

Jennings Water Quality Database

Sample Point	Date	Method of Flow Meas.	Flow (gpm)	Field pH	Lab pH	Spec. cond. (umhos/cm)	Field Temp (C)	Alk. (Field) (mg/L)	Alk. (lab) (mg/L)	Acidity (mg/L)	Iron (mg/L)	Manganese (mg/L)	Aluminum (mg/L)	Sulfate (mg/L)	Susp. Solids (mg/L)
INF	7/11/98					1100					17.7	12.3		840	
INF	7/18/98					1205					20.0	13.8	10.8	930	
INF	7/25/98					1100					34.5	14.2	9.9	990	
INF	8/1/98					1100					42.3	18.3	14.1	2010	
INF	8/8/98					1200					26.4	16.5	12.3	990	
INF	8/15/98					1200					20.4	15.3	15.3	1110	
INF	3/9/01			2.9		1100			0	335	18.7	12.9	2.2	810	7
INF	3/9/01			2.9		1100			0	335	18.7	12.9	2.8	810	7
INF	4/21/01			2.9		980	10		0	277	10.9	12.4	2.4	630	17
INF	4/21/01			2.9		980			0	277	10.9	12.4	2.4	630	17
INF	5/10/01			2.7		1000	10		0	283	12.7	12.3	4.3	720	14
INF	5/10/01			2.7		1000			0	283	12.7	12.3	4.3	720	14
INF	6/14/01			2.7		980	14		0	316	14.9	13.5	3.0	880	6
INF	7/13/01			4.2		1050			0	292	22.0	13.8	10.2	900	10
INF	8/9/01			3.0		1030	23		0	364	32.0	15.4	10.1	690	2
INF	8/16/01			4.2		1050	18		0	357	18.2	14.4	12.9	1030	14
INF	9/14/01			4.2		1100	18		0	255	27.3	15.9	13.2	1020	90
INF	10/12/01			4.2		1100	15		0	288	23.4	14.7	9.0	960	3
INF	11/9/01			4.3		1000	11		0	275	39.2	15.4	12.0	1200	5
INF	12/14/01			4.2		1200	10		0	344	39.9	17.7	13.8	1050	8
INF	1/11/02			4.4		1350	7		0	298	30.4	15.3	29.4	880	2
Min				3.0		980	7		0	255	10.9	12.3	2.2	630	2
Max				4.4		1350	23		0	364	42.3	18.3	29.4	2010	90
Avg				4.1		1092	14		0	305	23.5	14.4	9.7	943	14
Range				1.4		370	16		0	109	31.4	6.0	27.2	1380	88

Description: Raw water for full-scale & pilot-scale systems (for additional monitoring from 9/1997 thru 4/1999, see Final Report for Project 18)

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Sample Point	Date	Method of Flow Meas.	Flow (gpm)	Field pH	Lab pH	Spec. cond. (umhos/cm)	Field Temp (C)	Alk. (Field) (mg/L)	Alk. (lab) (mg/L)	Acidity (mg/L)	Iron (mg/L)	Manganese (mg/L)	Aluminum (mg/L)	Sulfate (mg/L)	Susp. Solids (mg/L)
7	3/9/01	Measured	9.8		6.3	930			95	-46	7.0	14.4	0.5	730	35
7	3/9/01				6.3	930			95	-46	7.0	14.4	0.5	730	35
7	5/10/01	Measured	16.7		6.9	920	15		100	-60	5.5	13.2	0.3	730	29
7	5/10/01				6.9	920			100	-60	5.5	13.2	0.3	730	29
7	6/14/01	Bucket	15.1		6.0	950	18		92	0	7.7	13.8	0.7	780	38
7	7/13/01	Measured	16.3	6.2	7.5	910			100	-50	13.3	14.1	0.4	360	18
7	8/9/01	Measured	16.2	6.3	6.2	950	21		143	-42	21.0	15.5	2.1	840	83
7	8/16/01	Measured	16.4	6.4	6.1	920	21		103	39	17.1	15.3	1.1	890	55
7	9/14/01	Measured	16.5	6.2	6.7	900	19		77	-66	16.8	14.7	1.0	900	116
7	10/12/01	Bucket	12.5	6.3	6.2	1000	15		82	0	9.8	8.1	0.4	840	66
7	11/9/01	Bucket	11.1	6.5	6.6	1000	10		87	0	12.6	10.2	0.7	960	60
7	12/14/01		10.3	6.3	6.3	960	8		87	0	17.5	16.8	15.0	930	68
7	1/11/02		8.6	6.2	6.9	1150	5		88	0	14.7	15.6	14.1	770	54
	Min		8.6	6.2	6.0	900	5		77	-66	5.5	8.1	0.3	360	18
	Max		16.7	6.5	7.5	1150	21		143	39	21.0	16.8	15.0	960	116
	Avg		13.6	6.3	6.5	957	15		96	-25	12.0	13.8	2.9	784	53
	Range		8.1	0.3	1.4	250	16		66	105	15.5	8.7	14.7	600	98

Description: Vertical Flow Pond effluent

Jennings Water Quality Database

Sample Point	Date	Method of Flow Meas.	Flow (gpm)	Field pH	Lab pH	Spec. cond. (umhos/cm)	Field Temp (C)	Alk. (Field) (mg/L)	Alk. (lab) (mg/L)	Acidity (mg/L)	Iron (mg/L)	Manganese (mg/L)	Aluminum (mg/L)	Sulfate (mg/L)	Susp. Solids (mg/L)
10-1	6/6/98										10.0		0.5	200	
10-1	6/13/98										10.0		0.5	200	
10-1	6/20/98										6.0		0.2	200	
10-1	6/27/98										4.0		0.1	1440	
10-1	7/4/98										4.0		0.1	1440	
10-1	7/11/98					1100					4.5	13.8		920	
10-1	7/18/98					1300					3.2	14.1	12.3	840	
10-1	7/25/98					1100					34.5	14.4	11.7	870	
10-1	8/1/98					1100					41.4	14.7	12.3	1200	
10-1	8/8/98					1200					64.8	15.6	15.3	1170	
10-1	8/15/98					1250					21.1	13.2	13.2	1140	
	Min					1100					3.2	13.2	0.1	200	
	Max					1300					64.8	15.6	15.3	1440	
	Avg					1175					18.5	14.3	6.6	875	
	Range					200					61.6	2.4	15.3	1240	

Description: Port 1; pilot-scale demonstration tanks (project #10 - compost and limestone mixture)

Jennings Water Quality Database

Sample Point	Date	Method of Flow Meas.	Flow (gpm)	Field pH	Lab pH	Spec. cond. (umhos/cm)	Field Temp (C)	Alk. (Field) (mg/L)	Alk. (lab) (mg/L)	Acidity (mg/L)	Iron (mg/L)	Manganese (mg/L)	Aluminum (mg/L)	Sulfate (mg/L)	Susp. Solids (mg/L)
10-2	6/6/98										10.0		0.2	200	
10-2	6/13/98										10.0		0.2	200	
10-2	6/20/98										1.0		0.2	200	
10-2	6/27/98										1.0		0.1	1920	
10-2	7/4/98										1.0		0.1	1920	
10-2	7/11/98					1100					6.3	14.1		990	
10-2	7/18/98					1300					1.4	14.4	1.3	870	
10-2	7/25/98					1200					21.0	14.4	6.3	780	
10-2	8/1/98					1100					27.6	15.1	13.8	780	
10-2	8/8/98					1300					50.4	14.7	11.7	990	
10-2	8/15/98					1250					22.8	14.3	10.3	1140	
	Min					1100					1.0	14.1	0.1	200	
	Max					1300					50.4	15.1	13.8	1920	
	Avg					1208					13.9	14.5	4.4	908	
	Range					200					49.4	1.0	13.8	1720	

Description: Port 2; pilot-scale demonstration tank (project #10 - compost and limestone mixture)

Jennings Water Quality Database

Sample Point	Date	Method of Flow Meas.	Flow (gpm)	Field pH	Lab pH	Spec. cond. (umhos/cm)	Field Temp (C)	Alk. (Field) (mg/L)	Alk. (lab) (mg/L)	Acidity (mg/L)	Iron (mg/L)	Manganese (mg/L)	Aluminum (mg/L)	Sulfate (mg/L)	Susp. Solids (mg/L)	
10-EFF	6/6/98															
10-EFF	6/13/98										10.0		0.2	200		
10-EFF	6/20/98										1.0		0.1	200		
10-EFF	6/27/98										1.0		0.1	1440		
10-EFF	7/4/98										1.0		0.1	1920		
10-EFF	7/11/98					1200					18.6	14.7		800		
10-EFF	7/18/98					1100					2.0	15.5	0.4	830		
10-EFF	7/25/98					1100					10.5	15.5	0.4	840		
10-EFF	8/1/98					1000					30.3	15.3	0.2	1350		
10-EFF	8/8/98					1000					16.8	15.9	0.1	1080		
10-EFF	8/15/98					1000					22.5	17.1	0.2	1320		
10-EFF	3/9/01	Measured	0.0	6.2	6.2	1100	0	108	108	-40	6.5	16.8	0.1	900	10	10
10-EFF	3/9/01		0.0	6.2	6.2	1100		108	108	-40	6.5	16.8	0.1	900	10	10
10-EFF	4/21/01	Measured	0.5	3.3	3.3	880	10	0	0	148	2.2	11.4	1.0	690	3	3
10-EFF	5/10/01	Measured	0.4	4.2	4.2	830	12	0	0	179	14.5	12.0	3.2	660	13	13
10-EFF	6/14/01	Bucket	0.3	3.1	3.1	910	22	0	0	210	8.2	11.7	4.0	720	7	7
10-EFF	7/13/01	Measured	0.0	5.5	5.5	900		9	9	133	29.7	13.8	1.9	960	43	43
10-EFF	8/9/01	Measured	0.1	5.9	5.7	920	28	52	52	125	36.4	13.5	3.8	930	57	57
10-EFF	8/16/01	Measured	0.1	5.9	4.3	860	23	0	0	143	24.7	9.3	1.9	930	61	61
10-EFF	9/14/01	Measured	0.0	6.3	6.2	910	23	35	35	27	35.0	13.2	0.9	990	240	240
10-EFF	10/12/01	Bucket	0.1	4.7	3.8	1000	14	0	0	120	16.8	14.7	2.2	850	69	69
10-EFF	11/9/01	Bucket	0.0	4.9	4.3	910	12	0	0	112	28.0	13.2	4.8	960	54	54
10-EFF	12/14/01		0.0	5.0	3.8	1000	11	0	0	168	27.6	15.6	5.7	990	77	77
10-EFF	1/11/02		0.0	5.4	3.9	1100	5	0	0	130	16.4	11.4	22.5	960	86	86
	Min		0.0	4.7	3.1	830	0	0	0	-40	1.0	9.3	0.1	200	3	3
	Max		0.5	6.3	6.2	1200	28	108	108	210	36.4	17.1	22.5	1920	240	240
	Avg		0.1	5.5	4.6	991	15	24	24	109	15.9	14.1	2.4	931	56	56
	Range		0.5	1.6	3.0	370	28	108	108	250	35.4	7.8	22.5	1720	237	237

