

PINE CREEK
CRAWFORD AND WARREN COUNTIES

WATER QUALITY STANDARDS REVIEW
STREAM REDESIGNATION EVALUATION REPORT

SEGMENT: BASIN
DRAINAGE LIST: Q
STREAM CODE: 54221

WATER QUALITY MONITORING AND ASSESSMENT SECTION (DSB)
DIVISION OF WATER QUALITY ASSESSMENT AND STANDARDS
BUREAU OF WATER SUPPLY AND WASTEWATER MANAGEMENT
DEPARTMENT OF ENVIRONMENTAL PROTECTION

JANUARY 2001
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GENERAL WATERSHED DESCRIPTION

Pine Creek is a tributary to Oil Creek in the Allegheny River watershed. This basin has a drainage area of 84.8 square miles and contains 155.0 stream miles. The Q_{7-10} at the mouth of the creek is estimated to be 6.87 cubic feet/second. This watershed is located in Oil Creek and Rome Townships and Titusville Borough, Crawford County; Harmony Township, Forest County; Oil Creek and Allegheny Townships and Pleasantville Borough, Venango County; and Southwest, Eldred, Triumph, Deerfield, and Pittsfield Townships, Warren County. Pine Creek is currently designated Cold Water Fishes (CWF) except for Caldwell Creek, a major tributary, which has a High Quality-Cold Water Fishes (HQ-CWF) designation. In response to a request from the Pennsylvania Fish and Boat Commission (PFBC) this basin was evaluated for possible redesignation as HQ-CWF. This evaluation is based on field surveys conducted in October 1995, April 1996, and April 2000.

Ten macroinvertebrate stations were sampled in 1995 but most of these samples were compared to reference stations in the Spring Creek (56113) watershed that has a designated use of HQ-CWF. Changes to the Department's regulations require that only streams with Exceptional Value Waters (EV) use designations be used as reference watersheds. As a result, 6 out of the 10 stations were resurveyed in 2000 and compared to EV reference stations sampled at the same time.

This watershed has a low population density. There are no major population centers in this basin. The entire basin is privately owned. Land use is a mixture of forest (70%), pasture (10%), residential (10%), industrial (5%) and agriculture (5%). In the past, this basin supported much oil and gas production, but currently oil production has virtually ceased and gas production has been greatly reduced. The National Wetland Inventory Maps indicate the presence of several extensive wetland areas. The flood plains of the main stem of Pine Creek (from 1 mile above Station 3PC to the mouth of Caldwell Creek), Caldwell Creek (from Route 127 to the mouth); and West Branch Caldwell Creek (from just below Station 12WB to the mouth) are mostly forested swamp. Other areas in this basin contain scrub/shrub swamp and emergent marsh. All of these wetland expressions of surface water within the study area are considered part of the respective basins for purposes of this evaluation.

WATER QUALITY AND USES

Surface Water

No long-term water quality data were available to allow a direct comparison to water quality criteria. Grab samples were taken at 19 stations throughout the watershed (Figure 1 and Table 1). Results from these samples show alkalinities less than 20 mg/l at 12 stations (Table 2). This indicates a very limited buffering capacity and probably results from natural conditions. Sulfate (SO_4) levels were elevated at Stations 10CC and 13WB. These values seemed anomalous because readings upstream and downstream of these stations were considerably lower. These two stations were resampled and sulfate levels typical of the rest of the basin were recorded the second time (Table 2, page 3). Station 4GR, at the mouth of Golby Run, was also resampled because of high chloride (Cl) levels, and elevated conductivity and hardness values. The resample showed chloride levels, hardness, and conductivity greatly reduced. The elevated levels in the first sample might have resulted from a brine discharge from an oil or gas well. However, the instantaneous nature of grab samples precludes comparison to applicable water quality criteria. The indigenous aquatic community is a better indicator of long-term conditions and is used as a measure of both water quality and ecological significance.

Despite its predominantly forested nature, the Pine Creek watershed contains six NPDES permitted discharges (Table 3) and one surface water withdrawal (not a public water supply).

The discharges consist of one ground water clean-up (GTE), one boiler blowdown (Weyerhaeuser), one cooling tower blowdown (PFV), and four discharges from small sewage treatment facilities. See Table 3 for the permitted and actual flow volumes of these discharges.

Aquatic Biota

Overall habitat scores for aquatic biota were within the optimal range at all but 2 of the stations (Table 4). These two stations fell just below the optimal score. Streams within the Pine Creek watershed support all designated uses. Benthic macroinvertebrate samples were collected at ten stations during the October 1995 and April 2000 surveys. The results of these sampling efforts are presented in Table 5. Benthic macroinvertebrates were collected using sampling techniques adapted from the EPA Rapid Bioassessment Protocols. Taxonomic diversity was good with a mean of 32.7 total taxa per station. EPT scores were high with many genera that are considered sensitive to water quality degradation present.

