11:35	7.9	17.38	84.4	7.99	588	22.9	296	< 1	22	12.2			0.2	309	< 0.1		3.1	0.09	25	336	0.5	4.3	394	20
	7/8/2008 11:55		21.32		7.9	576	33					24192	359												
	7/10/2008 11:20	6.66	19.66	74.9	7.88	535	38.6	228		20	13.5			0.2		< 0.1		2.7	0.1	22	319	0.8	3.3	378	41
	7/15/2008 11:20	8.39	20.44	94.9	7.79	592	49					> 2420	387.3												
	7/16/2008 12:00	7.38	21.44	85.2	8.05	618	28.7	254	< 1	24	9			0.1	326	< 0.1		2.4	0.07	27	383	0.3	2.2	415	25
	7/22/2008 11:35	7.83	20.98	88	7.29	270	77.5					> 24200	17329												
	7/29/2008 10:55	8.43	21	94.7	7.74	647	18					> 2420	214.3												
	8/5/2008 12:00	7.95	20.96	89.3	7.73	523	47.3					> 24200	17329												
	8/12/2008 10:20	6.9	18.3	75.1	8.08	641	12.9	283		26	9.7			0.2		< 0.1		1.6	0.05	28	386	0.3	2.3	432	11
	8/27/2008 11:30	7.5	19.89	85.1	8.14	655	3.2	269	< 1	30	7.3			0.2	334	< 0.1		1.4	0.04	35	394	0.2	1.8	415	< 4
	9/15/2008 14:30	7.21	18.72	80	8	612	4.2	278		24	9.3			0.3		< 0.1		1.3	0.05		401	0.2 (DJ)	2.4	417	< 4
	9/24/2008 12:20	7.5	18.52	81.5	8.03	631	3.1	264	< 1	24	6.5			0.2	345	< 0.1		1.2	0.04	37	366	0.3	2.3	394	< 4
	10/22/2008 11:22	9.14	9.01	80.3	8.16	645	8	267	< 1	23	7.4			0.2	343	< 0.1		0.8	0.04	30	369	0.3	3.2	390	< 4
	11/19/2008 11:35	12.98	2.15	85.7	8.51	672	7.9	274	< 1	27	7.8		< 0.1		366	< 0.1		1.2	< 0.03	38	380	0.3 (DJ)	2.6	411	< 4
	12/17/2008 12:00	14.23	0.08	98.6	8.51	683	5.4	256	< 1	28	< 5			0.1	358	< 0.1		1.4	< 0.03	42	393	0.2	1.8	419	< 4
WWU100-0082	6/18/2008 11:08	8.04	15.95	83.4	7.95	633	7.2	249	< 1	27	8.2			0.2	332	< 0.1		3	0.05	29	365	0.4	3.4	402	5
	7/8/2008 11:10		19.84		7.85	632	6.5					> 2420	816.4												
	7/10/2008 9:00	6.56	17.55	70.4	7.74	610	8.5	257		26	10.2			0.2		< 0.1		2.5	0.06	28	354	0.6	2.8	394	11
	7/15/2008 11:00	8.84	19.18	97	7.73	641	5.8					> 2420	1046.2												
	7/16/2008 11:35	7.81	19.39	86.6	8.01	657	10	266	< 1	29	6.5			0.2	328	< 0.1		2	0.04	34	390	0.2	2	420	5
	7/22/2008 11:20	8.93	20.68	99.6	7.42	274	187					> 24200	17329												
	7/29/2008 10:35	8.72	19.08	94.5	7.7	688	5					> 2420	435.2												
	8/5/2008 11:40	8.63	19.54	94.4	7.73	546	79.5					> 24200	10462												
	8/12/2008 8:20	7.19	16.05	74.8	7.99	695	6.8	299		32	6.9			0.2		< 0.1		1.2	0.04	33	426	0.2	1.7	434	6
	8/27/2008 11:00	7.62	17.57	82.2	8.15	721	15.5	293	< 1	36	< 5			0.2	373	< 0.1		1.1	0.04	43	426	0.2	1.3	454	< 4
	9/15/2008 10:00	5.75	17.58	61.9	7.83	681	5.1	294		39	8.5			0.2		< 0.1		0.8	0.04		453	0.3 (DJ)	2.4	455	< 4
	9/24/2008 11:50	7.36	16.74	78.1	8.02	723	19.5	290	< 1	36	6.1			0.3	381	< 0.1		0.9	0.05	38	423	0.2	2	450	< 4
	10/22/2008 10:56	6.84	7.42	57.9	7.98	744	2.6	292	< 1	37	7.4			0.2	389	< 0.1		0.5	0.05	38	435	0.2	3.2	461	< 4
	11/19/2008 11:07	11.65	1.9	85.2	8.43	725	4.7	281	< 1	35	7.3			0.1	380	< 0.1		0.8	< 0.03	48	411	0.2 (DJ)	2.4	444	< 4
	12/17/2008 11:30	13.43	0.67	94.5	8.37	712	6.7	251	< 1	36	8.2			0.2	366	< 0.1		1.1	< 0.03	44	411	0.2	2.5	433	< 4

Lick Creek Page 2
2009 Upper Fall Creek WQ Monitoring Program

	Sample Date	Dissolved Oxygen (mg/L)	Water Temperature (C)	Saturation PerCent (%)	pH (SU)	Specific Conductance (uS/cm)	Turbidity (NTU)	Alkalinity (as CaCO3) (mg/L)	CBOD5 (mg/L)	Chloride (mg/L)	COD (mg/L)	Fluoride (mg/L)	Hardness (as CaCO3) (mg/L)	Nitrogen, Ammonia (mg/L)	Nitrogen, Nitrate+Nitrite (mg/L)	Phosphorus, Total (mg/L)	Sulfate (mg/L)	TDS (mg/L)	TKN (mg/L)	TOC (mg/L)	TS (mg/L)	TSS (mg/L)
WWU100-0075	2/18/2009 11:25	11.58	4.84	92.7	8.19	578	10.4	226	< 1	27	7.1	< 0.1	259	< 0.1	2.7	0.04	30	328	0.3	1.7	363	6
	3/11/2009 11:57	12.26	9.08	108.5	8.47	610	14.7	256	< 1	29	7.9	0.1	346	< 0.1	1.5	0.03	37	349	0.3	2	387	8
WWU100-0082	2/18/2009 11:03	11.02	5.28	89.1	8.04	591	5.5	225	< 1	30	6.3	< 0.1	303	< 0.1	2.4	0.03	34	333	0.3	1.6	366	< 4
	3/11/2009 11:35	12.2	8.04	105.3	8.36	635	9.5	260	< 1	31	7.5	0.2	304	< 0.1	1.3	< 0.03	35	365	0.3	1.4	402	5

DO	8.81030303
E. Coli	3771.07
pH	7.953088235
Nitrate+Nit	1.7772
Total P	0.068823529
TSS	15.20588235
Turbidity	27.64166667
Atrazine	2

Foster Branch

IDEM WQ

2008 Fall Creek IBC Study

	Sample Date	Dissolved Oxygen (mg/L)	Water Temperature (C)	Saturation PerCent (%)	pH (SU)	Specific Conductance (uS/cm)	Turbidity (NTU)	Alkalinity (as CaCO3) (mg/L)	Chloride (mg/L)	COD (mg/L)	Cyanide (Total) (mg/L)	Fluoride (mg/L)	Hardness (as CaCO3) (mg/L)	Nitrogen, Ammonia (mg/L)	Nitrogen, Nitrate+Nitrite (mg/L)	Phosphorus, Total (mg/L)	Sulfate (mg/L)	TDS (mg/L)	TKN (mg/L)	TOC (mg/L)	TS (mg/L)	TSS (mg/L)	Atrazine (Aatrex) (ug/L)
WWU100-0066	5/7/2008	10.52	15.88	109.6	7.68	687	4																< 0.28 (QJ)
	6/17/2008 9:45	8.74	16.79	92.8	7.77	523	15.5	250	25	14	< 0.005	0.18	260	< 0.1		4.3	0.11	28	280	0.67	3.8	360	14 2.5 (QJ)
	8/11/2008 10:11							250	32	< 4 (IDJ)	< 0.005	0.19	330	< 0.1		1.5	< 0.05 (QJ	39	370	1 (QJ)	2.3	400	3 (IDJ)
	10/6/2008 12:50	8.64	13.97	86	8.22	693	25.7	280	33	< 4 (IDJ)	< 0.005	0.18	360	< 0.1		1.8	< 0.05	48	380	0.49	1.8	450	2
WWU100-0070	5/7/2008	10.73	15.08	110.1	7.91	694	29.2																< 0.28 (QJ)
	6/17/2008 10:20	5.94	17.41	63.8	7.31	502	10	190	23	18	< 0.005	0.2	260	< 0.1		3.9	0.12	29	280	0.78	5	330	9 2.7 (QJ)
	8/11/2008 13:02							250	31	< 4 (IDJ)	< 0.005 (Q	0.26	370	< 0.1		0.84	< 0.05 (QJ	51	340	0.71 (QJ)	2.4	430	4
	10/7/2008 8:35	6.5	13.62	66.6	7.93	702	18.3	270	31	< 4	< 0.005	0.27	390	< 0.1		0.11	< 0.05 (QJ	64	410	0.35 (QJ IE	2.1	480	7
WWU100-0073	6/17/2008 10:30	5.59	17.31	60.1	7.35	497	7.6	180	23	15	< 0.005	0.2	250	< 0.1		5.2	0.12	28	260	0.67	< 5	330	2
	8/11/2008 13:33							270	33	< 4 (IDJ)	< 0.005 (Q	0.28	370	< 0.1		0.82	< 0.05 (QJ	51	400	1.1 (QJ)	2.3	440	2 (IDJ)
	10/7/2008 8:53	2.24	12.46	22.8	7.63	740	65.8	310	31	14	< 0.005	0.37	410	< 0.1	< 0.01		< 0.05 (QJ	67	440	0.54 (QJ IE	2.3	500	5

2008 Upper Fall Creek WQ Monitoring Program

	Sample Date	Dissolved Oxygen (mg/L)	Water Temperature (C)	Saturation PerCent (%)	pH (SU)	Specific Conductance (uS/cm)	Turbidity (NTU)	Alkalinity (as CaCO3) (mg/L)	CBOD5 (mg/L)	Chloride (mg/L)	COD (mg/L)	Coliforms (Total) (MPN/100 mL)	E. Coli (MPN/100 mL)	Fluoride (mg/L)	Hardness (as CaCO3) (mg/L)	Nitrogen, Ammonia (mg/L)	Nitrogen, Nitrate+Nitrite (mg/L)	Phosphorus, Total (mg/L)	Sulfate (mg/L)	TDS (mg/L)	TKN (mg/L)	TOC (mg/L)	TS (mg/L)	TSS (mg/L)
WWU100-0066	6/18/2008 13:55	8.6	19.52	96.3	8.01	618	2.3	206	< 1	24	13.5			0.2	290	< 0.1		4.3	0.09	29	320	0.4	5	359 10
	7/7/2008 13:00		21.26		7.92	643	7.7	249		27	6.9			0.2		< 0.1		3.8	0.04	37	371	0.4	2.8	410 6
	7/8/2008 13:35	9.22	20.43	102.9	7.82	565	6.68					> 2420	686.7											
	7/15/2008 12:50	9.01	21.35	104.1	8.12	603	7.7					> 2420	579.4											
	7/16/2008 14:00	8.3	20.6	92.7	7.33	390	46.4	232	< 1	24	8.6			0.2	329	< 0.1		3.2	0.05	33	387	0.4	3	406 4
	7/22/2008 13:00	9.17	20.75	102.5	7.74	663	7.7					> 2420	> 2420											
	7/29/2008 12:20	8.53	21.12	96.1	7.79	441	53.6					> 2420	461.1											
	8/5/2008 13:45	8.36	17.81	90.3	8.11	699	3.2					> 24200	> 24200											
	8/12/2008 13:00	9.33	19.12	104	8.27	702	4.9	276		32	7.7			0.2		< 0.1		1.7	0.03	40	412	0.2	2.2	454 4
	8/27/2008 13:30	8.16	18.39	85.8	7.99	666	5.3	287	< 1	30	8.1			0.2	389	< 0.1		1.7	0.03	45	484	0.2	1.4	469 < 4
	9/16/2008 8:20	9.13	18.31	98.9	8.11	691	13.3	288		30	6.1			0.2		< 0.1		1.8	0.05		457	0.1 (DJ)	2	483 < 4
	9/24/2008 14:30	11.12	9.63	99.5	8.21	7.23	2.9	277	< 1	30	6.5			0.2	370	< 0.1		1.7	0.05	45	416	0.4	2	449 < 4
	10/22/2008 13:05	13.43	3.65	102.8	8.43	690	8.2	284	< 1	32	6.6			0.1	392	< 0.1		1.5	0.04	42	428	0.2	2.3	465 < 4
	11/19/2008 13:25	14.47	0.67	102.1	8.41	763	5.8	258	< 1	32	9.4		< 0.1		365	< 0.1		1.7	< 0.03	48	399	0.2 (DJ)	2.4	429 < 4
	12/17/2008 14:00	8.8	18.22	95.8	7.95	558	13.2	249	< 1	42	10.7			0.1	377	< 0.1		1.7	< 0.03	63	446	0.2	2.2	474 < 4

2009 Upper Fall Creek WQ Monitoring Program

	Sample Date	Dissolved Oxygen (mg/L)	Water Temperature (C)	Saturation PerCent (%)	pH (SU)	Specific Conductance (uS/cm)	Turbidity (NTU)	Alkalinity (as CaCO3) (mg/L)	CBOD5 (mg/L)	Chloride (mg/L)	COD (mg/L)	Fluoride (mg/L)	Hardness (as CaCO3) (mg/L)	Nitrogen, Ammonia (mg/L)	Nitrogen, Nitrate+Nitrite (mg/L)	Phosphorus, Total (mg/L)	Sulfate (mg/L)	TDS (mg/L)	TKN (mg/L)	TOC (mg/L)	TS (mg/L)	TSS (mg/L)
WWU100-0066	2/18/2009 13:10	12.04	8.01	99.1	8.12	807	18.7	206	< 1	39	10.2	0.1	315	< 0.1		3.6	0.04	41	349	0.4	2.2	395 7
	3/11/2009 13:48	13.68	9.74	123.8	8.51	715	12.1	251	< 1	54	8.7	0.2	370	< 0.1		2.1	< 0.03	50	420	0.4	2.4	472 8

DO	9.177083333
E. Coli	5689.44
pH	7.9535
Nitrate+Nit	2.3535
Total P	0.064166667
TSS	5.666666667
Turbidity	15.9112
Atrazine	2.6

McFadden Ditch
IDEM WQ
1996 Synoptic

	Sample Date	Dissolved Oxygen (mg/L)	Water Temperature (C)	pH (SU)	Specific Conductance (uS/cm)	Turbidity (NTU)	Alkalinity (as CaCO3) (mg/L)	Chloride (mg/L)	E_ Coli (CFU/100 mL)	Hardness (as CaCO3) (mg/L)	Phosphorus, Total (mg/L)	Sulfate (mg/L)	TDS (mg/L)	TKN (mg/L)	TOC (mg/L)	TPH - IR (mg/L)	TS (mg/L)	TSS (mg/L)
WWU100-0004	2/21/1996 14:24	12.7	6.9	8.1	273.299	14	260	26	90 (JH)	370	0.052	63	360	0.42 (B)	2.2	< 2 (U)	410	< 4 (U)
	4/23/1996 13:14	10.6	9.47	7.9	168.899	189	140	22		220	0.2 (B)	37	260	2.6 (B)	7.4	< 1 (U)	510	180
	5/30/1996 12:20	10.48	14.98	7.94	516	19	200 (Q)	25	20 (JH)	290	0.078	50 (B)	380	1.1 (B)	3		390	6
	7/10/1996 10:15	8.85	17.47	7.94	654	28.5	260	27	400 (JH)	360	0.12	56	420	0.45 (JH)	1.4		460	17
	10/2/1996 11:27	8.57	17.7	7.88	685	15.3	270	26	170	350	0.16	57	400	0.52	2.6		430	10
	11/13/1996 10:18	11.37	3.86	8	645	18.7	270 (Q)	29	240	320	0.067	61	400	0.59	2.8		400	< 4 (U)

2001 E. coli-Upper WFWR

	Sample Date	Dissolved Oxygen (mg/L)	Water Temperature (C)	pH (SU)	Specific Conductance (uS/cm)	Turbidity (NTU)	Coliforms (Total) (MPN/100mL)	E_ Coli (MPN/100 mL)
WWU100-0026	6/6/2001 15:10	8.85	17.04	8.11	660	51	> 2419.2	1986.28
	6/13/2001	8.1	23.09	8.18	696	38		
	6/20/2001 12:10	7.85	21.67	8.22	707	28	> 2419.2	816.4
	6/27/2001 11:15	8.22	21.2	8.34	709	22	> 2419.2	816.4
	7/4/2001 12:10	8.4	19.25	8.02	511	225	> 24192	8664
	7/10/2001 14:50	8.01	22.4	8.02	574	34	> 2419.2	648.8

2008 Fall Creek IBC Study

	Sample Date	Dissolved Oxygen (mg/L)	Water Temperature (C)	Saturation PerCent (%)	pH (SU)	Specific Conductance (uS/cm)	Turbidity (NTU)	Alkalinity (as CaCO3) (mg/L)	Chloride (mg/L)	COD (mg/L)	Cyanide (Total) (mg/L)	Fluoride (mg/L)	Hardness (as CaCO3) (mg/L)	Nitrogen, Ammonia (mg/L)	Nitrogen, Nitrate+Nitrite (mg/L)	Phosphorus, Total (mg/L)	Sulfate (mg/L)	TDS (mg/L)
WWU100-0063	5/7/2008	9.87	16.9	105	7.88	608	4.7											
	6/17/2008 10:15	8.37	18.36	94.3	7.94	553	28.2	240	21	15	< 0.005	0.17	290	< 0.1		2.6	0.09	30	310
	8/12/2008 15:49							240	23	< 4 (fDJ)	< 0.005 (Q	0.17	330	< 0.1		1.5	< 0.05 (QJ	37	360
	10/6/2008 10:24	8.31	12.56	80.6	8.09	614	55.3	270	24	< 4 (fDJ)	< 0.005	0.17	340	< 0.1		1.2	< 0.05	37	340
WWU100-0065	6/17/2008 13:20	8.32	18.48	91.7	7.96	555	15.1	240	21	9	< 0.005	0.15	290	< 0.1		2.8	0.08	29	310
	8/11/2008 10:25							300	22	< 4 (fDJ)	< 0.005	0.17	340	< 0.1		1.7	< 0.05 (QJ	36	360
	10/6/2008 13:20	8.95	13.5	87.8	8.2	617	16.6	260	23	< 4 (fDJ)	< 0.005	0.16	350	< 0.1		1.6	< 0.05	39	320
WWU100-0068	5/7/2008	9.36	16.33	98.3	7.6	620	6.9											
	6/17/2008 13:05	8.05	18.9	89.3	7.93	565	24.3	250	22	11	< 0.005	0.17	300	< 0.1		2.8	0.1	29	320
	8/11/2008 11:35							310	23	< 4 (fDJ)	< 0.005	0.17	320	< 0.1		1.8	< 0.05 (QJ	35	380
	10/6/2008 13:39	8.54	14.52	87.4	8.09	613	35.7	260	25	< 4 (fDJ)	< 0.005	0.19	340	< 0.1		1.7	< 0.05	40	340
WWU100-0069	6/17/2008 12:55	8.5	18.92	95	7.92	567	20	240	22	5	< 0.005	0.17	300	< 0.1		2.7	0.08	29	320
	8/11/2008 12:50							280	23	< 4 (fDJ)	< 0.005	0.17	330	< 0.1		1.6	< 0.05 (QJ	37	340
	10/6/2008 13:53	10	15.32	102.5	8.04	620	19.8	260	25	< 4 (fDJ)	< 0.005	0.2	350	< 0.1		1.5	< 0.05	38	340
WWU100-0074	6/17/2008 12:45	8.02	18.45	88.1	7.88	566	23.9	240	21	8	< 0.005	0.17	290	< 0.1		2.6	0.09	30	320
	8/11/2008 13:45							290	23	< 4 (fDJ)	< 0.005	0.15	330	< 0.1		1.3	< 0.05 (QJ	38	350
	10/6/2008 14:09	10.05	16.33	105.6	8.12	608	24.7	280	24	4 (fDJ)	< 0.005	0.2	340	< 0.1		1	< 0.05	39	320

2008 Upper Fall Creek WQ Monitoring Program

	Sample Date	Dissolved Oxygen (mg/L)	Water Temperature (C)	Saturation PerCent (%)	pH (SU)	Specific Conductance (uS/cm)	Turbidity (NTU)	Alkalinity (as CaCO3) (mg/L)	CBOD5 (mg/L)	Chloride (mg/L)	COD (mg/L)	Coliforms (Total) (MPN/100 mL)	E_ Coli (MPN/100 mL)	Fluoride (mg/L)	Hardness (as CaCO3) (mg/L)	Nitrogen, Ammonia (mg/L)	Nitrogen, Nitrate+Nitrite (mg/L)	Phosphorus, Total (mg/L)
WWU100-0026	7/9/2008 9:40	8.42	21.19	94.9	8.04	597	27.3					> 2420	980.4					
	7/16/2008 9:50	9.22	21.82	105.9	7.87	618	13.2					> 2420	613.1					
	7/23/2008 9:05	8.56	21.03	96.3	7.63	323	62.9					> 24200	4352					
	7/30/2008 9:05	8.5	21.97	97.3	7.78	644	11					> 2420	435.2					
	8/6/2008 9:20	8.55	21.6	97.3	7.84	533	25.4					> 2420	1299.7					
WWU100-0063	6/18/2008 14:40	8.72	18.49	95.5	8.21	592	18.8	240	< 1	20	13.1				0.2	332	< 0.1	2.7	0.07
	7/16/2008 14:45	8.59	22.7	101.7	8.32	615	18.6	254	< 1	22	7.3				0.2	339	< 0.1	2.2	0.05
	8/11/2008 14:00	8.72	19.1	95.9	8.37	621	3.6	274		22	8.5				0.2		< 0.1	1.8	0.04
	8/27/2008 14:25	9.18	20.5	105.1	8.35	626	2	260	< 1	24	6.5				0.2	359	< 0.1	1.4	< 0.03
	9/16/2008 10:10	7.8	17.57	84.2	8.17	607	4.3	274		22	8.1				0.2		< 0.1	1.4	0.03
	9/24/2008 15:50	8.76	19.05	96.2	8.18	645	5.2	270	< 1	22	6.5				0.1	353	< 0.1	1.3	< 0.03
	10/22/2008 14:05	11.09	9.51	98.5	8.25	655	1.6	270	< 1	22	8.2			< 0.1		339	< 0.1	0.7	< 0.03
	11/19/2008 14:25	14.66	3.43	111.8	8.82	669	5.3	275	< 1	26	9				0.1	370	< 0.1	1.2	< 0.03
	12/17/2008 14:40	15	0	103.6	8.6	677	4.7	251	< 1	25	9.9				0.1	388	< 0.1	1.4	< 0.03

2009 Upper Fall Creek WQ Monitoring Program

	Sample Date	Dissolved Oxygen (mg/L)	Water Temperature (C)	Saturation PerCent (%)	pH (SU)	Specific Conductance (uS/cm)	Turbidity (NTU)	Alkalinity (as CaCO3) (mg/L)	CBOD5 (mg/L)	Chloride (mg/L)	COD (mg/L)	Fluoride (mg/L)	Hardness (as CaCO3) (mg/L)	Nitrogen, Ammonia (mg/L)	Nitrogen, Nitrate+Nitrite (mg/L)	Phosphorus, Total (mg/L)	Sulfate (mg/L)	TDS (mg/L)
WWU100-0063	2/18/2009 14:10	12.23	4.81	98	8.33	588	8.9	230	< 1	26	7.8	< 0.1	326	< 0.1		2.5	0.04	38	338
	3/11/2009 14:50	12.87	10.81	118.6	8.55	610	10	254	< 1	28	9.5	0.2	345	< 0.1		1.2	0.03	41	357

TKN (mg/L)	TOC (mg/L)	TS (mg/L)	TSS (mg/L)	Atrazine (Aatrex) (ug/L)
				1.4 (QJ)
0.82	3.4	390	21	1.8 (QJ)
0.63	2	360	2	
< 0.3	2	390	1	
0.6	3.2	320	20	
0.36 (fDJ)	2.1	410	3 (fDJ)	
	1.8	400	1	
				< 0.28 (QJ)
0.73	3.1	360	26	1.9 (QJ)
0.41 (fDJ)	2.2	400	5 (fDJ)	
	1.9	390	3	
0.44	3	370	21	
0.33 (fDJ)	2.1	380	2 (fDJ)	
	2	400	6	
0.55	3.1	360	29	
< 0.3 (fDJ)	2.3	390	4 (fDJ)	
	2.4	390	2	

Sulfate (mg/L)	TDS (mg/L)	TKN (mg/L)	TOC (mg/L)	TS (mg/L)	TSS (mg/L)
30	344	0.4	4.4	390	16
33	370	0.2	2.3	416	11
33	386	0.2	2.2	420	< 4
42	396	0.2	1.7	405	< 4
	406	0.2 (DJ)	2.2	416	< 4
42	381	0.2	2.1	408	< 4
32	387	0.3	3.2	412	< 4
41	379	0.2 (DJ)	2.5	416	< 4
51	401	0.3	2.3	424	< 4