Description: Effluent; pilot-scale demonstration tank (project #10 - compost and limestone mixture)

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Sample Point	Date	Method of Flow Meas.	Flow (gpm)	Field pH	Lab pH	Spec. cond. (umhos/cm)	Field Temp (C)	Alk. (Field) (mg/L)	Alk. (lab) (mg/L)	Acidity (mg/L)	Iron (mg/L)	Manganese (mg/L)	Aluminum (mg/L)	Sulfate (mg/L)	Susp. Solids (mg/L)
11-1	6/6/98					1100									
11-1	6/13/98										10.0		0.2	200	
11-1	6/20/98										1.0		0.1	200	
11-1	6/27/98										10.0		0.1	1920	
11-1	7/4/98										3.0		0.1	1920	
11-1	7/11/98					1100					10.8	7.8		780	
11-1	7/18/98					1100					2.5	14.7	0.1	630	
11-1	7/25/98					1100					3.6	15.6	0.1	930	
11-1	8/1/98					1000					116.4	17.4		1110	
11-1	8/8/98					1000					20.2	15.0	0.1	960	
11-1	8/15/98					1100					141.6	20.4	0.2	1260	
		Min				1000					1.0	7.8	0.1	200	
		Max				1100					141.6	20.4	0.2	1920	
		Avg				1071					31.9	15.2	0.1	991	
		Range				100					140.6	12.6	0.1	1720	

Description: Port 1; test-bed wetland (Project #11)

Jennings Water Quality Database

Sample Point	Date	Method of Flow Meas. (gpm)	Flow (gpm)	Field pH	Lab pH	Spec. cond. (umhos/cm)	Field Temp (C)	Alk. (Field) (mg/L)	Alk. (lab) (mg/L)	Acidity (mg/L)	Iron (mg/L)	Manganese (mg/L)	Aluminum (mg/L)	Sulfate (mg/L)	Susp. Solids (mg/L)
11-2	6/6/98														
11-2	6/13/98												0.2	200	
11-2	6/20/98										1.0		0.1	200	
11-2	6/27/98												0.1	1920	
11-2	7/4/98										3.0		0.1	1920	
11-2	7/11/98					2100					4.8	0.0		1650	
11-2	7/18/98					1900					2.9	0.0	0.5	1530	
11-2	7/25/98					1900					3.9	1.2	1.3	1200	
11-2	8/1/98					2100					7.2	0.6		2520	
11-2	8/8/98					2100					8.1	1.2	0.2	2220	
11-2	8/15/98					2200					2.9	1.2		2550	
Min						1900					1.0	0.0	0.1	200	
Max						2200					8.1	1.2	1.3	2550	
Avg						2050					4.2	0.7	0.3	1591	
Range						300					7.1	1.2	1.3	2350	

Description: Port 2; test-bed wetland (project #11)

Jennings Water Quality Database

Sample Point	Date	Method of Flow Meas.	Flow (gpm)	Field pH	Lab pH	Spec. cond. (umhos/cm)	Field Temp (C)	Alk. (Field) (mg/L)	Alk. (lab) (mg/L)	Acidity (mg/L)	Iron (mg/L)	Manganese (mg/L)	Aluminum (mg/L)	Sulfate (mg/L)	Susp. Solids (mg/L)
11-EFF	6/6/98														
11-EFF	6/13/98										8.0			0.2	200
11-EFF	6/20/98										1.0			0.1	200
11-EFF	6/27/98										10.0			0.1	1920
11-EFF	7/4/98										3.0			0.1	1920
11-EFF	7/11/98					1200					3.3	13.8			840
11-EFF	7/18/98					1800					4.5	6.9	0.4		1980
11-EFF	7/25/98					1100					16.5	14.4	0.2		960
11-EFF	8/1/98					1000					17.1	16.8			1260
11-EFF	8/8/98					1200					36.0	19.5			1380
11-EFF	8/15/98					1100					0.5	13.8			1380
	Min					1000					0.5	6.9	0.1		200
	Max					1800					36.0	19.5	0.4		1980
	Avg					1233					10.0	14.2	0.2		1204
	Range					800					35.5	12.6	0.4		1780

Description: Effluent; test-bed wetland (Project #11)

Selected Papers/Reports on Jennings Passive Systems

DANEHY, Timothy P.; ENRIGHT, Michael; COOPER, Charles; PLESAKOV, James; DUNN, Margaret (2000) Investigation of Biosolids and Limestone in a Pilot-Scale Vertical Flow Passive Treatment System: *abstract in* Proceedings of 17th Annual Meeting of the American Society for Surface Mining and Reclamation, p. 160.

DUNN, Margaret H.; PLESAKOV, James; VANDYKE, Timothy; DeNICOLA, Dean; STAPLETON, Michael; WATZLAF, George; COOPER, Charles D.; DANEHY, Timothy; HEDIN, Robert (2000) Continuing Effectiveness of a Vertical Flow System in the Treatment of Dissolved Aluminum-Bearing Mine Drainage: *abstract in* Proceedings of 17th Annual Meeting of the American Society for Surface Mining and Reclamation, p. 161.

JENNINGS WATER QUALITY IMPROVEMENT COALITION (1999) Passive Treatment of Acid Mine Drainage, Vertical Flow System, Jennings Environmental Education Center: Final Report for Project 18, US EPA FY96, 138pp.

TAYLOR, Wilbur; ALBERT, JoAnn; JOHNSON, David; FIRST, Josh; VILD, Candice; SHANKEL, Jill; DANEHY, Timothy P.; DUNN, Margaret H. (2000) Jennings Vertical Flow System Environmental Education & Interpretation Effort: *presented as a poster at* 17th Annual Meeting of the American Society for Surface Mining and Reclamation.

WATZLAF, George R.; SCHROEDER, Karl T.; KAIRIES, Candace (2000) Long-Term Performance of Alkalinity-Producing Passive Systems for the Treatment of Mine Drainage: *in* Proceedings of 17th Annual Meeting of the American Society for Surface Mining and Reclamation, p. 262.



A poster focusing on the activities surrounding the Jennings Environmental Education Center's passive treatment education and demonstration site.



Tour of the test tanks at Jennings Environmental Education Center.



Water sampling and testing at the Jennings Environmental Education Center's aerobic wetlands.



Will Taylor, Jennings Environmental Education Center giving a tour and presentation of the education and demonstration site.



Students from Moniteau High School conducting water quality monitoring at the education and demonstration site.



Maintenance being conducted by volunteers during Jennings's "Spring into Action Day" .

CONTINUING EFFECTIVENESS OF A VERTICAL FLOW SYSTEM IN THE TREATMENT OF DISSOLVED ALUMINUM-BEARING MINE DRAINAGE¹

Margaret H. Dunn², James Plesakov, Timothy VanDyke, Dean DeNicola, Michael Stapleton, George Watzlaf, Charles D. Cooper, Timothy Danehy, Robert Hedin

Abstract: A Vertical Flow System, completed September 1997, was installed at Jennings Environmental Education Center (PA Department of Conservation and Natural Resources) in western Pennsylvania to passively treat a 30-gpm discharge from an abandoned underground coal mine containing 20 mg/L of dissolved aluminum. The system includes the following components in series: a Vertical Flow Pond with a treatment medium comprised of 300 tons of spent mushroom compost mixed with 380 tons of AASHTO #9 special (3/8" x 16 mesh) high-calcium limestone aggregate; a 200' X 10' channel wetland with a substrate of composted biosolids mixed with pond cleanings from a sand and gravel operation; and a 200' X 20' open water wetland/pond. Comparison of monthly/quarterly analyses of grab samples of the untreated and treated water demonstrates that the system has consistently provided successful treatment of this discharge. The following are representative sample analyses (September 1997 through June 1999): influent(raw) and effluent(discharge from wetland/pond) - 3.3 and 6.8 pH; 0 and 172 mg/L alkalinity; 284 and -145 mg/L acidity; 58 and 1 mg/L total iron; 15 and 12 mg/L manganese; 19 and <1 mg/L aluminum; 99 and 244 mg/L calcium; 665 and 712 mg/L sulfates. A decrease in concentrations of the following heavy metals (representative analyses) was also observed: influent(raw) and effluent(discharge from Vertical Flow Pond) - 850 and 40 ug/L zinc; 610 and 40 ug/L nickel; 310 and 50 ug/L cobalt. The design life of the system is about 15 years; however, as this is the earliest known installation utilizing a mixture of spent mushroom compost and limestone aggregate, there was no long-term data available to support the projected longevity. This system has been installed to document the efficacy through time in order to provide a model for the prediction of the design life of future systems.

Additional Key Words: Acid Mine Drainage, Passive Treatment, Abandoned Mine Reclamation

¹Abstract of poster presented at the 17th National Meeting of the American Society for Surface Mining and Reclamation, Tampa, FL, June 11 - 15, 2000.

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Dean DeNicola, PhD, Biologist, and **Michael Stapleton**, PhD, Geochemist, are professors in the Environmental Science Program, Slippery Rock University, Slippery Rock, PA 16057.

George Watzlaf, Mining Engineer, is Project Manager at the National Energy Technology Laboratory, US Dept. of Energy, PO Box 10940, Pittsburgh, PA 15236.

Charles D. Cooper, PE, PLS, is design engineer at C D S Associates, Inc., 1000 Hiland Ave., Coraopolis, PA 15108.

Timothy P. Danehy, EPI, is Secretary-Treasurer of BioMost, Inc., 3016 Unionville Rd., Cranberry Twp., PA 16066.

Robert Hedin, PhD, Ecologist, is President of Hedin Environmental, 195 Castle Shannon Blvd., Pittsburgh, PA 15228.

The development and execution of this project are part of a joint effort of the Slippery Rock Watershed Coalition and Jennings Water Quality Improvement Coalition.