A total of 29 species of fish were collected at eight stations (Table 6). Wild brown trout were present throughout the basin. Wild brook trout occurred in the headwaters of Caldwell Creek and the West Branch Caldwell Creek. Other cold water species included mottled sculpin and reddsides. The diversity of darters was good with six species present.

BIOLOGICAL USE QUALIFICATIONS

The biological use qualifying criteria applied to Pine Creek were the integrated benthic macroinvertebrate score test described at § 93.4b(a)(2)(i)(A) and § 93.4b(b)(1)(v). This score was calculated from a 100-count subsample which was randomly selected from the total sample and enumerated following EPA's RBP III protocol (Table 7). Selected benthic macroinvertebrate community metrics generated from the subsamples were compared to reference stations with comparable drainage areas (Table 8). Stations IPC, 3PC, 5PC, and 7PC were compared to Station R3 in the Arnot Run (55499) basin. The remaining stations in the Pine Creek basin were compared to Stations R1 and R2 in the Cross Fork (23765) watershed. See Table 1 for the location of these reference stations. Both of these reference watersheds have an Exceptional Value (EV) designation. All sampling was conducted over a three day period to minimize the effects of seasonal variation. This comparison was done using the following metrics which were selected as being indicative of community health: taxa richness; modified EPT index (total number of intolerant Ephemeroptera, Plecoptera, and Trichoptera taxa); modified Hilsenhoff Biotic Index; percent dominant taxon; and percent modified mayflies.

Based on these five metrics, all stations in the Pine Creek basin above the confluence with Caldwell Creek (1PC, 3PC, 5PC, and 7PC) had Biological Condition Scores between 83 and 91% of the reference stations scores. Scores from stations in the Caldwell Creek basin (12WB, 13WB, 15CC, and 17CC) were greater than 92% of the reference station scores except for Station 10CC which had a score of 53% of the reference station score. Station 19PC (Pine Creek below the confluence with Caldwell Creek) had a score that was 67% of the reference station score. Based on the Department's regulatory criteria, scores greater than or equal to 92% of the reference station score support an EV designation (§ 93.4b(b)(1)(v)), scores greater than or equal to 83% but less than 92% qualify for HQ, and scores less than 83% do not meet the threshold for an HQ designation (§ 93.4b(a)(2)(i)(A)).

The PFBC has designated the West Branch Caldwell Creek, from Three Bridge Run to the mouth, as "Class A" Wild Trout Waters based on a biomass of wild brown trout of 57.3 kg/ha. The main stems of Pine Creek and Caldwell Creek are stocked with trout, and the public heavily fishes this basin.

No special conditions were found during this survey that would qualify the Pine Creek basin as a "surface water of exceptional significance" or any other attribute listed in §93.4b

PUBLIC RESPONSE AND PARTICIPATION SUMMARY

The Department provided public notice of this redesignation evaluation and requested any technical data from the general public through publication in the Pennsylvania Bulletin on April 22, 2000 (30 Pa.B 2427). A similar notice was also published in the Titusville Herald on May 12, 2000. In addition, the Crawford County Planning Commission, City of Titusville and Oil Creek and Rome Townships, Crawford County; Warren County Planning and Zoning Commission and Deerfield, Eldred, Pittsfield, Southwest, and Triumph Townships, Warren County; Pleasantville Borough and Allegheny and Oil Creek Townships, Venango County; and Harmony Township, Forest County, were notified of the evaluation in a letter dated May 10, 2000. No data were received as a result of these inquiries.

A draft of this report was submitted to the above stakeholders, along with a request for comments, on September 20, 2002. No comments were received in response to this request.

RECOMMENDATION

Based on applicable regulatory definitions the Department recommends the following changes to Chapter 93:

Pine Creek basin (source to Caldwell Creek)

- Change current CWF designation to HQ-CWF
- Based on: waters with Biological Condition Scores between 83% and 92% of the reference
- Affects 52.9 stream miles

Caldwell Creek basin (source to West Branch Caldwell Creek)

- Retain current HQ-CWF designation

West Branch Caldwell Creek basin (source to mouth)

- Change current HQ-CWF designation to Exceptional Value (EV)
- Based on: waters with Biological Condition Scores greater than 92% of the reference
- Affects 38.9 stream miles

Caldwell Creek basin (West Branch Caldwell Creek to mouth)

