



Chehalis River Best Management Practices Evaluation Project-- 1996-97 Annual Report

Abstract

This is the third annual progress report for a six-year monitoring project being conducted by the Washington State Department of Ecology. The purpose of this project is to determine the effectiveness of best management practices (BMPs) installed in the Chehalis River basin to improve water quality and fish habitat. Accomplishments this year include: updating the quality assurance project plan for the project; conducting water quality monitoring in the Bunker/Deep Creek basin and Beaver/Allen Creek basin; conducting temperature monitoring in the North Lincoln Creek basin, the Salzer Creek basin, and the Mohny Creek basin; and conducting macroinvertebrate sampling on Deep Creek, and on a tributary to Mohny Creek. Reports completed this year include interim reports on Bunker/Deep Creek, Beaver/Allen Creek, the Chehalis River Project Area, and the temperature monitoring study. Maps for a Geographic Information System (GIS) Pilot Project were also completed.

Significant findings this year include statistically significant improvement in fecal coliform levels at a site on Deep Creek where BMPs were installed to limit cattle access to the creek.

Introduction

In the Chehalis River basin, poor water quality has been identified as a threat to the fisheries resource. In an effort to protect and enhance the fisheries, the U.S. Fish and Wildlife Service (USFWS) set up the Chehalis Fisheries Restoration Program (CFRP), which provides grants for projects to restore anadromous fish to the Chehalis basin. Types of projects funded by CFRP include habitat restoration and installation of best management practices (BMPs) to improve or protect water quality.

Water quality monitoring is essential for determining the effectiveness of BMPs, and can be used to adjust and refine land treatment practices designed to control nonpoint source pollution. This was one of the conclusions of the Rural Clean Water Program (RCWP), a federally-sponsored nonpoint source control program that studied the effectiveness of BMPs to control pollution. The Chehalis BMP Evaluation Project is largely funded by the CFRP, and its purpose is to monitor the effectiveness of the BMPs installed and to document improvements in water quality. This report describes progress made during the third year of the proposed six year monitoring project.

Project monitoring areas were selected in consultation with USFWS. Only a few CFRP project areas were selected to demonstrate results, since trying to monitor all areas would result in too dispersed an effort. The RCWP found that detection of water quality improvements is more effective if monitoring focuses on collecting samples at a relatively high frequency and analyzing

them for a small number of relevant variables. Project monitoring areas for 1997-98 will be scoped by summer 1997. An addendum to the current Quality Assurance Project Plan will be developed to describe 1997-98 monitoring activities. The addendum will be available in fall 1997.

Additional elements of this project are monthly ambient water quality monitoring at four stations in the Chehalis basin, and providing coordination and technical assistance to local governments, tribes, and citizen groups.

Completed Reports

Water quality reports and quality assurance project plans completed this year are listed in Table 1. Findings of reports are briefly summarized below. Reports and plans can be obtained by calling either Debby Sargeant at (360) 407-6684 or Barbara Tovrea at (360) 407-6696.

Table 1. Reports and Plans Completed in 1996-97.

Description	Date Complete	Reference
1996-97 Addendum to the QAPP for Chehalis River Basin Best Management Practices Evaluation Project	July 1996	Sargeant, 1996a
1995 Temperature Monitoring Data Report	September 1996	Sargeant, 1996d
Beaver Creek GIS Pilot Mapping Project	November 1996	Sargeant, 1996e
1995-96 Chehalis River Project Area Water Quality Data Report	December 1996	Sargeant, 1996f
1995-96 Beaver/Allen Creek Water Quality Data Report	January 1997	Sargeant, 1997a
1995-96 Bunker/Deep Creek Water Quality Data Report	February 1997	Sargeant, 1997b

Water Quality Monitoring

In July 1994, USFWS and the Washington State Department of Ecology (Ecology) chose four project areas to survey water quality for BMP effectiveness: the Beaver/Allen Creek sub-basin; the Bunker/Deep Creek sub-basin; the Black River adjacent to a dairy at river mile (RM) 12.2; and the mainstem Chehalis River at RM 70, also adjacent to a dairy operation. A quality assurance project plan (QAPP) was completed in 1994 (Sargeant, 1994). The QAPP describes in detail the monitoring plan for each project area, and includes a basin map and maps of the project sites. Each year an addendum to the QAPP was developed for changes to the work (Sargeant; 1995a, 1996a). In 1995-96 macroinvertebrate sampling was added and water quality sampling on the Black River was concluded. In 1996-97 pre-BMP sampling on a dairy adjacent to the Chehalis River was concluded; post-BMP sampling will begin after BMPs are installed.