VERTICAL FLOW SYSTEM EFFECTIVENESS

JENNINGS ENVIRONMENTAL EDUCATION CENTER
 Pennsylvania Department of Conservation and Natural Resources
 Brady Township, Butler County, PA

<u>Parameter</u>	<u>Vertical Flow Pond influent (raw)</u>	<u>Vertical Flow Pond effluent</u>	<u>Wetland effluent (final)</u>
Flow	NA	22	23
pH	3.3	6.6	6.8
Alkalinity	0	196	172
Acidity	284	-184	-145
Fe	56	8	1
Al	19	<1	<1
Mn	15	14	12
Ca	99	278	244
Mg	55	58	NM
Na	<3	<6	<6
Sulfate	665	747	712

SEPTEMBER 1997 through JUNE 1999

total mean concentrations in mg/L; mean flow in gpm;

alkalinity(as CaCO₃); acidity(as CaCO₃);

not available(NA); not measured(NM)

n(flow) = 72(VFP effluent); 8(final)

n(chemical analyses) = 54(raw); 51(VFP effluent); 14(final)

VERTICAL FLOW SYSTEM EFFECTIVENESS

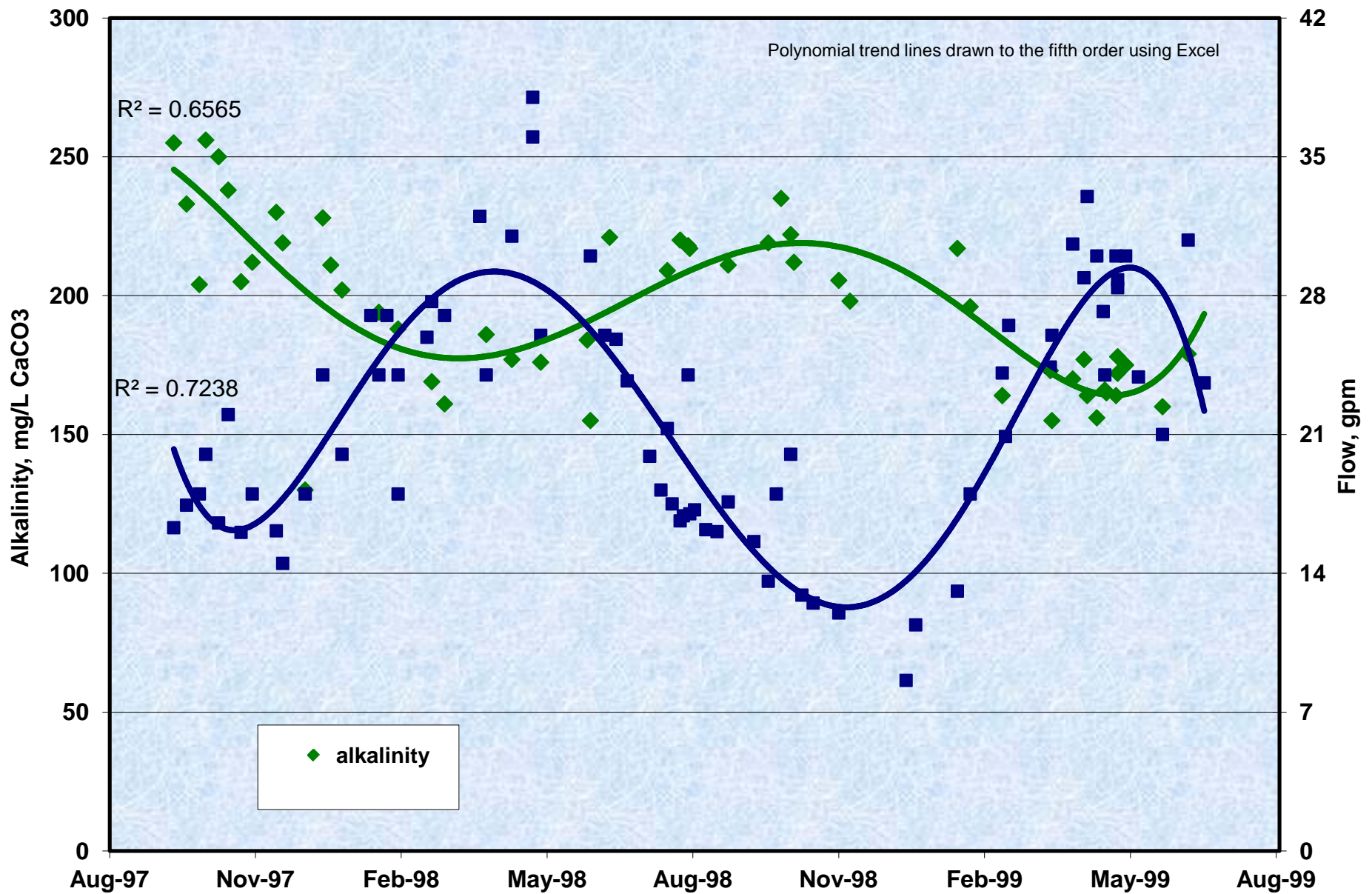
ZINC, NICKEL, COBALT

JENNINGS ENVIRONMENTAL EDUCATION CENTER
Pennsylvania Department of Conservation and Natural Resources
Brady Township, Butler County, PA

<u>Sample Date</u>	<u>Zinc influent/effluent [EPA stds. 5000 ug/L]</u>	<u>Nickel influent/effluent [EPA stds. NA]</u>	<u>Cobalt influent/effluent [EPA stds. NA]</u>
09/25/97	700/30	530/30	280/30
10/15/97	750/40	570/30	300/50
10/29/97	820/20	920/40	330/50
11/20/97	790/30	510/20	320/60
12/23/97	770/50	590/50	330/70
07/30/98	1390/30	610/20	300/30
04/29/99	700/70	530/100	310/70

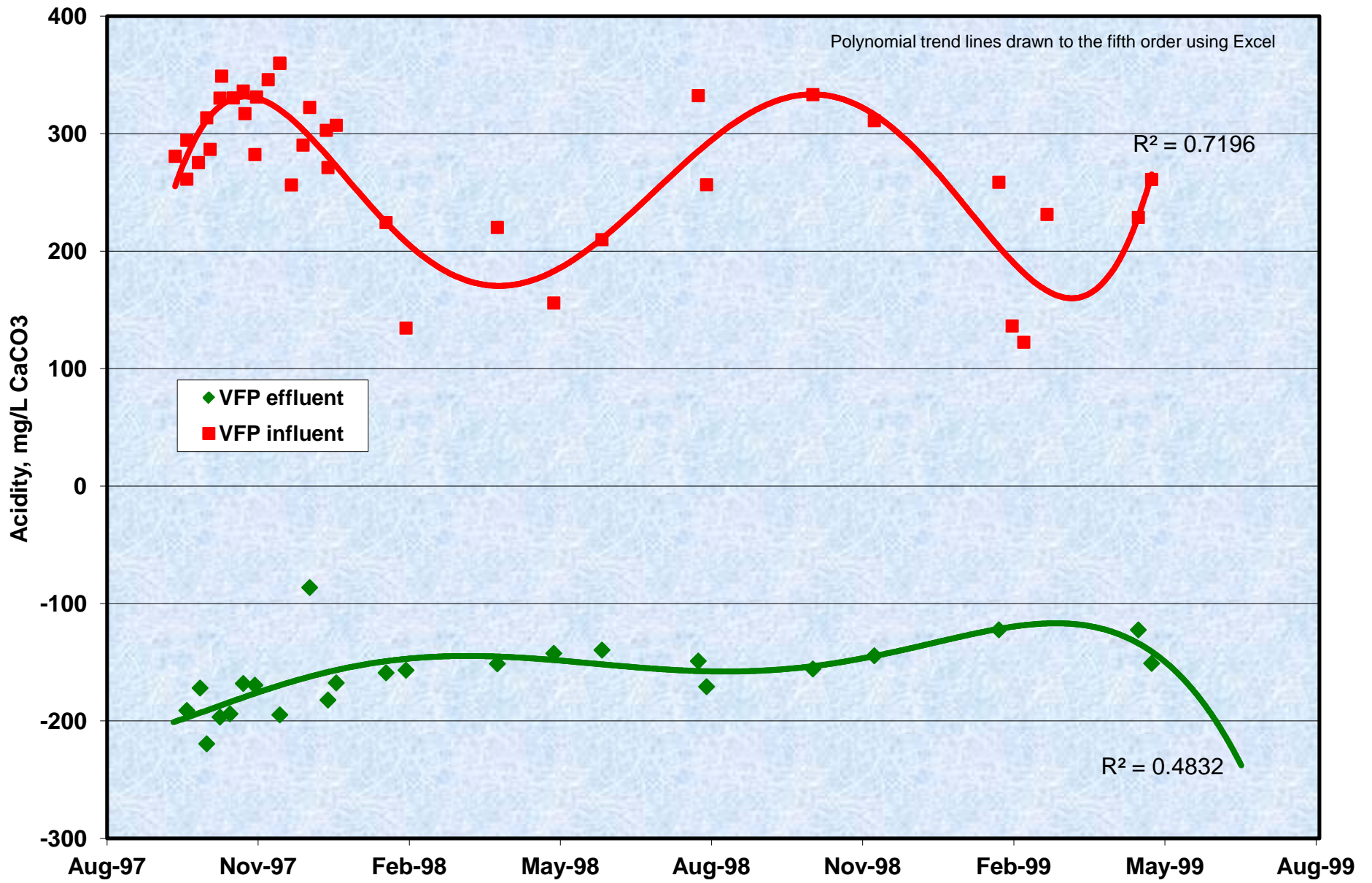
*total concentrations in ug/L
EPA Drinking Water Standards (5/21/99)
Copper was undetectable.*