TKN (mg/L)	TOC (mg/L)	TS (mg/L)	TSS (mg/L)
0.4	2.1	371	4
0.4	2.2	390	4

Flatfork Creek
IDEM WQ

1996 Synoptic

	Sample Date	Dissolved Oxygen (mg/L)	Water Temperature (C)	pH (SU)	Specific Conductance (uS/cm)	Turbidity (NTU)	Alkalinity (as CaCO3) (mg/L)	Chloride (mg/L)	E_ Coli (CFU/100 mL)	E Coli	Hardness (as CaCO3) (mg/L)	Phosphorus, Total (mg/L)	Sulfate (mg/L)	TDS (mg/L)	TKN (mg/L)	TOC (mg/L)	TPH - IR (mg/L)	TS (mg/L)	TSS (mg/L)
WWU100-0001	2/21/1996 13:39	11.3	6.59	8.1	309.7	13.39	270	44	50 (JH)	50	370	0.071	66	410	0.56 (B)	1.8	< 1 (U)	460	< 4 (U)
	4/23/1996 12:12	10.2	9.8	7.69	196.5	194	150	30			250	0.21 (B)	42	290	2.7 (B)	5.8	< 1 (U)	570	260
	5/30/1996 11:40	9.66	14.64	8	620	45.79	230 (Q)	32	10 (JH)	10	310	0.078	54 (B)	360	1.2 (B)	4		440	22
	7/10/1996 10:50	8.61	18.68	8.13	709	3.17	270	42	200 (JH)	200	370	0.14	62	460	0.43 (JH)	1.9		520	24
	10/2/1996 11:02	8.62	17.51	8.02	753	16	280	48	230	230	360	0.11	63	430	0.44	3.7		490	11
	11/13/1996 9:49						270 (Q)	38	190 (JH)	190	330	0.06	54	410	0.78	3.1		430	< 4 (U)

1996 Watershed

	Sample Date	Dissolved Oxygen (mg/L)	Water Temperature (C)	pH (SU)	Specific Conductance (uS/cm)	Turbidity (NTU)	Alkalinity (as CaCO3) (mg/L)	Chloride (mg/L)	E_ Coli (CFU/100 mL)	Hardness (as CaCO3) (mg/L)	Phosphorus, Total (mg/L)	Sulfate (mg/L)	TDS (mg/L)	TKN (mg/L)	TOC (mg/L)	TS (mg/L)	TSS (mg/L)
WWU100-0006	8/5/1996 10:15	7.53	21.12	8.07	972	19.5	250	130	600 (JH)	310	0.11	47	550	0.44 (Q)	3.1	620	7

1999 Fixed Station

	Sample Date	Dissolved Oxygen (mg/L)	Water Temperature (C)	pH (SU)	Specific Conductance (uS/cm)	Turbidity (NTU)	Alkalinity (as CaCO3) (mg/L)	Chloride (mg/L)	COD (mg/L)	E_ Coli (CFU/100 mL)	Hardness (as CaCO3) (mg/L)	Nitrogen, Ammonia (mg/L)	Nitrogen, Nitrate+Nitrite (mg/L)	pH (SU)	Phosphorus, Total (mg/L)	Sulfate (mg/L)	TDS (mg/L)	TKN (mg/L)	TOC (mg/L)	TS (mg/L)	TSS (mg/L)	Tss
WWU100-0001	4/21/1999 13:15	9.22	14.25	8.11	644	74.69	208	29	19.6		274	< 0.1	3.8	8.1	0.16	39	367	1.1	3.3	485	94	94
	5/27/1999 11:20	8.56	15.34	8.34	666	16.39	190	47	< 5	49	350	< 0.1 (J)	2.4		0.11	58	420	0.3	4.2	500	10	10
	6/23/1999 11:15	7.52	21.69	8.27	677	13.1	160		9.4	320	120	< 0.1	1.8		0.11	57	480 (H)	0.15	< 10	480	23	23
	7/21/1999 11:25	6.23	25.62	8.21	586	14.69	216	41	10	900	284	< 0.1	1.4	8.1	0.13	46	381	0.5	3.4	402	18	18
	8/26/1999 11:45	8.54	20.85	8.4	710	18.79	254	64	9.1	380	318	< 0.1	1.5	8	0.1	49	448	0.6	2.5	479	31	31
	9/21/1999 11:30	7.82	15.18	8.38	787	14.3	261	91	10.3	480	340	< 0.1	2.1	8.1	0.1	56	502	0.6	2.7	527	14	14
	10/21/1999 11:35	9.31	9.32	8.1	755	3.04	276	77	8.8	60	336	< 0.1	1.5	8	0.06	61	505	0.5	3.5	511	< 4	
	11/23/1999 11:45	8.62	12.26	8.03	736	8.07	273	65	10.8	290	345	< 0.1	1.5	8	0.07	80	491	0.6	2.9	503	13	13

2000 Fixed Station

	Sample Date	Dissolved Oxygen (mg/L)	Water Temperature (C)	pH (SU)	Specific Conductance (uS/cm)	Turbidity (NTU)	Alkalinity (as CaCO3) (mg/L)	Chloride (mg/L)	COD (mg/L)	E_ Coli (MPN/100 mL)	Hardness (as CaCO3) (mg/L)	Nitrogen, Ammonia (mg/L)	Nitrogen, Nitrate+Nitrite (mg/L)	pH (SU)	Phosphorus, Total (mg/L)	Sulfate (mg/L)	TDS (mg/L)	TKN (mg/L)	TOC (mg/L)	TS (mg/L)	TSS (mg/L)
WWU100-0001	1/20/2000 11:45	13.34	0.31	7.69	752	5.9	279	54	6.2	21	361	< 0.1	1.8 (QJ)	8.1	0.03	80	483	0.4	2	499	< 4
	2/25/2000 11:45	10.22	11.46	7.98	762	6.5	253	46	10.8	37	319	< 0.1	3.6	8	0.05	78	481	0.5	3	499	19
	3/30/2000 11:30	11.91	9.18	8.19	760	4.09	257	52	11.8	10 (QBJ)	291	1.1 (BJ)	3.1 (QJ)	8.2	0.03	69	380	0.5	2.4	395	5
	4/20/2000 11:45	8.91	16.15	8.3	751	9.6	246	46	9.8	68	368	< 0.1	3.2	8.1	0.05	68	450	0.6	2.7	483	25
	5/25/2000 11:30	7.36	19.47	8.1	355	20.39	248	41	11.6	140	366	0.1	5.1	8	0.08	57	452	0.7	2.7	500	31
	6/21/2000 12:05	6.44	22.2	7.86	415	362	147	21	42.3	< 1	228	0.1	6	7.8	0.43	31	292	2.2	4.6	549	240
	7/20/2000 11:50	7.65	21.13	8.22	685		255	55	8.2		360	< 0.1	1.9	8.2	0.05	54	462	0.3	2.1	475	10
	8/30/2000 11:50	6.78	23.19	8.18	718	6.44	261	59	9.8	140 (QJ)	365 (BJ)	0.2	1.6	7.8	0.09	59	486	0.6	2.6	516	11
	9/20/2000 11:55	8.16	18.95	8.14	752		279	51	8.7	190	408	< 0.1	1.9	8	0.08	67	484	< 0.1	2.5	514	11
	10/27/2000 12:10	7.63	17.13	8.03	751		298	49	16.1	210	384	< 0.1	1.3	7.9	0.07	58	472	0.2	3	485	4
	11/21/2000 12:30	12.8	1.34	8.42	715	2.14	298	41	13.3	990	396	< 0.1	2.6	8.2	< 0.03	67	478	0.2	2.1	488	4
	12/22/2000 11:15	14.1	-0.1	8.4	790	4.07	296	48	9.8	93	408	< 0.1	3.9	8	< 0.03	60	492	0.2	2.1	500	< 4

2001 Corvallis

	Sample Date	Dissolved Oxygen (mg/L)	Water Temperature (C)	Saturation PerCent (%)	pH (SU)	Specific Conductance (uS/cm)	Turbidity (NTU)	Alkalinity (as CaCO3) (mg/L)	Chloride (mg/L)	COD (mg/L)	Cyanide (Total) (mg/L)	Hardness (as CaCO3) (mg/L)	Nitrogen, Ammonia (mg/L)	Nitrogen, Nitrate+Nitrite (mg/L)	Phosphorus, Total (mg/L)	Sulfate (mg/L)	TDS (mg/L)	TKN (mg/L)	TOC (mg/L)	TS (mg/L)	TSS (mg/L)
WWU100-0014	5/23/2001 15:45	9.51	15.25	98.9	8.31	713	17.2	250	42	6.3	< 0.005	341	< 0.1	9	0.065	17 (QJ)	420	0.8 (QJ)	2.6	450	17
	7/2/2001 16:40	10.32	20.92	117.3	8.53	670	14.39	250	40 (DJ)	18 (DJ)	< 0.005	370.6	< 0.1	2	0.06	54	430	0.71	2.3	430	13
	8/28/2001 13:00	9.57	21.8	112.5	8.17	723	13.6	270	39	< 5	< 0.005	336	< 0.1	1.6 (QJ)	0.071	60	460	0.7 (B)	3.2	560	5

2001 E. coli-Upper WFWR

	Sample Date	Dissolved Oxygen (mg/L)	Water Temperature (C)	pH (SU)	Specific Conductance (uS/cm)	Turbidity (NTU)	Coliforms (Total) (MPN/100mL)	E_ Coli (MPN/100 mL)
WWU100-0024	6/6/2001 15:00	8.54	17.37	8.05	673	82	> 2419.2	> 2419.2
	6/13/2001	8.25	22.3	8.11	761	36		
	6/20/2001 12:00	7.91	21.32	8.15	782	20	> 2419.2	517.2
	6/27/2001 11:00	8.57	21.11	8.3	811	15	> 2419.2	235.9
	7/4/2001 12:00	8	19.2	8.05	674	195	> 24192	2282
	7/10/2001 14:35	7.74	23.8	8.07	683	40	> 2419.2	517.2
WWU100-0025	6/6/2001 14:35	9	17.8	8.02	666	110	> 2419.2	> 2419.2
	6/13/2001	8.82	21.87	8.1	694	35		
	6/20/2001 11:30	8.74	20.92	8.18	743	14	> 2419.2	325.5
	6/27/2001 10:45	9.5	20.87	8.36	767	12	> 2419.2	547.5
	7/4/2001 11:40	8.87	18.79	8.07	610	103	> 24192	3873
	7/10/2001 14:15	8.55	23.8	8.15	665	22	> 2419.2	648.8

2001 Fixed Station

	Sample Date	Dissolved Oxygen (mg/L)	Water Temperature (C)	pH (SU)	Specific Conductance (uS/cm)	Turbidity (NTU)	Alkalinity (as CaCO3) (mg/L)	Chloride (mg/L)	COD (mg/L)	Cyanide (Total) (mg/L)	E_ Coli (MPN/100 mL)	Hardness (as CaCO3) (mg/L)	Nitrogen, Ammonia (mg/L)	Nitrogen, Nitrate+Nitrite (mg/L)	pH (SU)	Phosphorus, Total (mg/L)	Sulfate (mg/L)	TDS (mg/L)	TKN (mg/L)	TOC (mg/L)	TS (mg/L)	TSS (mg/L)	Tss
WWU100-0001	1/23/2001 11:55	13.22	2	8.35	796	3.19	300	46	11		300	386	< 0.1	3.3	8.1	< 0.03	63	473	0.3	1.8	473	< 4	
	2/23/2001 12:30	12.21	4.28	8.28	762	5.9	285	42	6.8 (QJ)		120	370	< 0.1	3.7	8	0.03	58	462	0.2	1.7	478	4	4
	3/28/2001	13.77	5.84	8.51	729	3.65																	
	4/26/2001 12:20	9.6	14.47	8.43	747	7.38	275	43	7.5		24	358	< 0.1	2.4	8.2	0.05	54	451	0.4	2.2	491	5	5
	5/25/2001 12:10	8.31	14.06	8.47	597	211	202	32	25.3			293	< 0.1	8.5	8.1	0.21	34	372	1.3	3.3	491	113	113
	6/20/2001 11:40	7.25	21.54	7.98	689	20.39	267	41	14.9		290	356	< 0.1	4.2	8.1	0.1	43	475	0.6	1.9	514	20	20
	7/19/2001 11:50	6.93	21.88	7.69	372	103			30.3	< 0.005	< 1		< 0.1	2.4		0.25			1.5	5.6			
	8/29/2001 12:20	7.9	21.89	8.28		12.1	275	43	8.1		220	322	< 0.1	1.7	8.3	0.07	53	476	0.3	2.5	493	15	15
	9/21/2001 12:05	7.94	18.18	7.96	531	15	248	34	11.6		1200	296	< 0.1	2.9	8.3	0.09	41	398	0.6	3.9	434	18	18
	10/26/2001 11:45	9.1	8.64	7.59	331	70	162	17	25.7	< 1		202	< 0.1	2	8	0.24	27	281	1.1	7.3	318	43	43
	11/21/2001 12:45	12.36	7.42	7.65	647	1.95	301	42	8.9		190	386	< 0.1	2.3	8.5	< 0.03	81	456	0.2	2.3	473	< 4	
	12/21/2001 12:45	8.52	5.71	8.27	564	14.3	248	30	10		980	314	< 0.1	3.2	8.3	0.09	32	386	0.6	< 1	405	13	13

2001 Pesticides

	Sample Date	Dissolved Oxygen (mg/L)	Water Temperature (C)	Saturation PerCent (%)	pH (SU)	Specific Conductance (uS/cm)	Turbidity (NTU)	Atrazine (Aatrex) (ug/L)
WWU100-0001	3/21/2001 10:40	12.27	8.18		8	739	8.1	< 0.1
	4/18/2001 11:45	11.37	7.48		8.28	744	11	0.2

Thorpe Creek

IDEM WQ
2008 Fall Creek IBC Study

	Sample Date	Dissolved Oxygen (mg/L)	Water Temperature (C)	Saturation PerCent (%)	pH (SU)	Specific Conductance (uS/cm)	Turbidity (NTU)	Alkalinity (as CaCO3) (mg/L)	Chloride (mg/L)	COD (mg/L)	Cyanide (Total) (mg/L)	Fluoride (mg/L)	Hardness (as CaCO3) (mg/L)	Nitrogen, Ammonia (mg/L)	Nitrogen, Nitrate+Nitrite (mg/L)	Phosphorus, Total (mg/L)	Sulfate (mg/L)	TDS (mg/L)	TKN (mg/L)	TOC (mg/L)	TS (mg/L)	TSS (mg/L)	Atrazine (Aatrex) (ug/L)
WWU100-0050	6/17/2008 15:40	7.33	18.89	80.8	8.08	638	4.2	230	46	6	< 0.005	0.2	290	0.11	6.1	0.14	26	350	0.53	2.7	400	2	
	8/12/2008 14:45							240	95	19 (fDJ)	< 0.005	0.34	320	< 0.1	3.6	0.84 (QJ)	46	520	0.74 (fDJ)	4.2	540	7	
	10/6/2008 7:35	6.3	12.54	60.1	7.94	1401	4.3	220	260	36	< 0.005	0.54	350	< 0.1	11	4.2	95	780		7.9	880	6	
WWU100-0051	6/17/2008 15:15	7.34	19.43	82.4	8.09	530	6.6	200	27	7	< 0.005	0.17	260	< 0.1	5.1	< 0.05	20	290	1.2	2.6	320	1	
	8/12/2008 15:25							200	39	7 (fDJ)	< 0.005	0.21	250	< 0.1	0.53	< 0.05 (QJ	25	320	0.58 (fDJ)	3.4	340	4	
	10/6/2008 7:58	6.66	12.76	63.6	7.78	795	15.6	310	60	< 4	< 0.005	0.38	400	< 0.1	0.41	< 0.05	48	460	0.36	2.3	520	4	
WWU100-0052	5/7/2008	7.26	15.5	74.6	8.05	813	9.1																< 0.28 (QJ)
	6/17/2008 14:55	7.69	18.79	83.8	7.85	636	8.4	230	46	5	< 0.005	0.19	280	0.12	6.5	0.16	25	360	0.82	2.6	390	5	1.6 (QJ)
	8/12/2008 16:00							250	120	32 (fDJ)	< 0.005	0.38	320	< 0.1	5.7	0.92 (QJ)	51	590	0.84 (fDJ)	4.9	620	4	
	10/6/2008 9:01	4.07	13.06	40.5	7.59	1530	22.2	220	270	44	< 0.005	0.64	360	0.84	16	4.9	90	900	2.1	9.2	940	14 (fDJ)	
WWU100-0053	5/7/2008	9.07	16.49	102.5	8.04	568	2.6																< 0.28 (QJ)
	6/17/2008 13:50	8.75	20.12	97.3	7.93	532	9	190	27	4	< 0.005	0.15	270	< 0.1	6.6	< 0.05	19	290	0.62	2.3	310	4	1.5 (QJ)
	8/12/2008 16:40							210	34	7 (fDJ)	< 0.005	0.18	260	< 0.1	0.08	< 0.05 (QJ	26	310	0.63 (fDJ)	3.5	320	4	
	10/6/2008 8:11	5.81	13.09	61.8	7.67	660	85.1	180	64	53	< 0.005	0.54	280	< 0.1	0.1	0.17	69	380	1.5	11	470	33	
WWU100-0054	6/17/2008 14:40	7.2	19.87	83.2	7.43	549	6.6	190	29	8	< 0.005	0.16	270	< 0.1	9.9	< 0.05	15	300	0.41	2.3	340	2	
	8/13/2008 10:11							270	60	< 4	< 0.005	0.18	330	< 0.1	0.42	< 0.05 (QJ	20	430	0.4	3	440	26	
	10/6/2008 8:33	2.68	11.12	51.8	7.64	700		170	110	69	< 0.005	0.19	290	0.44	0.05	0.53	30	350	1.9	15	670	220	
WWU100-0055	5/7/2008	13.87	15.43	117.2	8.34	651	25.4																< 0.28 (QJ)
	6/17/2008 12:50	8.62	17.61	98.4	7.69	516	5.2	190	21	6	< 0.005	0.14	260	< 0.1	7.5	< 0.05	20	290	0.35	2.6	300	< 1	1.3 (QJ)
	8/13/2008 9:35							190	13	< 4	< 0.005	0.16	320	< 0.1	0.11	< 0.05 (QJ	70	390	< 0.3	1.9	390	3	
	10/6/2008 9:48	6.3	12.45	63.4	7.91	706	12.7	280	18	< 4	< 0.005	0.14	400	< 0.1	0.02	< 0.05	87	440	0.34	2.6	490	< 1	
WWU100-0056	6/17/2008 11:35	7.85	16.48	81.1	7.81	579	9.8	200	31	9	< 0.005	0.15	270	< 0.1	8.5	< 0.05	18	310	0.32	2	330	1	
	8/12/2008 17:30							280	56	< 4	< 0.005	0.17	310	< 0.1	0.12	< 0.05 (QJ	11	410	0.44	3.9	410	6	
	10/6/2008 9:19	4.49	10.31	42.9	7.56	801	497	260	99	36 (fDJ)	< 0.005	0.18	300	0.39	< 0.01	0.18	9.4	450	1.6	12	500	37	
WWU100-0057	6/17/2008 13:10	11.01	19.68	123.8	8.16	539	14.1	190	26	9	< 0.005	0.14	270	< 0.1	9.4	0.1	15	300	0.33	2.3	330	9	
	8/13/2008 8:53							300	50	< 4	< 0.005	0.16	360	0.6	0.07	0.06 (QJ)	12	430	1.7	5.2	470	47	
	10/6/2008 9:34	1.72	12.97	15.3	7.5	770	132	330	60	62 (fDJ)	< 0.005	0.19	350	8.3	0.02	0.32	11	400	10	17	570	74	
WWU100-0058	5/7/2008	9.71	16.66	101.6	7.77	565	0.8																< 0.28 (QJ)
	6/17/2008 9:40	8.11	17.82	86.4	7.85	517	8	190	30	14	< 0.005	0.16	250	< 0.1	7	0.06	17	290	0.7	2.7	330	3	2.2 (QJ)
	8/12/2008 14:48							190	36	< 4 (fDJ)	< 0.005 (Q	0.22	230	< 0.1	1.5	0.09 (QJ)	22	300	0.37	3.8	330	1	
	10/6/2008 11:39	5.86	12.62	58.5	7.92	782	33.6	230	85	21 (fDJ)	< 0.005	0.31	310	< 0.1	0.04	0.05	36	430		8	470	3	
WWU100-0120	5/7/2008	8.45	19.02	94	8.39	638	23.5																1.4 (QJ)
	6/18/2008	9.04	20.01	100.5	7.99	605	27.3																< 0.28 (QJ)

DO	7.299583333
E. Coli	
pH	7.874166667
Nitrate+Nitr	4.091153846
Total P	0.848
TSS	20.8
Turbidity	41.87391304
Atrazine	1.6

4/25/2001 13:10	10.69	14.44		8.3	747	7	< 0.1 (QJ)		
5/2/2001 8:30	8.33	17.44		8.17	705	11.19	< 0.1		
5/9/2001 11:30	8.49	18.51		8.14	689	23	0.3		
5/16/2001 13:35	8.13	19.25		8.15	760	20	0.1		
5/23/2001 16:50	8.46	18.31		8.23	728	33	8.3		
5/31/2001 12:50	9.66	14.46		8.1	719	27	1.6		
6/5/2001 14:45	9.07	15.65	94.9	8.14	740	10.69	0.6		
6/13/2001 13:30	7.77	23.79		8.19	744	37	0.67 (qJ)		
6/20/2001 13:45	7.71	21.46		8.17	745		0.3		
6/27/2001 9:40	8.4	21		8.38	750	15	0.2		
7/5/2001 12:30	8.2	20.89		8.1	542	75	0.4		
7/11/2001 10:30	7.79	21.1		7.92	691	40	0.4		
7/18/2001 10:25	7.3	22.39		8.02	468	300	0.2		

2002 Clean Sampling and Ultra-Clean Analyses

	Sample Date	Dissolved Oxygen (mg/L)	Water Temperature (C)	Saturation PerCent (%)	pH (SU)	Specific Conductance (uS/cm)	Turbidity (NTU)	Alkalinity (as CaCO3) (mg/L)	Chloride (mg/L)	COD (mg/L)	Cyanide (Free) (mg/L)	Cyanide (Total) (mg/L)	DOC (mg/L)	Fluoride (mg/L)	Hardness (as CaCO3) (mg/L)	Nitrogen, Ammonia (Dissolved) (mg/L)	Nitrogen, Nitrate+Nitrite (Dissolved) (mg/L)	pH (SU)	Phosphorus, Total (mg/L)	Sulfate (mg/L)	TDS (mg/L)	TKN (mg/L)	TOC (mg/L)	TS (mg/L)	TSS (mg/L)	Tss
WWU100-0001	2/11/2002 9:00	12.66	5.05	100.9	7.28	700	12	263 (fB)	32.1	21 (UJ)	< 0.012	< 0.012	1.8	0.17 (HJ)	352	0.022 (UJ)	3.09		0.041	53.7	412	0.37 (UJ)	1.9	452	7	7
	2/11/2002	13.6	5.21	109	7.36	699	12																			
	5/20/2002 9:00	10.05	10.6	92.3	7.76	630	15	243	25.4	< 28	< 0.012 (HJ)	0.012 (H	2.4	0.14	313	0.052	2.99	8.21	0.063	43.2	370 (HJ)	0.65	2.5	450 (HJ)	14 (HJ)	14
	8/12/2002 9:35	6.26	22.73	76.19	8.02	793	11.5	259	57.7	< 28	< 0.012 (HJ)	0.012 (H	2.1	0.21	337	0.039 (UJ)	2.85	8.21	0.194	59.4	458 (HJ)	0.35 (UJ)	2.1	526 (HJ)	14 (HJ)	14
	11/18/2002 9:00	11.29	4.3	87.3	7.05	843	6.9	279 (B)	49.7	14 (UJ)	< 0.012	< 0.012	2.5	0.2	372	0.015 (UJ)	1.95	8.26	0.041	74.6	484	0.4	2.8	518	4 (UJ)	4

2002 Fixed Station

	Sample Date	Dissolved Oxygen (mg/L)	Water Temperature (C)	pH (SU)	Specific Conductance (uS/cm)	Turbidity (NTU)	Alkalinity (as CaCO3) (mg/L)	Chloride (mg/L)	COD (mg/L)	E_ Coli (MPN/100 mL)	Hardness (as CaCO3) (mg/L)	Nitrogen, Ammonia (mg/L)	Nitrogen, Nitrate+Nitrite (mg/L)	pH (SU)	Phosphorus, Total (mg/L)	Sulfate (mg/L)	TDS (mg/L)	TKN (mg/L)	TOC (mg/L)	TS (mg/L)	TSS (mg/L)
WWU100-0001	1/25/2002 12:05	9.92	4.69	8.47	673	2.49	293	38.5754	7.5	310	373			8.4	< 0.03	50.3951	440	0.2094	2.315	460	< 4
	2/22/2002 12:10	9.03	5.55	8.53	644	4.46	267	37.8146	10.1	240	348	< 0.1	3.1727	8.4	< 0.03	47.2198	429	0.304	1.993	438	18
	3/22/2002 11:15	12.42	2.95	8.68	686	2.8	273	36.9759	6.3	340	356	< 0.1	3.3506	8.5	< 0.03	43.9558	424	< 0.1 (DJ)	2.076	445	4
	4/19/2002 12:05	9.13	19.7	8.11	631	16.29	265	31.9877	9.1	330	336	< 0.1	3.0252	8.3	0.0695	42.858	400	0.3869	2.627	436	24
	5/23/2002 11:20	9.2	14.27	8.01	623	10.19	279	30	10.9	93	355	< 0.1	2.8	8.4	0.06	48	414	0.3	2.4	439	13
	6/20/2002 11:30	7.64	21.7	8.13	689	17.79	297	37	7.9	550	386	< 0.1	2.6	8.5	0.09	50	448	0.4	2.5	496	29
	7/25/2002 11:55	7.02	22.54	8.19	717	17	278	48	7.2	57	355	< 0.1	3	8.5	0.16	52	464	0.3	2.6	500	20
	8/29/2002 11:15	6.95	22.14	8.34	736	16.2	266	61	5.8	410	345	< 0.1	2.8	8.2	0.2	52	477	0.3	2	508	18
	9/25/2002 11:15	8.45	15.22	8.31	739	6.23	276	63	7.3	310	339	< 0.1	2.5	8.1	0.12	67	496	0.4	2.7	525	10
	10/17/2002 11:15	11.18	13.69	7.96	750	2.49	278	70	< 5	140	397	< 0.1	2.3	8.2	0.05	60	496	0.2	2.1	518	< 4
	11/26/2002 12:15	12.17	4.59	7.75	730	2.1	277	62	6.8	190	374	< 0.1	1.7	8.1	< 0.03	69	484	0.2	2.2	499	< 4
	12/11/2002 11:55	13.46	1.82	7.73	759	2.15	292	62	6.1	150	386	< 0.1	2.4	8.1	< 0.03	68	509	0.1 (UJ)	1.6	538	< 4