Bunker/Deep Creek Sub-basin

This was the third year of monitoring for Bunker and Deep Creek. This year's monitoring included both pre- and post-BMP monitoring. This area was chosen because several CFRP fencing and riparian restoration projects took place in the Deep Creek basin in 1995, with more CFRP work planned for 1996 and 1997. The site at the mouth of Bunker Creek is also a follow-up location for Ecology's Upper Chehalis Total Maximum Daily Load (TMDL) Study (Pickett, 1994b).

In the Bunker/Deep Creek drainage, five sites were sampled for water quality. Monitoring included three sampling events during the 1996 dry season and will include ten wet season sampling events. Sampling for 1996 occurred on: July 8, August 6, September 11, November 13, November 25, December 3, and December 9. Sampling for 1997 has occurred on January 7 and January 28 and will continue twice a month through March 1997.

Water quality data reports describe the complete results for 1994-95 (Sargeant, 1996c), and 1995-96 (Sargeant, 1997b). Erosion and sedimentation appear to be the major problem during the winter months on Deep Creek. The 1995-96 wet season monitoring continued to show high turbidity and high levels of total suspended solids. Turbidity standards were exceeded at two sites on Deep Creek during the wet season.

In 1995 during summer monitoring of Deep Creek, high bacteria levels were found at one site just downstream of an animal access area. After summer monitoring was completed, fences were installed to prohibit animal access. Dry season sampling in 1996 showed a statistically significant improvement in bacteria levels at the site where fencing was installed. The improvement was due to fencing and herd size reduction.

During the 1996 dry season monitoring, dissolved oxygen criteria were not met at any of the sites. The lowest dissolved oxygen levels were seen in August and September.

Sampling recommendations for 1997-98 include: continue dry season monitoring to confirm improvements seen in 1996; and review 1996-97 wet season data to determine the 1997-98 sampling regime.

Beaver/Allen Creek Sub-basin

Water quality data reports describe the complete results for 1994-95 (Sargeant, 1996b), and 1995-96 (Sargeant, 1997a). The 1995-96 results show high fecal coliform and nutrient levels below the major BMP site on Beaver Creek (pre-BMP) and also at the mouth of Beaver Creek.

This year wet season post-BMP monitoring was continued on Allen Creek (a tributary to Beaver Creek) and wet season post-BMP monitoring was started on Beaver Creek. The Beaver Creek sites were chosen to evaluate a significant pollutant source above Allen Creek originally identified in the Black River TMDL studies (Coots, 1994; Pickett, 1994a) and now the site of a major BMP

project, as well as several other proposed CFRP restoration projects. The Allen Creek site was chosen to follow up several CFRP fencing and riparian restoration projects.

The five sites in the Beaver/Allen Creek drainage are being monitored in 1996-97 during ten winter sampling events. Sampling for 1996 occurred on: July 8, August 6, September 11, November 13, November 25, December 3, and December 9. Sampling for 1997 has occurred on January 7 and January 28 and will continue twice a month through March 1997. In consultation with the Thurston County Health Department, another station was added on Beaver Creek to differentiate between possible agricultural and residential sources.

Sampling recommendations for 1997-98 include continued wet season post-BMP monitoring at all sites.

Mainstem Chehalis River

The Chehalis River sites were chosen to obtain pre-BMP monitoring data on a high priority agricultural pollutant source identified in the Upper Chehalis TMDL study (Pickett, 1994b). Water quality data reports describe the complete results for pre-BMP monitoring in 1994-95 (Sargeant, 1995b) and 1995-96 (Sargeant, 1996f). Monitoring results show that all stations exceeded the fecal coliform standard. The tributary adjacent to the BMP site had significantly higher levels of conductivity, ammonia nitrogen, total nitrogen, and fecal coliform than the mainstem river stations.

Post-BMP monitoring on this site should begin when all BMPs have been implemented.

