

Beaver/Allen Creek Water Quality Data Report

1994-1995

Abstract

This report describes the water quality monitoring results for a pre-BMP site on Beaver Creek and a post-BMP site on Allen Creek during the first year of a six year BMP evaluation project. Allen Creek is a tributary to Beaver Creek, and Beaver Creek drains to the Black River near Littlerock in Thurston County. The 1994-95 monitoring results show violations in fecal coliform criteria and increases in nitrogen loads downstream of the pre-BMP site on Beaver Creek.

Introduction

This report transmits the results for the 1994 dry season and 1994-95 wet season sampling of Beaver and Allen Creeks. The purpose of the monitoring is to gather pre-BMP data for a dairy operation adjacent to Beaver Creek between creek mile (CM) 4.2 and CM 2.7, and post-BMP data for riparian restoration on Allen Creek. Results are shown in Tables 1 and 2. Sampling sites are shown in Figure 1. All sampling was conducted as described by the Quality Assurance Project Plan (QAPP) (Sargeant, 1994).

Best Management Practices

Several BMPs are planned for the large commercial dairy operation that is located between monitoring sites BeCM 4.2 and BeCM 2.5 on Beaver Creek. Thurston Conservation District has developed a conservation plan for the site. Construction of a waste management system including a storage pond plan began in summer 1995, and is scheduled for completion in summer 1996. The CFRP is funding fencing and revegetation and some bioengineering of Beaver Creek at this site in 1996.

On Allen Creek approximately 2 miles upstream of the mouth, the CFRP has funded BMPs along a 3/4 mile stretch of the creek. The BMPs installed include 7,011 feet of stream bank fencing, 15,000 square feet of buffer restored (Dominguez, 1995), placing and anchoring of 10 large woody debris structures and 1 gravel weir, and construction of a livestock water access area (Edwards, 1995).

Dry Season Sampling

Temperature, pH, ammonia, and fecal coliform bacteria levels met Class A water quality standards during dry season sampling.

The lowest dissolved oxygen (D.O) levels were 5.2 mg/L at the mouth of Allen Creek, 4.2 mg/L at site BeCM 4.2, and 5.1 mg/L at BeCM 2.5. None of these sites met the water quality standard of 8.0 mg/L for D.O.

TABLE 1
BEAVER/ALLEN CREEK DRY AND WET SEASON FIELD DATA

Site Location	Station creek mile	Date	Time	Temp °C	pH	COND µmho /cm	Discharge cfs	D.O. mg/L (dry season) meter Winkler
Beaver Ck. (Case Rd.)	BeCM 4.2	8/31/94	07:50	14.4	7.1	125	1.3	4.4
Beaver Ck. (Case Rd.)	BeCM 4.2	8/31/94	13:21	14.7		123	0.8	4.2
Beaver Ck. (Case Rd.)	BeCM 4.2	9/13/94	14:16	13.3	7.1	155	0.5	7.4
Beaver Ck. (Case Rd.)	BeCM 4.2	9/14/94	10:10	13.7	6.8	149	0.4	5.4
Beaver Ck. (Case Rd.)	BeCM 4.2	11/14/94	10:25	7.2	6.8	128	5.6	
Beaver Ck. (Case Rd.)	BeCM 4.2	12/26/94	13:05	6.8	6.2	62	E 95.1	
Beaver Ck. (Case Rd.)	BeCM 4.2	1/10/95	13:55	5.0	*	64	E 46.7	
Beaver Ck. (Case Rd.)	BeCM 4.2	1/25/95	9:55	3.0	6.3	68	25.3	
Beaver Ck. (Case Rd.)	BeCM 4.2	1/29/95	8:10	6.2	7.5	65	31.1	
Beaver Ck. (Case Rd.)	BeCM 4.2	2/16/95	9:03	3.9	7.3	64	28.0	
Beaver Ck. (Case Rd.)	BeCM 4.2	2/21/95	15:00	9.8	*	49	E 112.7	
Beaver Ck. (Case Rd.)	BeCM 4.2	3/9/95	8:25	7.0	7.8	57	48.1	
Beaver Ck. (Case Rd.)	BeCM 4.2	3/14/95	9:20	9.1	7.1	50	77.9	
Beaver Ck. (Case Rd.)	BeCM 4.2	3/22/95	12:12	7.3	7.2	52	79.7	
Allen Creek (mouth)	BeCM 2.6T	8/31/94	08:10	14.2	7.2	105	1.8	6.2
Allen Creek (mouth)	BeCM 2.6T	8/31/94	14:09	15.8		110	1.8	
Allen Creek (mouth)	BeCM 2.6T	9/13/94	13:55	13.9	6.8	104	2.1	6.3
Allen Creek (mouth)	BeCM 2.6T	9/14/94	10:45	15.1	6.6	108	2.0	5.2
Allen Creek (mouth)	BeCM 2.6T	11/14/94	11:10	7.5	6.7	112	8.5	
Allen Creek (mouth)	BeCM 2.6T	12/26/94	13:45	7.3	6.7	70	E 77.6	
Allen Creek (mouth)	BeCM 2.6T	1/10/95	14:00	5.7	*	75	E 42.2	
Allen Creek (mouth)	BeCM 2.6T	1/25/95	10:40	4.3	6.8	79	24.5	
Allen Creek (mouth)	BeCM 2.6T	1/29/95	9:01	6.8	7.7	75	28.2	
Allen Creek (mouth)	BeCM 2.6T	2/16/95	9:42	4.4	7.4	74	27.4	
Allen Creek (mouth)	BeCM 2.6T	2/21/95	15:20	10.1	*	64	E 71.8	
Allen Creek (mouth)	BeCM 2.6T	3/9/95	9:15	8.3	7.7	71	33.8	
Allen Creek (mouth)	BeCM 2.6T	3/14/95	10:05	9.6	7.1	54	45.9	
Allen Creek (mouth)	BeCM 2.6T	3/22/95	12:50	8.1	7.1	70	49.0	