JENNINGS VERTICAL FLOW POND EFFLUENT



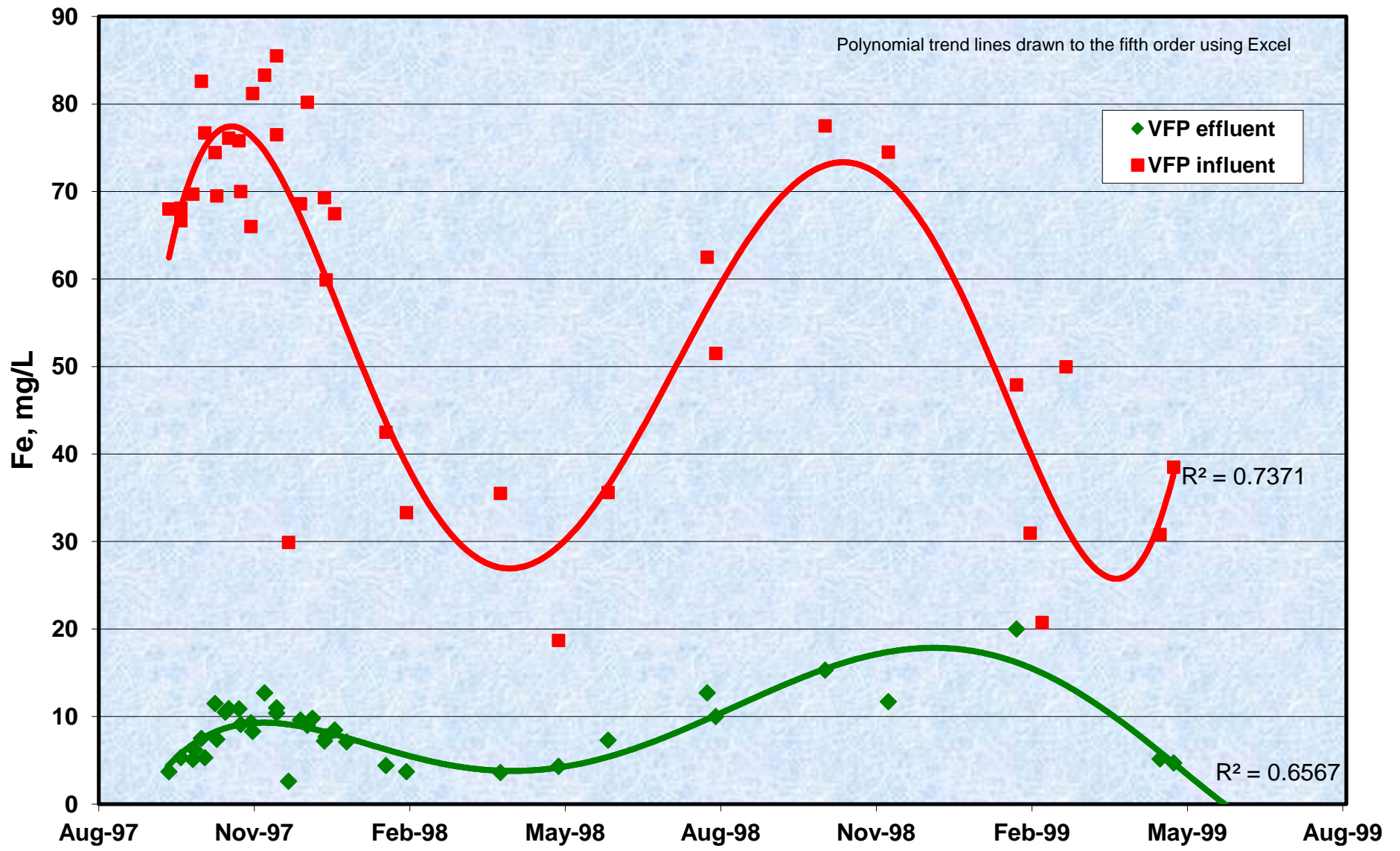
ACIDITY CONCENTRATION

Jennings Vertical Flow Pond



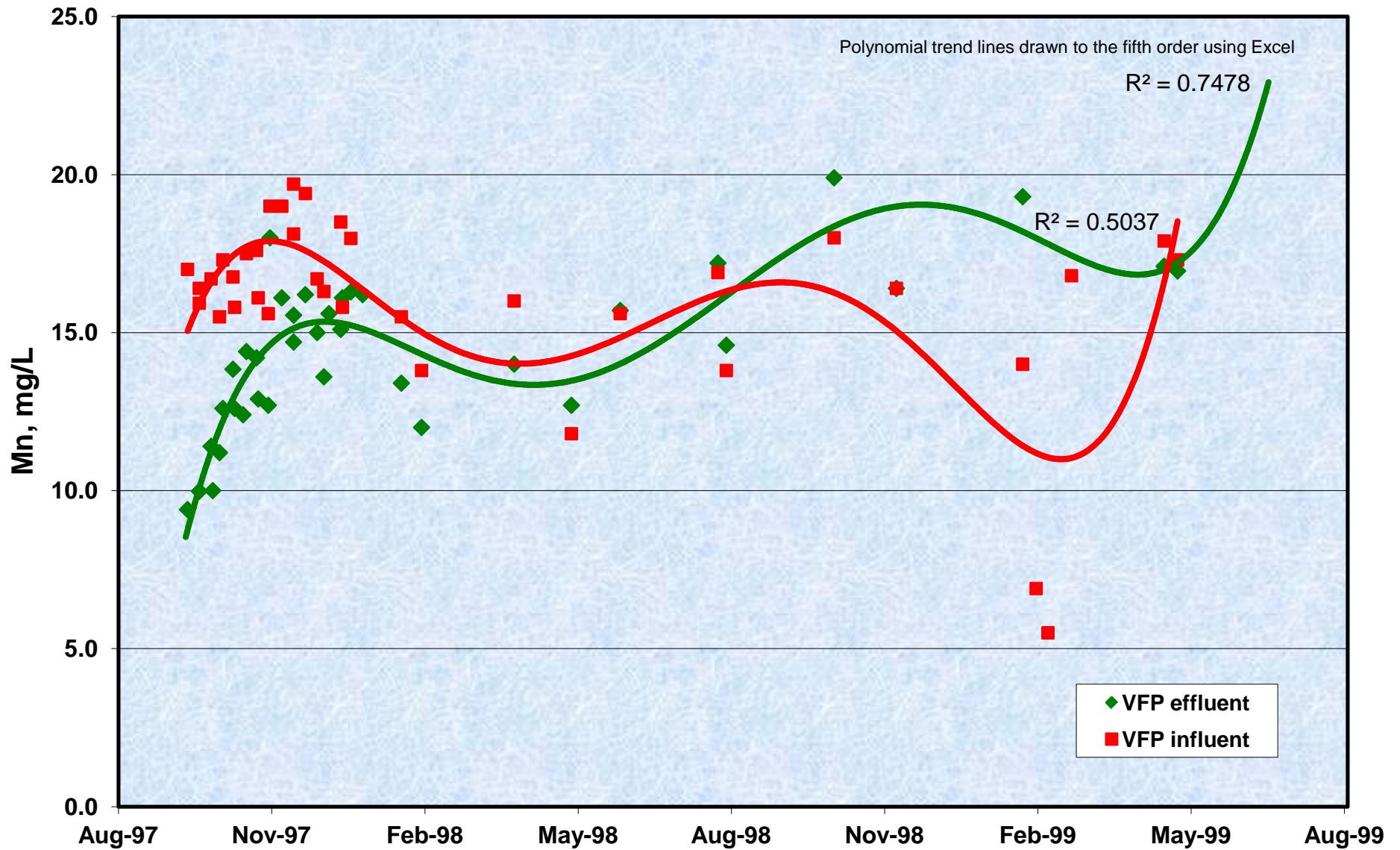
IRON CONCENTRATION

Jennings Vertical Flow Pond



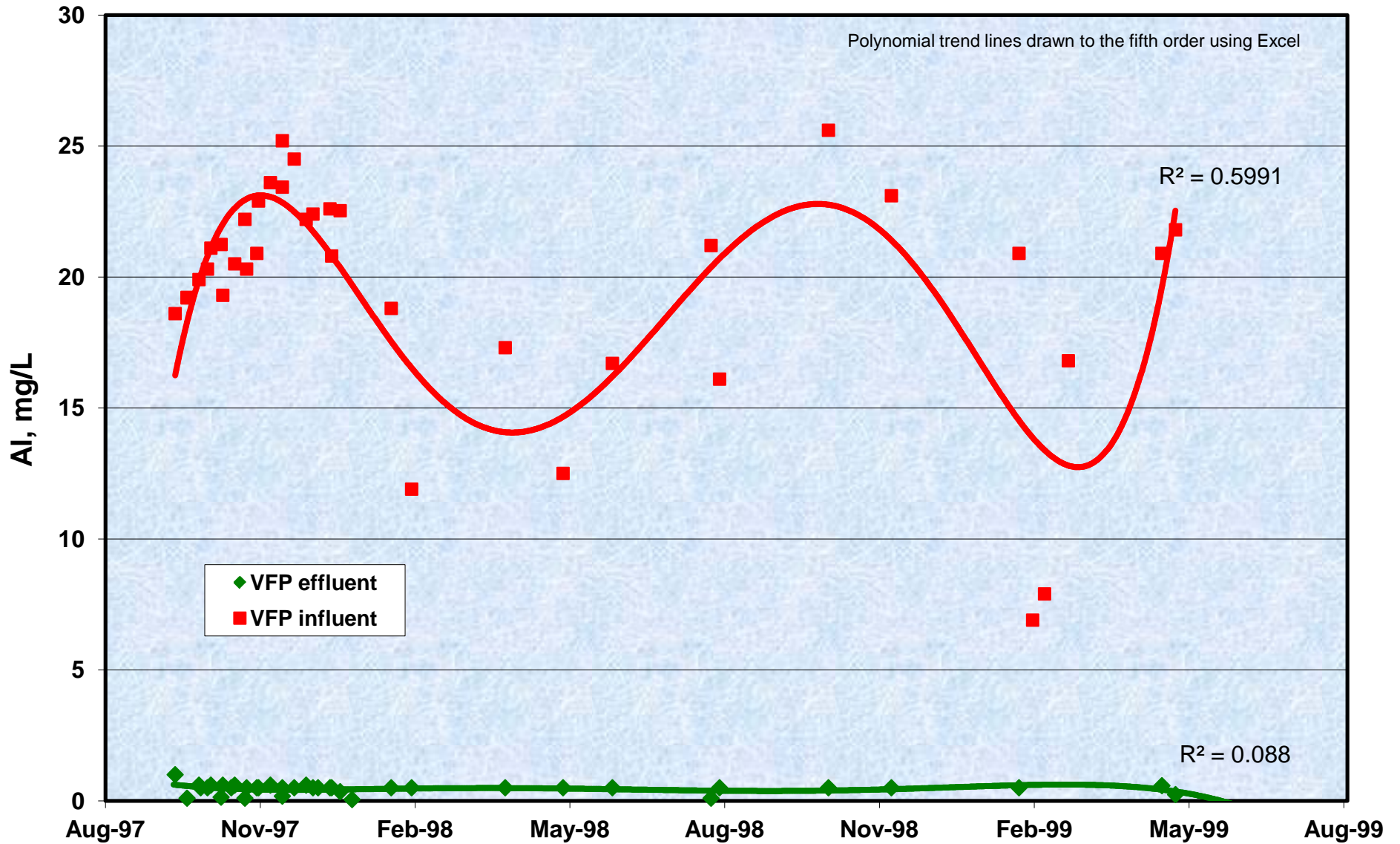
MANGANESE CONCENTRATION

Jennings Vertical Flow Pond



ALUMINUM CONCENTRATION

Jennings Vertical Flow Pond

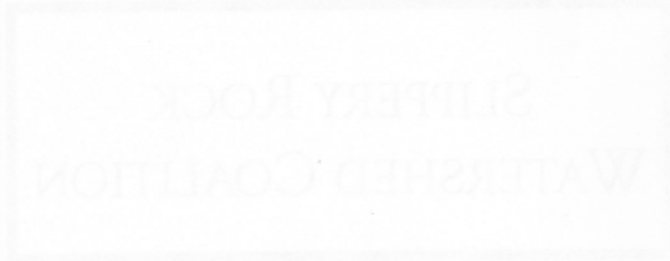


SLIPPERY ROCK
WATERSHED COALITION

Annual Symposium
2001



April 6, 2001
Jennings Environmental Education Center
Slippery Rock, Pennsylvania



Symposium Goals

This Symposium has been designed to create a forum for

- (1) *providing an opportunity for community groups and students from local education institutions to present their activities and findings to their peers, the public, and environmental professionals*
- (2) *promoting interaction across all interested in the restoration effort, including public and private entities and the community*
- (3) *documenting the degree of success of completed projects by identifying terrestrial and aquatic improvements*
- (4) *discussing the development of new technology relating to land restoration and discharge abatement*
- (5) *observing restoration efforts in the field.*

**Slippy Rock Watershed Coalition
Annual Symposium**

8:30 Registration, Refreshments & Poster Session

Symposium Moderator: *Janice Belgedan*
Slippy Rock Watershed Coalition

9:00 Welcome
David E. Johnson, Center Coordinator
Jennings Environmental Education Center

9:10 Overview of the Slippy Rock Watershed Coalition
Margaret Dunn
Stream Restoration, Inc.