2003 Clean Sampling and Ultra-Clean Analyses

	Sample Date	Dissolved Oxygen (mg/L)	Water Temperature (C)	Saturation PerCent (%)	pH (SU)	Specific Conductance (uS/cm)	Turbidity (NTU)	Alkalinity (as CaCO3) (mg/L)	Chloride (mg/L)	COD (mg/L)	Cyanide (Free) (mg/L)	Cyanide (Total) (mg/L)	DOC (mg/L)	Fluoride (mg/L)	Hardness (as CaCO3) (mg/L)	Nitrogen, Ammonia (Dissolved) (mg/L)	Nitrogen, Nitrate+Nitrite (Dissolved) (mg/L)	pH (SU)	Phosphorus, Total (mg/L)	Sulfate (mg/L)	TDS (mg/L)	TKN (mg/L)	TOC (mg/L)	TS (mg/L)	TSS (mg/L)	Tss
WWU100-0001	3/10/2003 9:30	12.87	0.14		7.26	413	32	127 (B)	23.9	27 (UJ)	< 0.012	< 0.012		0.1	194	0.061	4.52	8.16	0.182	26.8	224	0.98	4.7 (HJ)	316	46 (fDJ)	46
	6/16/2003 9:00	7.71	19.34	85.4	8.02	647	17	227 (B)	31.7	12 (UJ)	< 0.012	< 0.012	3.2	0.16	331	0.074	6.24	8.32	0.11	39.6	360	0.73	4.4	448	45	45
	9/23/2003 10:10	8.47	16.81	87.2	7.86	694	16	255 (B)	36.9	10 (UJ)	< 0.012	< 0.012	2.7	0.17	337	< 0.048	2.11	8.3	0.061	50.5	376	0.47	2.8	418	10 (fDJ)	10
	12/15/2003 9:15	12.77	3.4	99.9	7.06	745	9	279 (B)	35	< 28	< 0.012	< 0.012	1.9	0.14	366	0.022 (UJ)	3.05	8.18	0.028	46.6	418	0.34 (UJ)	2	458	< 7	

2003 Fixed Station

	Sample Date	Dissolved Oxygen (mg/L)	Water Temperature (C)	pH (SU)	Specific Conductance (uS/cm)	Turbidity (NTU)	Alkalinity (as CaCO3) (mg/L)	Chloride (mg/L)	COD (mg/L)	E_ Coli (MPN/100 mL)	Hardness (as CaCO3) (mg/L)	Nitrogen, Ammonia (mg/L)	Nitrogen, Nitrate+Nitrite (mg/L)	pH (SU)	Phosphorus, Total (mg/L)	Sulfate (mg/L)	TDS (mg/L)	TKN (mg/L)	TOC (mg/L)	TS (mg/L)	TSS (mg/L)
WWU100-0001	2/21/2003 11:30	13.06	1.63	7.84	738	3.3	261	73	8.6	26	380	< 0.1	2.2	8.1	< 0.03	60	488	0.2	1.6	495	< 4
	3/27/2003 12:10	10.27	11.05	8.08	614	17.2	226	45	10.6	1000	341	< 0.1	4.1	8.1	0.06	39	395	0.2 (DJ)	2.9	453	23
	4/23/2003 11:30	10.47	10.43	8.16	690	3.07	278	48	7.4	74	370	< 0.1	2.1	8.2	0.04	53	453	0.2	2.2	489	5
	5/29/2003 11:25	8.32	16.29	8.36	699	17.3	275	46	10.7		371	< 0.1	2.4	8.1	0.07	52	444	0.4	2.3	492	36
	6/25/2003 11:10	7.51	22.28	8.28	738	19.9	275		10.9	170 (fDJ)	366	< 0.1	2.7	8.2	0.07		455	0.4	2.2	509	29
	7/29/2003 14:00	8.4	21.6	8.1	751	15.8	286	43	13.7		374	< 0.1	2.3	8.2	0.06	48	444	0.3	3.2	492	13
	8/27/2003 11:05	6.88	23.25	8.37	768	9.78	263	59	8.3	820	356	< 0.1	2	8.2	0.07	55	466	0.3 (fDJ)	2.3	505	13
	9/24/2003 9:50	8.9	14.9	8.52	672	11.5	270	37	10	730	349	< 0.1	2	8.2	0.05	46	414	0.4	2.7	437	8
	10/30/2003 11:30	10.76	10.66	7.8	746	8.7	264	42	6.5 (DJ)	110	382	< 0.1	2	8.2	< 0.03	46	446	0.3	2.6	463	4
	11/25/2003 9:10	11.48	6.02	8.66	565	30.1	202	30	14.7	2000	297	< 0.1	2.9	8	0.12	32	333	0.8	4.4	372	29
	12/23/2003 10:15	10.79	6.76	8.64	597	40.5	212	43	20	1700	314	< 0.1	2.1	8	0.18	36	354	1	3.1	471	96

2004 Clean Sampling and Ultra-Clean Analyses

	Sample Date	Dissolved Oxygen (mg/L)	Water Temperature (C)	Saturation PerCent (%)	pH (SU)	Specific Conductance (uS/cm)	Turbidity (NTU)	Alkalinity (as CaCO3) (mg/L)	Chloride (mg/L)	COD (mg/L)	Cyanide (Free) (mg/L)	Cyanide (Total) (mg/L)	DOC (mg/L)	Fluoride (mg/L)	Hardness (as CaCO3) (mg/L)	Nitrogen, Ammonia (Dissolved) (mg/L)	Nitrogen, Ammonia (mg/L)	Nitrogen, Nitrate+Nitrite (Dissolved) (mg/L)	Nitrogen, Nitrate+Nitrite (mg/L)	pH (SU)	Phosphorus, Total (mg/L)	Sulfate (mg/L)	TDS (mg/L)	TKN (mg/L)	TOC (mg/L)	TS (mg/L)	TSS (mg/L)
WWU100-0001	3/22/2004 9:30	14.02	3.24	102	7.3	699	10.4	258 (B)	37.5	14 (UJ)	< 0.012	< 0.012	1.8	0.15	330	0.025 (UJ)		2.23		8.37	0.019	45.2	402	0.34 (UJ)	2.2	414	< 7
	8/23/2004 9:00	7.14	19.32	79.8	7.99	726	5.5	250	55.4	< 5					313		< 0.1		1.8		0.098	55.4	446	0.796	3	461	9
	10/12/2004 10:30	8.52	11.91	79.4	8.02	813	2.3	260	71.9	< 10					373		< 0.5		1.65		< 0.05	69.8	462	< 0.2 (QJ)	3.7	514	4.2

2004 Fixed Station

	Sample Date	Dissolved Oxygen (mg/L)	Water Temperature (C)	pH (SU)	Specific Conductance (uS/cm)	Turbidity (NTU)	Alkalinity (as CaCO3) (mg/L)	Chloride (mg/L)	COD (mg/L)	E_ Coli (MPN/100 mL)	Hardness (as CaCO3) (mg/L)	Nitrogen, Ammonia (mg/L)	Nitrogen, Nitrate+Nitrite (mg/L)	pH (SU)	Phosphorus, Total (mg/L)	P	Sulfate (mg/L)	TDS (mg/L)	TKN (mg/L)	TOC (mg/L)	TS (mg/L)	TSS (mg/L)	Tss
WWU100-0001	1/23/2004 9:15	13.84	0.27	8.79	740	4.38	247	46	6.5	200	397	< 0.1	2.8	8.1	0.03	0.03	46	456	0.3	1.7	469		
	2/19/2004 8:45	11.94	4.05	8.81	685	12.3	272	45	10.9	240	370	< 0.1	2	8.1	0.06	0.06	47	418	0.4	2.7	448	13	13
	3/15/2004 14:25	9.01	13.53	8.19	688	3.18	254	44	< 5		367	< 0.1	2.1	8.3	< 0.03		48	429	0.2	1.6	443	4 (fDJ)	4
	4/29/2004 8:45	9.78	13.89	8.44	738	6.74		51	9.8	93	354	< 0.1	1.6	8.1	0.04	0.04	49	446	0.4	2.1	465	10	10
	5/27/2004 9:05	8.49	18.94	8.44	719	19.5	265	46	11.1 (DJ)	250	351	< 0.1	2.9	8.2	0.11	0.11	41	437	0.6	2.3	483	25	25
	6/24/2004 8:50	8.3	19.05	8.32	651	18.4	244	33	12.2 (DJ)	240	304	< 0.1	2.5	8.1	0.07	0.07	38	382	0.6	3.2	434	22	22
	7/28/2004 8:40	7.73	17.34	8.15	776	13.1	273	51	9.1	180	360	< 0.1	2	8.2	0.08	0.08	54	457		2.2	508	14 (DJ)	14
	8/20/2004 8:30	5.88	20.71	8.07	789	12.3	282	64	8.2	200	347	< 0.1	1.9	8.1	0.11	0.11	50	474	0.4	2	530	13	13
	9/22/2004 8:40	6.2	16.6	8.22	816	7.05	267	73	6.8	190	375	< 0.1	2	8.1	0.06	0.06	56	497		2.2	526	8	8
	10/21/2004 8:55	6.9	11.55	8.12	745	4.41	252	51	10.6	160	356	< 0.1	1.6	8	0.05	0.05	57	452	0.5	2.6	486	6	6
	11/19/2004 9:05	7.11	12.84	8.08	782	5.15	294	60	9.7	410	361	< 0.1	1.6	8	0.05	0.05	56	468	0.4	2.1	493	10	10
	12/16/2004 8:55	10.38	3.4	8.07	771	4.34	290	50	5	260	366	< 0.1	3.2	8.2	0.03	0.03	49	446 (B)	0.4	1.7	455	< 4	

2005 Clean Sampling and Ultra-Clean Analyses

	Sample Date	Dissolved Oxygen (mg/L)	Water Temperature (C)	Saturation PerCent (%)	pH (SU)	Specific Conductance (uS/cm)	Turbidity (NTU)	Alkalinity (as CaCO3) (mg/L)	Chloride (mg/L)	COD (mg/L)	Hardness (as CaCO3) (mg/L)	Nitrogen, Ammonia (mg/L)	Nitrogen, Nitrate+Nitrite (mg/L)	Phosphorus, Total (mg/L)	Sulfate (mg/L)	TDS (mg/L)	TKN (mg/L)	TOC (mg/L)	TS (mg/L)	TSS (mg/L)
WWU100-0001	2/22/2005 11:00	11.2	5.8	89.5	7.9	653	8.24	280	34	11	308	0.18	2.7	< 0.05	40	370 (HJ)	0.78	1.09	430	10

Flatfork Creek Page 3	6/27/2005 10:00	6.4	23.3	75	7.8	746	18.1	234	54.8	11.3	323	< 0.5 (QJ)	1.88	0.1	52.4	424	< 2	3.4	464	24.1	
	9/15/2005 9:30	6.41	21	72.3	7.8	775	13.1	244	65.6	< 10 (Q)	340	< 0.5	1.84	0.11	61.6	474	< 2	3	504	10.3	
	12/16/2005 11:00	13	1.4	92.5	7.8	832	3.2	288	71.5	< 10	361	< 0.5	2.08	0.07	50.5	484	< 2 (QJ)	3.1	486	< 5	

2005 Fixed Station

	Sample Date	Dissolved Oxygen (mg/L)	Water Temperature (C)	pH (SU)	Specific Conductance (uS/cm)	Turbidity (NTU)	Alkalinity (as CaCO3) (mg/L)	Chloride (mg/L)	COD (mg/L)	E_ Coli (MPN/100 mL)	Hardness (as CaCO3) (mg/L)	Nitrogen, Ammonia (mg/L)	Nitrogen, Nitrate+Nitrite (mg/L)	pH (SU)	Phosphorus, Total (mg/L)	P	Sulfate (mg/L)	TDS (mg/L)	TKN (mg/L)	TOC (mg/L)	TS (mg/L)	TSS (mg/L)
WWU100-0001	1/26/2005 9:05	10.62	5.81	7.92	720	8.8	270	43	6.4	100	320	< 0.1	2.8	8	0.04	0.04	45	417	0.4	1.7	445	9
	2/18/2005 8:55	13.14	3.27	7.85	567	34.9	235	34	10.1	43 (fDJ)	288	< 0.1	3.2	7.9	0.04	0.04	35	337	0.5	2.3	379	26
	3/30/2005 8:45	9.33	10.77	7.95	719	9.9	266	47	6.5	120	337	< 0.1	2.3	8.1	< 0.03		43	410	0.3	2.2	436	5
	4/19/2005 8:55	6.99	17.71	7.86	732	7.28	265	54	9.3	46	330	< 0.1	1.5	8.1	0.04	0.04	50	418	0.5	2.4	454	11
	5/26/2005 8:45	7.82	15.9	7.87	715	13.2	267	42	9.8	110	347	< 0.1	3.3	8.1	0.06	0.06	47	423	0.5	2.1	464	16
	6/29/2005 8:55	6.04	22.04	7.79	724	26.4	240	49	13.5	260	356	< 0.1	2.1	8.1	0.09	0.09	52	452	0.6	2.6	490	42
	7/27/2005 9:30	5.48	23.86	7.85	704	18.6	251	50	11.4	6	340	< 0.1	2	8.1	0.13	0.13	46	434	0.6	2.6	484	30
	8/24/2005 9:30	6.34	20	7.69	801	11.6	259	71	7.8	96	348	< 0.1	1.9	8.1	0.08	0.08	49	485	0.5	2.2	523	14
	9/21/2005 8:45	6	19.1	7.5	593	39.4	206	31	19	830	280	< 0.1	2.6	8	0.17	0.17	31	344	0.9	4.8	420	53
	10/19/2005 8:40	8.63	13.37	7.85	720	5.64	289	68	8.2	180	368	< 0.1	1.7	8.1	0.04	0.04	53	516	0.1 (QJ)	2.5	507	7
	11/22/2005 8:50	10.42	6.84	7.93	639	5.18	271	43	9.4	300	369	< 0.1	2.7	8.1	0.06	0.06	48	467	0.4	3	491	< 4

2006 Clean Sampling and Ultra-Clean Analyses

	Sample Date	Dissolved Oxygen (mg/L)	Water Temperature (C)	Saturation PerCent (%)	pH (SU)	Specific Conductance (uS/cm)	Turbidity (NTU)	Alkalinity (as CaCO3) (mg/L)	Chloride (mg/L)	COD (mg/L)	Fluoride (mg/L)	Hardness (as CaCO3) (mg/L)	Nitrogen, Ammonia (mg/L)	Nitrogen, Nitrate+Nitrite (mg/L)	Phosphorus, Total (mg/L)	Sulfate (mg/L)	TDS (mg/L)	TKN (mg/L)	TOC (mg/L)	TS (mg/L)	TSS (mg/L)
WWU100-0001	3/10/2006 11:00	9.8	8.3	83	7.4	368	285	88	23.4	15.1	0.17	190	< 0.1	0.511	0.298	17.6	244	2.09	6.4	449	200
	5/15/2006 9:30	9.5	11.7	87.9	7.8	518	42	170	25.2	10.1	0.18	279	< 0.1	4.33	0.148	25.1	305	0.816	4.3	357	50

2006 Fixed Station

	Sample Date	Dissolved Oxygen (mg/L)	Water Temperature (C)	pH (SU)	Specific Conductance (uS/cm)	Turbidity (NTU)	Alkalinity (as CaCO3) (mg/L)	Chloride (mg/L)	COD (mg/L)	E_ Coli (MPN/100 mL)	Hardness (as CaCO3) (mg/L)	Nitrogen, Ammonia (mg/L)	Nitrogen, Nitrate+Nitrite (mg/L)	pH (SU)	Phosphorus, Total (mg/L)	P	Sulfate (mg/L)	TDS (mg/L)	TKN (mg/L)	TOC (mg/L)	TS (mg/L)	TSS (mg/L)
WWU100-0001	1/20/2006 8:55	10.01	8.06	8.07	581	22.9	218	41	13.2	550	319	< 0.1	3.9	8.1	0.09	0.09	35	369	0.6	2.8	415	30
	2/15/2006 8:45	11.52	4.71	8.23	647	8.93	276	45	7.8 (DJ)	62	337	< 0.1	2.9	8.1	0.03	0.03	52	433	0.3	2	456	11
	3/30/2006 8:45	9.17	8.25	8.32	710	7.48	257	40	7.8	64	377	< 0.1	2	8.1	< 0.03		44	407	0.3	2.2	440	9
	4/20/2006 8:35	7.18	14.85	8.12	632	20.3	238	32	14.4	280	313	< 0.1	2.9	8	0.08	0.08	41	370	0.6	3.2	418	29
	5/24/2006 9:05	6.7	14.55	8.26	694	14.9	271	35	12.4	160	351	< 0.1	3.2	8.1	0.04	0.04	45	422	0.5	2.3	460	25
	6/28/2006 9:00	8.44	19.39	8.21	565	26.9	271	40	12.4	310	346	< 0.1	2.8	8	0.1	0.1	46	485	0.6	2.4	542	34
	7/26/2006 8:50	8.02	22.6	8.27	727	16.4	274	58	10.7	220	335	< 0.1	2.1	8.1	0.12	0.12	45	460	0.5	2.7	537	21
	8/23/2006 8:45	9.13	20.63	8.31	750	14.7	268	70	8.6	270	370	< 0.1	1.8	8.1	0.1	0.1	46	491	0.4	2.8	531	16
	9/21/2006 8:30	9.01	12.73	8.27	731	8.93	269	67	8.4	340	342	< 0.1	1.9	8.2	0.07	0.07	44	478	0.4	2.4	499	12
	10/25/2006 9:00	10.91	5.97	8.49	655	5.08	277	44	8.2	170	358	< 0.1	2.2	8.1	0.07	0.07	42	447	0.3	3.3	469	5
	11/29/2006 8:59	9.15	11.93	8.2	727	6.79	277	48	6.1	440	385	< 0.1	2	8.1	0.06	0.06	42	436	0.3	2.6	475	12
	12/21/2006 8:40	11.27	7.33	8.17	712	8.45	276	42	7.4	270	382	< 0.1	2.4	8	0.03	0.03	38	429	0.3	2.4	396	8

2007 Fixed Station Monitoring

	Sample Date	Dissolved Oxygen (mg/L)	Water Temperature (C)	pH (SU)	Specific Conductance (uS/cm)	Turbidity (NTU)	Alkalinity (as CaCO3) (mg/L)	Chloride (mg/L)	COD (mg/L)	E_ Coli (MPN/100 mL)	Hardness (as CaCO3) (mg/L)	Nitrogen, Ammonia (mg/L)	Nitrogen, Nitrate+Nitrite (mg/L)	pH (SU)	Phosphorus, Total (mg/L)	P	Sulfate (mg/L)	TDS (mg/L)	TKN (mg/L)	TOC (mg/L)	TS (mg/L)	TSS (mg/L)	Tss
WWU100-0001	1/24/2007 8:40	12.56	4.5	8	643	8.15	270	36	7.4	140	335	< 0.1	2.5	7.9	0.04	0.04	41	400	0.3	2.1	429	11	11
	2/22/2007 8:50	13.5	2.16	8.17	767	4.63	254	74	< 8		323	< 0.1	2	8.09	< 0.06		47.5	381	0.572	2.13	418	< 10	
	3/28/2007 8:50	8.76	15	8.12	558	57.9	215	26	15.9	370	273	< 0.1	2.2	7.9	0.08	0.08	31	322	0.6	3.4 (QJ)	379	45	45
	4/24/2007 8:35	8.37	15.6	8.19	630	13.6	261	35	12		336	< 0.1	1.9	7.9	< 0.03		43	405	0.4	2.4	466	15	15
	5/22/2007 8:25	6.01	17.68	8.51	742	14.1	274	47	10.5	96	358	< 0.1	2	8	0.05	0.05	46	422	0.4	2.36	491	23	23
	6/20/2007 8:20	7.27	20.55	8.05	745	13.7	268	61	< 5	370	367	< 0.1	1.9	8	0.09	0.09	43	464	0.4	2.6	506	19	19
	7/18/2007 8:20	6.5	21.1	8.12	686	9.66	254	63	6.9	200	352	< 0.1	1.6	8	0.09	0.09	49	454	0.4	2.7	495	11	11
	8/23/2007 8:25	6.28	23.83	8.04	549	32.4	195	35	17	980	287	< 0.1	2.4	7.9	0.14	0.14	45	359	0.8	4.9	410	37	37
	9/28/2007 8:55	7.35	18.21	7.91	785	9.39	230	80	10.4	390	339	< 0.1	1.6	7.9	0.08	0.08	54	486	0.4	3.3	549	10	10
	10/25/2007 9:05	8.82	11.27	7.91	648	4.61	257	54	10.5	180	353	< 0.1	1.6	7.9	0.04	0.04	49	439	0.4	3.6	472	6	6
	11/20/2007 8:35	9.19	11.42	8.04	804	4.26	280 (Q)	58	8.1	89	376	< 0.1	2	7.9	0.04	0.04	60	477	0.3	3.1	508	6	6
	12/20/2007 8:45	13.05	3.8	7.97	790	6.15	252	52	7.7	370	383	< 0.1	3.5	7.9	0.05	0.05	52	449	0.3	2.9	481	9	9

2008 Fall Creek IBC Study

	Sample Date	Dissolved Oxygen (mg/L)	Water Temperature (C)	Saturation PerCent (%)	pH (SU)	Specific Conductance (uS/cm)	Turbidity (NTU)	Alkalinity (as CaCO3) (mg/L)	Chloride (mg/L)	COD (mg/L)	Cyanide (Total) (mg/L)	Fluoride (mg/L)	Hardness (as CaCO3) (mg/L)	Nitrogen, Ammonia (mg/L)	Nitrogen, Nitrate+Nitrite (mg/L)	Phosphorus, Total (mg/L)	P	Sulfate (mg/L)	TDS (mg/L)	TKN (mg/L)	TOC (mg/L)	TS (mg/L)	TSS (mg/L)	Tss	Atrazine (Aatrex) (ug/L)
WWU100-0040	6/17/2008 9:30	8.66	18.11	94.6	8.01	590	25.4	220	29	11	< 0.005	0.17	310	< 0.1		3.2	0.1	0.1	33	330	0.7	3.2	400	26	26
	8/11/2008 9:08							250	40	4 (fDJ)	< 0.005 (Q.	0.2	340	< 0.1		1.4	< 0.05 (QJ)		44	410	0.81 (QJ)	2.3	420	17 (fDJ)	17
	10/6/2008 12:36	10.92	13.9	108	8.24	699	15.2	240	48	5 (fDJ)	< 0.005	0.19	350	< 0.1		1.2	< 0.05		49	360		2.1	450	3	3
WWU100-0059	5/7/2008	8.23	16.73	87	7.88	868	1.8																		< 0.28 (QJ)
	6/17/2008 10:40	7.86	19.1	86	7.63	556	11.7	200	38	16	< 0.005	0.17	270	< 0.1		3.7	0.1	0.1	22	300	0.92	5.1	380	8	8 1.9 (QJ)
	8/11/2008 8:15							260	130	20 (fDJ)	< 0.005	0.29	310	< 0.1		1.8	< 0.05 (QJ)		42	520	0.52 (fDJ)	3.6	550	3 (fDJ)	3
	10/6/2008 10:08	8.8	12.81	86	8.08	1550	6.2	260	330	41 (fDJ)	< 0.005	0.46	380	< 0.1		2.8	< 0.05		72	840	0.69	4.7	930	3	3
WWU100-0061	6/17/2008 10:55	7.11	19.72	79.5	7.57	496	21	190	23	16	< 0.005	0.17	260	< 0.1		4	0.13	0.13	20	290	1.2	5.6	310	12	12
	8/11/2008 9:05							250	34	9 (fDJ)	< 0.005	0.21	250	< 0.1		0.62	< 0.05 (QJ)		24	320	0.71 (fDJ)	4.3	330	11 (fDJ)	11
	10/6/2008 10:41	6.67	14.86	61.9	7.82	631	8.1	280	32	4 (fDJ)	< 0.005	0.48	180	< 0.1		0.23	< 0.05		28	360		3.4	390	3	3
WWU100-0062	6/17/2008 11:15	6.9	18.3	74.2	7.46	464	16.1	180	21	22	< 0.005	0.16	230	< 0.1		3.8	0.14	0.14	17	260	0.99	6.4	280	14	14
	8/11/2008 9:50							290	35	< 4 (fDJ)	< 0.005	0.15	310	< 0.1		0.36	0.08 (QJ)	0.08	29	340	0.68 (fDJ)	3.6	400	8 (fDJ)	8
	10/6/2008 11:02	2.81	12.71	28.4	7.53	540	90	240	35	16 (fDJ)	< 0.005	0.16	250	< 0.1		0.01	0.07	0.07	14	270		8.7	330	4	4
WWU100-0064	5/7/2008	10.03	16.88	107.1	7.75	696	6.2																		< 0.28 (QJ)
	6/17/2008 9:00	8.72	18.3	95.6	7.97	609	25.6	240	34	17	< 0.005	0.17	320	< 0.1		3.2	0.13	0.13	36	340	0.88	3.2	450	31	31 1.6 (QJ)
	8/12/2008 16:30							250	46	< 4 (fDJ)	< 0.005 (Q.	0.18	330	< 0.1		1.7	< 0.05 (QJ)		47	390	< 0.3	2.4	410	3	3
	10/6/2008 12:16	11.2	14.66	112.6	8.34	828	22.3	260	82	5 (fDJ)	< 0.005	0.19	350	< 0.1		2.6	< 0.05		54	460		2.4	530	< 1	