TABLE 1 PAGE 2

Site Location	Station creek mile	Date	Time	Temp ° C	pH	COND mmho /cm	Discharge cfs	D.O. mg/L (dry season) meter Winkler
Beaver Ck. (Beaver Ck. Ranch)	BeCM 2.5	8/31/94	14:33	15.5		115	2.0	6.1
Beaver Ck. (Beaver Ck. Ranch)	BeCM 2.5	9/13/94	13:30	13.7	6.8	122	2.1	5.8
Beaver Ck. (Beaver Ck. Ranch)	BeCM 2.5	9/14/94	11:08	14.9	6.6	122	1.9	5.1
Beaver Ck. (Beaver Ck. Ranch)	BeCM 2.5	11/14/94	11:44	7.4	5.2	145	22.1	
Beaver Ck. (Beaver Ck. Ranch)	BeCM 2.5	12/26/94	14:07	7.3	7.0	70	e 172.7	
Beaver Ck. (Beaver Ck. Ranch)	BeCM 2.5	1/10/95	14:25	5.4	*	79	e 88.9	
Beaver Ck. (Beaver Ck. Ranch)	BeCM 2.5	1/25/95	11:14	4.0	6.9	81	e 49.8	
Beaver Ck. (Beaver Ck. Ranch)	BeCM 2.5	1/29/95	9:14	6.5	7.3	85	e 59.3	
Beaver Ck. (Beaver Ck. Ranch)	BeCM 2.5	2/16/95	10:15	4.5	7.3	75	e 55.4	
Beaver Ck. (Beaver Ck. Ranch)	BeCM 2.5	2/21/95	15:53	10.1	*	55	e 184.5	
Beaver Ck. (Beaver Ck. Ranch)	BeCM 2.5	3/9/95	9:40	7.7	7.7	83	e 81.9	
Beaver Ck. (Beaver Ck. Ranch)	BeCM 2.5	3/14/95	10:35	9.4	7.2	70	e 123.8	
Beaver Ck. (Beaver Ck. Ranch)	BeCM 2.5	3/22/95	13:18	7.8	7.4	63	e 128.7	
Beaver Ck. (Hwy 121)	BeCM 0.1	8/31/94	09:14	14.0		112	2.2	9.3
Beaver Ck. (Hwy 121)	BeCM 0.1	8/31/94	15:20	16.3		111	2.3	9.4
Beaver Ck. (Hwy 121)	BeCM 0.1	9/13/94	12:55	13.7	7.3	113	3.0	10.3
Beaver Ck. (Hwy 121)	BeCM 0.1	9/14/94	11:47	14.9	7.2	104	3.0	9.7
Beaver Ck. (Hwy 121)	BeCM 0.1	11/14/94	13:15	7.7	8.0	142	17.9	
Beaver Ck. (Hwy 121)	BeCM 0.1	12/26/94	14:25	7.3	6.9	74	E 200.4	
Beaver Ck. (Hwy 121)	BeCM 0.1	1/10/95	14:35	5.5	*	70	E 99.3	
Beaver Ck. (Hwy 121)	BeCM 0.1	1/25/95	12:10	4.4	7.0	78	63.8	
Beaver Ck. (Hwy 121)	BeCM 0.1	1/29/95	9:42	6.7	7.7	80	79.6	
Beaver Ck. (Hwy 121)	BeCM 0.1	2/16/95	10:39	4.7	7.3	69	75.1	
Beaver Ck. (Hwy 121)	BeCM 0.1	2/21/95	16:05	10.1	*	55	E 254.3	
Beaver Ck. (Hwy 121)	BeCM 0.1	3/9/95	10:05	7.8	7.7	85	104.0	
Beaver Ck. (Hwy 121)	BeCM 0.1	3/14/95	10:55	9.5	7.3	74	160.2	
Beaver Ck. (Hwy 121)	BeCM 0.1	3/22/95	13:35	7.7	7.2	60	161.0	

Post calibration of meter showed meter reading from 0.4 to 0.5 low compared to known standard data is considered valid, but biased from 0.4 to 0.5 low.