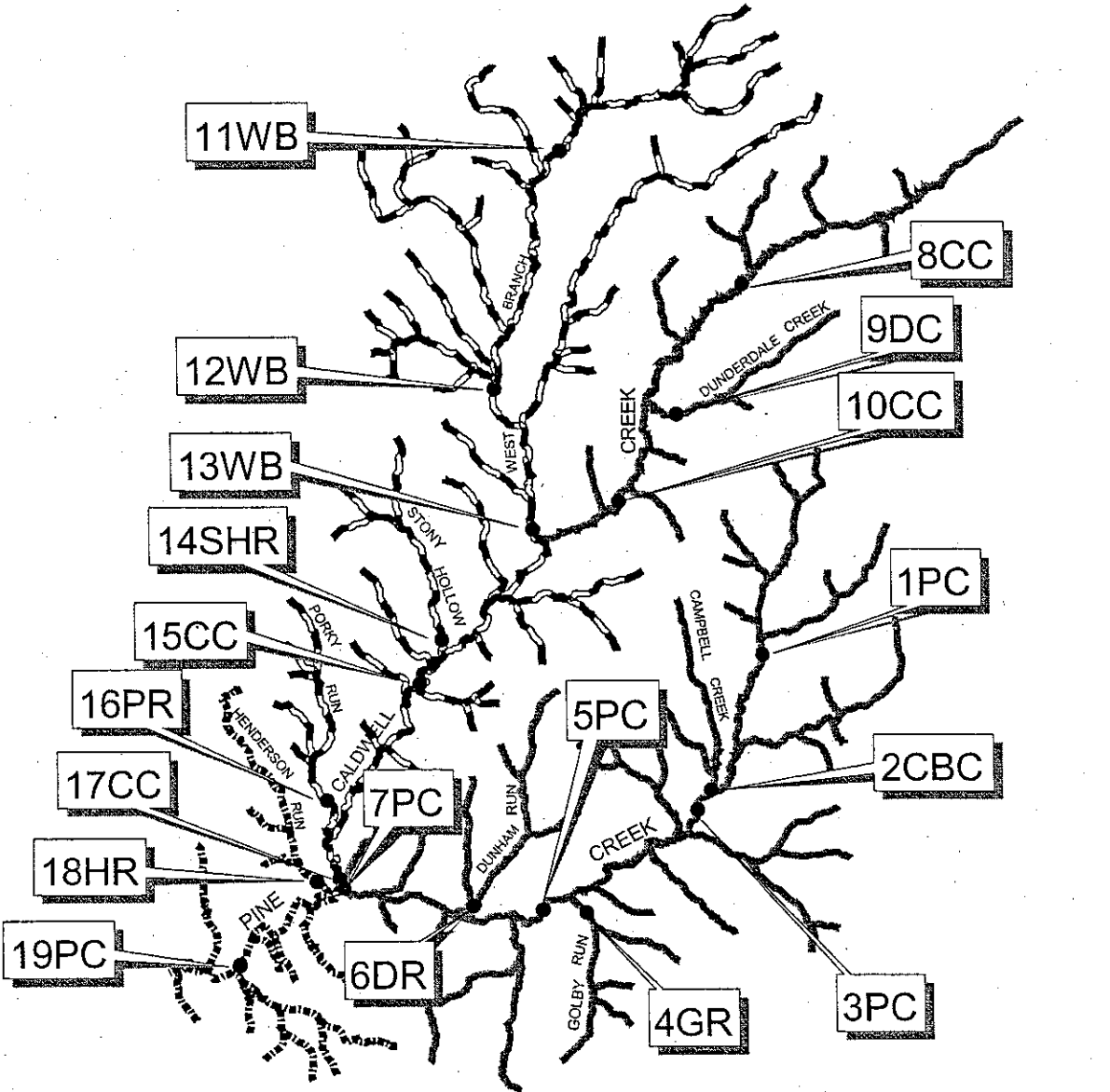
- Change current HQ-CWF designation to EV
- Based on: waters with Biological Condition Scores greater than 92% of the reference
- Affects 26.3 stream miles

Pine Creek basin (Caldwell Creek to mouth)

- Retain the current CWF designation

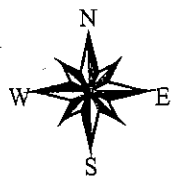
This recommendation differs from the original Fish and Boat Commission request in that the West Branch Caldwell Creek basin and Caldwell Creek basin (from West Branch to mouth) have been recommended for a higher level of protection than requested. Also Pine Creek from Caldwell Creek to the mouth retains the current CWF designation. The remainder of the watershed complies with the original request.