Since inception of the Coalition in December 1994, public-private partnership efforts by Coalition participants have reclaimed over 85 acres of abandoned minelands and have installed about a dozen environmentally-friendly systems to treat polluted abandoned mine drainage. Six miles of streams have been significantly improved in the Slippy Rock Creek headwaters with fish being observed in a two-mile section, probably for the first time in a century. With an original mailing of about a dozen copies in 1995, the distribution of the SRWC newsletter, "The Catalyst", is currently over 650 copies monthly.

9:15 Slippy Rock Watershed Coalition Appreciation Award to Robert C. Dolence
Margaret Dunn
Stream Restoration, Inc.

This annual award is presented to an individual who has generously contributed time and talent to the restoration of the Slippy Rock Creek watershed.

*Slippery Rock Watershed Coalition
Annual Symposium*

9:25 Impact of Acid Mine Drainage on Benthic Communities in Slippery Rock Creek: The Relative Roles of Substrate vs. Aqueous Effects

Scott Daly, Student

Slippery Rock University

(Professors: Dean DeNicola, Ph.D., Dept. of Biology, and

Michael Stapleton, Ph.D., Dept. of Environmental Geosciences)

Restoration of streams impacted by acid mine drainage (AMD) focuses on improving water quality, however precipitates of metals on the substrata can remain and adversely affect the benthos. To examine the effects of AMD precipitates, we compared invertebrate and periphyton density and composition in trays of clean and AMD metal-coated substrata. AMD precipitate on the substrata did not significantly effect community composition. An additional experiment was conducted to examine the effects of aqueous metals on macroinvertebrates independent of substrata. The results suggest that the aqueous chemical environment of AMD may have a greater effect on organisms than chemical precipitate on the substrata.

9:40 Importance of Undergraduate Student Involvement in the Slippery Rock Watershed

Fred J. Brenner, Ph.D.

Dept. of Biology, Grove City College

An overview of Grove City College student involvement in the Slippery Rock Watershed, considering its value from the perspective of both watershed restoration and the future careers of the students.

9:55 Investigation of the Ability of Two Model Acid Mine Drainage Passive Treatment Systems to Reduce Iron, Aluminum and Nickel Concentrations in Discharged Waters

Student Researchers: *Jessica Beham, Jennifer Bennett, Katherine*

Borden, Christopher Hall, Joshua Martin, Seth Rice,

Christina Zahmiser

Westminster College

(Professors: Joseph Balczon, Ph.D., Dept. of Biology and
Timothy Wooster, Ph.D., Dept. of Chemistry)

Two replicated model passive treatment systems were established as part of a semester-long student initiated research project at the Jennings Environmental Education Center. The model systems utilized two organic constituents, untreated saw dust and aquatic macrophyte compost, as well as river gravel and limestone in the project design. The overall purpose of the project was to examine the ability of each system to reduce the concentration of iron, aluminum and nickel in the discharged water as a result of contact with system substrate and chemistry. The presentation will focus on the research design pending the completion of data collection later this spring.

10:10 Two Heads Are Better than One

Jeffrey D. Jarrett, Deputy Secretary

Mineral Resources Management

PA Department of Environmental Protection

An exploration of the importance of public/private partnerships in working towards common goals.

10:25 Overview of Pennsylvania Spatial Data Access (PASDA)

Maurie Caitlin Kelly, Coordinator

Pennsylvania Spatial Data Access

The Pennsylvania Geospatial Data Clearinghouse

PASDA is a public service of the PA Department of Environmental Protection and the PA Geospatial Information Council. This Geographic Information Systems data clearinghouse provides free public access to over 14,000 data sets and 18,000 metadata records.

10:35 Break

Refreshments and Poster Session

Slippery Rock Watershed Coalition
Annual Symposium

- 10:50 **Water as an Element of Ecological Homeostasis**
Valentine Kefeli, Ph.D.
Slippery Rock Watershed Coalition

Water is a vital component of the life processes for autotrophic and heterotrophic organisms. Water also serves a medium for the life and reproduction of many bacteria, fungi, insects and mammals, as well as the green world plants such as hydrophytes, hygrophytes, mesophytes and succulents. Plants can absorb water from the soil by the roots (lower pump) and evaporate by leaves (upper pump). Deficiency of water stops growth and developmental processes and brings plants to dormancy or anabiosis. Some plants can reduce the amount of the harmful bacteria in water (so-called sanitary plants). This paper will discuss broadly the properties of water to maintain the necessary equilibria within ecosystems. (Researchers: V. Kefeli, Slippery Rock Watershed Coalition, and C. Steglich and B. Borsari, Slippery Rock University)

- 11:05 **Our Sustainable Future**
Joan S. Clippinger
Coordinator of Education and Information
PA Department of Conservation and Natural Resources

A look at the links between multi-generational education and natural resource conservation and sustainability.

- 11:20 **Positive Impact of Abandoned Mine Site Reclamation Using CFB Ash**
Todd Lawton, Fuels Manager
Scrubgrass Power Plant, P.G.& E., Nat'l Energy Group

A description of concepts related to the beneficial uses of ash and abandoned mine reclamation.

Slippery Rock Watershed Coalition
Annual Symposium

- 11:35 **The Bat Hibernaculum at Goff Station**
Will Taylor, Program Coordinator
Jennings Environmental Education Center

In this unique project taking place at the Goff Station Restoration Area, an artificial "cave" will be placed and buried on site in order to provide conditions that bats may find suitable for hibernation. The only major predator of night time flying insects in Pennsylvania, bats are a valuable natural resource. Bat populations have been steadily decreasing due to human disturbance of suitable hibernacula sites, often as a result of mining activities. This project is unique not only for potential bat research opportunities, but for the positive example the mining community can present to efficiently create or enhance wildlife habitat during reclamation activities.

- 11:45 **William and Frances Aloe Charitable Foundation**
Joseph Aloe, President
Quality Aggregates Inc.

Presentation of a donation dedicated to expand the award-winning programs at Jennings Environmental Education Center.

- 11:55 **Watershed Panel Presentation**
Topic: Restoration Activities
Moderators:
Fred J. Brenner, Grove City College
Tim Danehy, Stream Restoration, Inc.
Panelists:
Bob Beran, Aquascape Wetland and Environmental Services
Margaret Dunn, Stream Restoration, Inc.
David Hogeman, PA Dept. of Environmental Protection
David Johnston, Butler County Planning Commission
John Oliver, PA Dept of Conservation & Natural Resources
John Stille, Amerikohl Mining, Inc.

Due to time considerations, we ask that audience questions focus on watershed restoration.

Slippery Rock Watershed Coalition
Annual Symposium

12:40 Lunch and Poster Session

1:20 Selected Abandoned Mine Restoration Projects within Slippery
Rock Creek Watershed

Shaun Busler, Biologist
Stream Restoration, Inc.

This multimedia presentation will describe selected sites recently
constructed within the Slippery Rock watershed. The sites are included
in this year's field tour.

1:30 Field Tour of Public-Private Partnership Restoration Efforts

Tour Leaders

Fred Johnson, Amerikohl Mining, Inc.
Bob Beran and Jeff Reidenbaugh, Aquascape
Fred Brenner, Grove City College
John Stoops and Kevin Steiner, Quality Aggregates Inc.
Tim Danehy, Stream Restoration, Inc.

De Sale Phase I

To treat the abandoned mine drainage (100 gpm design flow), an Anoxic
Collection System, two Vertical Flow Ponds, a Settling Pond, a Wetland
(planted for wildlife habitat), and a Horizontal Flow Limestone Bed were
installed. About 8 acres of essentially barren, acidic spoil were reclaimed
utilizing alkaline, circulating, fluidized-bed coal ash from Scrubgrass Gen-
erating Plant. Within 6 weeks (Spring 2000) from the start of passive sys-
tem construction, the decades-old acidic drainage was alkaline with neutral
pH. Over 37 tons of acidity, over 5 tons of iron, and over 1 ton of alumi-
num annually will no longer enter the stream. (Partnership effort: Amerikohl
Mining, Inc., Aquascape, BioMost, Inc., Grove City College, Jennings Environmental Ed.
Center, landowners and SRWC volunteers, PA Dept. of Environmental Protection, PA
Game Comm., Quality Aggregates Inc., Scrubgrass Generating Plant, Shalston Enterprises,
Stream Restoration Inc., Urban Wetland Institute, WOPEC, and others)

Slippery Rock Watershed Coalition
Annual Symposium

De Sale Phase II

Operational within 6 weeks (Fall 2000) and with a design flow of 200
gpm, a drainage intake, forebay, two Vertical Flow Ponds, Settling
Pond, Wetland, and Horizontal Flow Limestone Bed were installed to
passively treat drainage from a half-century old minesite. With the
completion of this system in combination with other restoration ef-
forts, preliminary monitoring indicates that about 3 miles of stream
have been significantly improved. The acidic drainage is now alkaline
with a neutral pH. Over 33 tons of acidity, over 1 ½ tons of iron, and
over 1 ¼ tons of aluminum annually will no longer enter the stream.
(Additional wetland planting this summer - come join in the fun and
learn about wetland plants!!) (Partnership effort: Amerikohl Mining, Inc., Aqua-
scape, BioMost, Inc., Grove City College, landowners and SRWC volunteers, PA Dept.
Environmental Protection, PA Game Comm., Quality Aggregates Inc., Shalston Enter-
prises, Slippery Rock Univ., Stream Restoration Inc., Urban Wetland Institute, US
Dept. of Energy, WOPEC, and others)

Goff Station Restoration Area

A comprehensive restoration effort is on-going which includes the re-
moval of over 70,000 CY of abandoned coal refuse, reclamation of a
½-mile long abandoned strip cut, installation of passive systems to treat
five abandoned mine discharges totaling over 400 gpm, and the resto-
ration and creation of wildlife habitat including 4 acres of naturally-
functioning wetlands and a bat hibernaculum (the first known of its
kind east of the Mississippi River!!) Over 44 tons of acidity, over 2 ½
tons of iron, and over 2 tons of aluminum annually will no longer en-
ter the stream. (Additional wetland planting this summer - come join
in the fun and learn about wetland plants!!) (Partnership effort: Quality Ag-
gregates Inc., Aquascape, BioMost, Inc., Grove City College, landowners and SRWC
volunteers, PA Dept. of Environmental Protection, PA Game Comm., Stream Restora-
tion Inc., Urban Wetland Institute, US Dept. of Energy, US Geological Survey,
WOPEC, and others)

Slippery Rock Watershed Coalition
Annual Symposium

Special Thanks

Refreshments and Lunch provided through the support of:

Allegheny Mineral Corporation
Amerikohl Mining, Inc.
Quality Aggregates Inc.
Jennings Environmental Education Center

Jennings Environmental Education Center Staff:

David E. Johnson, Center Coordinator
Will Taylor, Program Coordinator
Cindy Shirley, Administrative Assistant
Eric Best, Environmental Education Specialist
Tanya Rukoski, Environmental Education Specialist
Mary Jo Graham, Environmental Education Specialist
Ray Markle, Maintenance II
Gary Jenkins, Maintenance I

SRWC Symposium Organizers:

Janice Belgredan, Bob Beran, Fred Brenner,
Shaun Busler, Charles Cooper, Tim Danchy,
Cliff Denholm, Margaret Dunn, Valentine Kefeli,
Jeff Reidenbaugh

The Slippery Rock Watershed Coalition meets monthly on the second Thursday of the month at 7:00 p.m. at the Jennings Environmental Education Center on Rte. 528 near Slippery Rock. Everyone is welcome to attend! There are no dues or fees.