2008 Fixed Station Monitoring

	Sample Date	Dissolved Oxygen (mg/L)	Water Temperature (C)	pH (SU)	Specific Conductance (uS/cm)	Turbidity (NTU)	Alkalinity (as CaCO3) (mg/L)	Chloride (mg/L)	COD (mg/L)	E_ Coli (MPN/100 mL)	Hardness (as CaCO3) (mg/L)	Nitrogen, Ammonia (mg/L)	Nitrogen, Nitrate+Nitrite (mg/L)	pH (SU)	Phosphorus, Total (mg/L)	Sulfate (mg/L)	TDS (mg/L)	TKN (mg/L)	TOC (mg/L)	TS (mg/L)	TSS (mg/L)	Tss
WWU100-0001	1/24/2008 8:40	11.41	0.85	7.78	713	4.29	283	47	6	130	384	< 0.1	3.1	8	0.04	51	437	0.3	1.6	470	< 4	
	2/20/2008 8:50	13.53	2.34	7.66	641	16	216	36	8.9	240	316	< 0.1	3.7	7.9	0.06		367	0.3	2.8	410	14	14
	3/26/2008 8:50	12.22	6.84	7.88	577	13.3	237	33	12 (DJ)	230	318	< 0.1	2.7	7.8	0.03	37	361	0.4	2.8	394	13	13
	4/23/2008 8:25	6.29	16.14	7.82	691	7.16	261	40	9.4	82	348	< 0.1	2	7.9	0.03	41	389	0.3	3	432	10	10
	5/22/2008 8:40	9.85	13.33	7.81	638	10.2	259 (QJ)	38	7.8	170	371	< 0.1	2.8	7.9	0.05	43	392	0.4	3	434	11	11
	6/25/2008 8:45	8.86	19.28	7.87	643	11.9	272	38	9.4 (QJ)	220	363	< 0.1	2.6	7.9	0.06	45	403	0.4	2.6	450	17	17
	7/24/2008 9:15	7.24	20	7.81	568	21.8	216	29	14	730	301	< 0.1	2.3	8.1	0.1	28	348	0.6	4.1	400	34	34
	8/19/2008 9:10	7.2	19.74	8.01	673	8.05	269	54	8.1	110	370	< 0.1	1.9	8.2	0.04	47	455	0.2	1.9	480	11	11
	9/24/2008 9:30	7.61	18.26	7.82	863	6.71	271	68	7.3	250	360	< 0.1	2.3	8.2	0.06	51	476	0.3	2.3	508	10	10
	10/22/2008 9:05	9.54	9.78	8.01	803	2.11	265	65	7.8 (QJ)	180	378	< 0.1	1.9	8.1	0.04	41	469	0.3	3.5	492	4	4
	11/20/2008 9:39	13.63	4.05	7.9	-4	1.96	267	55	8.2	490	380	< 0.1 (QJ)	2	8.1	< 0.03	52	457	0.2	2.5	477	< 4	

Flatfork Creek Page 4	12/11/2008 9:15	12.33	3.44	8.37	741	7.16	243	58	7.6 < 1 (fB)	348	< 0.1	2	8	0.04	54	422	0.4	3.3	444	7	7

2008 Upper Fall Creek WQ Monitoring Program

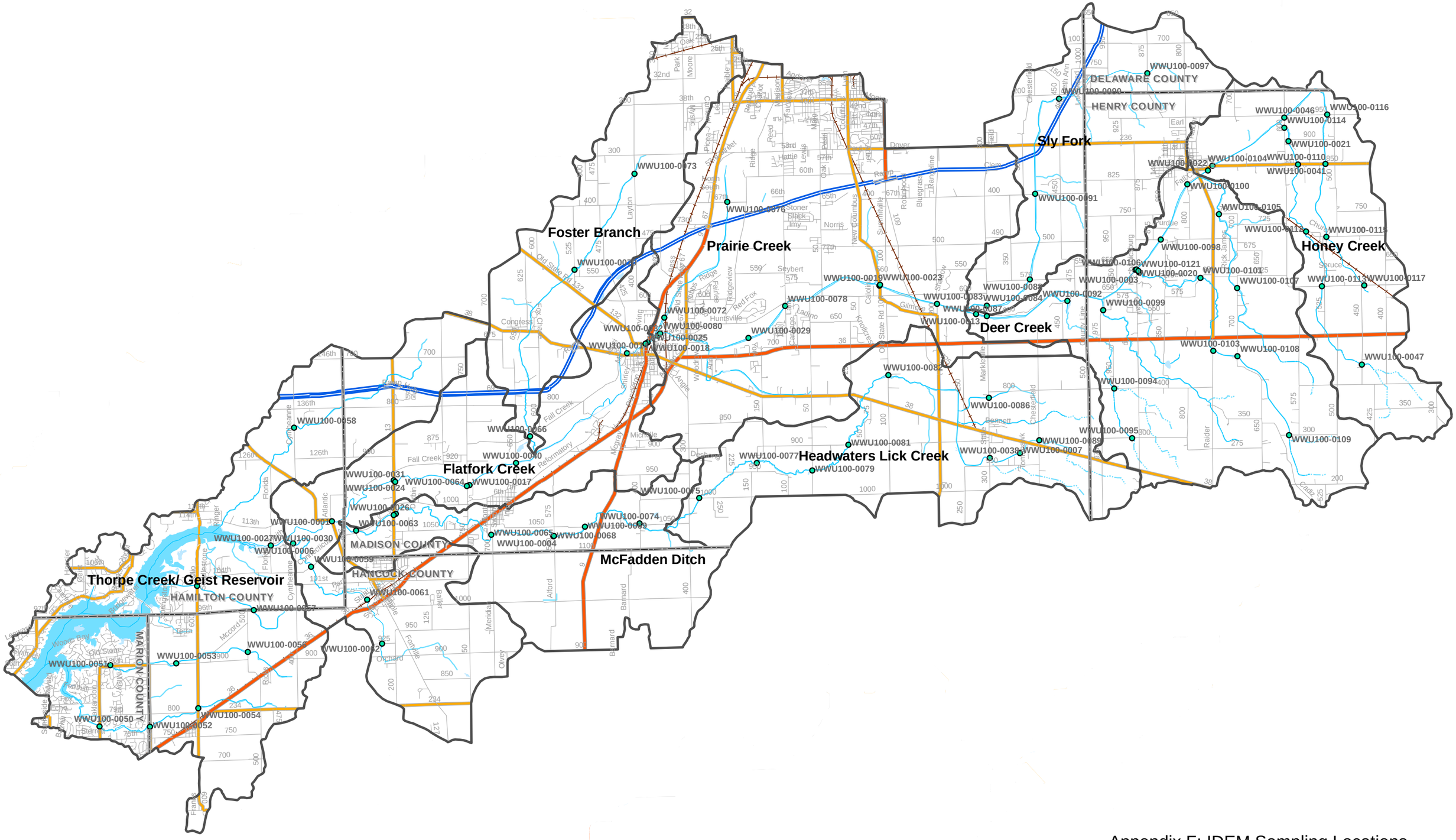
	Sample Date	Dissolved Oxygen (mg/L)	Water Temperature (C)	Saturation PerCent (%)	pH (SU)	Specific Conductance (uS/cm)	Turbidity (NTU)	Alkalinity (as CaCO3) (mg/L)	CBOD5 (mg/L)	Chloride (mg/L)	COD (mg/L)	Coliforms (Total) (MPN/100 mL)	E_ Coli (MPN/100 mL)	E Coli	Fluoride (mg/L)	Hardness (as CaCO3) (mg/L)	Nitrogen, Ammonia (mg/L)	Nitrogen, Nitrate+Nitrite (mg/L)	Phosphorus, Total (mg/L)	Sulfate (mg/L)	TDS (mg/L)	TKN (mg/L)	TOC (mg/L)	TS (mg/L)	TSS (mg/L)	Tss
WWU100-0001	7/9/2008 9:50	7.89	21.43	89.8	8.01	641	22.6					> 2420	648.8	648.8												
	7/16/2008 10:00	8.28	21.76	94.7	7.84	651	17.1					> 2420	344.8	344.8												
	7/23/2008 9:15	8.4	21.25	95.2	7.55	392	40.9					> 2420	> 2420	2420												
	7/30/2008 9:20	7.01	22.64	83.6	8.09	688	9.8					> 2420	224.7	224.7												
	7/30/2008 15:00	7.74	22.17	89	7.73	716	6.1	290 (QJ)		40	9.6				0.2		< 0.1	1.9	0.06	44	418	0.3	2.8	469	7	7
	8/6/2008 9:35	8.08	21.99	92.6	7.87	554	19.7					> 2420	1553.1	1553.1												
	9/10/2008 8:00	6.8	17.29	72.2	7.97	712	30	245		54	10.9				0.2		< 0.1	1.6	0.08	43	430	0.4	2.4	462	21	21
WWU100-0059	6/18/2008 14:57	8.1	20.21	91.8	8.12	603	8.1	212	< 1	40	15.9				0.2	287	< 0.1	3.8	0.08	23	342	0.7	6	382	6	6
	7/8/2008 8:30	6.89	21.4	79.9	8.04	660	3.7	245		47	8.2				0.2		< 0.1	3.8	0.05	26	387	0.6	3.2	422	6	6
	7/9/2008 10:10	8.14	22.23	93.5	7.95	676	6.2					1011.1	1046.2	1046.2												
	7/16/2008 10:15	8.01	24.69	98.5	8.3	764	1.5					> 2420	816.4	816.4												
	7/16/2008 15:00	9.42	22.94	111.3	7.85	750	3.4	240	< 1	75	9				0.2	338	< 0.1	2.7	0.04	30	446	0.4	2.7	478	4	4
	7/23/2008 9:30	8.7	20.67	97.2	7.56	565	14.9					> 2420	> 2420	2420												
	7/30/2008 9:30	8.31	22.91	96.9	7.75	909	3					> 2420	178.9	178.9												
	8/6/2008 9:45	7.96	22.96	93	7.85	517	19.8					> 2420	2419.2	2419.2												
	8/11/2008 10:30	7.82	18.66	85.6	8.22	955	2.2	252		134	11.7				0.3		< 0.1	2	0.06	39	560	0.5	3.6	599	< 4	
	8/27/2008 14:45	10.81	21.39	126.3	8.49	148.9	2	253	< 1	290	15.4				0.4	395	< 0.1	2.8	0.07	63	863	0.6	4	900	< 4	
	9/16/2008 13:00	8.18	18.06	88.7	8.12	1107	1.7	254		176	13.7				0.5		< 0.1	3.6	0.1		659	0.5 (DJ)	4.4	695	< 4	
	9/24/2008 16:10	9.02	20.26	101.9	8.26	1720	1.1	258	< 1	336	13.3				0.5	433	< 0.1	3.6	0.07	62	977	0.5	4.3	1050	< 4	
	10/22/2008 15:20	12.8	9.67	114.8	8.35	1680	2.8	270	< 1	322	16.5				0.5	384	< 0.1	2.9	0.07	38	915	0.7	5.7	969	< 4	
	11/19/2008 14:50	14.93	4.01	115.8	8.88	1117	19.3	256	< 1	207	15.9				0.4	325	< 0.1	2.2	0.05	52	615	0.5 (DJ)	4.1	652	6	6
	12/17/2008 14:57	17.42	0.96	124.2	8.74	1180	6.1	227	< 1	189	15.2				0.3	346	< 0.1	2.6	0.03	52	653	0.5	3.7	681	< 4	
WWU100-0064	6/18/2008 14:17	8.68	19.28	96.6	8.15	665	26.1	243	< 1	36	14.3				0.2	342	< 0.1	3.3	0.09	39	384	0.6	4.2	444	27	27
	7/9/2008 9:25	8.47	21.65	96.6	8.04	689	15.5					> 2420	686.7	686.7												
	7/16/2008 9:30	8.5	23.23	101.9	8.22	674	21.5					> 2420	517.2	517.2												
	7/16/2008 14:25	8.51	21.66	97.2	7.79	673	18	248	< 1	38	11.4				0.2	352	< 0.1	2.6	0.08	42	412	0.4	2.5	455	19	19
	7/23/2008 8:50	8.63	20.61	96.3	7.52	611	44					> 2420	> 2420	2420												
	7/30/2008 8:50	7.85	22.03	90.1	7.67	729	7.1					> 2420	191.8	191.8												
	7/30/2008 13:00	8.53	23.22	102.9	8.17	714	6.3	285 (QJ)		47	10				0.2		< 0.1	2	0.06	45	432	0.3	2.8	475	5	5
	8/6/2008 9:05	7.98	21.83	91.1	7.8	564	20.7					> 2420	2419.2	2419.2												
	8/27/2008 13:35	10.62	21.85	124.6	8.31	778	1.6	263	< 1	62	7.7				0.2	368	< 0.1	1.9	0.05	50	490	0.3	1.7	499	< 4	
	9/10/2008 10:30	8.01	16.78	84.1	8.1	826	7.5	262		75	9.3				0.2		< 0.1	2.1	0.07	58	503	0.4	2.6	521	9	9
	9/24/2008 15:15	10.87	21.16	124.7	8.22	859	3.9	260	< 1	82	8.1				0.2	370	< 0.1	2.8	0.07	48	513	0.4	2.2	534	4	4
	10/22/2008 13:43	13.57	10.68	124.3	8.5	870	1.5	265	< 1	78	7				0.2	373	< 0.1	2.4	0.06	49	503	0.3	3	537	< 4	
	11/19/2008 14:05	15.03	4.42	117.9	8.81	806	4	260	< 1	60	7.8				0.1	373	< 0.1	2.4	< 0.03	60	462	0.3 (DJ)	2.7	491	< 4	
	12/17/2008 14:19	15.72	1.38	113.3	8.58	862	5.3	254	< 1	70	13.6				0.1	365	< 0.1	2.8	< 0.03	63	497	0.3	2.3	521	< 4	

2009 Fixed Station Monitoring

	Sample Date	Dissolved Oxygen (mg/L)	Water Temperature (C)	pH (SU)	Specific Conductance (uS/cm)	Turbidity (NTU)	Alkalinity (as CaCO3) (mg/L)	Chloride (mg/L)	COD (mg/L)	E_ Coli (MPN/100 mL)	Hardness (as CaCO3) (mg/L)	Nitrogen, Ammonia (mg/L)	Nitrogen, Nitrate+Nitrite (mg/L)	pH (SU)	Phosphorus, Total (mg/L)	Sulfate (mg/L)	TDS (mg/L)	TKN (mg/L)	TOC (mg/L)	TS (mg/L)	TSS (mg/L)
WWU100-0001	2/25/2009 9:15	12.69	3.54	8.2	742	5.28	274	49	6.6	220	369	< 0.1	2.6	8.1	0.04	48	421	0.2	1.5	457	7
	3/18/2009	9.19	11.54	8.07	721	6.58															

2009 Upper Fall Creek WQ Monitoring Program

	Sample Date	Dissolved Oxygen (mg/L)	Water Temperature (C)	Saturation PerCent (%)	pH (SU)	Specific Conductance (uS/cm)	Turbidity (NTU)	Alkalinity (as CaCO3) (mg/L)	CBOD5 (mg/L)	Chloride (mg/L)	COD (mg/L)	Fluoride (mg/L)	Hardness (as CaCO3) (mg/L)	Nitrogen, Ammonia (mg/L)	Nitrogen, Nitrate+Nitrite (mg/L)	Phosphorus, Total (mg/L)	Sulfate (mg/L)	TDS (mg/L)	TKN (mg/L)	TOC (mg/L)	TS (mg/L)	TSS (mg/L)
WWU100-0059	2/18/2009 14:30	12.34	5.64	100.9	8.21	598	21.7	192	< 1	48	12.2	< 0.1	266	< 0.1		3.7	0.07	31	340	0.6	2.5	374	8
	3/11/2009 15:00	18.33	9.82	165.3	9	759	14.1	198	1.9	99	14.3	0.2	297	< 0.1		1.8	0.06	42	431	0.6	3.5	479	9
WWU100-0064	2/18/2009 13:52	12.21	5.47	99.4	8.24	671	52.4	235	< 1	42	12.5	0.1	350	< 0.1		3.1	0.05	46	387	0.5	2	423	9
	3/11/2009 14:25	13.42	10.71	123.5	8.6	734	13.7	259	< 1	55	9.9	0.2	369	< 0.1		2.1	0.04	53	429	0.4	2.6	476	7



Appendix F: IDEM Sampling Locations

Appendix G – CIWRP Data

A summary of the data obtained from CIWRP within the Geist Reservoir/Upper Fall Creek watershed is provided within this Appendix. The raw data is provided on CD at the end of this report.

	CEES Water Quality Data											
	DO		E. Coli		Nitrate+Nitrite		Total P		TSS		Turbidity	
Honey Creek	1	7	1	7	1	6	1	7	1	5	1	5
	11.59		42940.3		2.6		0.173		74.1		68.9	
Sly Fork	1	7	1	7	1	6	1	7	1	5	1	5
	11.59		42940.3		2.6		0.173		74.1		68.9	
Deer Creek	1	7	1	7	1	6	1	7	1	5	1	5
	11.59		42940.3		2.6		0.173		74.1		68.9	
Prairie Creek	3	16	3	16	3	13	3	16	3	11	3	11
	10.97		47006.8		1.79		0.12		48		47.8	
Headwaters Lick Creek	1	7	1	7	1	6	1	7	1	5	1	5
	12		14382.9		2.45		0.132		48.9		67.3	
Foster Branch	1	7	1	7	1	6	1	7	1	5	1	5
	11.94		15321.4		3.17		0.146		16.9		43.5	
McFadden Ditch	1	7	1	7	1	6	1	7	1	5	1	5
	12		14382.9		2.45		0.132		48.9		67.3	
Flatfork Creek	1	7	1	7	1	6	1	7	1	5	1	5
	12.08		36842.9		2.45		0.165		52.2		67.2	
Thorpe Creek	3	21	3	21	3	18	3	21	3	15	3	15
	11.47		38437.2		3.4		0.193		53.1		82.8	
Limits	Min 4.0mg/L Max 12.0mg/L		Max 235CFU/100mL		Max 1.6mg/L		Max 0.3mg/L		Max 30.0mg/L		Max 10.4 NTU	

Honey Creek
CEES 2003 Data

	Date	Esti-Q	TSSed (g/m3)	Water Surfa	Stream Bottom (ı	Water Depl	Sample Depth (n	Temp. (°C)	pH	SpC (mS)	TDS (g/L)	Salinity (pp	DO (mg/L)	Turbidity (NT	TSSolids (p	Silica (mg/l	Silica (mg/L) (unfi	Cl- (mg/L)	SO4 (mg/L	NO2 (mg/l	NO3 (mg/l
FCW9	2/20/2003	0.70	3.1963				0.0500	2.0000	7.9100	0.6401	0.4093	0.3300	14.8400					37.0000	47.0000	<0.04	2.4000
	3/14/2003	9.83	115.4483	467	555	88	0.0500	5.5400	7.7000	0.3365	0.2154	0.1700	11.5000					16.0000	21.0000	<0.04	4.1000
	5/27/2003	1.10	11.9388	410	455	45	0.0500	15.2200	7.9500	0.6287	0.4024	0.3200	11.7100	5.0000	12.0000	7.1000	7.1000	27.0000	41.0000	<0.20	2.6000
	7/7/2003	26.01	97.7174	230	455	225	0.0500	20.8400	7.5400	0.3302	0.2114	0.1600	7.4700	48.0000	140.0000	9.0000	9.0000	12.0000	15.0000		
	10/14/2003	2.15	87.0103	350	455	105	0.0500	13.7400	7.8200	0.5024	0.3215	0.2500	7.8800	59.0000	100.0000	7.1000	7.8000	21.0000	29.0000	<0.10	2.1000
	12/22/2003	1.69	2.8723	405	455	50	0.0500	4.7400	8.0800	0.6407	0.4100	0.3300	13.2900	2.7000	1.6000	8.1000	8.5000	25.0000	38.0000	<0.10	2.7000
	1/5/2004	30.39	199.4000	255	455	200	0.0500	3.5400	7.6300	0.2480	0.1594	0.1200	14.4500	230.0000	117.0000	5.3100	4.9400	11.0000	13.0000	<0.10	1.7000
		10.2666	73.9405	352.8333	471.6667	118.8333	0.0500	9.1171	7.8043	0.4752	0.3042	0.2400	11.5914	68.9400	74.1200	7.3220	7.4680	21.2857	29.1429	#DIV/0!	2.6000

Honey Creek Page 2

Ophos (mg	Total P (m	Alkalinity (r	Total Hardı	NH4-N (m	Ca (mg/L)	Mg (mg/L)	K (mg/L)	Na (mg/L)	DOC (mg	TOC (mg	Vac Line	Trans	Zero	CO2 Yield	DIC (m	d13CDIC	±	d18O	±	TKN (mg/l	Total Colifc	E. Coli (colo	HPC (color	Chlo-A (mg	MIB (ppb)	Geosmin (j
NR	0.0250	290.0000	370.0000	0.0700	93.0000	33.0000	1.8000	21.0000	1.8000	1.8000	C	89.6000	6.3000	51.9921	62.3905	-11.5050	0.0060	-8.1620	0.0050	0.3500	15531.00	122.00	1100.00			
0.1100	0.1400	150.0000	200.0000	0.0690	53.0000	17.0000	2.7000	7.7000	5.5000	5.6000	C	31.9000	1.3000	18.4222	22.1066	-10.0930	0.0090	-10.0930	0.0090	0.9800	198630.00	1090.00	51000.00	0.10		
<0.20	0.0050	260.0000	360.0000	0.1100	91.0000	32.0000	1.7000	13.0000	2.4000	2.5000	E	53.8000	8.1000	29.3266	35.1919	-9.3960	0.0080			0.9800	17000.00	1200.00		0.30	BDL	BDL
	0.3000	140.0000	170.0000	0.1000	46.0000	14.0000	4.0000	6.0000	7.7000	7.8000	C	39.9000	-1.0000	24.9833	29.9800	-13.1780	0.0060	-7.7750	0.0440	1.1000	>241920	>241920		0.30		
<0.10	0.4200	220.0000	270.0000	0.0200	70.0000	24.0000	5.2000	8.7000	7.8000	8.1000	E	59.0000	-1.8000	38.9604	46.7525	-11.7730	0.0040			1.1000	>241920	51720.00		<0.1	BDL	BDL
<0.10	0.0260	280.0000	360.0000	0.0600	95.0000	31.0000	1.5000	11.0000	1.7000	1.8000										0.4300	3950.00	980.00		0.50	BDL	BDL
<0.10	0.2920	112.0000	140.0000	0.0200	39.0000	12.0000	4.2000	5.3000	5.0200	5.5200										3.1000	72700.00	3550.00		0.30	BDL	BDL
0.1100	0.1726	207.4286	267.1429	0.0641	69.5714	23.2857	3.0143	10.3857	4.5600	4.7314	#DIV/0!	54.8400	2.5800	32.7369	39.2843	-11.1890	0.0066	-8.6767	0.0193	1.1486	########	42940.2857	########	0.3000		

Calculated Location D	Comments
0.6974	Madison County Bridge #164 built in 2000. CR 200E south of 600S. South side of river east side of bridge.
NA	Landmark for water height is from railing top at south bridge support to water surface. current too swift to measure streamflow.
1.1012	Landmark to surface measured from bottom of road deck. * Local farmer said crops have been in 2 weeks. * filter stirps along stream for last 15 years - no farming to edge.
NA	Landmark to surface measured from bottom of road deck.
NA	Landmark to surface measured from bottom of road deck.
1.6868	Landmark to surface measured from bottom of road deck east side of bridge at mark.
NA	Landmark to surface measured from bottom of road deck east side of bridge at mark.

Sly Fork
CEES 2003 Data

	Date	Esti-Q	TSSed (g/m	Water Surfa	Stream Bottom (	Water Dept	Sample Depth (r	Temp. (°C)	pH	SpC (mS)	TDS (g/L)	Salinity (pp	DO (mg/L)	Turbidity (N	TSSolids (p	Silica (mg/	Silica (mg/L) (unfi	Cl- (mg/L)	SO4 (mg/t	NO2 (mg/l	NO3 (mg/l
FCW9	2/20/2003	0.70	3.1963				0.0500	0.2000	7.9100	0.6401	0.4093	0.3300	14.8400					37.0000	47.0000	<0.04	2.4000
	3/14/2003	9.83	115.4483	467	555	88	0.0500	5.5400	7.7000	0.3365	0.2154	0.1700	11.5000					16.0000	21.0000	<0.04	4.1000
	5/27/2003	1.10	11.9388	410	455	45	0.0500	15.2200	7.9500	0.6287	0.4024	0.3200	11.7100	5.0000	12.0000	7.1000	7.1000	27.0000	41.0000	<0.20	2.6000
	7/7/2003	26.01	97.7174	230	455	225	0.0500	20.8400	7.5400	0.3302	0.2114	0.1600	7.4700	48.0000	140.0000	9.0000	9.0000	12.0000	15.0000		
	10/14/2003	2.15	87.0103	350	455	105	0.0500	13.7400	7.8200	0.5024	0.3215	0.2500	7.8800	59.0000	100.0000	7.1000	7.8000	21.0000	29.0000	<0.10	2.1000
	12/22/2003	1.69	2.8723	405	455	50	0.0500	4.7400	8.0800	0.6407	0.4100	0.3300	13.2900	2.7000	1.6000	8.1000	8.5000	25.0000	38.0000	<0.10	2.7000
	1/5/2004	30.39	199.4000	255	455	200	0.0500	3.5400	7.6300	0.2480	0.1594	0.1200	14.4500	230.0000	117.0000	5.3100	4.9400	11.0000	13.0000	<0.10	1.7000
		10.2666	73.9405	352.8333	471.6667	118.8333	0.0500	9.1171	7.8043	0.4752	0.3042	0.2400	11.5914	68.9400	74.1200	7.3220	7.4680	21.2857	29.1429	#DIV/0!	2.6000

Sly Fork Page 2

Ophos (mg	Total P (mg/L)	Alkalinity (mg/L a	Total Hardn	NH4-N (m	Ca (mg/L)	Mg (mg/L)	K (mg/L)	Na (mg/L)	DOC (mg	TOC (mg	Vac Line	Trans	Zero	CO2 Yield	DIC (n	d13CDIC	±	d18O	±	TKN (mg/l	Total Colifc	E. Coli (co	HPC (color	Chlo-A (mg	MIB (ppb)
NR	0.0250	290.0000	370.0000	0.0700	93.0000	33.0000	1.8000	21.0000	1.8000	1.8000	C	89.6000	6.3000	51.9921	62.3905	-11.5050	0.0060	-8.1620	0.0050	0.3500	15531.00	122.00	1100.00		
0.1100	0.1400	150.0000	200.0000	0.0690	53.0000	17.0000	2.7000	7.7000	5.5000	5.6000	C	31.9000	1.3000	18.4222	22.1066	-10.0930	0.0090	-10.0930	0.0090	0.9800	198630.00	1090.00	51000.00	0.10	
<0.20	0.0050	260.0000	360.0000	0.1100	91.0000	32.0000	1.7000	13.0000	2.4000	2.5000	E	53.8000	8.1000	29.3266	35.1919	-9.3960	0.0080			0.9800	17000.00	1200.00		0.30	BDL
	0.3000	140.0000	170.0000	0.1000	46.0000	14.0000	4.0000	6.0000	7.7000	7.8000	C	39.9000	-1.0000	24.9833	29.9800	-13.1780	0.0060	-7.7750	0.0440	1.1000	>241920	>241920		0.30	
<0.10	0.4200	220.0000	270.0000	0.0200	70.0000	24.0000	5.2000	8.7000	7.8000	8.1000	E	59.0000	-1.8000	38.9604	46.7525	-11.7730	0.0040			1.1000	>241920	51720.00		<0.1	BDL
<0.10	0.0260	280.0000	360.0000	0.0600	95.0000	31.0000	1.5000	11.0000	1.7000	1.8000										0.4300	3950.00	980.00		0.50	BDL
<0.10	0.2920	112.0000	140.0000	0.0200	39.0000	12.0000	4.2000	5.3000	5.0200	5.5200										3.1000	72700.00	3550.00		0.30	BDL
0.1100	0.1726	207.4286	267.1429	0.0641	69.5714	23.2857	3.0143	10.3857	4.5600	4.7314	#DIV/0!	54.8400	2.5800	32.7369	39.2843	-11.1890	0.0066	-8.6767	0.0193	1.1486	########	9777.0000	########	0.3000	

Sly Fork Page 3

Geosmin (µ	Calculated Location D	Comments
	0.6974	Madison County Bridge #164 built in 2000. CR 200E south of 600S. South side of river east side of bridge.
	NA	Landmark for water height is from railing top at south bridge support to water surface. current too swift to measure streamflow.
BDL	1.1012	Landmark to surface measured from bottom of road deck. * Local farmer said crops have been in 2 weeks. * filter stirps along stream for last 15 years - no farming to edge.
	NA	Landmark to surface measured from bottom of road deck.
BDL	NA	Landmark to surface measured from bottom of road deck.
BDL	1.6868	Landmark to surface measured from bottom of road deck east side of bridge at mark.
BDL	NA	Landmark to surface measured from bottom of road deck east side of bridge at mark.