FIGURE 1. PINE CREEK CRAWFORD AND WARREN COUNTIES



USE DESIGNATIONS
 EV
 HQ-CWF
 CWF

STATIONS



**TABLE 1
STATION LOCATIONS
PINE CREEK
CRAWFORD AND WARREN COUNTIES**

<u>STATION</u>	<u>LOCATION</u>
1PC	Pine Creek approximately 10 meters upstream of the crossing of road T313 Southwest Township, Warren County Lat: 41 40 28 Long: 79 31 10 RMI: 11.05
2CBC	Campbell Creek approximately 250 meters upstream from the mouth Lat: 41 39 05 Long: 79 31 48 RMI: 0.14
3PC	Pine Creek approximately 5 meters upstream of the crossing of road T309 Southwest Township, Warren County Lat: 41 38 53 Long: 79 32 02 RMI: 8.67
4GR	Golby Run approximately 3 meters upstream of the crossing of SR3002 Lat: 41 37 44 Long: 79 33 32 RMI: 0.30
5PC	Pine Creek approximately 15 meters upstream of the crossing of SR3002 Lat: 41 37 47 Long: 79 34 08 RMI: 5.89
6DR	Dunham Run approximately 105 meters upstream from the mouth Lat: 41 37 45 Long: 79 35 21 RMI: 0.06
7PC	Pine Creek approximately 30 meters downstream of the crossing of road T928 Oil Creek Township, Crawford County Lat: 41 37 58 Long: 79 36 52 RMI: 3.15
8CC	Caldwell Creek approximately 5 meters upstream of the crossing of SR3015 Lat: 41 44 19 Long: 79 31 26 RMI: 11.36
9DC	Dunderdale Creek approximately 3 meters upstream of the crossing of SR27 Lat: 41 42 55 Long: 79 32 20 RMI: 0.48
10CC	Caldwell Creek approximately 0.93 stream miles downstream of road T355 Southwest Township, Warren County Lat: 41 41 59 Long: 79 33 10 RMI: 7.37
11WB	West Branch Caldwell Creek approximately 20 meters upstream of road T377 Eldred Township, Warren County Lat: 41 45 32 Long: 79 34 09 RMI: 5.49

- 12WB West Branch Caldwell Creek approximately 15 meters downstream of road T355
Eldred Township, Warren County
Lat: 41 43 14 Long: 79 34 50 RMI: 2.45
- 13WB West Branch Caldwell Creek approximately 5 meters upstream of road T304
Southwest Township, Warren County
Lat: 41 41 40 Long: 79 34 19 RMI: 0.14
- 14SHR Stony Hollow Run approximately 3 meters upstream of road T304
Southwest Township, Warren County
Lat: 41 40 35 Long: 79 35 33 RMI: 0.26
- 15CC Caldwell Creek approximately 10 meters downstream of road T311
Southwest Township, Warren County
Lat: 41 40 05 Long: 79 35 55 RMI: 3.29
- 16PR Porky Run approximately 3 meters upstream of road T930
Oil Creek Township, Crawford County
Lat: 41 38 53 Long: 79 37 05 RMI: 0.52
- 17CC Caldwell Creek approximately 20 meters upstream of the mouth
Lat: 41 38 01 Long: 79 36 55 RMI: 0.02
- 18HR Henderson Run approximately 5 meters downstream of road T930
Oil Creek Township, Crawford County
Lat: 41 38 01 Long: 79 37 12 RMI: 0.41
- 19PC Pine Creek approximately 15 meters upstream of the SR27 bridge
Lat: 41 37 08 Long: 79 38 19 RMI: 1.12
- R1 Cross Fork (23765) approximately 5 meters upstream of confluence with "Dry Hollow"
Abbott Township, Potter County
Lat: 41 34 16 Long: 77 46 54 RMI: 7.46
- R2 Cross Fork approximately 15 meters downstream of the ford of the old road (T416)
Stewardson Township, Potter County
Lat: 41 29 41 Long: 77 49 14 RMI: 0.88
- R3 Arnot Run (55499) approximately 75 meters downstream of the confluence with Little
Arnot Run. Mead Township, Warren County
Lat: 41 44 38 Long: 79 04 52 RMI: 0.84

TABLE 2
WATER CHEMISTRY¹
PINE CREEK, CRAWFORD & WARREN COUNTIES
OCTOBER 16-18,1995

Station	1PC	2CBC	3PC	4GR	5PC	6DR	7PC	8CC	9DC	10CC
Field Parameters										
Temp (°C)	8.2	8.3	7.8	6.8	6.7	9.1	6.1	9.6	7.7	7.9
pH	6.8	6.9	6.3	7.2	6.8	6.5	4.9	5.9	6.4	6.1
Cond (µmhos)	120	127	141	682	225	97	183	108	103	131
Diss. O ₂	NO DATA (meter malfunction)									
Laboratory Parameters										
pH	6.5	6.4	6.5	6.6	6.5	6.4	6.6	6.2	6.3	6.3
Alkalinity	19.8	16.2	22.0	38.0	26.0	17.8	30.0	11.4	18.8	17.8
Acidity	0	1.0	0	0	0	0	0	9.2	1.0	2.8
Hardness	29	27	34	130	44	27	44	25	32	32
T Diss. Sol.	100	90	94	514	74	76	110	102	100	108
Susp.Sol.	10	6	12	2	72	8	10	2	2	4
NH ₃ -N	<.02	<.02	<.02	<.02	<.02	<.02	<.02	<.02	<.02	0.03
NO ₂ -N	<.004	<.004	<.004	<.004	<.004	<.004	<.004	<.004	<.004	<.004
NO ₃ -N	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	0.07	0.04	<0.04
Kjeldahl-N	<0.2	<0.2	<0.2	0.57	<0.2	<0.2	<0.2	<0.2	<0.2	0.26
Total P	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.03	0.02	0.03
Ca	11.5	9.64	10.8	37.6	13.7	8.51	11.9	8.17	9.19	10.9
Mg	3.05	2.93	3.33	10.2	4.09	2.56	3.47	2.32	2.51	2.96
Cl	13	17	17	162	33	8.0	27	11	8.0	15
SO ₄	13	12	14	14	28	21	15	17	14	253
As*	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0
Cd*	<.2	<.2	<.2	<.2	<.2	<.2	<.2	<.2	<.2	<.2
hex Cr*	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Cr*	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
Cu*	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Fe*	822	182	323	90	287	108	314	904	353	988
Pb*	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Mn*	58	23	46	59	38	14	38	79	82	102
Ni*	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25
Zn*	15	12	<10	<10	<10	<10	<10	<10	<10	<10
Al*	<135	<135	<135	<135	<135	<135	<135	<135	<135	147
fecal coliforms							100	40		