E Field estimate\gauge reading.

e Flow estimated by combining Allen Creek flow and Beaver Ck (Case Rd) flow.

TABLE 2

BEAVER/ALLEN CREEK DRY AND WET SEASON LABORATORY DATA

Site Location	Station creek mile	Date	Time	Turbidity NTU	BOD5 mg/L dry season	NH3 mg/L	NO2/3 mg/L	Total** Organic Nitrogen mg/L	TPN mg/L	Total Phos. mg/L dry season	Fecal Coliform cfu/100 mL
Beaver Ck. (Case Rd.)	BeCM 4.2	8/31/94	07:50			J 0.029	J 0.284	0.253	J 0.566	J 0.043	4
Beaver Ck. (Case Rd.)	BeCM 4.2	8/31/94	13:21			J 0.033	J 0.284	0.211	J 0.528	J 0.038	
Beaver Ck. (Case Rd.)	BeCM 4.2	9/13/94	14:16			0.042	0.275	0.197	0.514	0.039	9
Beaver Ck. (Case Rd.)	BeCM 4.2	9/14/94	10:10			0.022	0.301	0.184	0.507	0.032	
Beaver Ck. (Case Rd.)	BeCM 4.2	11/14/94	10:25	3.9		0.017	0.173	0.298	0.488		43
Beaver Ck. (Case Rd.)	BeCM 4.2	12/26/94	13:05	2.3		< 0.010	0.385	0.308	0.703		195
Beaver Ck. (Case Rd.)	BeCM 4.2	1/10/95	13:55	1.7		0.011	0.405	0.141	0.557		27
Beaver Ck. (Case Rd.)	BeCM 4.2	1/25/95	9:55	1.0		< 0.010	U 0.010	0.419	0.439		8
Beaver Ck. (Case Rd.)	BeCM 4.2	1/29/95	8:10	2.0		< 0.010	0.286	0.195	0.491		31
Beaver Ck. (Case Rd.)	BeCM 4.2	2/16/95	9:03	1.4		< 0.010	0.271	0.143	0.424		36
Beaver Ck. (Case Rd.)	BeCM 4.2	2/21/95	15:00	2.2		< 0.010	0.422	0.222	0.654	X	16
Beaver Ck. (Case Rd.)	BeCM 4.2	3/9/95	8:25	2.2		< 0.010	0.199	0.228	0.437		61
Beaver Ck. (Case Rd.)	BeCM 4.2	3/14/95	9:20	2.1		0.018	0.166	0.223	0.407		52
Beaver Ck. (Case Rd.)	BeCM 4.2	3/22/95	12:12	1.6		0.019	0.124	0.266	0.409		11
Allen Creek (mouth)	BeCM 2.6T	8/31/94	08:10			J < 0.010	J 0.102	0.099	J 0.253	J 0.063	130
Allen Creek (mouth)	BeCM 2.6T	8/31/94	14:09			J 0.011	J 0.105	0.170	J 0.286	J 0.053	170
Allen Creek (mouth)	BeCM 2.6T	9/13/94	13:55			0.024	0.080	0.213	0.317	0.046	57
Allen Creek (mouth)	BeCM 2.6T	9/14/94	10:45			0.035	0.099	0.238	0.372	0.054	
Allen Creek (mouth)	BeCM 2.6T	11/14/94	11:10	1.9		0.012	0.235	0.293	0.540		26
Allen Creek (mouth)	BeCM 2.6T	12/26/94	13:45	5.5		< 0.010	0.339	0.401	0.750		210
Allen Creek (mouth)	BeCM 2.6T	1/10/95	14:00	1.8		< 0.010	0.398	0.253	0.661	X	60
Allen Creek (mouth)	BeCM 2.6T	1/25/95	10:40	1.8		< 0.010	0.483	0.252	0.745		29
Allen Creek (mouth)	BeCM 2.6T	1/29/95	9:01	2.3		< 0.010	0.426	0.431	0.780	0.751	61
Allen Creek (mouth)	BeCM 2.6T	2/16/95	9:42	2.5		< 0.010	0.415	0.206	0.631		35
Allen Creek (mouth)	BeCM 2.6T	2/21/95	15:20	2.1		< 0.010	0.407	0.281	0.698		71
Allen Creek (mouth)	BeCM 2.6T	3/9/95	9:15	2.7		< 0.010	0.356	0.370	0.736	X	14
Allen Creek (mouth)	BeCM 2.6T	3/14/95	10:05	2.0		< 0.010	0.350	0.384	0.744		79
Allen Creek (mouth)	BeCM 2.6T	3/22/95	12:50	2.3		0.029	0.319	0.461	0.809		29
Beaver Ck. (Beaver Ck. Ranch)	BeCM 2.5	8/31/94	08:45			J < 0.010	J 0.656	0.227	J 0.893	J 0.067	120
Beaver Ck. (Beaver Ck. Ranch)	BeCM 2.5	8/31/94	14:33			J 0.018	J 0.709	0.283	J 1.01	J 0.056	
Beaver Ck. (Beaver Ck. Ranch)	BeCM 2.5	9/13/94	13:30			0.060	0.498	0.373	0.931	0.118	69
Beaver Ck. (Beaver Ck. Ranch)	BeCM 2.5	9/14/94	11:08			0.032	0.605	0.284	0.921	0.113	
Beaver Ck. (Beaver Ck. Ranch)	BeCM 2.5	11/14/94	11:44	2.9		0.486	0.491	1.20	1.93	2.22	J 5600
Beaver Ck. (Beaver Ck. Ranch)	BeCM 2.5	12/26/94	14:07	4.6		0.171	0.658	0.781	1.61		5800
Beaver Ck. (Beaver Ck. Ranch)	BeCM 2.5	1/10/95	14:25	1.7		0.057	0.838	0.841	1.08	1.21	660
Beaver Ck. (Beaver Ck. Ranch)	BeCM 2.5	1/25/95	11:14	2.8		0.023	0.977	0.390	1.39		84
Beaver Ck. (Beaver Ck. Ranch)	BeCM 2.5	1/29/95	9:14	2.7		0.182	0.819	0.339	1.34		4700
Beaver Ck. (Beaver Ck. Ranch)	BeCM 2.5	2/16/95	10:15	2.9		0.052	0.793	0.194	1.05	1.03	230