Deer Creek
CEES 2003 Data

	Date	Esti-Q	TSSed (g/m	Water Surfa	Stream Bottom (	Water Dept	Sample Depth (r	Temp. (°C)	pH	SpC (mS)	TDS (g/L)	Salinity (pp	DO (mg/L)	Turbidity (N	TSSolids (ppm)	Silica (mg/l	Silica (mg/L) (unfi	Cl- (mg/L)	SO4 (mg/l	NO2 (mg/l	NO3 (mg/l
FCW9	2/20/2003	0.70	3.1963				0.0500	0.2000	7.9100	0.6401	0.4093	0.3300	14.8400					37.0000	47.0000	<0.04	2.4000
	3/14/2003	9.83	115.4483	467	555	88	0.0500	5.5400	7.7000	0.3365	0.2154	0.1700	11.5000					16.0000	21.0000	<0.04	4.1000
	5/27/2003	1.10	11.9388	410	455	45	0.0500	15.2200	7.9500	0.6287	0.4024	0.3200	11.7100	5.0000	12.0000	7.1000	7.1000	27.0000	41.0000	<0.20	2.6000
	7/7/2003	26.01	97.7174	230	455	225	0.0500	20.8400	7.5400	0.3302	0.2114	0.1600	7.4700	48.0000	140.0000	9.0000	9.0000	12.0000	15.0000		
	10/14/2003	2.15	87.0103	350	455	105	0.0500	13.7400	7.8200	0.5024	0.3215	0.2500	7.8800	59.0000	100.0000	7.1000	7.8000	21.0000	29.0000	<0.10	2.1000
	12/22/2003	1.69	2.8723	405	455	50	0.0500	4.7400	8.0800	0.6407	0.4100	0.3300	13.2900	2.7000	1.6000	8.1000	8.5000	25.0000	38.0000	<0.10	2.7000
	1/5/2004	30.39	199.4000	255	455	200	0.0500	3.5400	7.6300	0.2480	0.1594	0.1200	14.4500	230.0000	117.0000	5.3100	4.9400	11.0000	13.0000	<0.10	1.7000
		10.2666	73.9405	352.8333	471.6667	118.8333	0.0500	9.1171	7.8043	0.4752	0.3042	0.2400	11.5914	68.9400	74.1200	7.3220	7.4680	21.2857	29.1429	#DIV/0!	2.6000

Deer Creek Page 2

Ophos (mg	Total P (mg/L)	Alkalinity (mg/L a	Total Hardn	NH4-N (m	Ca (mg/L)	Mg (mg/L)	K (mg/L)	Na (mg/L)	DOC (mg	TOC (mg	Vac Line	Trans	Zero	CO2 Yield	DIC (n	d13CDIC	±	d18O	±	TKN (mg/l	Total Colifc	E. Coli (co	HPC (color	Chlo-A (mg	MIB (ppb)
NR	0.0250	290.0000	370.0000	0.0700	93.0000	33.0000	1.8000	21.0000	1.8000	1.8000	C	89.6000	6.3000	51.9921	62.3905	-11.5050	0.0060	-8.1620	0.0050	0.3500	15531.00	122.00	1100.00		
0.1100	0.1400	150.0000	200.0000	0.0690	53.0000	17.0000	2.7000	7.7000	5.5000	5.6000	C	31.9000	1.3000	18.4222	22.1066	-10.0930	0.0090	-10.0930	0.0090	0.9800	198630.00	1090.00	51000.00	0.10	
<0.20	0.0050	260.0000	360.0000	0.1100	91.0000	32.0000	1.7000	13.0000	2.4000	2.5000	E	53.8000	8.1000	29.3266	35.1919	-9.3960	0.0080			0.9800	17000.00	1200.00		0.30	BDL
	0.3000	140.0000	170.0000	0.1000	46.0000	14.0000	4.0000	6.0000	7.7000	7.8000	C	39.9000	-1.0000	24.9833	29.9800	-13.1780	0.0060	-7.7750	0.0440	1.1000	>241920	>241920		0.30	
<0.10	0.4200	220.0000	270.0000	0.0200	70.0000	24.0000	5.2000	8.7000	7.8000	8.1000	E	59.0000	-1.8000	38.9604	46.7525	-11.7730	0.0040			1.1000	>241920	51720.00		<0.1	BDL
<0.10	0.0260	280.0000	360.0000	0.0600	95.0000	31.0000	1.5000	11.0000	1.7000	1.8000										0.4300	3950.00	980.00		0.50	BDL
<0.10	0.2920	112.0000	140.0000	0.0200	39.0000	12.0000	4.2000	5.3000	5.0200	5.5200										3.1000	72700.00	3550.00		0.30	BDL
0.1100	0.1726	207.4286	267.1429	0.0641	69.5714	23.2857	3.0143	10.3857	4.5600	4.7314	#DIV/0!	54.8400	2.5800	32.7369	39.2843	-11.1890	0.0066	-8.6767	0.0193	1.1486	########	9777.0000	########	0.3000	

Geosmin (µ	Calculated Location D	Comments
	0.6974	Madison County Bridge #164 built in 2000. CR 200E south of 600S. South side of river east side of bridge.
	NA	Landmark for water height is from railing top at south bridge support to water surface. current too swift to measure streamflow.
BDL	1.1012	Landmark to surface measured from bottom of road deck. * Local farmer said crops have been in 2 weeks. * filter stirps along stream for last 15 years - no farming to edge.
	NA	Landmark to surface measured from bottom of road deck.
BDL	NA	Landmark to surface measured from bottom of road deck.
BDL	1.6868	Landmark to surface measured from bottom of road deck east side of bridge at mark.
BDL	NA	Landmark to surface measured from bottom of road deck east side of bridge at mark.

Prairie Creek
CEES 2003 Data

	Date	Esti-Q	TSSed (g/m	Water Surf	Stream Bottom (	Water Dep	Sample Depth (r	Temp. (°C)	pH	SpC (mS)	TDS (g/L)	Salinity (pp	DO (mg/L)	Turbidity (N	TSSolids (ppm)	Silica (mg/	Silica (mg/L) (unfi	Cl- (mg/L)	SO4 (mg/l
FCW 6 ditch	3/14/2003		29.3684					10.9300	7.7300	0.2622	0.1678	0.1300	11.3200					17.0000	10.0000
	7/7/2003		7.1503					28.1000	7.7700	0.2701	0.1729	0.1300	6.2000	4.9000	3.0000	5.5000	5.5000	22.0000	8.7000
FCW 7	2/20/2003	0.92	3.8542				0.0500	1.3400	8.1200	0.6438	0.4121	0.3300	16.8000					36.0000	47.0000
	3/14/2003	16.52	137.9427	454	544	90	0.0500	4.1000	7.6000	0.3551	0.2271	0.1700	11.5200					22.0000	22.0000
	5/27/2003	1.70	4.9485	360	409	49	0.0500	15.8300	8.0700	0.6430	0.4110	0.3300	12.3100	3.8000	6.5000	5.9000	5.6000	31.0000	43.0000
	7/7/2003	39.94	109.8969	280	409	129	0.0500	21.3800	7.5700	0.3414	0.2186	0.1700	7.2000	47.0000	120.0000	8.8000	9.2000	15.0000	17.0000
	10/14/2003	5.49	44.1451	340	409	69	0.0500	13.5900	7.8700	0.6119	0.3913	0.3100	7.9200	28.0000	50.0000	8.1000	8.8000	32.0000	38.0000
	12/22/2003	2.24	1.7708	365	409	44	0.0500	4.4900	8.0700	0.6580	0.4216	0.3400	13.0400	2.3000	0.8000	8.3000	8.5000	31.0000	40.0000
	1/5/2004	47.15	241.2371	200	409	209	0.0500	3.3600	7.6700	0.2027	0.1355	0.0800	14.6100	290.0000	161.0000	5.1200	4.7600	9.7000	9.9000
FCW8	2/20/2003	0.16	2.6621				0.0500	2.0500	7.8100	1.0250	0.6542	0.5400	15.2900					120.0000	150.0000
	3/14/2003	1.08	42.5418	163	269	106	0.0500	6.8900	7.5700	0.6385	0.4079	0.3300	11.1400					53.0000	100.0000
	5/27/2003	0.31	58.1633	100	187	87	0.0500	16.8200	7.7300	0.9254	0.5924	0.4800	9.3200	22.0000	63.0000	8.8000	8.1000	82.0000	140.0000
	7/7/2003	8.42	50.9845	11	187	176	0.0500	21.6000	7.3900	0.4858	0.3108	0.2500	5.6000	30.0000	50.0000	8.4000	8.3000	25.0000	69.0000
	10/14/2003	0.72	44.0437	95	187	92	0.0500	13.9300	7.6400	0.7554	0.4837	0.3900	8.1600	37.0000	36.0000	7.6000	7.8000	75.0000	90.0000
	12/22/2003	0.36	24.3386	100	187	87	0.0500	4.5200	7.8400	0.9278	0.5943	0.4800	12.6500	6.9000	8.0000	9.3000	8.8000	80.0000	120.0000
	1/5/2004	10.12	58.1053	20	187	167	0.0500	4.8200	7.5800	0.5117	0.3294	0.2600	12.4200	54.0000	30.0000	6.5000	6.5000	31.0000	65.0000
		9.65	53.82	207.33	316.08	108.75	0.05	10.86	7.75	0.58	0.37	0.30	10.97	47.81	48.03	7.48	7.44	42.61	60.60

Prairie Creek Page 2

NO2 (mg/l	NO3 (mg/l	Ophos (m	Total P (mg/L)	Alkalinity (mg/L a	Total Hardi	NH4-N (m	Ca (mg/L)	Mg (mg/L)	K (mg/L)	Na (mg/L)	DOC (mg	TOC (mg	Vac Line	Trans	Zero	CO2 Yield	DIC (n	d13CDIC	±	d18O	±	TKN (mg/l	Total Colifo
<0.04	0.7400	0.1000	0.1400	110.0000	150.0000	0.2000	36.0000	14.0000	4.9000	9.4000	7.3000	7.0000	E	38.1000	7.1000	19.9480	23.9376	-9.6000	0.0110				86640.00
			0.1000	96.0000	120.0000	0.1000	27.0000	12.0000	4.8000	12.0000	6.8000	7.2000	C	27.3000	-0.9000	16.8934	20.2721	-7.1310	0.0070			0.7400	>241920
<0.04	2.1000	<0.10	0.0200	280.0000	340.0000	0.0400	86.0000	30.0000	1.5000	18.0000	1.7000	1.7000	C	87.3000	6.3000	50.5270	60.6324	-10.9870	0.0060	-8.0190	0.0040	0.3100	318.00
<0.04	3.9000	0.1300	0.2000	140.0000	210.0000	0.0920	54.0000	17.0000	2.9000	14.0000	5.7000	5.8000	C	33.3000	3.4000	17.9763	21.5716	-11.7810	0.0040	-10.0770	0.0070	1.0000	173290.00
<0.20	2.6000	<0.20	0.0410	260.0000	360.0000	0.1800	92.0000	32.0000	1.8000	15.0000	2.5000	2.5000			.							0.7100	10000.00
			0.2900	130.0000	170.0000	0.0920	47.0000	14.0000	4.1000	6.9000	7.2000	7.6000	C	36.4000	-1.3000	22.9449	27.5339	-13.4760	0.0050	-8.0510	0.0410	1.0000	>241920
<0.10	1.6000	<0.10	0.1700	270.0000	320.0000	0.0500	84.0000	28.0000	3.4000	15.0000	5.3000	4.9000	E	65.5000	-1.9000	43.1712	51.8054	-11.7840	0.0050			0.7800	173290.00
<0.10	2.6000	<0.10	0.0190	280.0000	370.0000	0.0400	96.0000	31.0000	1.5000	14.0000	1.7000	1.7000										0.3300	2980.00
<0.10	1.4000	<0.10	0.3790	98.0000	120.0000	0.0600	33.0000	9.5000	4.6000	4.6000	5.1300	5.9600										1.9000	46110.00
<0.04	0.8000	<0.10	0.0150	290.0000	470.0000	0.2900	120.0000	40.0000	3.2000	62.0000	2.2000	2.3000	E	89.9000	9.5000	51.4652	61.7582	-10.7460	0.0040	-7.8630	0.0070	0.5000	776.00
<0.04	3.1000	<0.10	0.0350	200.0000	340.0000	0.2600	92.0000	28.0000	2.7000	28.0000	4.7000	4.6000	E	38.1000	7.1000	19.9480	23.9376	-11.2860	0.0080	lost		0.8100	61310.00
<0.20	1.0000	<0.20	0.1100	260.0000	460.0000	0.2800	120.0000	41.0000	3.1000	38.0000	3.0000	3.3000	E	88.2000	3.5000	54.2086	65.0503	-10.6150	0.0040			0.8300	12000.00
			0.1500	150.0000	240.0000	0.1900	65.0000	18.0000	3.7000	15.0000	7.5000	7.8000	E	48.3000	2.0000	29.7094	35.6513	-13.3180	0.0100	-9.0690	0.0230	0.9000	>241920
<0.10	0.8000	<0.10	0.1300	230.0000	340.0000	<0.02	92.0000	27.0000	4.2000	39.0000	6.4000	6.5000	E	58.6000	-1.6000	38.5776	46.2931	-12.0520	0.0020			0.8100	>241920
<0.10	1.1000	<0.10	0.0230	280.0000	450.0000	0.1900	120.0000	38.0000	2.8000	41.0000	2.4000	2.5000										0.4800	4810.00
<0.10	1.5000	<0.10	0.0904	170.0000	260.0000	0.1500	70.0000	20.0000	3.4000	19.0000	4.8000	4.8900										0.8100	22820.00
#DIV/0!	1.79	0.12	0.120	202.75	295.00	0.15	77.13	24.97	3.29	21.93	4.65	4.77	#DIV/0!	55.55	3.02	33.22	39.86	-11.16	0.01	-8.62	0.02	0.79	49528.67

E. Coli (co	HPC (color	Chlo-A (mg	MIB (ppb)	Geosmin (µ	Calculated Location D	Comments
<100	51000.00	<0.10			NA	agriculture ditch flowing into FCW6 stream
>241920		0.40			NA	CARP MOVING UPSTREAM IN DITCH.
10.00	1000.00				0.9171 State Rd 9	south of Market St. east side of bridge. North bank.
630.00	100000.00	<0.10			NA	Landmark for water hieght is from top of railing to water surface. too deep to measure streamflow. Pipe once showing now under water - small ruffle where it nears surface.
580.00		0.40	BDL	BDL	1.6975	Landmark for water surface measured from bottom of road deck.
>241920		0.30			NA	Landmark to surface measured from bottom of road deck.
3680.00		0.30	BDL	BDL	5.4925	Landmark to surface measured from bottom of road deck.
520.00		0.50	BDL	BDL	2.2376	Landmark to surface measured from bottom of road deck E side of bridge.
5680.00		0.30	BDL	BDL	NA	Landmark to surface measured from bottom of road deck E side of bridge.
98.00	1900.00				0.1562 State Rd. 9	Pipe inputting water into creek ~8m downstream of sample location.
0.00	34000.00	<0.10			1.0809	Landmark for water height is from top of bridge (cement) to water surface. suctioning bottom - sink right in.
430.00		0.40	BDL	18.00	0.3079	Landmark to surface measured to bottom of road deck.
>241920		0.30			NA	Landmark to surface measured from bottom of road deck.
10460.00		<0.1	BDL	6.80	NA	Landmark to surface measured from bottom of road deck.
3180.00		0.50	BDL	8.40	0.3638	Landmark to surface measured from bottom of road deck east side of bridge, center (at orange markind).
980.00		0.30	BDL	5.31	NA	Landmark to surface measured from bottom of road deck east side of bridge, center (at orange markind).
47006.75	37580.00	0.37				

Lick Creek
CEES 2003 Data

	Date	Esti-Q	TSSed (g/m	Water Surf	Stream Bottom (	Water Dep	Sample Depth (n	Temp. (°C)	pH	SpC (mS)	TDS (g/L)	Salinity (pp	DO (mg/L)	Turbidity (N	TSSolids (ppm)	Silica (mg/	Silica (mg/L) (unfi	Cl- (mg/L)	SO4 (mg/	NO2 (mg/	NO3 (mg/	Ophos (m	Total P (mg/L)
FCW 5	2/20/2003	0.47	3.5811				0.0500	0.2500	8.2400	0.6012	0.3852	0.3100	16.9400					32.0000	58.0000	<0.04	2.0000	<0.10	0.0230
	3/14/2003	6.79	114.8562	642			0.0500	2.5300	7.7200	0.3111	0.1990	0.1500	13.2500					18.0000	21.0000	<0.04	4.2000	0.1300	0.2200
	5/27/2003	0.77	7.9798	500	675	175	0.0500	17.1000	8.1600	0.6224	0.3982	0.3200	11.3800	6.1000	8.5000	4.9000	4.4000	26.0000	51.0000	<0.20	2.8000	<0.20	0.0610
	7/7/2003	14.20	27.4611	480	675	195	0.0500	22.8100	7.5000	0.2483	0.1590	0.1200	6.4700	24.0000	23.0000	8.1000	8.4000	9.5000	14.0000				0.2100
	10/14/2003	1.17	4.6632	590	675	85	0.0500	13.9300	7.9600	0.5836	0.3734	0.3000	8.4600	3.8000	3.6000	6.5000	6.3000	23.0000	43.0000	<0.10	1.5000	<0.10	0.0730
	12/22/2003	0.97	2.1053	590	675	85	0.0500	3.6400	8.1200	0.6403	0.4095	0.3300	13.2600	2.6000	1.6000	8.8000	8.3000	28.0000	47.0000	<0.10	2.9000	<0.10	0.0180
	1/5/2004	17.44	245.8586	450	675	225	0.0500	3.3900	7.6700	0.1848	0.1168	0.0800	14.2200	300.0000	208.0000	4.9400	4.2300	8.1000	9.9000	<0.10	1.3000	<0.10	0.3190
		5.97	58.07	542.00	675.00	153.00	0.05	9.09	7.91	0.46	0.29	0.23	12.00	67.30	48.94	6.65	6.33	20.66	34.84	#DIV/0!	2.45	0.13	0.132

Lick Creek Page 2

Alkalinity (mg/L a	Total Hardı	NH4-N (m	Ca (mg/L)	Mg (mg/L)	K (mg/L)	Na (mg/L)	DOC (mg	TOC (mg	Vac Line	Trans	Zero	CO2 Yield	DIC (m	d13CDIC	±	d18O	±	TKN (mg/l	Total Colifc	E. Coli (co	HPC (color	Chlo-A (mc	MIB (ppb)
250.0000	340.0000	0.1000	87.0000	30.0000	1.3000	19.0000	1.6000	1.6000	C	84.7000	6.5000	48.7434	58.4921	-9.9750	0.0030	-8.1390	0.0060	0.3100	282.00	0.00	1750.00		
120.0000	180.0000	0.0900	48.0000	15.0000	3.0000	8.1000	6.4000	6.2000	E	38.6000	6.8000	20.4584	24.5501	-10.5750	0.0120	-9.6700	0.0000	1.2000	241920.00	410.00	100000.00	<0.10	
250.0000	360.0000	0.1300	93.0000	32.0000	1.5000	11.0000	2.1000	2.2000								-11.1210	0.0570	0.5300	8700.00	260.00		0.30	BDL
92.0000	130.0000	0.0610	35.0000	9.0000	4.6000	3.9000	7.7000	8.0000	E	29.6000	2.3000	17.5874	21.1049	-13.3600	0.0120	-7.5020	0.0380	0.7700	>241920	92080.00		0.30	
260.0000	320.0000	0.0500	85.0000	27.0000	2.9000	9.9000	5.4000	4.9000	E	67.1000	-1.9000	44.1920	53.0304	-11.1640	0.0060			0.4400	32550.00	2750.00		0.20	BDL
270.0000	360.0000	0.0400	96.0000	30.0000	1.3000	11.0000	1.6000	1.6000										0.3500	2750.00	300.00		0.50	BDL
84.0000	110.0000	0.0300	30.0000	8.5000	4.7000	4.7000	5.3200	6.3900										2.4000	64880.00	4880.00		0.50	BDL
189.43	257.14	0.07	67.71	21.64	2.76	9.66	4.30	4.41	#DIV/0!	55.00	3.43	32.75	39.29	-11.27	0.01	-9.11	0.03	0.86	58513.67	14382.86	50875.00	0.36	

Geosmin (µ	Calculated	Location D	Comments
	0.4709	HWY 13 s	stream is mostly ice covered except for small open area (5-10m) with open flow below bridge. Clear water. Pebble and sand bottom.
	NA		Landmark for water height is from bridge to water surface at concrete expansion joint 1.9m south of NW drain. Uncertain of where on road deck measurement was taken. really muddy bottom. Turbid-merky water. High water level. Tire swing now under water. Streamflow too swift to measure.
BDL	0.7661		Landmark to surface measured from bottom of road deck.
	NA		Landmark to surface measured from bottom of road deck.
BDL	1.1691		Landmark to surface measured from bottom of road deck.
BDL	0.9736		Landmark to surface measured from bottom of road deck east side of bridge center stream (thawleg).
BDL	NA		Landmark to surface measured from bottom of road deck east side of bridge center stream (thawleg).

Foster Branch
CEES 2003 Data

	Date	Esti-Q	TSSed (g/m	Water Surf	Stream Bottom (	Water Dep	Sample Depth (r	Temp. (°C)	pH	SpC (mS)	TDS (g/L)	Salinity (pp	DO (mg/L)	Turbidity (N	TSSolids (ppm)	Silica (mg/l	Silica (mg/L) (unfi	Cl- (mg/L)	SO4 (mg/l	NO2 (mg/l
FCW 6	2/20/2003	0.14	2.8862				0.0500	3.0200	8.1400	0.8960	0.5733	0.4700	16.7700					110.0000	63.0000	<0.04
	3/14/2003	2.88	92.7586	167			0.0500	4.3900	7.4300	0.3502	0.2242	0.1700	12.2200					25.0000	22.0000	<0.04
	5/27/2003	0.28	2.6263	140	164	24	0.0500	15.6800	8.0900	0.6596	0.4220	0.3400	12.9600	2.4000	3.5000	3.2000	2.8000	35.0000	50.0000	<0.20
	7/7/2003	6.02	31.5183	200	164		0.0500	20.8300	7.3500	0.3623	0.2319	0.1800	7.1200	21.0000	27.0000	9.3000	9.4000	16.0000	17.0000	
	10/14/2003	0.75	11.8974	120	164	44	0.0500	13.9600	7.6700	0.5408	0.3462	0.2800	8.4900	12.0000	9.2000	7.6000	7.8000	30.0000	35.0000	<0.10
	12/22/2003	0.36	2.1111	135	164	29	0.0500	6.1400	7.9900	0.6737	0.4301	0.3500	12.2500	2.0000	1.6000	9.6000	9.8000	36.0000	48.0000	<0.10
	1/5/2004	7.11	156.0000	95	164	69	0.0500	4.7200	7.3900	0.2824	0.1810	0.1400	13.7800	180.0000	43.0000	6.5000	5.7000	16.0000	15.0000	<0.10
		2.50	42.83	142.83	164.00	41.50	0.05	9.82	7.72	0.54	0.34	0.28	11.94	43.48	16.86	7.24	7.10	38.29	35.71	#DIV/0!