Benthic Macroinvertebrate Monitoring

In April 1995, benthic macroinvertebrate sampling was conducted at two BMP sites, an erosion control project on Deep Creek and a riparian restoration site on North Lincoln Creek. For the 1996 sampling the site on North Lincoln Creek was dropped due to lack of maintenance of the BMP (stream corridor revegetation). Much of the newly planted vegetation did not survive due to competition from reed canary grass and wildlife grazing. A series of BMP sites (riparian restoration) on a tributary to Mohny Creek in Mason County replaced the North Lincoln Creek sites. In fall of 1996, the tributary to Mohny Creek and Deep Creek were sampled for benthic macroinvertebrates.

Tributary to Mohny Creek

Benthic macroinvertebrate samples were collected upstream and downstream of a series of riparian restoration and fencing sites on October 4, 1996. Laboratory analysis of samples was completed in January 1997. An interim report on the data collected in 1996 will be released by spring 1997.

Deep Creek

A benthic macroinvertebrate survey was done on two sites in the Deep Creek basin, a control site on a tributary and a site downstream of BMP implementation. Sampling was done in 1995 and on September 31, 1996. Laboratory analysis of the 1996 samples was completed in January 1997. An interim report on the data collected in 1995-96 will be released in spring 1997.

Sampling recommendations for 1997-98 include continued monitoring at both sites.

Temperature Monitoring

The USFWS requested temperature monitoring on a number of riparian restoration sites in the Chehalis basin and at the mouths of some of the larger tributaries. A QAPP for the temperature monitoring was completed in May 1995 (Sargeant, 1995c).

Hourly temperature data on the larger tributaries were collected from early July through late August 1996. The following sites were monitored: South Fork Chehalis River; Newaukum River; Chehalis River upstream of the Newaukum; Lincoln Creek; and the Black River. Because the temperature monitoring device for Newaukum River was vandalized, no 1996 data will be available for this site.

In 1995 three BMP sites were monitored: a tributary to Mohny Creek, Mill Creek, and North Lincoln Creek. For 1996 monitoring, the Mill Creek site was dropped due to lack of BMP maintenance and difficulty in finding a well shaded upstream control site. A site on a tributary of Salzer Creek was added. For the BMP sites, upstream and downstream temperature probes were installed. For the newly added sites and the sites upstream of BMP implementation, an evaluation of streamside shading was conducted in August and September 1996, which included photo points and densiometer readings taken every 25 meters along the creek.

An interim data report was prepared to discuss the 1995 temperature results (Sargeant, 1996d). A report describing data collected in 1996 will be available in early summer 1997.

Sampling recommendations for 1997-98 include continued monitoring at all sites and moving the Newaukum station to a more secure location.

GIS Pilot Mapping Project

Maps for a GIS pilot project on Beaver and Allen Creeks were completed (Sargeant, 1996e). The goal of the pilot project was to bring different GIS layers together to illustrate applicable information about project areas in the Chehalis basin. The lower Beaver Creek basin was chosen as the area for the pilot project. Information contained in the maps includes water quality impacts, water quality data, and the location of the BMP site. Data came from Pickett (1994a), Coats (1994), Sargeant (1996d, 1997a), and Wampler *et al.* (1993).

Ambient Monitoring

Monthly ambient water quality monitoring was done at four stations in the Chehalis basin: the Chehalis River at Dryad, at Porter, and near Grand Mound; and the Black River at Moon Road. The Chehalis station near Grand Mound and the Black River station were added as a result of the CFRP grant. Data collected from 1994-96 at these two stations can be found in Appendix A. Additional data collected this year or data from the other stations can be obtained by calling Brad Hopkins from Ecology's Ambient Monitoring Section, at (360) 407-6686. Ambient monitoring at all four stations will continue in 1996-97.

Technical Assistance and Coordination

Project staff coordinated with Thurston, Lewis, and Mason Conservation District staff in selecting sites for monitoring and in gathering information on the status of BMP implementation. Completed reports and plans were sent to appropriate District staff.

Project staff met with staff from the Chehalis Tribe to discuss water quality monitoring for the year. Technical assistance and relevant reports and plans were provided to Tribal staff.

In November, project staff assisted Tribal staff and Ecology's Southwest Regional Office (SWRO) staff in investigating possible sources of the bacterium *Sphaerotilus natans* in the Chehalis River. No signs of the bacterium were found upstream of the town of Centralia. Because signs of the bacterium were first spotted in September, Ecology's Southwest Regional Office staff plans to start investigation of the source next year more promptly after the bacterium is reported.

Project staff met with Chehalis River Council staff and provided technical assistance in their development of a pilot project for volunteer monitoring in the basin. We reviewed and provided comments on their draft citizen water quality monitoring plan for Waddell Creek.