If you would like more information about the Coalition, or would like to be added to our mailing list so that you receive *The Catalyst* newsletter, please contact the Coalition :

724-776-0161 (voice)

724-776-0166 (fax)

sri@salsgiver.com (email)

Check out the
Slippery Rock Watershed Coalition
website at:
www.srwc.org

THE CATALYST

SLIPPERY ROCK WATERSHED COALITION MONTHLY ACTIVITIES UPDATE

THIS MONTH'S MEETING: NO MEETING THIS MONTH!! COME TO THE "GET TOGETHER ON MAY 9!" 4/12/01 meeting attendance: J. Belgredan, B. Beran, F. Brenner, S. Busler, C. Cooper, T. Danehy, M. Dunn, D. Johnson, V. Kefeli, S. Stevenson, and W. Taylor.

GET TOGETHER—MAY 9, 6:00 PM!!

Yes, the annual "Get Together" is finally here!!! It will be held at the Epiphany Catholic Church located off Forestville Road and Rt. 308 in Boyers, PA on May 9, 2001 from 6:00 P.M. to 8:00 P.M. There will be **door prizes, great picnic foods, and loads of fun for everyone!!!** So, come on out!!! All are Welcome!!! Bring the Kids!!! **Smash some Piñatas!!!!** For more detailed directions and more information call (724) 776-0161.

2001 ANNUAL SRWC SYMPOSIUM

We cannot thank Jennings Environmental Education Center, the speakers, and all the attendees enough for making the 6th Annual Slippery Rock Watershed Coalition Symposium so rewarding and memorable!!! (Some traveled as far away as Harrisburg and Wilkes Barre!!!)

Thursday evening (4/05/01), Dr. Philip Moseley, PSU, provided a great "kick-off" to the event by depicting an historical overview of coal mining in film and song.

Very special thanks to **The William and Frances Aloe Charitable Foundation** for their generous donation to Stream Restoration Inc. which will be dedicated to the expansion of the award-winning programs at Jennings Environmental Education Center.



Joe Aloe

Janice Belgredan, a watershed resident and Coalition participant, donated her matchless talents to organize and to moderate the event. Working with **Dave Johnson, Will Taylor, Cindy Shirley, Eric Best, Tanya Rukoski, Mary Jo Graham, Ray Markle, and Gary Jenkins** at Jennings, the event went smoothly and appeared effortless. For the first time, a program with a summary of each presentation was distributed. Needless to say, this was an excellent effort. As requested, additional copies are being made available. In addition to those pictured, speakers included undergraduate college students from Slippery Rock University Scott Daly (Professors: Dean DeNicola, PhD, Biology; Michael Stapleton, PhD, Geochemistry) and from Westminster College (See next page).



J. Clippinger, DCNR



M. Kelly, PASDA



J. Belgredan, SRWC



T. Lawton, Scrubgrass Gen.



Bob Dolence, former PA DEP Deputy Secretary accepts **2001 SRWC Appreciation Award** for his vision and steadfast support of watershed groups and restoration efforts throughout the Commonwealth.



Dr. Mosley, PSU



Dr. Kefeli, SRWC



Dr. Brenner, GCC



J. Jarrett, Dep. Sec. DEP



A NEW IDEA — A NEW SUCCESS

Dr. Fred Brenner, after providing a follow-up on the successful careers of Grove City College students previously involved in our restoration effort, ably moderated (assisted by Tim Danehy) a panel of experts in a discussion regarding watershed restoration.

The panelists were **Bob Beran** of Aquascape, designer of naturally-functioning wetlands; **Dave Hoggeman**, Director of the PADEP Grants Center, part of the largest-ever, state-sponsored environmental program; **John Oliver**, Secretary of the PADCNR, promoting environmental stewardship in the state parks and forests; **John Stilley**, President of Amerikohl Mining, Inc., a surface coal mining company that has received state and national awards for reclamation ; **Margaret Dunn**, PG, President of the non-profit Stream Restoration Inc., involved in the restoration of abandoned minelands; **David Johnston**, Director of the Butler County Planning Commission involved in watershed efforts and landuse issues relating to abandoned minelands restoration. **This was a unique opportunity with experts from state and local government, environmental companies, the mining industry, and non-profits.** (Special thanks to **Connie White, New Wilmington School District** for bringing her students, who asked well thought-out questions!!! Special thanks to **Dr. Valentine Kefeli**, who first presented the idea for the panel.)

WESTMINSTER STUDENTS CONDUCT RESEARCH AT JENNINGS



Early this year, Westminster College seniors **Jessica Beham, Jennifer Bennett, Katherine Borden, Christopher Hall, Joshua Martin, Seth Rice, and Christina Zahniser**, under the direction of **Dr. Joseph Balczon and Dr. Timothy Wooster**, initiated a research project at Jennings Environmental Education Center. Two replicated model passive treatment systems were established utilizing two organic constituents, untreated saw dust and aquatic macrophyte compost, as well as river gravel and limestone in the project design. The overall purpose of the project was to examine the ability of each system to reduce the concentration of iron, aluminum, and nickel in the discharged water as a result of contact with system substrate and chemistry.

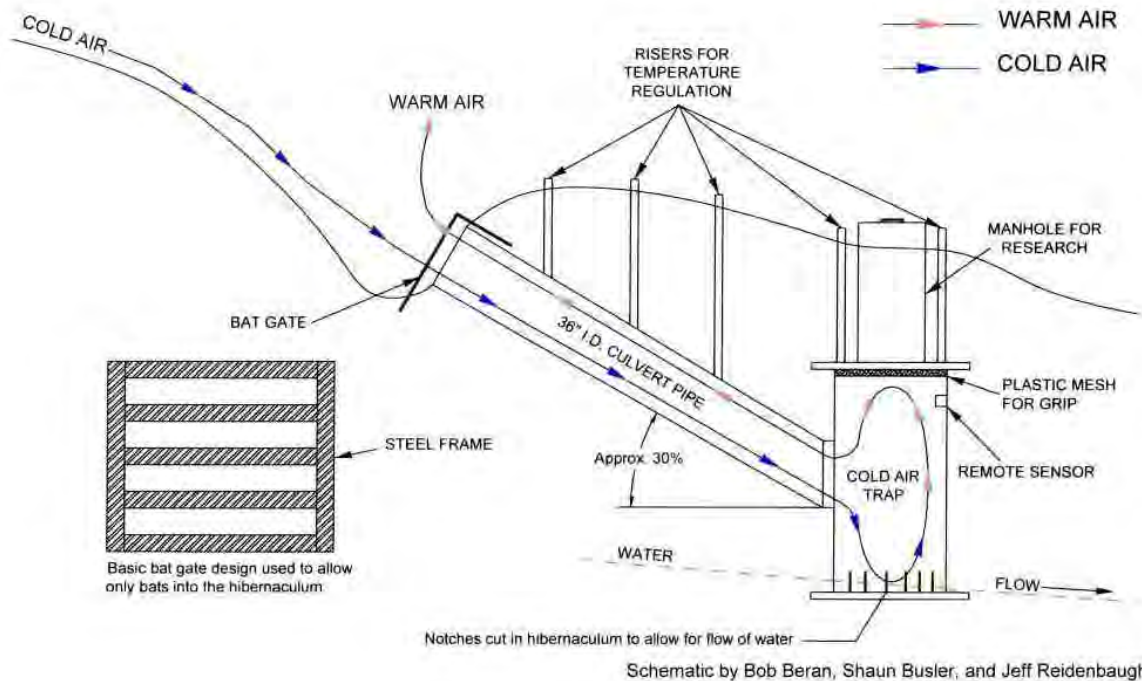
**Thanks for the excellent presentation at the Symposium!
We cannot wait to hear the results!**



THE BATTY CATALYST

ANNOUNCING THE UNVEILING OF THE BAT HIBERNACULUM AT

AN IDEA...



TURNED INTO REALITY!!!



SYMPOSIUM FIELD TOUR

Following lunch, we put on our boots (and boy, we sure needed them!) and headed out into the field, to see what all of this is really about. We visited De Sale Phase I and Goff Station Restoration Areas. Goff Station was the first site of the tour, which in addition to the very interesting passive treatment system that has been constructed by Quality Aggregates Inc. also includes a man-made bat hibernaculum. Thanks to **Kelly Meinhart** (right) for coming out to film the installation of the bat hibernaculum and the Goff Station site. Be sure to watch the feature on **Watershed Weekly** sometime in the coming months!





JENNINGS ENVIRONMENTAL CENTER SPRINGS INTO ACTION

For the eighth year in a row the dynamic spirit of volunteerism that fuels the Slippery Rock Watershed Coalition was harnessed for a day at Jennings Environmental Center. Over a hundred enthusiastic volunteers turned out on a dreary Saturday morning to celebrate Earth Day by helping their local park.

Armed with heavy gloves, mattocks, paint buckets, rakes, and Pulaski axes, workers aged 12 to 82 gave a much needed facelift to Jennings passive treatment system and added a set of new drainage pipes. Meanwhile troops of scouts painted bridges and installed water bars and drains throughout the park. Other volunteers scoured the roads and streams which amble through the park removing trash and exotic invasive plant species. Through-out the park, clogged drains were cleared, gravel was raked, two bridges were built, signs were painted and a composting bin was even constructed. Sitting tired on the top of the ridge, one boy scout was heard saying, "Wow, I had no idea we could do this, I can't wait to show my mother what I helped build today. From now on, this trail belongs to me too."

Exhausted, proud and muddied by their accomplishments the work teams poured into Jennings Center for a hearty lunch and a special "Spring into Action" T-shirt designed by a fellow volunteer. As the day wound to a close binoculars, fishing gear and berry bushes were raffled off to excited participants.