Foster Branch Page 2

NO3 (mg/l	Ophos (m	Total P (mg/L)	Alkalinity (mg/L a	Total Hardi	NH4-N (m	Ca (mg/L)	Mg (mg/L)	K (mg/L)	Na (mg/L)	DOC (mg	TOC (mg	Vac Line	Trans	Zero	CO2 Yield	DIC (m	d13CDIC	±	d18O	±	TKN (mg/l	Total Colifo	E. Coli (co
2.2000	<0.10	0.0250	280.0000	400.0000	0.2400	110.0000	33.0000	1.5000	57.0000	1.7000	1.6000	E	89.6000	9.7000	51.1462	61.3754	-10.7490	0.0040	-8.1400	0.0060	0.3400	823.00	0.00
4.8000	0.1100	0.2400	130.0000	200.0000	0.0810	53.0000	16.0000	2.7000	11.0000	6.4000	6.4000	C	37.7000	3.4000	20.7791	24.9349	-10.6860	0.0140	-9.8910	0.0070	1.2000	241920.00	200.00
3.6000	<0.20	0.0260	250.0000	380.0000	0.0400	98.0000	32.0000	1.4000	13.0000	2.2000	2.2000										0.5300	4100.00	760.00
		0.2300	130.0000	180.0000	0.0810	50.0000	14.0000	3.4000	8.0000	7.0000	7.6000	E	43.5000	2.0000	26.6470	31.9764	-12.0290	0.0040	-7.8200	0.0510	0.8000	>241920	72700.00
2.7000	<0.10	0.1400	220.0000	280.0000	<0.02	74.0000	23.0000	4.1000	12.0000	6.5000	6.5000	E	58.3000	-1.6000	38.3862	46.0634	-11.4800	0.0090			0.8100	241920.00	30760.00
2.9000	<0.10	0.0180	280.0000	380.0000	0.0700	99.0000	31.0000	1.3000	13.0000	1.8000	1.7000										0.5300	18500.00	1730.00
2.8000	<0.10	0.3420	114.0000	160.0000	0.0500	42.0000	12.0000	4.0000	7.0000	5.0100	5.8100										2.5000	72700.00	1100.00
3.17	0.11	0.146	200.57	282.86	0.09	75.14	23.00	2.63	17.29	4.37	4.54	#DIV/0!	57.28	3.38	34.24	41.09	-11.24	0.01	-8.62	0.02	0.96	96660.50	15321.43

HPC (color	Chlo-A (mg	MIB (ppb)	Geosmin (µ	Calculated Location D	Comments
2900.00				0.1357 Fall Creek	limestone exposed. Small fall below sample site
51000.00	<0.10			2.8760	Landmark for water hieght is from road deck(uncertain where) to water surface (center). high turbidity. Agriculture ditch w/high flow into stream
	0.30	BDL	BDL	0.2772	Landmark to surface measured from bottom of road deck. * local farmers said well water is good and sewers upstream that used to dump.
	0.30			NA	Landmark to surface measured from bottom of road deck.
	0.20	BDL	5.10	0.7540	Landmark to surface measured from bottom of road deck.
	0.50	BDL	BDL	0.3622	Landmark to surface measured from bottom of road deck N side of bridge in center.
	0.30	BDL	BDL		Landmark to surface measured from bottom of road deck N side of bridge in center.
26950.00	0.32				

McFadden Ditch
CEES 2003 Data

	Date	Esti-Q	TSSed (g/m3)	Water Surf	Stream Bottom (	Water Dep	Sample Depth (r	Temp. (°C)	pH	SpC (mS)	TDS (g/L)	Salinity (pp	DO (mg/L)	Turbidity (NT	TSSolids (ppm)	Silica (mg/l	Silica (mg/L) (unfi	Cl- (mg/L)	SO4 (mg/l
FCW 5	2/20/2003	0.47	3.5811				0.0500	0.2500	8.2400	0.6012	0.3852	0.3100	16.9400					32.0000	58.0000
	3/14/2003	6.79	114.8562	642			0.0500	2.5300	7.7200	0.3111	0.1990	0.1500	13.2500					18.0000	21.0000
	5/27/2003	0.77	7.9798	500	675	175	0.0500	17.1000	8.1600	0.6224	0.3982	0.3200	11.3800	6.1000	8.5000	4.9000	4.4000	26.0000	51.0000
	7/7/2003	14.20	27.4611	480	675	195	0.0500	22.8100	7.5000	0.2483	0.1590	0.1200	6.4700	24.0000	23.0000	8.1000	8.4000	9.5000	14.0000
	10/14/2003	1.17	4.6632	590	675	85	0.0500	13.9300	7.9600	0.5836	0.3734	0.3000	8.4600	3.8000	3.6000	6.5000	6.3000	23.0000	43.0000
	12/22/2003	0.97	2.1053	590	675	85	0.0500	3.6400	8.1200	0.6403	0.4095	0.3300	13.2600	2.6000	1.6000	8.8000	8.3000	28.0000	47.0000
	1/5/2004	17.44	245.8586	450	675	225	0.0500	3.3900	7.6700	0.1848	0.1168	0.0800	14.2200	300.0000	208.0000	4.9400	4.2300	8.1000	9.9000
		5.97	58.07	542.00	675.00	153.00	0.05	9.09	7.91	0.46	0.29	0.23	12.00	67.30	48.94	6.65	6.33	20.66	34.84

McFadden Ditch Page 2

NO2 (mg/l	NO3 (mg/l	Ophos (m	Total P (mg/L)	Alkalinity (mg/L a	Total Hardi	NH4-N (m	Ca (mg/L)	Mg (mg/L)	K (mg/L)	Na (mg/L)	DOC (mg	TOC (mg	Vac Line	Trans	Zero	CO2 Yield	DIC (n	d13CDIC	±	d18O	±	TKN (mg/l	Total Colifo
<0.04	2.0000	<0.10	0.0230	250.0000	340.0000	0.1000	87.0000	30.0000	1.3000	19.0000	1.6000	1.6000	C	84.7000	6.5000	48.7434	58.4921	-9.9750	0.0030	-8.1390	0.0060	0.3100	282.00
<0.04	4.2000	0.1300	0.2200	120.0000	180.0000	0.0900	48.0000	15.0000	3.0000	8.1000	6.4000	6.2000	E	38.6000	6.8000	20.4584	24.5501	-10.5750	0.0120	-9.6700	0.0000	1.2000	241920.00
<0.20	2.8000	<0.20	0.0610	250.0000	360.0000	0.1300	93.0000	32.0000	1.5000	11.0000	2.1000	2.2000								-11.1210	0.0570	0.5300	8700.00
			0.2100	92.0000	130.0000	0.0610	35.0000	9.0000	4.6000	3.9000	7.7000	8.0000	E	29.6000	2.3000	17.5874	21.1049	-13.3600	0.0120	-7.5020	0.0380	0.7700	>241920
<0.10	1.5000	<0.10	0.0730	260.0000	320.0000	0.0500	85.0000	27.0000	2.9000	9.9000	5.4000	4.9000	E	67.1000	-1.9000	44.1920	53.0304	-11.1640	0.0060			0.4400	32550.00
<0.10	2.9000	<0.10	0.0180	270.0000	360.0000	0.0400	96.0000	30.0000	1.3000	11.0000	1.6000	1.6000										0.3500	2750.00
<0.10	1.3000	<0.10	0.3190	84.0000	110.0000	0.0300	30.0000	8.5000	4.7000	4.7000	5.3200	6.3900										2.4000	64880.00
#DIV/0!	2.45	0.13	0.132	189.43	257.14	0.07	67.71	21.64	2.76	9.66	4.30	4.41	#DIV/0!	55.00	3.43	32.75	39.29	-11.27	0.01	-9.11	0.03	0.86	58513.67

E. Coli (co	HPC (color	Chlo-A (mg	MIB (ppb)	Geosmin (µ	Calculated Location D	Comments
0.00	1750.00				0.4709 HWY 13 sc	stream is mostly ice covered except for small open area (5-10m) with open flow below bridge. Clear water. Pebble and sand bottom.
410.00	100000.00	<0.10			NA	Landmark for water height is from bridge to water surface at concrete expansion joint 1.9m south of NW drain. Uncertain of where on road deck measurement was taken. really muddy bottom.
260.00		0.30	BDL	BDL	0.7661	Landmark to surface measured from bottom of road deck.
92080.00		0.30			NA	Landmark to surface measured from bottom of road deck.
2750.00		0.20	BDL	BDL	1.1691	Landmark to surface measured from bottom of road deck.
300.00		0.50	BDL	BDL	0.9736	Landmark to surface measured from bottom of road deck east side of bridge center stream (thawleg).
4880.00		0.50	BDL	BDL	NA	Landmark to surface measured from bottom of road deck east side of bridge center stream (thawleg).
14382.86	50875.00	0.36				

Flatfork Creek
CEES 2003 Data

	Date	Esti-Q	TSSed (g/m	Water Surf	Stream Bottom (	Water Dep	Sample Depth (n	Temp. (°C)	pH	SpC (mS)	TDS (g/L)	Salinity (pp	DO (mg/L)	Turbidity (NT	TSSolids (ppm)	Silica (mg/	Silica (mg/L) (unfi	Cl- (mg/L)	SO4 (mg/L	NO2 (mg/L	NO3 (mg/l
FCW 4	2/20/2003	1.79	4.3845				0.0500	1.6900	8.2400	0.7141	0.4569	0.3700	16.4300					58.0000	61.0000	<0.04	2.3000
	3/14/2003	34.41	172.8450	440			0.0500	2.5000	7.6800	0.3212	0.2055	0.1600	13.7800					24.0000	23.0000	<0.04	3.5000
	5/27/2003	4.23	20.7143	510			0.0500	17.1200	8.0600	0.7019	0.4494	0.3600	10.4100	8.0000	20.0000	6.5000	5.7000	46.0000	57.0000	<0.20	2.9000
	7/7/2003	72.00	37.7551	340	808	468	0.0500	22.8800	7.5500	0.3073	0.1973	0.1600	7.0600	28.0000	35.0000	8.8000	8.8000	14.0000	19.0000		
	10/14/2003	5.96	10.1031	500	808	308	0.0500	14.0500	7.9500	0.6583	0.4209	0.3400	8.1600	7.2000	9.2000	6.9000	6.7000	42.0000	50.0000	<0.10	1.8000
	12/22/2003	4.11	2.6042	500	808	308	0.0500	3.8100	8.0900	0.7059	0.4521	0.3600	13.0200	2.6000	1.6000	8.3000	8.3000	44.0000	52.0000	<0.10	2.8000
	1/5/2004	87.36	227.0833	320	808	488	0.0500	3.6800	7.7000	0.2227	0.1411	0.1000	15.6800	290.0000	195.0000	5.1200	5.1200	12.0000	13.0000	<0.10	1.4000
		29.98	67.93	435.00	808.00	393.00	0.05	9.39	7.90	0.52	0.33	0.26	12.08	67.16	52.16	7.12	6.92	34.29	39.29	#DIV/0!	2.45

Flatfork Creek Page 2

Ophos (mg	Total P (mg/L)	Alkalinity (mg/L a	Total Hardn	NH4-N (m	Ca (mg/L)	Mg (mg/L)	K (mg/L)	Na (mg/L)	DOC (mg	TOC (mg	Vac Line	Trans	Zero	CO2 Yield	DIC (n	d13CDIC	±	d18O	±	TKN (mg/l	Total Colifc	E. Coli (co	HPC (color	Chlo-A (mg	MIB (ppb)
<0.10	0.0250	260.0000	350.0000	0.1200	90.0000	31.0000	2.0000	30.0000	1.8000	1.8000	E	88.2000	9.7000	50.2530	60.3036	-10.5040	0.0040	-8.0950	0.0060	0.3400	272.00	10.00	1000.00		
0.1500	0.3000	120.0000	180.0000	0.1300	47.0000	14.0000	3.3000	12.0000	7.7000	6.8000	C	34.1000	3.5000	18.4222	22.1066	-11.3500	0.0040	-9.8180	0.0100	1.1000	241920.00	860.00	150000.00	<0.10	
<0.20	0.0830	260.0000	380.0000	0.1000	96.0000	33.0000	2.1000	23.0000	2.3000	2.7000								-10.6520	0.0590	0.6500	11000.00	280.00		0.30	BDL
	0.2300	120.0000	160.0000	0.0710	44.0000	12.0000	4.3000	6.9000	7.0000	7.1000	C	34.2000	-0.8000	21.2250	25.4700	-13.2600	0.0120	-7.2680	0.0420	0.7700	>241920	241920.00		0.30	
<0.10	0.0880	260.0000	340.0000	0.0600	88.0000	29.0000	3.5000	21.0000	5.0000	4.8000	E	42.3000	-1.9000	28.3696	34.0435	-11.2030	0.0050			0.3200	141360.00	4260.00		0.30	BDL
<0.10	0.0320	280.0000	380.0000	0.0800	100.0000	32.0000	1.8000	21.0000	1.7000	1.8000										0.3700	3180.00	720.00		0.50	BDL
0.1500	0.3970	98.0000	130.0000	0.0700	34.0000	7.6000	4.6000	6.6000	5.3000	6.1900										2.7000	98040.00	9850.00		0.50	BDL
0.15	0.165	199.71	274.29	0.09	71.29	22.66	3.09	17.21	4.40	4.46	#DIV/0!	49.70	2.63	29.57	35.48	-11.58	0.01	-8.96	0.03	0.89	82628.67	36842.86	75500.00	0.38	

Geosmin (µ	Calculated Location D	Comments
	1.7875	sampled from east (upstream) side of bridge. SR 238 and Fall Creek Rd.
NA		Landmark for water height is from east side of north bridge support to water surface. Uncertain of where on road deck measurement was taken. high flow. Turbid. Cloudy. Flow too swift for streamflow measurements.
BDL	4.2252	Uncertain where Landmark to surface was measured in relation to road deck.
NA		Landmark to surface measured from bottom of road deck.
11.00	NA	Landmark to surface measured from bottom of road deck.
BDL		Landmark to surface measured from bottom of road deck east side of bridge at center support.
BDL	NA	Landmark to surface measured from bottom of road deck east side of bridge at center support.

11.00	3.01

Thorpe Creek
CEES 2003 Data

	Date	Esti-Q	TSSed (g/m	Water Surf	Stream Bottom (	Water Dep	Sample Depth (r	Temp. (°C)	pH	SpC (mS)	TDS (g/L)	Salinity (pp	DO (mg/L)	Turbidity (N	TSSolids (ppm)	Silica (mg/	Silica (mg/L) (unfi	Cl- (mg/L)	SO4 (mg/l
FCW 1	2/20/2003	0.08	7.0924				0.0500	0.0500	8.4900	1.2980	0.8309	0.6900	18.5600					300.0000	40.0000
	3/14/2003	1.23	38.7307	275			0.0500	2.3900	7.5100	0.3929	0.2504	0.2000	12.1000					31.0000	21.0000
	5/27/2003	0.00	14.1837	300			0.0500	17.8900	8.2600	0.6337	0.4069	0.3300	11.5500	88.0000	16.0000	6.1000	4.8000	48.0000	34.0000
	7/7/2003	2.89	74.7664	200	265	65	0.0500	22.1800	7.4200	0.3680	0.2358	0.1800	7.1700	22.0000	77.0000	9.6000	9.7000	17.0000	15.0000
	10/14/2003	1.66	90.9645	200	265	65	0.0500	14.7300	7.5400	0.3541	0.2264	0.1700	9.6600	90.0000	110.0000	7.1000	7.6000	20.0000	16.0000
	12/22/2003	0.11	1.4000	415	448	33	0.0500	4.5900	7.6300	0.7031	0.4501	0.3600	12.8100	2.9000	3.2000	5.3000	5.1000	56.0000	34.0000
	1/5/2004	3.51	196.0622	380	448	68	0.0500	4.7300	7.3500	0.2500	0.1601	0.1200	13.2500	330.0000	81.0000	5.7000	5.5000	15.0000	14.0000
FCW 2	2/20/2003	0.03	4.5042				0.0500	2.5500	8.1800	0.8152	0.5216	0.4200	18.0200					140.0000	36.0000
	3/14/2003	0.50	38.1176	232			0.0500	3.0400	7.6600	0.3853	0.2466	0.1900	12.3000					33.0000	20.0000
	5/27/2003	0.01	2.2449	200	236	36	0.0500	17.8800	8.0300	0.5624	0.3601	0.2900	9.7200	2.6000	2.5000	4.9000	3.1000	42.0000	30.0000
	7/7/2003	1.70	45.6995	160	236	76	0.0500	23.4600	7.4700	0.2683	0.1719	0.1300	7.6500	30.0000	48.0000	8.1000	8.3000	23.0000	11.0000
	10/14/2003	0.85	151.2953	150	236	86	0.0500	14.9700	7.5400	0.3375	0.2161	0.1700	8.5600	130.0000	150.0000	6.2000	6.9000	16.0000	18.0000
	12/22/2003	0.04	2.6596	190	236	46	0.0500	4.0700	7.9400	0.6389	0.4088	0.3300	11.8900	2.9000	2.4000	6.1000	6.3000	43.0000	29.0000
	1/5/2004	2.12	138.1910	165	236	71	0.0500	4.8200	7.5000	0.2625	0.1693	0.1200	13.5000	190.0000	72.0000	5.1200	5.1200	15.0000	12.0000
FCW 3	2/20/2003	0.08	25.3782				0.0500	1.1600	7.9600	0.7630	0.4881	0.4000	14.7100					97.0000	39.0000
	3/14/2003	1.63	68.0268	239			0.0500	3.0900	7.5600	0.3660	0.2343	0.1800	10.4400					41.0000	19.0000
	5/27/2003	0.13	31.5306	180			0.0500	15.6200	7.7000	0.5897	0.3768	0.3000	8.1800	22.0000	29.0000	1.6000	1.5000	37.0000	29.0000
	7/7/2003	3.18	83.6649	110			0.0500	21.9600	7.3600	0.2628	0.1681	0.1300	7.0800	49.0000	67.0000	7.8000	8.1000	12.0000	10.0000
	10/14/2003	0.26	55.7447	150			0.0500	13.7500	7.7800	0.4379	0.2806	0.2200	8.7400	61.0000	49.0000	4.8000	5.1000	27.0000	21.0000
	12/22/2003	0.19	0.5319	250			0.0500	3.2800	7.8900	0.6194	0.3961	0.3200	12.0100	1.6000	0.4000	5.3000	5.3000	46.0000	29.0000
	1/5/2004	3.96	153.8308	205			0.0500	4.1800	7.5300	0.2611	0.1673	0.1200	12.8800	220.0000	89.0000	5.8900	5.7000	18.0000	13.0000
		1.15	58.32	222.28	289.56	60.67	0.05	9.54	7.73	0.50	0.32	0.26	11.47	82.80	53.10	5.97	5.87	51.29	23.33

NO2 (mg/l	NO3 (mg/l	Ophos (m	Total P (mg/L)	Alkalinity (mg/L a	Total Hardn	NH4-N (m	Ca (mg/L)	Mg (mg/L)	K (mg/L)	Na (mg/L)	DOC (mg	TOC (mg	Vac Line	Trans	Zero	CO2 Yield	DIC (n	d13CDIC	±	d18O	±	TKN (mg/l	Total Colifo
<0.04	2.8000	<0.1	0.0730	190.0000	300.0000	0.0400	76.0000	25.0000	4.0000	180.0000	2.8000	2.9000	C	62.9000	6.2000	35.0479	42.0575	-10.8420	0.0050	-9.3530	0.0060	0.4100	1019.00
<0.04	5.9000	0.1200	0.1500	150.0000	220.0000	0.0670	58.0000	17.0000	1.8000	18.0000	4.8000	4.6000	E	37.2000	7.1000	19.3738	23.2486	-11.5770	0.0120	-10.1740	0.0130	0.8700	155310.00
<0.20	4.4000	<0.20	0.1400	210.0000	300.0000	0.1500	77.0000	27.0000	2.5000	26.0000	3.7000	4.0000								-9.6240	0.0460	0.6500	17000.00
			0.1900	130.0000	180.0000	0.0780	49.0000	13.0000	2.5000	11.0000	7.0000	7.2000	E	42.7000	2.2000	26.0090	31.2108	-11.9460	0.0050	-7.7640	0.0230	0.7100	>241920
<0.10	2.5000	<0.10	0.4800	150.0000	340.0000	0.0600	92.0000	27.0000	14.0000	23.0000	13.2000	14.0000	E	32.0000	-2.5000	22.1810	26.6172	-12.4150	0.0090			1.2000	>241920
<0.10	3.7000	<0.10	0.1400	280.0000	340.0000	<0.02	92.0000	28.0000	1.9000	31.0000	2.2000	2.1000										0.4300	7120.00
>0.10	2.0000	<0.10	0.2440	112.0000	150.0000	0.0600	42.0000	10.0000	2.4000	9.4000	5.1000	5.9100										3.0000	43520.00
<0.04	2.0000	NR	0.0500	200.0000	290.0000	0.2500	74.0000	25.0000	2.2000	76.0000	3.1000	3.2000	E	61.5000	9.2000	33.5374	40.2449	-10.5510	0.0080	-9.0390	0.0090	0.4400	520.00
<0.04	5.5000	<0.10	0.1700	140.0000	210.0000	0.0640	55.0000	16.0000	2.1000	16.0000	5.7000	5.0000	C	32.1000	3.9000	16.8934	20.2721	-10.6370	0.0120	-8.7280	0.0180	0.7700	173290.00
<0.20	4.5000	<0.20	0.0360	200.0000	290.0000	0.3000	71.0000	27.0000	1.3000	20.0000	2.8000	2.9000								-10.5140	0.0080	0.5300	20000.00
			0.2400	98.0000	130.0000	0.0770	36.0000	9.4000	3.7000	7.7000	8.3000	8.6000	C	28.6000	-0.5000	17.4667	20.9600	-12.7420	0.0070	-7.2900	0.0200	0.8300	>241920
<0.10	2.3000	<0.10	0.4400	140.0000	350.0000	<0.02	95.0000	27.0000	9.0000	15.0000	9.8000	11.4000	E	34.4000	-1.8000	23.2656	27.9187	-11.7690	0.0070			1.4000	>241920
<0.10	2.7000	<0.10	0.0240	270.0000	340.0000	<0.02	90.0000	27.0000	1.4000	21.0000	2.1000	2.1000										0.5000	3450.00
<0.10	1.9000	<0.10	0.2690	112.0000	150.0000	0.0600	41.0000	11.0000	2.7000	13.0000	4.1500	4.9500										2.2000	51720.00
<0.04	4.2000	<0.10	0.0580	230.0000	320.0000	0.2200	81.0000	29.0000	1.8000	52.0000	2.4000	2.5000	C	76.4000	6.3000	43.5837	52.3004	-10.9150	0.0030	-8.0210	0.0050	0.5800	238.00
<0.04	5.0000	0.1400	0.2900	120.0000	180.0000	0.1000	49.0000	15.0000	2.9000	19.0000	7.1000	6.1000	E	37.8000	7.2000	19.6928	23.6314	-11.4900	0.0060	-7.4070	0.0270	0.9100	173290.00
<0.20	4.8000	<0.20	0.1000	220.0000	310.0000	0.0720	77.0000	29.0000	1.7000	16.0000	2.5000	3.0000								-11.3960	0.0590	0.7100	16000.00
			0.3000	92.0000	120.0000	0.0570	35.0000	9.3000	3.8000	6.8000	7.2000	7.5000	E	28.4000	2.4000	16.7580	20.1096	-12.8110	0.0060	-7.0760	0.0320	0.7100	>241920
<0.10	1.3000	<0.10	0.2800	180.0000	440.0000	<0.02	120.0000	37.0000	9.5000	23.0000	8.0000	8.9000	E	46.4000	-1.9000	30.9854	37.1825	-12.0090	0.0050			0.9200	>241920
<0.10	3.4000	<0.10	0.0190	250.0000	340.0000	0.0600	88.0000	28.0000	1.3000	19.0000	1.8000	1.8000										0.3700	2950.00
<0.10	2.3000	0.1700	0.3570	106.0000	140.0000	0.0600	39.0000	11.0000	4.2000	8.7000	5.1800	5.8900										1.7000	46110.00
#DIV/0!	3.40	0.14	0.193	170.48	259.05	0.10	68.43	21.32	3.65	29.12	5.19	5.45	#DIV/0!	43.37	3.15	25.40	30.48	-11.64	0.01	-8.87	0.02	0.94	47435.80

E. Coli (co	HPC (color	Chlo-A (mg	MIB (ppb)	Geosmin (µ	Calculated	Location D	Comments
52.00	2900.00				NA	S side of F	stream is frozen. Hole created with pick ax to obtain samples.
310.00	51000.00	<0.10			1.2253		Landmark for water height is benchmark on south bridge to water surface. water flowing. water very mucky. Muddy bottom.
1400.00		0.60	BDL	9.00	-0.0002		landmark to surface measured at benchmark on bridge.
>241920		0.40			NA	NEW SITE	Landmark to surface measured from bottom of road deck.
20750.00		<0.1	BDL	BDL	1.6639		Landmark to surface measured from bottom of road deck.
740.00		0.50	BDL	BDL	0.1057		Landmark to surface measured from TOP of bridge rail. Measured from W side of bridge - center of stream.
310.00		0.30	BDL	BDL	NA		Landmark to surface measured from TOP of bridge rail. Measured from W side of bridge - center of stream.
30.00	7400.00				0.0266	S of 86th S	mucky bottom
410.00	51000.00	<0.10			0.5040		Landmark for water height is from center of bridge (south side) to water surface. eddy current near east bank
980.00		0.30	BDL	BDL	0.0109		Landmark to surface measured from bottom of road deck.
>241920		0.40			NA		Landmark to surface measured from bottom of road deck.
17230.00		<0.1	BDL	5.80	0.8541		Landmark to surface measured from bottom of road deck.
1580.00		0.50	BDL	BDL	0.0378		Landmark to surface measured from bottom of road deck.
2030.00		0.40	BDL	BDL	NA		Landmark to surface measured from bottom of road deck.
0.00	1100.00				NA	N side of b	could not measure streamflow b/c ice covered. Hole (~25cm diameter) was created with pick ax to obtain samples. Ice is ~ 10" think.
200.00	100000.00	<0.10			NA		Landmark for water height is from center of bridge to water surface. Uncertain of where on road deck measurement was taken. water too deep for streamflow measurements.
400.00		0.30	BDL	BDL	NA		Landmark to surface measured from bottom of road deck.
>241920		0.40			NA		Landmark to surface measured from bottom of road deck.
32820.00		<0.1	BDL	5.30	NA		Landmark to surface measured from bottom of road deck. Bridge collapsed - old elevation 795' 6.75"
1100.00		0.50	BDL	BDL	NA		Landmark to surface measured from top of south bridge rail. Bridge still collapsed +92.50. ~0.82m (2'7") from top of S bridge rail to elevation marker +92.50.
1080.00		0.30	BDL	BDL	NA		Landmark to surface measured from top of south bridge rail. Bridge still collapsed.
38437.24	35566.67	0.41		6.70	0.49		

Center for Earth and Environmental Science

Indiana University ~ Purdue University, Indianapolis

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http://www.cees.iupui.edu/research/water_resources/ciwrp/Algae_Information

CIWRP 2008 Research Project

About CEES

About Veolia Water Indianapolis

Blue-Green Algae Dynamics and Algal Toxicity: A Study of Central Indiana Reservoirs

Following the documentation of toxic blue-green algae and an algal toxin in Geist Reservoir last year, CIWRP research into blue-green algae has been expanded into a comprehensive research program for 2008. Last summer, blue-green algae concentrations in both Eagle Creek and Geist Reservoirs, and the detection of microcystin toxin in Geist Reservoir resulted in recreational usage advisories being posted by the Indiana State Department of Health for both reservoirs. While the 2007 summer drought conditions created unusual conditions very favorable for the proliferation of blue-green algae, potentially toxic blue-green algae blooms have been occurring in central Indiana reservoirs for several years. In fact, there have been documented cases of blooms of potentially toxic blue-green algae in several areas of Indiana since 2001. Further, a review of blue-green algae research throughout the Midwest indicates that blue-green algae blooms and the occurrence of algal toxins, especially microcystin, are becoming increasingly common in midcontinent lakes and reservoirs.