Project staff worked with Thurston County staff to develop a strategy to determine the source or sources of pollutant loading observed at the mouth of Beaver Creek. Another station was added upstream of the mouth of Beaver Creek in an effort to differentiate residential sources from agricultural sources.

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Wampler, P.L., E.E. Knudsen, M. Hudson, T.A. Young. 1993. Chehalis River Basin Fishery Resources: Salmon and Steelhead Stream Habitat Degradations. U.S. Fish & Wildlife Service, Olympia, WA.

Contacts:

Debby Sargeant/ Washington State Department of Ecology
Paul Pickett Environmental Investigations and Laboratory Services Program
(360) 407-6684/(360) 407-6685

If you have special accommodation needs, please contact Barbara Tovrea (360) 407-6696 (voice). Ecology's telecommunication device for the deaf (TDD) number at Ecology Headquarters is (360) 407-6006.

**Appendix A: 1994-96 Ambient Water Quality Data
from the Chehalis River near Grand Mound
and the Black River at Moon Road**

Station No.: 23A100 CHEHALIS R @ PRATHER RD Water Class: A Latitude: 46 46 31.4
 Water Body No.: WA-23-1010 River Mile: 59.90 Longitude: 123 02 03.3

Date	Time	Temp (C)	Flow (CFS)	Conduc- tivity (umhos)	Oxygen (mg/L)	Oxygen Satur. (%)	pH (units)	Suspend Solids (mg/L)	TPN (mg/L)	NH3+NH4 Nitrog. (mg/L)	Total Phosph. (mg/L)	Dissol. Ortho P (mg/L)	Turbid- ity (NTU)	Fecal Colif. (#/100ml)	N02+N03 Nitrog. (mg/L)
94/10/26	0835	10.7	287.0	121	8.9	80.5	7.3	4.0	0.523	0.010 K	0.088	0.102	2.0	9	0.340
94/11/30	0900	6.9	8090.0	74	11.2	92.7	7.1	59.0	1.070	0.013	0.073	0.015	29.0	600 S	0.834
94/12/29	1020	4.1	22300.0	63	10.6	80.1	6.5	44.0	1.160	0.025	0.097	0.009	45.0	120 S	0.857
95/01/25	0905	2.9	2760.0	69	12.0	89.6	6.8	5.0	0.940	0.030	0.021	0.020	8.3	26	0.839
95/02/28	0910	5.2	2850.0	78	11.4	88.9	7.0	7.0	0.925	0.017	0.041	0.016	8.5	59	0.798
95/03/28	0900	6.5	3060.0	73	11.2	89.6	6.9	7.0	0.898	0.018	0.033	0.013	5.4	55	0.677
95/04/26	0845	10.0	1580.0	79	9.8	86.7	7.2	10.0	0.623	0.035	0.061	0.020	3.1	8	0.416
95/05/24	0800	16.3	931.0	95	8.2	82.8	7.1	7.0	0.698	0.068	0.044	0.033	2.8	8	0.403
95/06/28	0815	19.5	459.0	101	8.5	91.4	7.3	12.0	0.609	0.015	0.070	0.040	1.8	22	0.393
95/07/26	0805	20.8	287.0	117	7.2	78.9	7.4	4.0	0.698	0.073	0.096	0.069	1.6	110	0.446
95/08/27	0900	17.1	294.0	103	7.4	74.9	7.1	2.0	0.695	0.044	0.138	0.070	1.2	5	0.459
95/09/27	0820	15.8	300.0	108	7.3	73.9	7.3	3.0	0.766	0.096	0.089	0.071	1.4	35	0.465
95/10/24	1230	10.2		96	10.3	91.0	7.3	2.0	0.660	0.044	0.056	0.027	3.1	17	0.462
95/11/28	1230	9.6		66	10.6	91.6	7.0	118.0	1.190	0.019	0.110	0.015	60.0	1500 S	0.820
95/12/19	1310	7.8		84	10.4	85.4	7.0	22.0	1.190	0.034	0.043	0.014	15.0	120	0.804
96/01/30	1400	2.9		80	12.1	89.0	7.1	7.0	0.988	0.031	0.042	0.018	7.1	12	0.757
96/02/27	1300	5.0		71	12.0	93.8	7.1	18.0	0.951	0.025	0.063	0.006	19.0	23 S	0.778
96/03/26	1140	8.1		92	10.9	92.3	7.4	4.0	0.734	0.039	0.032	0.013	6.7	6	0.555
96/04/29	1235	10.6		67	10.0	88.5	6.9	34.0	0.864	0.024	0.055	0.010	25.0	48	0.641
96/05/28	1350	14.4		78	10.3	100.1	7.4	6.0	0.549	0.018	0.036	0.016	5.1	23	0.459
96/06/24	1255	16.7		94	9.7	99.7	7.5	9.0	0.530	0.042	0.058	0.022	5.2	72	0.295
96/07/30	1350	22.1		95	9.7	110.3	7.4	3.0	0.491	0.010 U	0.034	0.013	2.3	20	0.329
96/08/27	1530	18.8		102	8.6	92.0	7.5	4.0	0.675	0.023	0.080	0.046	2.1	12	0.491
96/09/24	1405	13.2		91	10.3	97.1	7.5	2.0	0.591	0.031	0.052	0.028	2.9	6	0.408
96/10/29	1315	8.1		87	10.7	90.1	7.4	6.0	0.887	0.011	0.034	0.009	5.7	65	0.763
96/11/25	1335	6.2		74	10.9	86.8	6.8								
96/12/16	1300	5.3		70	11.2	86.1	7.0								