1 - Except for pH & conductance and indicated otherwise, all values are total concentrations in mg/l

* - Total concentrations in ug/l

TABLE 2 (Cont.)¹

Station	11WB	12WB	13WB	14SHR	15CC	16PR	17CC	18HR	19PC
Field Parameters									
Temp (°C)	9.6	10.2	6.8	6.7	6.9	6.6	6.4	9.2	9.4
pH	6.0	6.0	6.2	5.8	5.6	6.2	5.0	6.3	6.0
Cond (µmhos)	101	95	95	80	112	139	107	148	116
Diss. O ₂	NO DATA (meter malfunction)								
Laboratory Parameters									
pH	6.3	6.4	6.3	6.3	6.3	6.4	6.5	6.6	6.5
Alkalinity	16	22	19.4	14.8	19.4	26	18.4	32	22
Acidity	5	3	0	0.8	0.8	0	0	0	0
Hardness	26	27	24	19	28	35	28	38	33
T Diss. Sol.	94	44	88	76	90	104	84	114	94
Susp. Sol.	<2	<2	<2	<2	<2	<2	4	<2	10
NH ₃ -N	0.03	0.02	0.02	0.02	0.02	0.02	<0.02	0.02	0.02
NO ₂ -N	<.004	<.004	<.004	<.004	<.004	<.004	<.004	<.004	<.004
NO ₃ -N	0.18	0.04	0.04	0.04	0.04	0.11	0.04	0.04	0.04
Kjeldahl-N	0.22	<0.2	<0.2	0.22	<0.2	<0.2	<0.2	<0.2	<0.2
Total P	0.03	0.02	0.02	0.02	0.03	<0.02	0.03	0.02	0.03
Ca	8.52	8.89	9.18	7.02	9.19	11.6	9.78	13.4	10.3
Mg	2.34	2.41	2.62	2.38	2.88	3.35	2.51	3.16	2.85
Cl	10	8.0	7.0	6.0	10	15	10	12	14
SO ₄	14	17	349	12	14	14	16	17	16
As*	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0
Cd*	<.2	<.2	<.2	<.2	<.2	<.2	<.2	<.2	<.2
hex Cr*	<10	<10	<10	<10	<10	<10	<10	<10	<10
Cr*	<50	<50	<50	<50	<50	<50	<50	<50	<50
Cu*	<10	<10	11	<10	<10	<10	<10	<10	<10
Fe*	788	431	417	270	662	87	616	125	164
Pb*	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Mn*	73	40	32	30	55	<10	37	23	14
Ni*	<25	<25	<25	<25	<25	<25	<25	<25	<25
Zn*	<10	<10	<10	<10	<10	<10	<10	<10	<10
Al*	165	<135	<135	185	<135	<135	<135	192	<135
fecal coliforms			20				240		260

¹ - Except for pH & conductance and indicated otherwise, all values are total concentrations in mg/l

* - Total concentrations in µg/l

TABLE 2 (Cont.)¹
RESAMPLE (APRIL 3,1996)

Station	4GR	10CC	13WB
Field Parameters			
Temp (°C)	6.2	6.9	5.0
pH	7.1	7.3	7.3
Cond (µmhos)	100	77	##
Laboratory Parameters			
pH	6.3	6.3	6.3
Alkalinity	15.4	13.8	13.6
Acidity	0	1.8	0
Hardness	27	28	22
T Diss. Sol.	56	78	42
Susp.Sol.	<2	<2	4
NH ₃ -N	<0.02	0.02	0.02
NO ₂ -N	<.004	<.004	<.004
NO ₃ -N	0.26	0.22	0.42
Total P	<0.02	0.02	<0.02
Ca	7.84	7.52	6.07
Mg	2.43	2.03	1.84
Cl	9.0	10	4.0
SO ₄	13	17	16
As*	<4.0	<4.0	<4.0
Cd*	<.2	<.2	<.2
hex Cr*	<10	<10	<10
Cr*	<50	<50	<50
Cu*	<10	<10	<10
Fe*	68	552	179
Pb*	<1.0	<1.0	<1.0
Mn*	<10	66	<10
Ni*	<25	<25	<25
Zn*	<10	<10	<10
Al*	<135	389	<135
fecal coliforms			

1 - Except for pH & conductance and indicated otherwise, all values are total concentrations in mg/l