For years, CIWRP research has focused on understanding phytoplankton (typically microscopic floating plants) occurrence and dynamics in area reservoirs because several types cause taste and odor in finished drinking water. These compounds are likely familiar to you as the earthy and/or musty smell and taste sometimes present in drinking water. Nuisance algal blooms of taste and odor producing phytoplankton have been documented in Eagle Creek, Geist and Morse Reservoirs since at least 2000. Resident reservoir phytoplankton from diatoms to blue-green algae and actinomycetes (fungi-like bacteria) are known to produce taste and odor causing compounds - chemically known to be MIB (2-methylisoborneol) and geosmin. Further, certain species of blue-green algae are known to produce specific taste and odor compounds. For example, *Anabaena* has been documented as producing geosmin and potentially MIB; *Pseudanabaena* has been shown to produce MIB; *Aphanizomenon* has been shown to produce geosmin; and *Planktothrix* has been shown to produce both MIB and geosmin. Yet understanding if these same species produce taste and odor compounds locally remains unknown and anecdotal.

In recent years, concern regarding the production and occurrence of blue-green algal toxins has grown in central Indiana and nationally. Evaluation of phytoplankton community structure information from Eagle Creek, Geist and Morse Reservoirs has shown that potentially toxic blue-green algae comprise important parts of the phytoplankton communities in mid-late summer and fall in all three reservoirs. Additional reports of potentiallytoxic blue-green algae in Indiana include Ball Lake in Steuben County, Lake Lemon and Monroe Reservoir in Monroe County, and at least 20 other lakes and reservoirs statewide.

Given the ecological, recreational, and municipal uses of Eagle Creek, Geist and Morse Reservoirs, maintaining and improving their water quality has been a focus of the Central Indiana Water Resource Partnership (CIWRP). A primary focus area has been on Eagle Creek Reservoir (ECR) because of the drinking water intake location within the reservoir. In 2003, CIWRP research focused on obtaining physical, chemical, and

phytoplankton data to understand how ECR's physical and chemical environments affect phytoplankton growth (Pascual and Tedesco, 2004a). Algaecide treatment was being used to control algal bloom formation more aggressively in 2003 with three algaecide treatments occurring in ECR in 2003. Thus a secondary focus of the 2003 study included determining algaecide treatment effectiveness (Pascual and Tedesco, 2004b). Subsequent research designed to develop a rapid blue-green algae mapping tool utilizing remote sensing has resulted in monitoring the distribution of blue-green algae in the three reservoirs over the past three years (Li et al., 2006). This work also included Monroe Reservoir in south-central Indiana, a drinking water supply reservoir for Bloomington and surrounding communities and an important recreational use resource. Our work provided snapshots of whole reservoir blue-green algae distributions with some information on the physical and chemical characteristics of the reservoirs and limited information on phytoplankton community structure. However, CIWRP research has not studied the occurrence of blue-green algal toxins in central Indiana reservoirs or elsewhere and information on the occurrence of algal toxins is very limited despite the fact that known toxin-producing algae comprise important components of blue-green algal populations in the three central Indiana reservoirs, as well as elsewhere throughout the state.

Given the importance of the central Indiana reservoirs for the drinking water supply and their recreational use, a comprehensive study of the phytoplankton ecology of the three reservoirs is being undertaken. Additionally, documenting the occurrence of taste and odor compounds (MIB and geosmin) as well as blue-green algae toxin occurrence will be an important part of the study and will be undertaken during the spring, summer, and fall of 2008, and potentially 2009.

The 2008 CIWRP Algal Ecology and Toxicity study has three main purposes:

1) To document algal community composition and abundance;
2) To determine the relationship between physical and chemical reservoir conditions and algal community structure and abundance; and
3) To document the occurrence of blue-green algal toxins (microcystin, anatoxin-a, and cylindrospermopsin) and taste and odor compounds (MIB and geosmin) and their relationship to algal community structure and reservoir conditions.

This study is already underway and will involve a lot of field work. We will sample Eagle Creek, Geist and Morse Reservoirs on every two weeks beginning in mid-May and extending through mid-October. This will result in at least 12 sampling events per reservoir. Additional samples may be taken in response to monitoring specific blooms or during unusual conditions. Researchers will be monitoring physical and chemical reservoir conditions important to understanding the factors that lead to algal blooms and potentially even specific species of algae. This type of monitoring will occur at a series of sites throughout each reservoir. At a few select sites, we will collect water samples throughout the water column (for example at the surface, near the bottom, and at places in the middle of the water column where different important biological conditions occur). These samples will be analyzed for a large number of parameters that can control algae community abundance and composition (eg. levels of the nutrients nitrogen and phosphorus, dissolved oxygen levels, amount of light etc). Additionally, samples will be analyzed for several measures that are created by the algal communities (eg. number and species of phytoplankton present, levels of algal pigments present, amount and type of taste and odor compounds, and amount and type of algal toxins, if any, present).

CEES is partnering with both Veolia Water Indianapolis, LLC. though the CIWRP partnership, and with the State of Indiana (Indiana Department of Natural Resources,

Indiana Department of Environmental Management and Indiana State Department of Health) to conduct these studies. CIWRP funding will be the dominant funding source and will document reservoir physical and chemical conditions, algal community dynamics, taste and odor compounds, and some toxin analyses. The State of Indiana will provide limited funding for additional algal toxin analyses predominantly for Geist Reservoir with some additional analyses of Eagle Creek and Morse Reservoirs. Specifically, CEES will collect samples for algal toxin analyses and results will be provided to the State for dissemination to the public via their website at www.algae.in.gov. CEES will not make recommendations to the public regarding health and safety associated with the use of recreational waters. The State will provide additional information to the public on their website. CEES will continue to provide science-based information about blue-green algae and our understanding of the causes and conditions that help promote algal blooms as they become available.

This study is one of the first studies in Indiana that will document the occurrence of algal toxins on a biweekly basis throughout the growing season. While there have been isolated tests for algal toxins on a few select lakes and reservoirs in response to a bloom or as part of a state-wide screening for one specific algal toxin, this study will provide important comprehensive information to help assess blue-green algal occurrence and reservoir conditions that might be responsible for blooms and toxin production.

CIWRP research and the expertise of CEES researchers (especially Tedesco, Clercin, Pascual, and new graduate student Angie Cowan) continues to provide important information and analyses. Our work has been important in that we have been able to provide information to state agencies, the Indiana legislature, Veolia Water, and the general public. We hope to be able to provide solid science data to the public policy arena as Indiana works to set standards, develop policies for advisories and determine if there is a need for statewide monitoring. We have posted some background information about blue-green algae on our website as well as presentations made at a public meeting for Geist residents. We will continue to provide updates and information as we learn more about our water resources and ways to improve, enhance and protect them.

CENTRAL INDIANA WATER RESOURCES PARTNERSHIP

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Blue-Green Algae in Central Indiana: Results from 2008 with a Focus on Geist Reservoir

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VEOLIA WATER

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Blue-Green Algae

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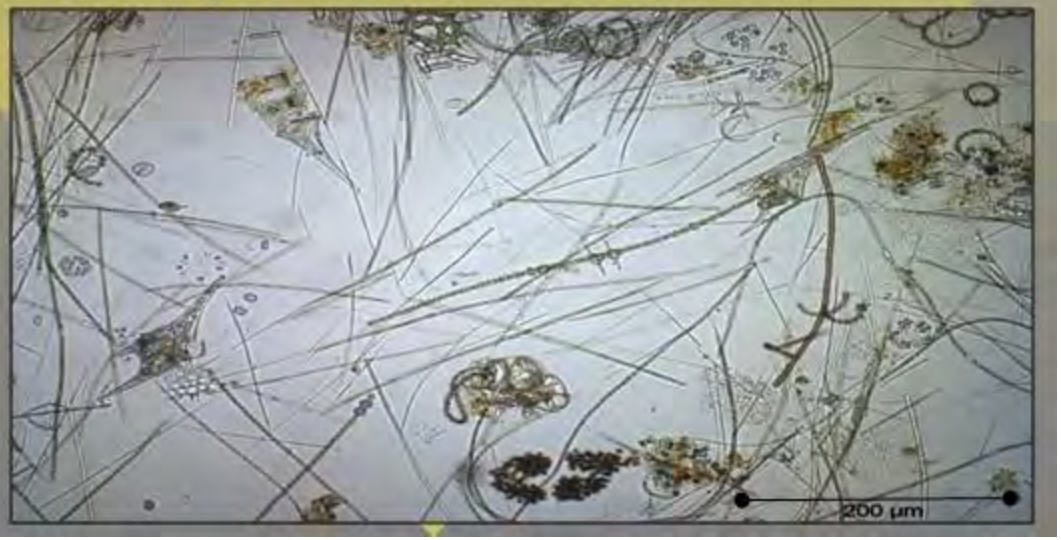
- Cyanobacteria
  - Differ from Other Bacteria
    - ➔Can perform photosynthesis
  - Differ from True Eukaryotic Algae
    - ➔Lack a well-defined nucleus
  - More Closely Related to Gram Negative Bacteria than Algae
  - 2.2-3.5 Billion Years Old
  - Naturally Occurring but Antropogenically Amplified



Causes of Algal Blooms

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Biomass increases to bloom densities under conditions favorable to growth

- Sunlight (light penetration)
- Temperature – to start growth
- Nutrients – not so simple
- Modified Hydrology
  - Resuspension of Nutrient-rich Bottom Sediment
  - Flushing vs Retention Times

2008 Blue-Green Algae Research: Indianapolis Water Reservoirs

CENTRAL INDIANA WATER RESOURCES PARTNERSHIP

- *Purpose*
  - *Document algae community composition and abundance*
  - *Determine relationship between physical and chemical reservoir conditions and algae, taste and odor and toxin production*
- *Biweekly Mid-May – End-December*
- *Nutrients, Algal Populations, Physical Reservoir Conditions, Taste and Odor Compounds, Algal Toxins*
- *Algal Toxin Analyses by Greenwater Labs, Florida*
- *Funded by Veolia Water Indianapolis through CIWRP with additional funds for toxin analysis from Indiana DNR*

Indianapolis Drinking Water Supply

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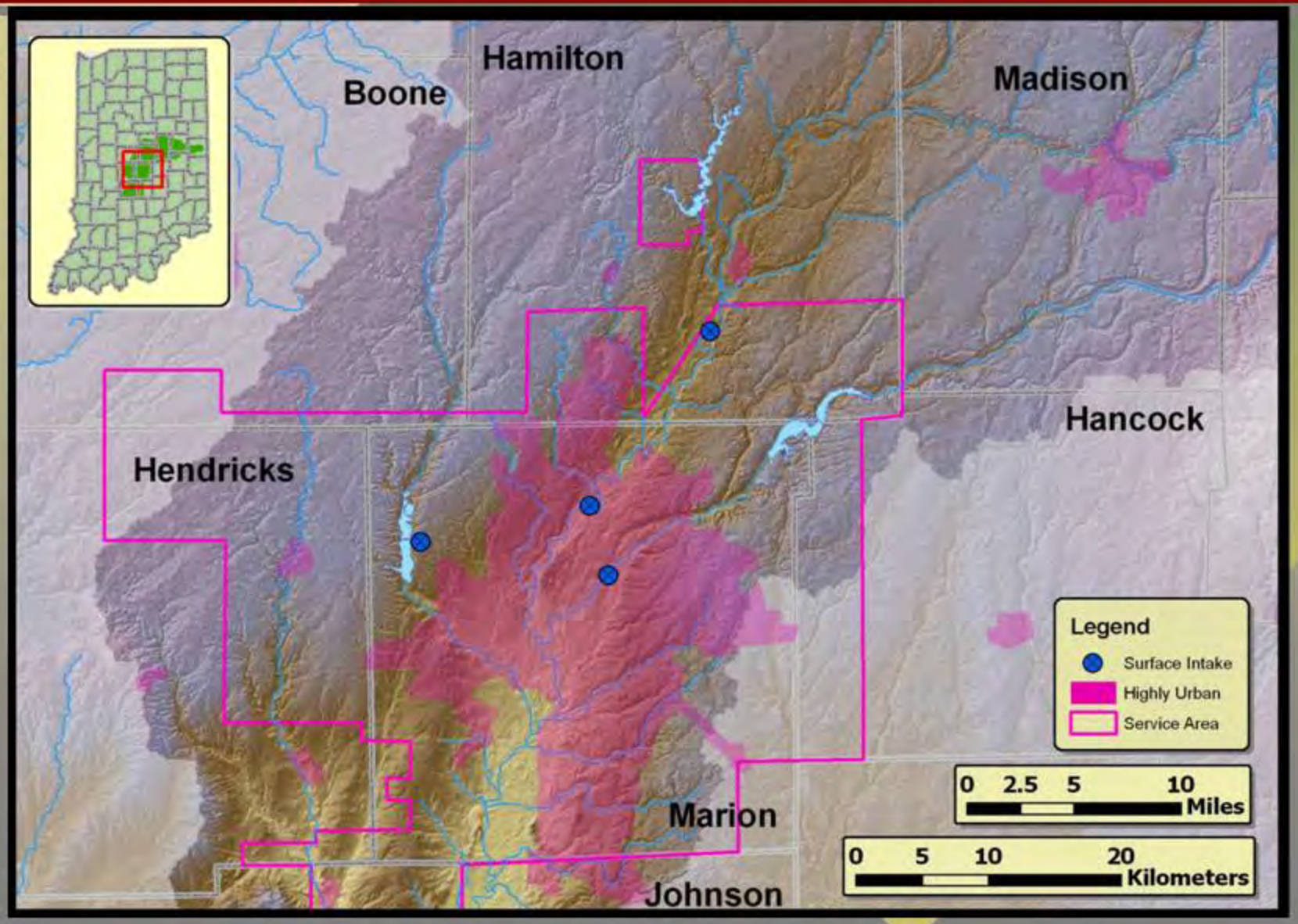

Reservoir Characteristics: Indianapolis Water Reservoirs

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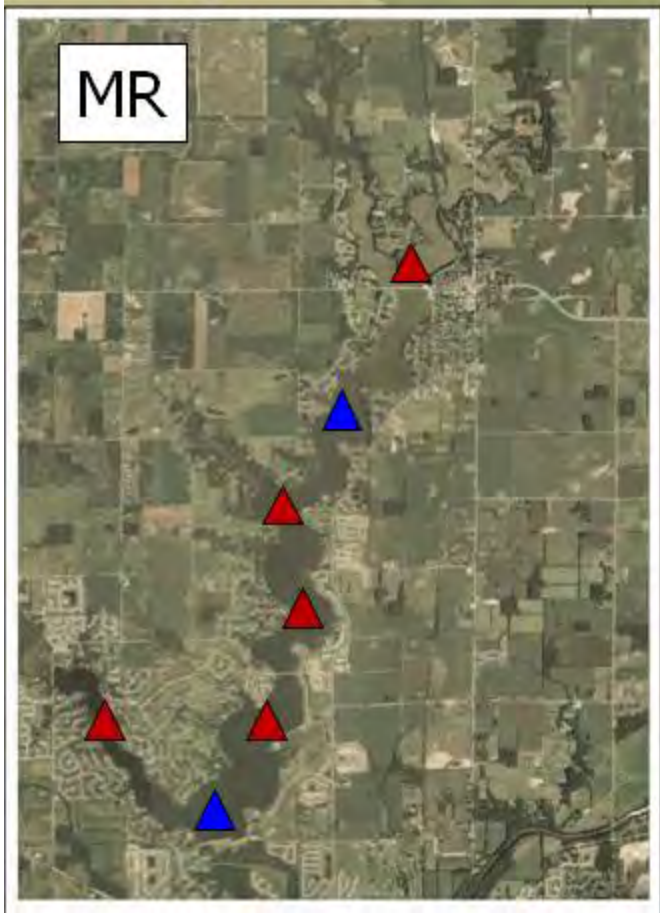
Reservoir	Eagle Creek	Geist	Morse	Units
Surface Area	5	5.9	6	km^2
Reservoir Volume	21	23.8	28	million m^3
Mean Depth	4.2	3.2	4.7	m
Watershed Area above Dam	420	560	590	km^2
% Agriculture in Watershed	52.0%	58.3%	76.9%	%
Median Photic Depth (secchi)	196	167	188	cm
Mean Total P	93	135	112	µg/L
Trophic Status	Eutrophic	Eutrophic	Eutrophic	

2008 Reservoir Study Sites
Eagle Creek, Geist, & Morse Reservoirs

▲ Water Quality Monitoring Station

▲ Water Quality and Algal Toxin



Samples for nutrients and T&O

- Surface, Bottom, Photic Depth

Samples for algae and toxins

- Integrated Photic Depth

Important Cyanobacteria Genera Found in Central Indiana Reservoirs

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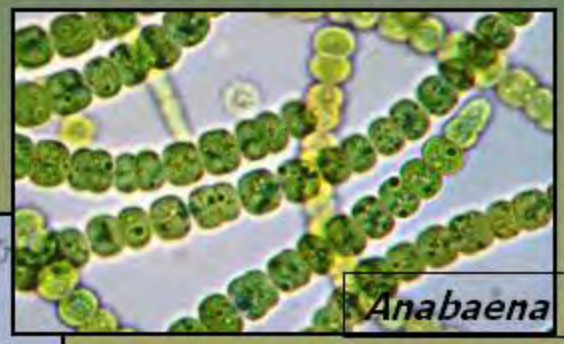
- Unicellular/Colonial – No heterocyst, Non-Nitrogen Fixer (Chroococcales)
  - *Microcystis*
  - *Merismopedia*
  - *Coelosphaerium*
- Filamentous – No heterocyst, Non-N Fixer (Oscillatoriales)
  - *Planktothrix*
  - *Oscillatoria*
  - *Limnothrix*
  - *Pseudanabaena*
- Filamentous – Heterocyst, Nitrogen Fixer (Nostocales)
  - *Cylindrospermopsis*
  - *Aphanizomenon*
  - *Anabaena*
  - *Rhaphidiopsis*



Toxins and Taste and Odor Compounds Produced by Cyanobacteria

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	Dermatotoxin, Irritant Toxin	**Hepatotoxin** (Liver)	**Neurotoxin** (Nervous System)	**Taste/Odor**
Anabaena	LPS	microcystins cylindrospermopsin	anatoxins saxitoxins	geosmin MIB?
Microcystis	LPS	microcystins		
Oscillatoria/ Planktothrix	LPS Lyngbyatoxins	microcystins	anatoxins saxitoxins	geosmin MIB
Cylindrospermopsis	LPS	cylindrospermopsin	saxitoxins	
Aphanizomenon	LPS	cylindrospermopsin microcystins	anatoxins saxitoxins	geosmin
Lyngbya	Lyngbyatoxins		saxitoxins	MIB
Snowella	LPS	microcystins		
Pseudanabaena	LPS	microcystins	anatoxin	geosmin MIB
Aphanacapsa	LPS	microcystins		

LPS = Lipopolysaccharide

Modified from: Graham et al., 2008; Lawton and Edwards, 2008; NOAA, 2007; Graham, 2007; Wiedner et al., 2006

2008 Algal Dynamics
Geist Reservoir @ Dam

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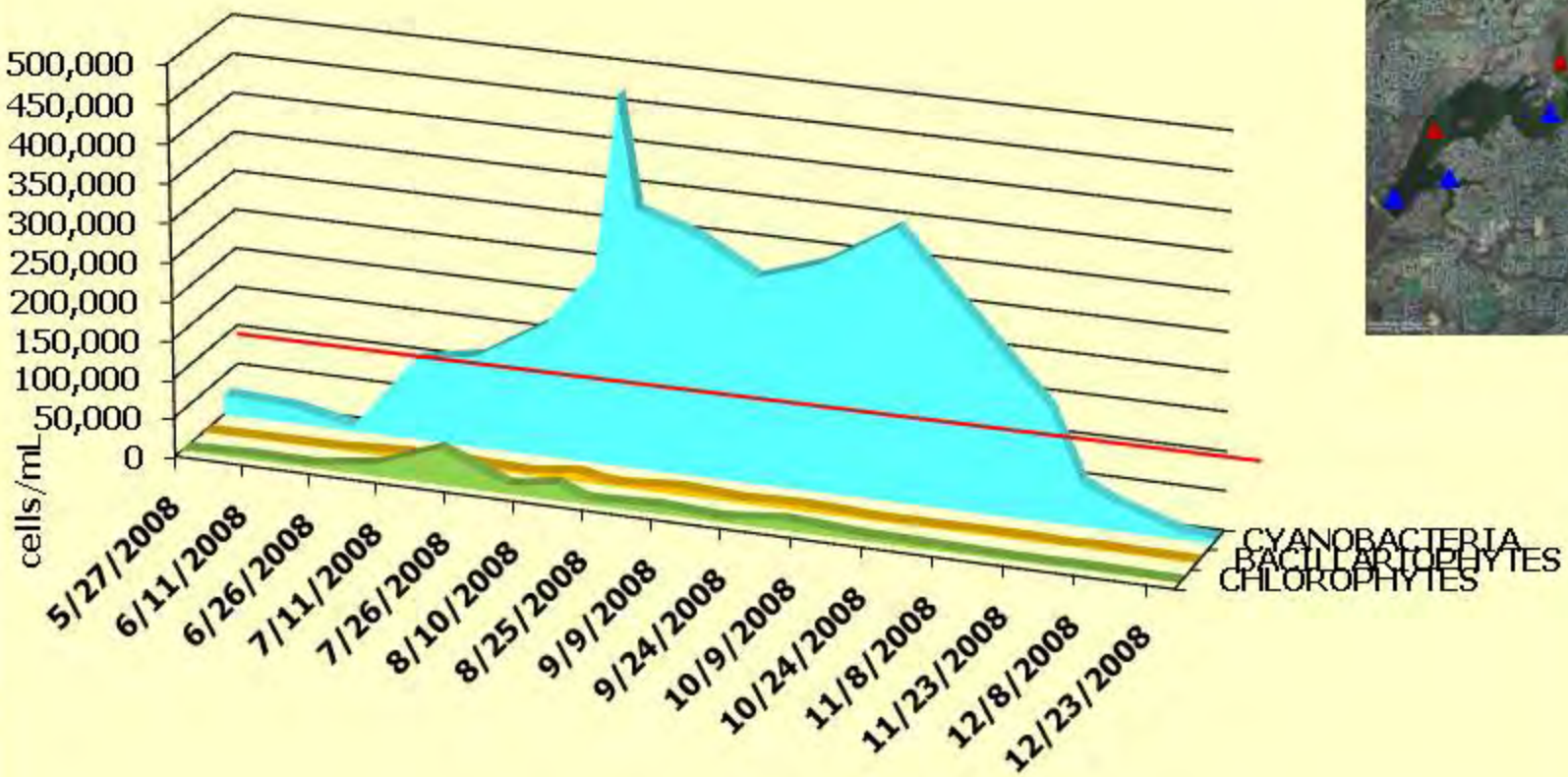
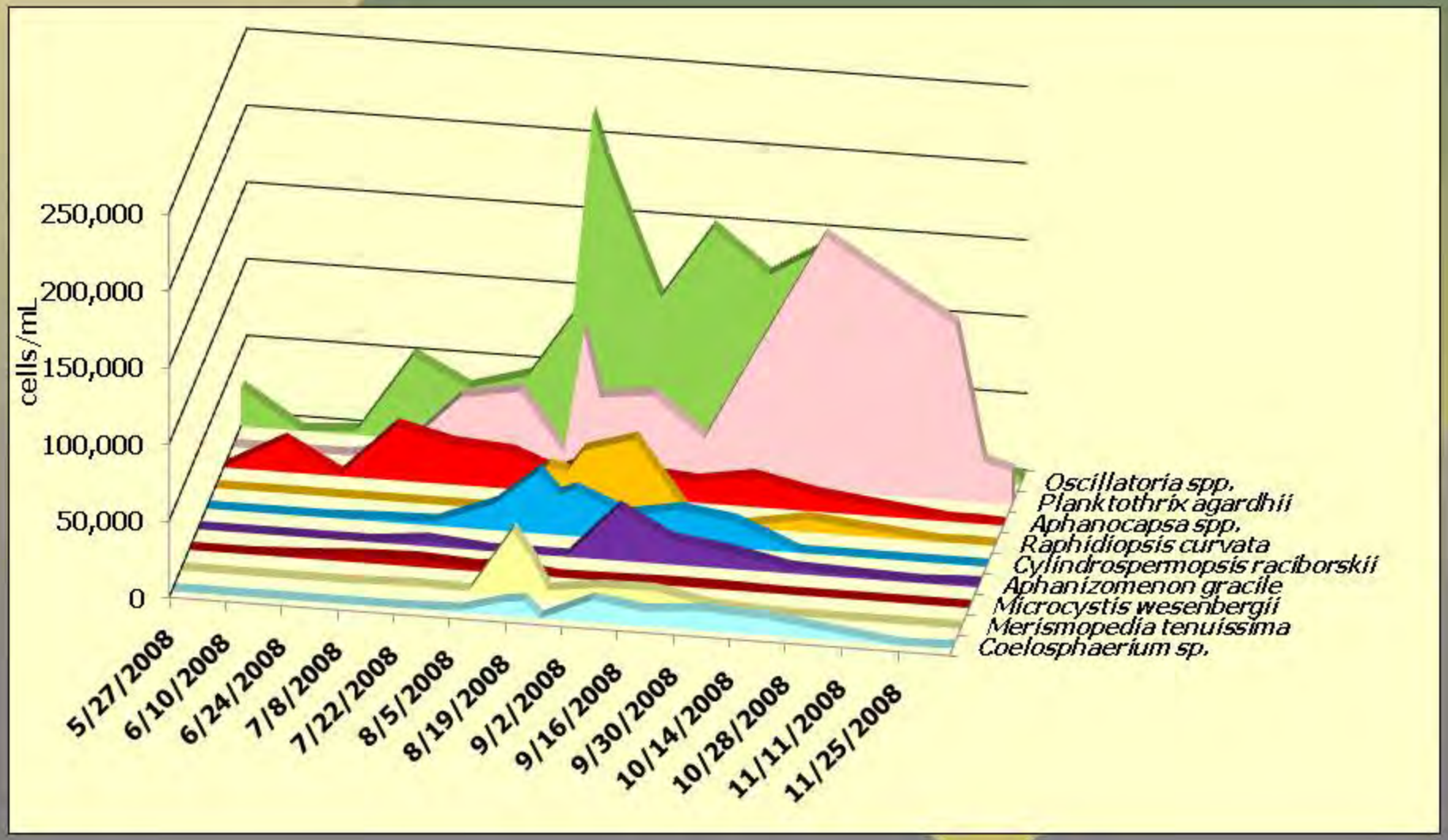
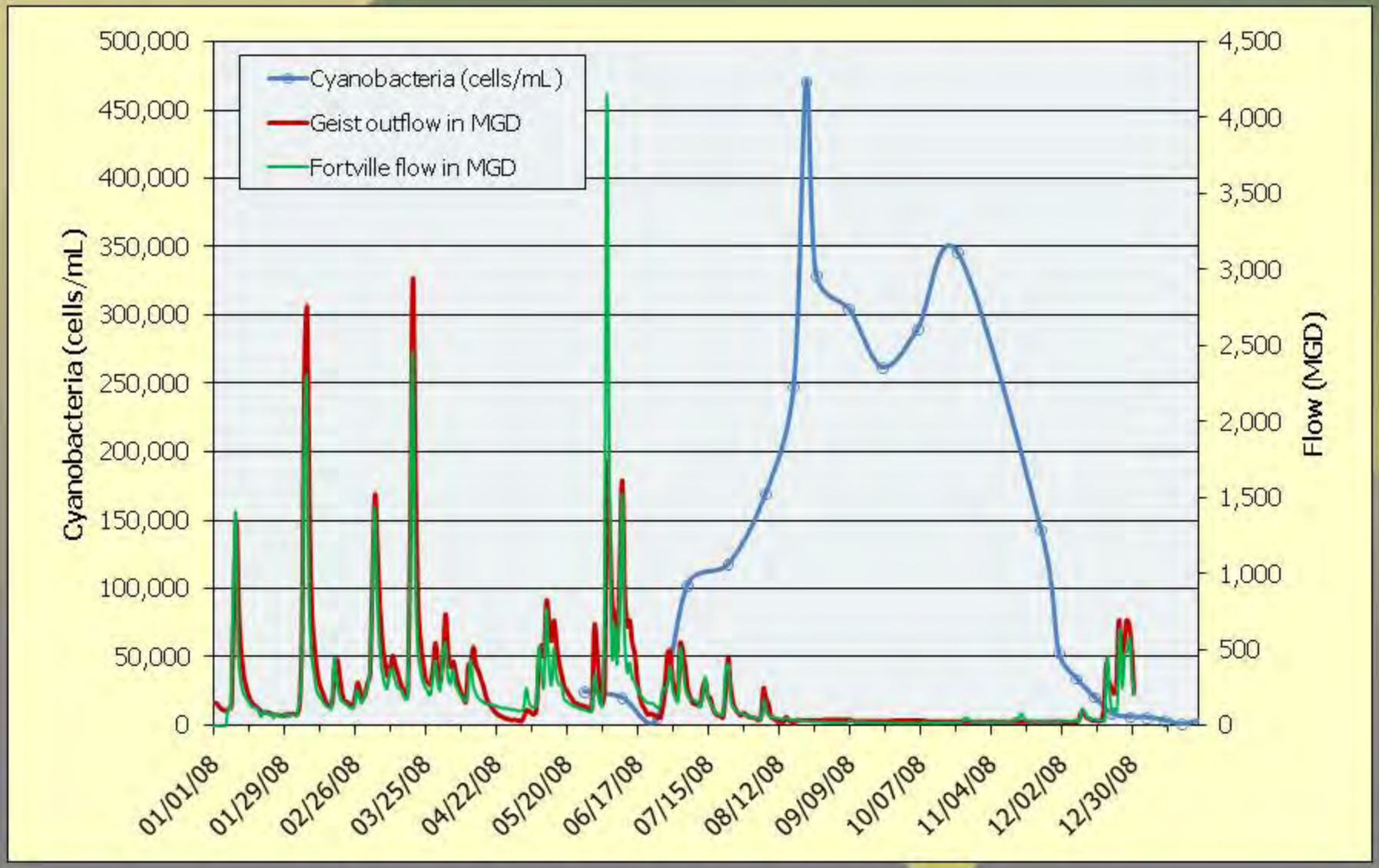