Remarks: U,K - Below reporting limit; B - analyte in blank; X - background organisms; J - Estimate; S - Spreader colonies, P - below quantitation limit.

Station No.: 23E070
 Water Body No.: WA-23-1019
 BLACK RIVER @ MOON ROAD BRIDGE
 Water Class: A
 River Mile: 7.10
 Latitude: 46 50 21.1
 Longitude: 123 08 17.0

Date	Time	Temp (C)	Conduc- tivity (umhos)	Oxygen (mg/L)	Oxygen Satur. (%)	pH (units)	Suspend Solids (mg/L)	TPN (mg/L)	NH3+NH4 Nitrog. (mg/L)	Total Phosph. (mg/L)	Dissol. Ortho P (mg/L)	Turbid- ity (NTU)	Fecal Colif. (#/100ml)	NO2+NO3 Nitrog. (mg/L)	Dissol. Nitrite (mg/L)
92/10/26	1325	12.0	103	9.5	87.2	7.4	1.0		0.014	0.024	0.016	0.7	7	0.973	0.010 K
92/11/22	1335	7.9	81	9.0	75.3	7.2	9.0		0.029	0.045	0.015	6.0	170	0.763	0.010 K
92/12/20	1420	4.1	62	10.3	78.4	7.0	3.0		0.022	0.036	0.015	1.5	29	0.843	0.010 K
93/01/25	1510	6.1	53	11.2	89.0	7.0	7.0		0.024	0.033	0.010 K	3.1	72	0.756	0.010 K
93/02/22	1320	4.7	85	11.3	87.0	7.2	3.0		0.019	0.029	0.016	1.8	6	1.160	0.010 K
93/03/22	1420	9.7	73	9.7	85.7	7.1	4.0		0.018	0.030	0.018	1.8	49	0.802	0.010 K
93/04/26	1415	11.4	65	9.1	82.2	7.1	2.0		0.023	0.046	0.022	1.8	130 S	0.550	0.010 K
93/05/24	1320	15.8	84	9.2	92.4	7.0	4.0		0.022	0.047	0.022	1.8	29	0.691	0.010 K
93/06/28	1335	15.8	88	9.5	94.8	7.1	2.0		0.011	0.033	0.022	1.4	28	0.950	0.010 K
93/07/26	1350	17.9	99	9.8	101.6	7.2	3.0		0.013	0.029	0.011	0.7	5	0.976	0.010 K
93/08/23	1300	17.4	103	8.8	90.5	7.4	1.0 K		0.012	0.025	0.020	1.0	13	1.050	0.011
93/09/27	1425	14.6	106	11.0	107.0	7.5	2.0		0.010 K	0.022	0.016	0.6	18	0.917	0.010 K
94/10/26	0735	10.2	107	7.5	67.0	7.3	2.0	1.060	0.010 K	0.046	0.030	1.0	23	0.919	
94/11/30	0800	6.4	72	9.7	79.3	6.9	8.0	1.080	0.010 U	0.049	0.021	7.2	130	0.680	
94/12/29	0910	10.5	54	8.2	72.4	6.7	12.0	1.080	0.022	0.055	0.019	17.0	760 S	0.675	
95/01/25	0805	4.9	71	9.2	72.2	6.9	2.0	1.140	0.025	0.010	0.027	3.5	8	1.040	
95/02/28	0815	4.2	74	8.4	63.6	6.6	3.0	0.912	0.013	0.042	0.021	2.2	74	0.742	
95/03/28	0800	5.4	74	9.3	72.2	6.7	3.0	1.110	0.010 U	0.039	0.013	2.0	39	0.870	
95/04/26	0755	9.7	85	8.2	71.9	6.9	2.0	1.090	0.019	0.061	0.020	2.4	150	0.855	