Jennings wishes to thank all the super people who made this year yet another phenomenal success. Special thanks are in order to **Giant Eagle, the Bulter Garden Club, King's Family Restaurant, Titlers' Special Tees, Natili's, Appalachian Trails LTD, Marti Outdoor Extreme, Eisler Nurseries, General Electric, Dean Dairy, Wild Birds Unlimited and the Pennsylvania Social Services Union.** No thanks would be complete without thanking each and every one of those hardy volunteers, many of whom have come back year after year, who lent their unique skills and expertise to making Jennings the wonderful place that it is.

Thanks to The William & Frances Aloe Charitable Foundation, Amerikohl Mining, Inc., Quality Aggregates Inc., and Allegheny Mineral Corporation for their support. For more information contact: Slippery Rock Watershed Coalition, c/o Stream Restoration Incorporated (PA non-profit), 3016 Unionville Road, Cranberry Twp., PA 16066, (724) 776-0161, fax (724)776-0166, sri@salsgiver.com, www.srwc.org. May Distribution: 692 copies



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THE CATALYST

SLIPPERY ROCK WATERSHED COALITION MONTHLY ACTIVITIES UPDATE

THIS MONTH'S MEETING: Thursday September 14 @ 7:00 PM, Jennings Environmental Education Center, Pizza and Pop will be provided!!

SRWC Meetings will be held on the second Thursday of every month here on!!!

Kim Kosick Received Award in TriBeta Competition

Kim Kosick received **SECOND PLACE** at the regional **Beta Beta Beta** competition at Ganon University in May. TriBeta is a national biological honorary dedicated to improving the understanding and appreciation of biological study and extending boundaries of human knowledge through scientific research. Kim presented a paper co-authored by **Corey Gardener** and **Shaun Busler** concerning the treatment of acid mine drainage with a test tank Vertical Flow Pond and test bed wetland. Under the guidance of **Dr. Fred Brenner** and **Charles Cooper**, Kim, Corey, and Shaun have worked for over two years at Jennings Environmental Education Center constructing the pilot scale Vertical Flow Pond and test bed wetland and analyzing samples. Through this research, larger scale passive treatment systems can be more effectively designed to treat acid mine drainage.

During this past summer, Kim was an Ecology/Conservation director at the French Creek Boy Scout camp. She has received a full scholarship to Clemson University and plans to study Aquatic toxicology.

Completed Reclamation Projects Summary

The Slippery Rock Creek Watershed has seen a lot of action this summer. Several projects have been completed and Final Reports have been submitted to the PA DEP.

Charlie Cooper, Darcy Peart, and Shaun Busler finished dye tests on several Vertical Flow Ponds within the watershed, including Jennings, the Ferris Complex (pictured below), and SR109.

De Sale Phase I was_ amazingly constructed in five weeks by **Amerikohl Mining, Inc.** consisting of two Vertical Flow Ponds with **innovative** flush pipes (pictured below), a settling pond/wetland, and a Horizontal Flow Limestone Bed. This passive treatment system treats one of the worst discharges within the Seaton Creek sub-basin.

At Goff Station (below), coal refuse extending into Murrin Run has been removed, neutralized, and placed within an abandoned strip pit. A total of over 78,000 cubic yards of coal refuse was removed, **approximately four times the amount originally estimated!!** Because of the strong partnerships and in-kind contributions from **Quality Aggregates Inc.**, this project was completed.



Modernizing Catalyst Distribution

The Slippery Rock Watershed Coalition is experimenting with distributing *The Catalyst* via email. For anyone who has access to HTML based email and is interested in receiving *The Catalyst* in this form, please send us an email requesting to change the method of delivery.

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The Slippery Rock Watershed Coalition was honored to host a field tour organized by Chuck Cravotta, PhD, (USGS) of several passive treatment systems within the watershed, including the Goff Station Restoration Area (pictured above). Professors and students from Australia, who have similar problems with acidic discharges, toured the watershed with personnel from PA DEP, USGS, EPA, Aquascape, Amerikohl Mining, Inc., Quality Aggregates Inc., Susquehanna River Basin Commission, U.S. Department of Energy, Ohio State University, University of Pittsburgh, Penn State University, Hedin Environmental, BioMost, Inc., and Stream Restoration Inc. (Notice everyone wearing Slippery Rock Watershed Coalition hats. Some of these hats are going to travel to the land Down Under!)

Thanks to The William & Frances Aloe Charitable Foundation, Amerikohl Mining, Inc., Quality Aggregates Inc., and Allegheny Mineral Corporation for their support. For more information contact: Slippery Rock Watershed Coalition, c/o Stream Restoration Incorporated (PA non-profit), 3016 Unionville Road, Cranberry Twp., PA 16066, (724)776-0161, fax (724)776-0166, sri@salsqiver.com. September Distribution: 533 copies

THE CATALYST

SLIPPERY ROCK WATERSHED COALITION MONTHLY ACTIVITIES UPDATE

NO MEETING IN APRIL:

SYMPOSIUM APRIL 6th AND 7th AT JENNINGS ENVIRONMENTAL EDUCATION CENTER

GET-TOGETHER APRIL 12th AT BOYERS EPIPHANY CHURCH 03/08/00 meeting attendance: W.

Taylor, V. Kefeli, J. Hicks, M. Dunn, T. Danehy, D. Peart, S. Smith, J. Belgredan, S. Busler, J. Coulter

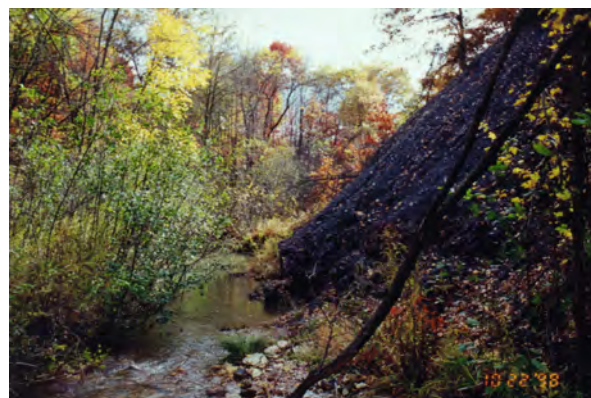
Symposium Field Tour Preview

De Sale



Passive treatment system with vertical flow pond under construction.

Goff Station Gob Pile



Removal of coal refuse pile and placement

with coal ash in reclamation of abandoned cut.

See the attached page for more information about times and speakers at the symposium.

GIS DATA FOR SLIPPERY ROCK WATERSHED NEARING COMPLETION

Erin Grabigel is nearly done compiling water quality data in a GIS system. Erin is a Geography student at Slippery Rock University and will be graduating in May. This system integrates the location of abandoned mine sites, streams, roads, and geological information with data. For example, if you click on a stream the water quality data will appear. The maps should be available on the Slippery Rock Watershed Coalition's website very soon. Thank you Erin for all your hard work.

PHOTO OF THE MONTH



Mike Leon of Harding Lawson and **Margaret Dunn** at the Society for Mining, Metallurgy and Exploration Dinner in Salt Lake City, Utah. The conference, with an attendance of about 4,900, provided a great opportunity to “compare notes” with others. Margaret Dunn was recognized for receiving the Environmental Conservation Distinguished Service Award from The American Institute of Mining, Metallurgical, Petroleum Engineers.

Thanks to The William & Frances Aloe Charitable Foundation, Amerikohl Mining, Inc., Quality Aggregates Inc., and Allegheny Mineral Corporation for their support. For more information contact: Slippery Rock Watershed Coalition, c/o Stream Restoration Incorporated (PA non-profit), 3016 Unionville Road, Cranberry Twp., PA 16066, (724)776-0161, fax (724)776-0166, sri@ccja.com. April Distribution: 423 copies

Slippery Rock Watershed Coalition

2000 Symposium

Thursday April 6 and Friday April 7,

held at

Jennings Environmental Education Center
PA Department of Conservation and Natural Resources

Symposium Goal

This Symposium has been designed to create a forum to:

- (1) provide an opportunity for community groups and students from local colleges/universities to present their findings to their peers, the public, and environmental professionals;
- (2) allow interaction among all interested in the restoration effort;
- (3) document the degree of success of the completed projects by identifying terrestrial and aquatic improvements;
- (4) discuss the development of new technology relating to land restoration and discharge abatement;
- (5) observe restoration efforts in the field.



Food for each event provided by...
Allegheny Mineral Corporation
Oxy-Aggregates Inc.
Amerikohl Mining, Inc.
Stream Restoration, Inc.

Slippery Rock Watershed Team
Knox District Mining Office

Roger Bowman, Timothy Gillen, Timothy VanDyke, James Plesakov, Robert Kowalsky, Theresa Elicker, William Edmiston, William Allen, Javid Mirza, Lorraine Oden-thal, Douglas Caylor.

Poster Presentations

Boy Scout Troop 204, Delahunty Middle School, Wilmington Area School District, Northern Area Alternative High School, Slippery Rock Area High School, Macoskey Center, PA DEP, Knox DMO, WPCAMR, Stream Restoration, Inc., BioMost, Inc., Grove City College, Slippery Rock University, Jennings Environmental Education Center



Jennings Staff

David E. Johnson, Center Manager; Jo Ann Albert, Environmental Education Specialist I; Will Taylor, Candy Vild, Jill Shankel, Environmental Education Specialists I; Ray Markle, Maintenance II; Gary Jenkins, Maintenance I; Cindy Shirley, Adm. Asst.

DON'T FORGET TO REGISTER!

Call Stream Restoration, Inc. at 724-776-0161 or e-mail sri@ccia.com

Slippery Rock Watershed Coalition meets monthly on the second Wednesday of every month at the Harmony House, Macoskey Center, Harmony Rd. Slippery Rock University, at 7:00 p.m. Contact Stream Restoration Incorporated 724-776-0161 sri@ccia.com for information

All are welcome!



THURSDAY APRIL 6, 2000
 (Moderator: **Darcy Peart**)

3:00 Arrival/Registration/Snacks

3:30 Pathway Waste Water Cleaning
Ryan Snow, Macoskey Center, Slippery Rock University Professor: Valentine Kefeli, Ph.D., Soil Scientist

3:45 Selected Pilot Scale Systems at Jennings **Kim Kosick**, Biology student
 Grove City College Professor: Fred Brenner, Ph.D., Biologist

4:00 County Government Perspective on Wastephered Issues **Glenn Anderson**, Butler County Commissioner

4:15 Conception of Sanitary Properties of Plants for Cleaning Water **Valentine Kefeli**, Ph.D., Soil Scientist
 Macoskey Center, Slippery Rock University

4:30 SNACKS/POSTERS

4:45 Experimental Columns Based on Jennings Treatment System **Taylor Zenter**, Env. Science Student
 Slippery Rock University Professor: Michael Stapleton Ph.D., Geochemist,

5:00 Role of the Crushed Stone Industry in Abandoned Mine Land Restoration
Joseph Aloe, President Quality Aggregates Inc.