WHO Guideline (Recreation) – Moderate Risk for Adverse Effects = 100,000 cells/mL

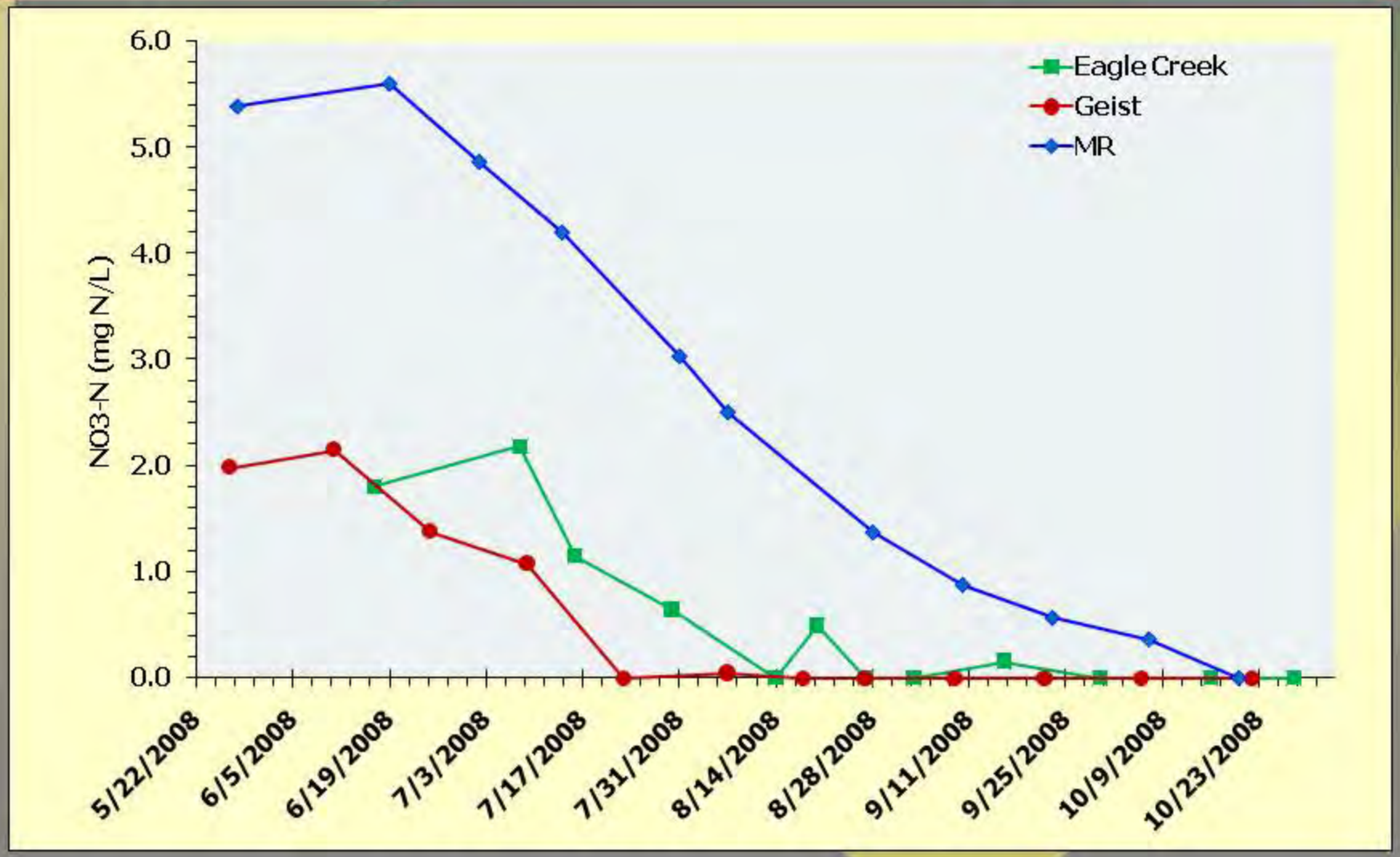
Species Dynamics of Cyanobacteria: Geist Dam



Cyanobacteria Populations vs Reservoir Inflow/Outflow

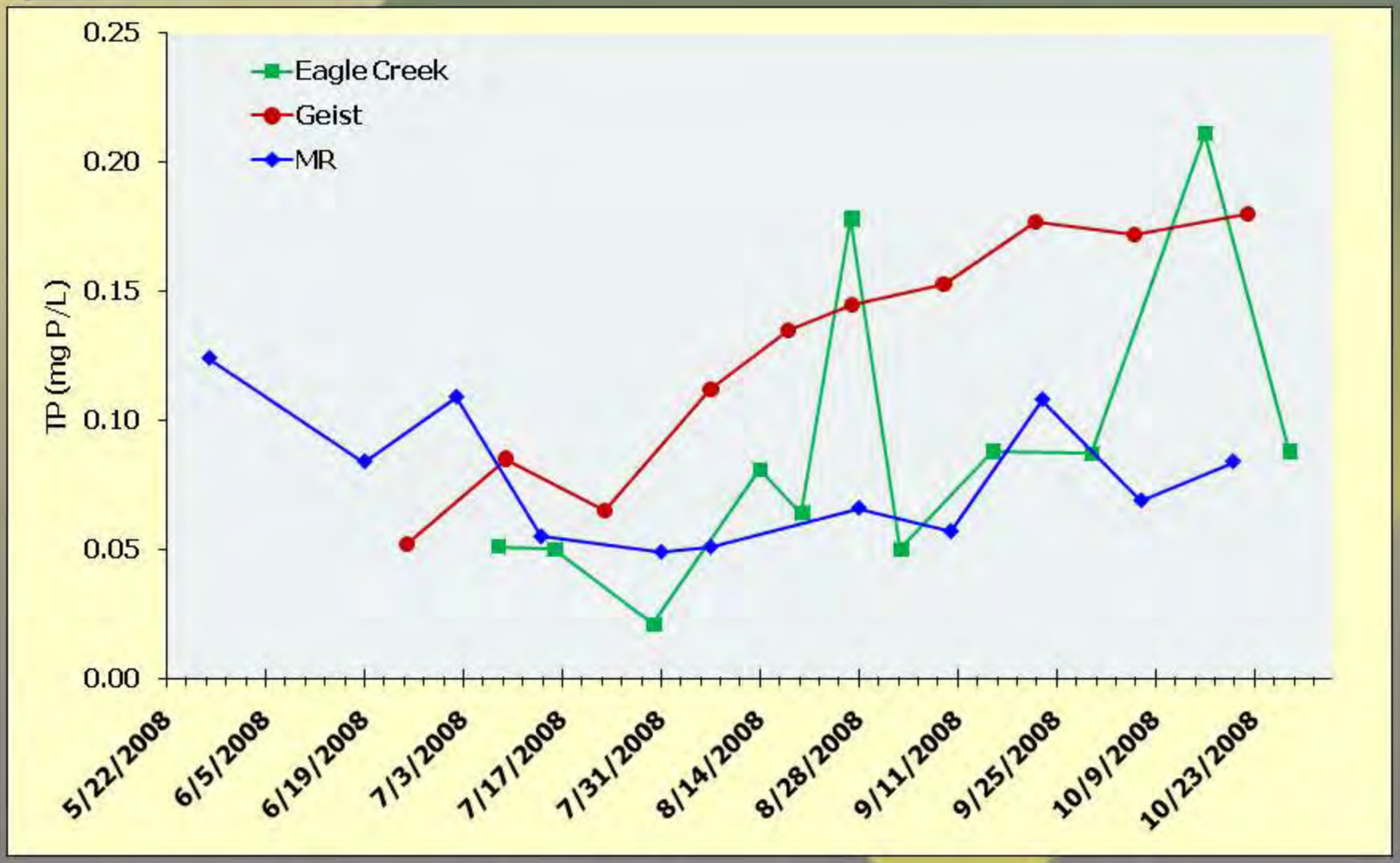


Nutrient Dynamics (Nitrate): Dam Sites



Integrated Photic Depth Samples

Nutrient Dynamics (Total P): Dam Sites



Integrated Photic Depth Samples

Algal Toxin Occurrence in Central Indiana Reservoirs

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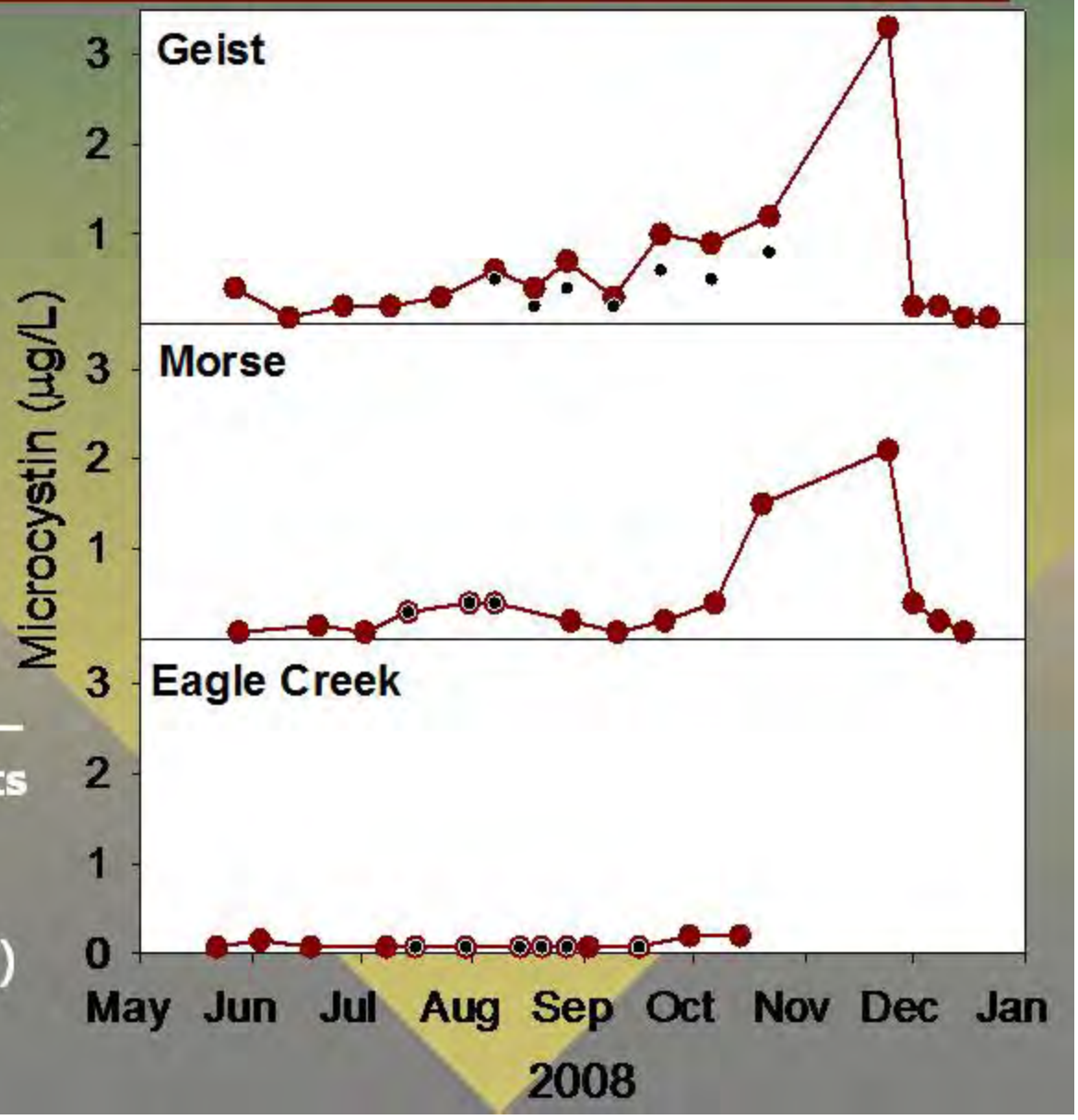
- Microcystin
  - 61% of samples positive for MYC (<0.15 ug/L detection limit)
    - All Reservoirs
      - 40 of 66 samples
      - Avg = 0.56 ug/L
    - Geist
      - 21 of 24 (88%)
      - Avg = 0.62 ug/L
    - Morse
      - 16 of 22 samples (73%)
      - Avg = 0.55 ug/L
    - Eagle Creek
      - 3 of 20 samples (15%)
      - Avg = 0.18 ug/L

WHO Guideline (Recreation) – Low Risk for Adverse Effects = 4 ug/L

- Anatoxin-a and Cylindrospermopsin (n=57)
  - Non-detect (<0.1 ug/L) in all samples

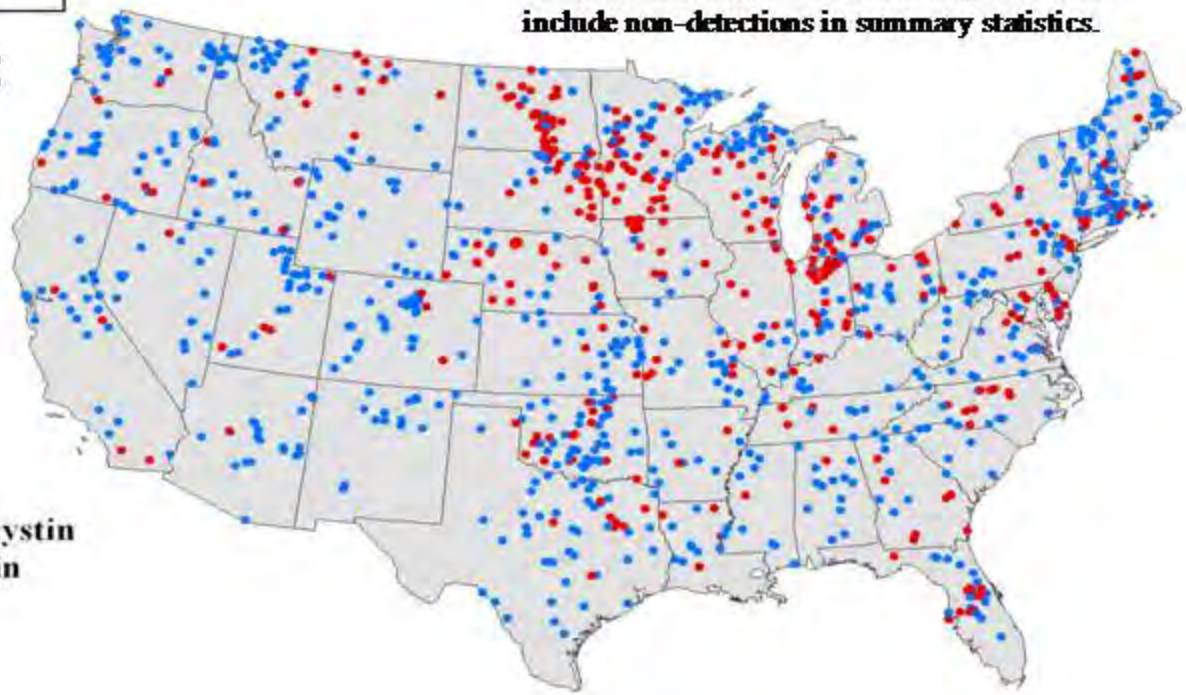


2007 EPA National Lakes Assessment: Microcystin

Concentration (ppb MCLR equivalents)	Study Lakes
Mean	3.0 (~ 1.0)
Median	0.52 (< 0.10)
Minimum	0.10 (< 0.10)
Maximum	230

1 Values outside parenthesis are summary statistics for detections only. Values inside parenthesis include non-detections in summary statistics.

% Overall Detections:
32 % (401/1238)



- No Detectable Microcystin
- Detectable Microcystin

Algal Species Dynamics in Central Indiana Reservoirs

- Shallow, frequently mixed, nutrient-rich reservoirs in Central Indiana are dominated by *Oscillatoria sp.* and *Planktothrix agardhii* throughout the growing season
- Cyanobacterial cell counts exceed 100,000 cells/mL by mid-July and persist
- Reservoirs are turbid, with shallow light penetration favoring *Oscillatoriales* which are known to be low light specialists

Microcystin Occurrence in Central Indiana Reservoirs

- Microcystin toxin was present at the three reservoirs at low levels
  - Geist Reservoir > Morse > Eagle Creek
- Ongoing data analysis continues to assess nutrient, taste and odor and microcystin relationships and trends.

2009 Cyanobacteria Research

CENTRAL INDIANA WATER RESOURCES PARTNERSHIP

- Biweekly Reservoir Sampling (April-November)
  - 4-7 Locations/reservoir
  - Physical and Chemical Conditions
  - Algal Identification and Enumeration
  - Microcystin Analysis

- Whole Reservoir Spatial Distribution Sampling
  - 15-20 sites/reservoir
  - Two times per reservoir
  - Same Parameters

Phytoplankton Dynamics: Geist Dam 2009

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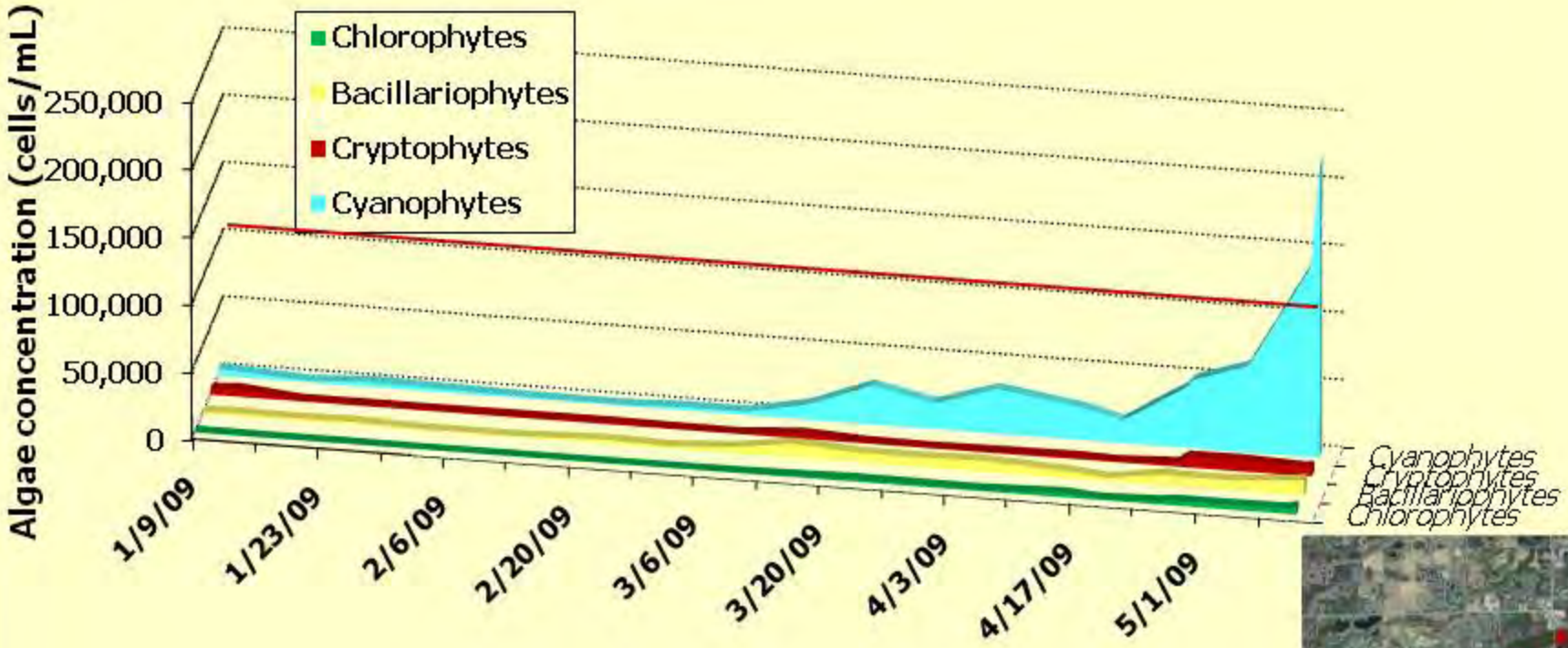

WHO Guideline (Recreation) – Moderate Risk for Adverse Effects = 100,000 cells/mL

What Can Recreational Users Do

- Wise Users Take Sensible Precautions
- Prepare BEFORE Entering the Water
  - Use Appropriate Gear
  - Check Weather Forecast
- While IN THE WATER
  - Recreate in Groups
  - Always Supervise Children
  - Avoid Consuming Raw (Reservoir or Lake) Water
- When you're FINISHED
  - Make Sure You Shower
  - Clean Your Equipment
- USE COMMON SENSE

What can you do NOW to help?

- Use Phosphorus-free lawn fertilizers and dishwasher detergent
- Fertilize less – first check soils nutrient levels
- Pick up pet wastes regularly
- Keep lawn clippings and leaves out of streets, waterways, and the reservoir!
- Keep household wastes out of storm sewers (including soaps from car washing)
- Collect storm water from gutters to use in gardens, create flower gardens at the base of downspouts
- Cover bare ground with plantings
- Use straw bales or silt fence when doing construction or major landscaping projects
- Plant beds of native flowers or trees with deep roots for infiltration
- Talk to your neighbors about what you are doing
- Think about how water is used around your house and how it moves across your yard!

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