* - Total concentrations in µg/l

- No data (meter malfunction)

TABLE 3
NPDES PERMITTED DISCHARGES
PINE CREEK
CRAWFORD AND WARREN COUNTIES

<u>Discharger</u>	<u>NPDES Permit Number</u>	<u>Permitted Flow</u>	<u>Actual Flow (Average)</u>	<u>Estimated Q₇₋₁₀ (CFS)</u>
Weyerhaeuser	PA0104493	300 gal/day	0 gal/day	6.87
PFV Enterprises Outfall 001 Outfall 002	PA0000701	150 gal/day 7000 gal/day	1000 gal/day 1000 gal/day	0.044 0.044
Colonial Estates	PA0101320	17,500 gal/day	6,425 gal/day	0.00
Wesley Woods CEC	PA0103101	21,300 gal/day	4,820 gal/day	0.00
GTE	PA0221384	29,000 gal/day	8,700 gal/day	0.045
Hummer, Kirk	PA0221058	400 gal/day	-----	0.00

TABLE 4
HABITAT ASSESSMENT SUMMARY
PINE CREEK
CRAWFORD & WARREN COUNTIES
OCTOBER 16-19, 1995 AND APRIL 12-13, 2000

HABITAT PARAMETER	STATIONS ¹												
	1PC	3PC	5PC	7PC	10CC	12WB	13WB	15CC	17CC	19PC	R1	R2	R3
1. instream cover	16	16	14	16	14	16	17	14	15	14	16	16	18
2. epifaunal substrate	19	17	17	13	17	17	16	17	13	17	18	17	15
3. embeddedness	18	16	18	15	13	15	14	15	13	15	15	18	14
4. velocity/depth	17	15	14	18	12	17	16	16	16	14	13	15	18
5. channel alterations	18	18	18	18	19	16	18	17	18	13	18	18	19
6. sediment deposition	18	17	18	14	16	17	17	16	14	16	17	18	18
7. riffle frequency	18	16	16	12	14	13	14	14	12	14	18	14	13
8. channel flow status	13	13	13	12	18	18	18	18	19	20	19	18	12
9. bank condition	16	15	17	16	17	17	16	17	18	17	17	18	16
10. bank vegetation protection	17	16	16	17	18	18	17	18	17	16	16	18	18
11. grazing/disruptive pressures	17	17	12	19	19	19	18	16	19	15	17	19	19
12. riparian vegetation zone width	18	18	11	19	19	18	19	19	19	13	15	19	19
Total Score	205	194	184	189	196	201	200	197	193	184	199	208	199
Rating ²	OPT	OPT	SUB	OPT	OPT	OPT	OPT	OPT	OPT	SUB	OPT	OPT	OPT

¹ Refer to Figure 1 and Table 1 for stations locations.

² OPT - Optimal; SUB - Suboptimal

Taxa	Station															
	1PC	3PC	5PC	7PC	10CC	12WB	13WB	15CC	17CC	19PC	R1	R2	R3			
Coleoptera (aquatic beetles)				R			R	R								
Elmidae; Dubiraphia																
Optoservus	A	A	VA	A	P	A	A	P	P	C	C	P	A			
Oulimius	A	P	P	R	P	C	P				P		A			
Promoresia	R						R					R	C			
Stenelmis	P	C	C	C	C	P	P	P	P	A			R			
Psephenidae; Psephenus			C	P	R	P	P	C	C	A			P			
Ectopria	R									R						
Non-Insect Taxa																
Oligochaeta (lumbricid type)		R	R	R												
Oligochaeta			C	C				C	R	P	C	P				
Decapoda (crayfish)																
Cambaridae sp.	R		R								P	R				
Cambarus					R		R									
Gastropoda (univalves, snails)																
Ancylidae; Ferrissia		R	C	P									R			
Lymnaeidae sp.																
Pelecypoda (bivalve clams)						P										
Sphaeriidae sp.							P									
Number of taxa in total sample	33	36	33	37	30	32	36	34	30	26	30	30	30			

1 - Stations 1PC, 3PC, 5PC, 7PC, and R4 collected 10/16-19/1995. The remaining stations collected 4/12-13/2000

- VA - very abundant, >99 organisms
- A - abundant, 25-99 organisms
- C - common, 10-24 organisms
- P - present, 3-9 organisms
- R - rare, <3