95/05/24	0710	14.1	103	7.7	74.1	6.9	2.0	1.380	0.010 U	0.012	0.015	1.9	13	1.090	
95/06/28	0730	17.8	111	7.3	75.9	6.9	2.0	1.090	0.010 U	0.030	0.013	1.1	26	0.910	
95/07/26	0730	18.1	126	7.0	72.7	7.5	2.0	1.160	0.157	0.027	0.019	0.7	78	1.080	
95/08/27	0830	15.5	110	7.3	71.3	7.0	1.0 U	1.100	0.043	0.030	0.012	0.5	28	0.932	
95/09/27	0745	14.6	117	6.5	64.1	7.3	2.0	1.340	0.022	0.039	0.032	0.8	280 J	1.170	
95/10/24	1150	10.4	96	6.3	55.8	7.2	2.0	1.070	0.025	0.090	0.043	1.5	6	0.659	
95/11/28	1155	9.4	63	8.0	68.7	7.4	6.0	0.863	0.013	0.058	0.024	4.7	84	0.488	
95/12/19	1235	7.3	68	7.5	60.8	7.3	2.0	1.070	0.017	0.034	0.020	2.1	120	0.637	
96/01/30	1320	2.3	68	10.4	75.1	7.3	3.0	1.140	0.010	0.039	0.024	2.3	40	0.840	
96/02/27	1235	4.7	69	9.9	76.7	7.2	3.0	1.110	0.014	0.037	0.015	2.6	22	0.873	
96/03/26	1220	8.8	84	9.3	80.0	7.2	5.0	1.140	0.028	0.034	0.017	2.7	7	0.895	
96/04/29	1205	11.2	48	7.8	69.8	7.4	4.0	0.680	0.018	0.050	0.023	4.0	77	0.364	
96/05/28	1315	14.7	81	9.1	88.9	7.6	3.0	0.969	0.018	0.033	0.023	2.7	27	0.810	
96/06/24	1225	15.1	96	7.7	76.4	7.5	3.0	1.190	0.089	0.054	0.026	2.5	120 S	0.928	
96/07/30	1315	19.2	107	9.4	101.0	7.5	1.0	0.836	0.010 U	0.032	0.017	2.2	100	0.903	
96/08/27	1445	16.5	106	9.8	99.9	7.5	1.0 U	0.890	0.010 U	0.033	0.013	1.2	39	0.804	

Remarks: U, K - Below reporting limit; B - analyte in blank; X - background organisms; J - Estimate; S - Spreader colonies, P - below quantitation limit.

23E070 Black River @ Moon Road Bridge continued: more dates.

Date	Time	Temp (C)	Conduc- tivity (umhos)	Oxygen (mg/L)	Oxygen Satur. (%)	pH (units)	Suspend Solids (mg/L)	TPN (mg/L)	NH3+NH4 Nitrog. (mg/L)	Total Phosph. (mg/L)	Dissol. Ortho P (mg/L)	Turbid- ity (NTU)	Fecal Colif. (#/100ml)	NO2+NO3 Nitrog. (mg/L)	Dissol. Nitrite (mg/L)
96/09/24	1330	12.5	107	9.9	91.8	7.4	1.0	1.110	0.010 U	0.047	0.017	0.8	14	0.876	
96/10/29	1415	8.1	74	6.6	55.4	7.2	1.0	0.903	0.010 U	0.066	0.032	2.0	14	0.444	
96/11/25	1430	6.6	64	9.9	79.2	6.9									
96/12/16	1215	4.7	59	8.7	65.8	6.7									

Remarks: U, K - Below reporting limit; B - analyte in blank; X - background organisms; J - Estimate; S - Spreader colonies, P - below quantitation limit.