5:15 Slippery Rock – Seaton Creek Watershed Monitoring **Dan Dougherty**, Biology Student
 Grove City College Professor: Fred Brenner Ph.D.

5:30 Bacterial Colonization in Selected Pilot Scale Systems at Jennings **Carol Tippi**, Biology Student
 Grove City College Professor: Fred Brenner Ph.D., Biologist

5:45 SNACKS/POSTERS

6:00 Chemical and Biological Monitoring in the Slippery Rock Watershed **Heather Doyle**, Biology Student
 Slippery Rock University Professor: Dean Denicola Ph.D., Aquatic Biologist

6:15 Pennsylvania's Growing Greener Program
Mary Jo White, State Senator

6:45 Dinner/Posters

FRIDAY APRIL 7, 2000

(Moderator: **Janice Belgredan**)
Morning Session

8:00 Arrival/Registration (coffee & donuts)

8:40 Greetings
David Johnson, Center Coordinator
Jo Ann Albert, Env. Ed. Coordinator

8:50 Slippery Rock Watershed Coalition Update,
Margaret H. Dunn, Stream Restoration, Inc.

9:00 PA DEP's Role in Watershed Restoration
Robert Dolence, Deputy Secretary for Mineral Resources Management, PA Department of Environmental Protection

9:25 High School Students' Watershed Studies
Will Taylor, Env. Ed. Jennings

9:40 Overview of Passive Treatment Technology and Performance of Jennings Vertical Flow System
George Watzlaf, Mining Research Engineer US Department of Energy, NETL

10:00 Role of the Surface Mining Industry in Abandoned Mine Land Restoration
John Stille, President Amerikohl Mining, Inc.

10:15 BREAK!

10:30 DCNR's Role in Watershed Restoration
John Oliver, Secretary of DCNR

11:00 Watershed Restoration Efforts in Western PA
Mark Killar, Reg. Coordinator

11:15 **SRWC Appreciation Award**

Volunteer Group Award, PA Recreational Park Society to Jennings Water Quality Improvement Coalition
Gary Pinkerton, Director Butler County Parks and Recreation

11:30 Summary of Student Presentations
Fred Brenner Ph.D., Biologist Professor Grove City College

11:45 LUNCH/POSTERS

Afternoon Session
 12:45-3:30 **FIELD TOUR** (Vans available)
 Guides: **Tim Gillen** and **Roger Bowman**

(1) **Goff Station**: gob pile removal in process
 Scheduled Passive Treatment Construction
Bob Beran Wetland Ecologist
Jeff Ankrom, Proj. Mgr, Quality Aggregates Inc.

(2) **De Sale**, Passive Treatment System in Process
Fred Johnson, Project Mgr, Amerikohl Mining, Inc

(3) **Chernicky** Completed Land Restoration Project with beneficial coal ash use



THE CATALYST

SLIPPERY ROCK WATERSHED COALITION MONTHLY ACTIVITIES UPDATE

LOOK AT YOUR CALENDARS IT'S APRIL ALREADY!!!!!!!!!!!!!!!!!!!!

Let's meet at the Community Get-Together this month!! It will be great to discuss new ideas with everyone and look at the past and up-coming SRWC activities! (See below for directions.) Prior meeting (3/10/99) attendees: Todd Colosimo, Steve Smith, Roger Bowman, Fred Brenner, Mike Enright, Valentin Kefeli, Bob Zick, Charlie Cooper, Tim Danehy, Margaret Dunn

1999 SRWC "GET-TOGETHER"

Our "indoor picnic" is to be held Wednesday, April 14 at the Epiphany Catholic Church, Boyers, PA between 6:00 and 8:00 pm. Todd Colosimo, Janice Belgredan, Steve Smith, and others have generously offered to place flyers in prominent places throughout the community to make everyone (all ages) feel welcome. We can't wait to enjoy everyone's company. The Camelot from Slippery Rock will be providing "oodles" of yummy food. New, cotton, SRWC ball caps are sure to be a hit, as well as the new mugs and stickers. The PA Game Commission bird feeders and other items for outdoor activities have been donated for door prizes. Posters by Coalition participants, including Girl Scouts, Grove City College and Slippery Rock University students, PA Department of Environmental Protection, and Jennings Water Quality Improvement Coalition will be used to explain the recent activities on a "one on one" basis. This event promises to be a "fun time" and an opportunity to entertain new ideas and answer questions about the efforts and goals of the Coalition. The Epiphany Catholic Church is located in Boyers just north of Forestville Road less than 1 mile west of the post office. There is a sign on Forestville Road. (We will also have signs.) Doors will be open by 5:30 pm for anyone who wishes to help set up. All are invited...drop by any time between 6:00 pm and 8:00 pm...very casual...bring the family!!!

1999 SLIPPERY ROCK WATERSHED COALITION SYMPOSIUM

On Friday, April 16, 1999 at Jennings Environmental Education Center, the Coalition will hold its fourth(!) annual symposium.

Over 100 (!!!) high school students are planning to attend. At the first break, these students will have the opportunity to participate in a field program which includes stream characterization and passive treatment demonstrations at Jennings. This is an exceptional opportunity for them to interact with JoAnn Albert, Will Taylor, and Candy Vild of Jennings and Dr. Robert Hedin, an internationally-recognized expert in passive treatment technology.

Robert C. Dolence, Deputy Secretary, PA Department of Environmental Protection, has graciously agreed to be our Guest Speaker. His words of encouragement and support of our restoration efforts have been instrumental in the success that the Coalition has enjoyed. This year we also "re-welcome" George Watzlaf, U.S. Department of Energy, to speak from his "wealth of knowledge" regarding the on-going development of passive treatment technology. Other speakers include Dr. Dean DeNicola, Biologist, SRU and Dr. Fred Brenner, Biologist, Grove City College and the following students :

Steve Stefko, student SRU (Professor: Dr. Dean DeNicola, Biologist)

Brian Lipinski, student SRU (Professor: Dr. Michael Stapleton, Geochemist)

Mike Enright, student GCC (Professor: Dr. Fred Brenner, Biologist)

Pat Dimpfl, Dan McGuirk, Anthony Liguori, master's candidates Sustainable Systems, SRU (Professor: Dr. Valentine Kefeli, Soil Scientist)

One of the highlights last year and no doubt at this event are the presentations by Girl Scouts and homeschool students. (John Oliver, Secretary, Department of Conservation and Natural Resources has personally acknowledged their continuing contributions in the restoration effort.)

A field tour (transportation provided) led by participants in the Coalition, including Roger Bowman and Tim Gillen from the Knox District Mining Office, will be conducted after a "hardy" lunch to an unreclaimed area, an active project, and to a newly completed Anoxic Limestone Drain (SR101A) and Vertical Flow System (SR109). (Tour may be revised depending upon the weather.)

Posters can be installed at Jennings on Thursday afternoon from 3:30 to 5:00 pm and/or from 7:45 to 8:15 am on Friday. Registration (don't forget the coffee/tea/juice and cookies from Fairground Market) will begin at 8:00 am. The field tour is scheduled to return to Jennings around 3:30 pm.

SEE YOU THERE!!!!

PHOTO OF THE MONTH

Student Intern Mike Enright assembles under-drain for the Composted Biosolids & Limestone pilot-scale vertical flow system at Jennings Environmental Education Center, Brady Twp., Butler Co. (2/19/1999). Working with Stream Restoration Incorporated and the Coalition Mike is completing his internship requirement for his Biology degree at Grove City College under the direction of Dr. Fred Brenner, Biology Dept. After assisting in tank construction Mike completed a survey of plant species diversity and density in the channel wetland at Jennings. The channel wetland used composted biosolids mixed with quarry fines to fabricate an economical substrate used for wetland construction. Thanks Mike for all the hard work!!!!!!



SPECIAL THANKS

A special thanks to Mike Sajna for announcing the upcoming Symposium in the March 10, 1999 edition of the Pittsburgh Post-Gazette in his column, "Outdoors" !!!

Thanks to Quality Aggregates Inc., Amerikohl Mining, Inc., and Allegheny Mineral Corporation for their support.

For more information contact: Slippery Rock Watershed Coalition, c/o Stream Restoration Incorporated (PA non-profit), 338 Glen Eden Road, Rochester PA 15074, (724)774-2813, fax (724)774-1219, sri@ccia.com. April Distribution: approx. 340 copies

SLIPPERY ROCK WATERSHED COALITION

1999 SYMPOSIUM

Friday, April 16, 1999

held at

JENNINGS ENVIRONMENTAL EDUCATION CENTER
PA Department of Conservation and Natural Resources

sponsored in part by
SLIPPERY ROCK UNIVERSITY

Symposium Goal

This Symposium has been designed to create a forum to:

- (1) provide an opportunity for community groups and students from local colleges/universities to present their findings to their peers, the public, and environmental professionals;
- (2) allow interaction among all interested in the restoration effort;
- (3) document the degree of success of the completed projects by identifying terrestrial and aquatic improvements;
- (4) discuss the development of new technology relating to land restoration and discharge abatement;
- (5) observe restoration efforts in the field.

High School Student Field Program
High School students may participate in a program which includes stream characterization and passive treatment demonstrations at Jennings Environmental Education Center.

Instructors: Dr. Robert Hedin, Hedin Environmental
JoAnn Albert, Wilbur Taylor, Candy Vild and Jill Shankel, Jennings Environmental Education Center

Lunch and Snacks provided by:
Amerikohl Mining, Inc.
Quality Aggregates Inc.
Allegheny Mineral Corporation
Stream Restoration Incorporated

Poster Presentations
Slippery Rock Watershed Coalition
PA DEP, Knox District Mining Office
C D S Associates, Inc.
Grove City College
Slippery Rock University
Macoskey Center, SRU
Jennings Water Quality Improvement Coalition

Jennings Staff
David E. Johnson, Center Manager; Jo Ann Albert, Environmental Education Specialist II; Wilbur Taylor, Candy Vild, Jill Shankel, Environmental Education Specialists I; Ray Markle, Maintenance II; Gary Jenkins, Maintenance I; Cindy Shirley, Adm. Asst.

Slippery Rock Watershed Team - Knox District Mining Office
Roger Bowman, Timothy Gillen, Timothy VanDyke, James Plesakov, Robert Kowalsky, Theresa Elicker, Henry Thomas, William Edmiston, William Allen, Javid Mirza, Lorraine Odenthal, Douglas Caylor.

SRWC Symposium Organizers
Janice Belgredan, Steve Smith, Dean DeNicola, Roger Bowman, Fred Brenner, Tim Gillen, Robert Zick, Charles Cooper, Tim Danehy, Lucy Blanchfield, Margaret H. Dunn

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All are welcome!
(There are no fees or dues.)