TABLE 6
FISHES
PINE CREEK
CRAWFORD AND WARREN COUNTIES

SPECIES	STATION ¹							
	3PC ²	5PC ²	7PC ²	10CC ³	11WB ³	13WB ³	17CC ³	19PC ²
Brown trout, <i>Salmo trutta</i>	X	X	X	X	X	X		X
Brook trout, <i>Salvelinus fontinalis</i>				X	X			
Grass pickerel, <i>Esox americanus</i>						X		
Central stoneroller, <i>Campostoma anolmalum</i>		X	X					X
Redside dace, <i>Clinostomus elongatus</i>	X			X		X		
Common shiner, <i>Luxilus cornutus</i>		X	X					X
Pearl dace, <i>Margariscus margarita</i>	X			X			X	
River chub, <i>Nocomis micropogon</i>	X	X					X	X
Silver shiner, <i>Notropis photogenis</i>		X	X	X	X	X	X	X
Rosyface shiner, <i>Notropis rubellus</i>								X
Mimic shiner, <i>Notropis volucellus</i>								X
Toungetied minnow, <i>Exoglossum laurae</i>							X	
Blacknose dace, <i>Rhinichthys atratulus</i>	X	X	X		X	X		X
Longnose dace, <i>Rhinichthys cataractae</i>	X	X	X					X
Creek chub, <i>Semotilus atromaculatus</i>	X		X	X	X	X		X
White sucker, <i>Catostomus commersoni</i>	X	X		X	X	X	X	X
Hog sucker, <i>Hypentelium nigricans</i>	X	X	X	X		X	X	X
Trout-perch, <i>Percopsis omiscomaycus</i>	X	X	X	X		X	X	
Rock bass, <i>Ambloplites rupestris</i>		X						
Bluegill, <i>Lepomis macrochirus</i>					X			
Pumpkinseed, <i>Lepomis gibbosus</i>	X	X						
Smallmouth bass, <i>Micropterus dolomieu</i>		X						X
Greenside darter, <i>Etheostoma blennioides</i>		X	X				X	X
Rainbow darter, <i>Etheostoma caeruleum</i>	X	X	X	X		X	X	X
Fantail darter, <i>Etheostoma flabellare</i>	X	X	X	X		X	X	X
Johnny darter, <i>Etheostoma nigrum</i>	X	X		X	X			X
Banded darter, <i>Etheostoma zonale</i>		X						X
Blackside darter, <i>Percina maculata</i>		X	X	X			X	
Mottled sculpin, <i>Cottus bairdi</i>	X	X	X	X	X	X	X	X

1 - See Figure 1 and Table 1 for station locations

2 - Data from PA Fish and Boat Commission survey (9/13/93)

3 - Data from DEP survey (4/3/96)

TABLE 7
 SEMI-QUANTITATIVE BENTHIC MACROINVERTEBRATE DATA
 PINE CREEK, CRAWFORD AND WARREN COUNTIES
 OCTOBER 16-19, 1995 AND APRIL 12-13, 2000

Taxa	Station 1												
	1PC	3PC	5PC	7PC	10CC	12WB	13WB	15CC	17CC	19PC	R1	R2	R3
Ephemeroptera (mayflies)													
Ameletidae; Ameletus								1					
Baetiscidae; Baetisca		1	3	1									
Baetidae; Baetis						3					2		
Caenidae; Caenis				3	1			2	1	7			
Ephemereillidae; Drunella						4	5	5	16	16	1	20	
Ephemera	10	2	29	3	5	5	21	4	14	19	30	23	
Emphemeridae; Ephemera								2	2				
Heptageniidae; Epeorus	1					7	6	2	2		8	9	8
Cinygmula						6	1	3				3	
Leucrocuta													1
Heptagenia													1
Rhithrogena											1		
Stenacron			1		3			5		2	1		1
Stenonema	6	17	5	3	2	1	2	13	18	4	2	7	14
Isonychiidae; Isonychia		12		1			1		4		1	4	
Leptophlebiidae; Paraleptophlebia	47	28	7	6	4	4	4	3	2		11	2	5
Plecoptera (stoneflies)													
Capnidae; Paracapnia	2												1
Chloroperlidae; Sweltsa							6				1		2
Leuctridae; Leuctra													
Nemouridae; Amphinemura							1	1					
Prostia									1	1	1		
Perlidae; Acroneuria	3	2			2		1			2	1	4	3
Agnetina											5		
Eccoptura					1								
Paragnetina							1					2	

Taxa	Station													
	1PC	3PC	5PC	7PC	10CC	12WB	13WB	15CC	17CC	19PC	R1	R2	R3	
Periodidae; <i>Isoperla</i>		1				5	9	2			7	5		
<i>Isogenoides</i>			2											
Pteronarcyidae; <i>Pteronarcys</i>	1													
Taeniopterygidae; <i>Taeniopteryx</i>	1			3									4	
Trichoptera (caddisflies)														
Brachycentridae; <i>Brachycentrus</i>			3	4										
Glossosomatidae; <i>Glossosoma</i>			1					2					1	
Helicopsychidae; <i>Helicopsyche</i>				1							1			
Hydropsychidae; <i>Cheumatopsyche</i>	5	7	11	7	3			22	5	2	2	2	18	3
<i>Diplectrona</i>	2					1							2	
<i>Hydropsyche</i>	5	27	5	1		2	2			2		1	1	22
Limnephilidae; <i>Goera</i>						1								
Odontoceridae; <i>Psilotreta</i>						11						1		
Philiopotamidae; <i>Chimarra</i>					1			4			1			
<i>Dolophilodes</i>	6	14			1	1	1	1					5	
Polycentropodidae; <i>Polycentropus</i>		1	1											
Psychomyiidae; <i>Psychomyia</i>				1										
Rhyacophilidae; <i>Rhyacophila</i>	6	2	2	4			1	1	1	1	1	1	2	
Uenoidae; <i>Neophylax</i>	1					4	3	1	1	9	1	14	1	
Diptera (true flies)														
Athericidae; <i>Atherix</i>		1		3			1	1			1		1	
Empididae; <i>Clinocera</i>								3	7	4				
<i>Chellitera</i>					1									
Simuliidae; <i>Prosimulium</i>					8	29	2	14	5	13	22	9		
Tabanidae; <i>Chrysops</i>				1										
Tipulidae; <i>Antocha</i>			1			1	4	1	1	1	1			
<i>Dicranota</i>		2	2	8									7	
<i>Hexatoma</i>			2	4	5	2	6	1			3	1	3	
<i>Pseudolimmnophila</i>														
<i>Tipula</i>								1						
Ceratopogonidae sp.			2	2	1									
Chironomidae spp.		2	1	11	24	2	5		1	8	1	3	4	

Taxa	Station													
	1PC	3PC	5PC	7PC	10CC	12WB	13WB	15CC	17CC	19PC	R1	R2	R3	
Megaloptera (dobson- and alderflies)														
<i>Corydalidae; Nigronia</i>			4	4	10		10			1	3	3	1	
<i>Sialidae; Sialis</i>		1			2					1	2			
Odonata (dragon-, damselflies)													1	
<i>Aeshnidae; Boyeria</i>														
<i>Gomphidae sp.</i>									3					
<i>Ophiogomphus</i>				2										
<i>Stylogomphus</i>					9					1				
Coleoptera (aquatic beetles)														
<i>Elmidae; Dubiraphia</i>				1										
<i>Optoservus</i>	5	5	39	31	2	2	12	12		4	7		18	
<i>Oulimnius</i>	17		1		2	3	1				1		19	
<i>Promoresia</i>													5	
<i>Stenelmis</i>		1	1	5	5	1		7		13				
<i>Psephenidae; Psephenus</i>			2	3	1	3	1	3		10		2		
Non-Insect Taxa														
<i>Oligochaeta</i>			3	6						1	2		6	
<i>Gastropoda (univalves, snails)</i>														
<i>Sphaeriidae sp.</i>						1				2	3			
<i>Ancylidae; Ferrisia</i>			4										1	

1 - Stations 1PC, 3PC, 5PC, 7PC, AND R4 collected 10/16-19/1995. The remaining stations collected 4/12-13/2000

TABLE 8
RBP METRIC COMPARISON
PINE CREEK, CRAWFORD AND WARREN COUNTIES
OCTOBER 16-19, 1995 AND APRIL 12-13, 2000

METRIC*	STATION												
	1PC	3PC	5PC	7PC	10CC	12WB	13WB	15CC	17CC	19PC	R1	R2	R3
1. TAXA RICHNESS	16	18	24	27	22	22	25	32	24	22	26	19	25
Cand/Ref (%)	64	72	96	108	85	85	96	123	92	116			
Biol. Cond. Score	2	4	6	6	6	6	6	6	6	6	6	6	6
2. MOD. EPT INDEX	12	9	9	11	8	12	14	16	10	9	15	12	13
Cand/Ref (%)	92	69	69	85	53	80	93	107	67	75			
Biol. Cond. Score	6	4	4	6	2	6	6	6	4	4	6	6	6
3. MOD. HBI	2.1	2.8	3.4	3.9	4.0	2.0	2.8	3.3	2.9	3.4	2.3	2.2	3.2
Cand-Ref	<0	<0	0.2	0.7	1.7	<0	0.5	1.0	0.6	1.2			
Biol. Cond. Score	6	6	6	4	0	6	6	4	6	2	6	6	6
4. % DOMINANT TAXA	40	22	30	26	20	28	18	13	17	17	22	20	16
Cand-Ref	24	6	14	10	<0	6	<0	<0	<0	<0			
Biol. Cond. Score	6**	6	4	4	6	6	6	6	6	6	6	6	6
5. % MOD. MAYFLYS	54	48	34	12	12	26	32	34	55	36	41	58	22
Ref-Cand	<0	<0	<0	10	29	15	9	7	<0	22			
Biol. Cond. Score	6	6	6	6	2	4	6	6	6	2	6	6	6
TOTAL BIOLOGICAL CONDITION SCORE	26	26	26	26	16	28	30	28	28	20	30	30	30
% COMPARABILITY TO REFERENCE	87	87	87	87	53	93	100	93	93	67			

* - Station 1PC, 3PC, 5PC, and 7PC compared to R3
 Station 10CC, 12WB, 13WB, 15CC, and 17CC compared to R1
 Station 19PC compared to R2

** - Based on the dominant taxon having a Hilsenhoff score less than 3