TABLE 2 PAGE 2

Site Location	Station creek mile	Date	Time	Turbidity NTU	BOD5 mg/L dry season	NH3 mg/L	NO2/3 mg/L	Total** Organic Nitrogen mg/L	TPN mg/L	Total Phos. mg/L dry season	Fecal Coliform cfu/100 mL
Beaver Ck. (Beaver Ck. Ranch)	BeCM 2.5	2/21/95	15:53	2.0		0.012	0.601	0.290	0.903		X
Beaver Ck. (Beaver Ck. Ranch)	BeCM 2.5	3/9/95	9:40	4.3		0.139	0.667	0.790	1.68	1.48	J 11000
Beaver Ck. (Beaver Ck. Ranch)	BeCM 2.5	3/14/95	10:35	4.1		0.409	0.514	0.687	1.61		14000
Beaver Ck. (Beaver Ck. Ranch)	BeCM 2.5	3/22/95	13:18	2.1		0.055	0.492	0.364	0.911	0.957	S 830
Beaver Ck. (Hwy 121)	BeCM 0.1	8/31/94	09:14		< 2	J < 0.010	J 0.853	0.217	J 1.08	J 0.063	
Beaver Ck. (Hwy 121)	BeCM 0.1	8/31/94	15:20		< 2	J 0.033	J 0.834	0.213	J 1.08	J 0.078	84
Beaver Ck. (Hwy 121)	BeCM 0.1	9/13/94	12:55		< 2	0.011	0.502	0.345	0.858	0.111	88
Beaver Ck. (Hwy 121)	BeCM 0.1	9/14/94	11:47		< 2	0.011	0.558	0.348	0.917	0.112	
Beaver Ck. (Hwy 121)	BeCM 0.1	11/14/94	13:15	2.6		0.379	1.290	0.391	2.06		S 1000
Beaver Ck. (Hwy 121)	BeCM 0.1	12/26/94	14:25	5.8		0.190	0.700	0.710	1.60		S 6800
Beaver Ck. (Hwy 121)	BeCM 0.1	1/10/95	14:35	1.6		0.034	0.873	0.213	1.12		460
Beaver Ck. (Hwy 121)	BeCM 0.1	1/25/95	12:10	1.5		< 0.010	0.994	0.106	1.11		80
Beaver Ck. (Hwy 121)	BeCM 0.1	1/29/95	9:42	3.0		0.101	0.878	0.141	1.12		S 2800
Beaver Ck. (Hwy 121)	BeCM 0.1	2/16/95	10:39	2.7		0.043	0.859	0.138	1.04		270
Beaver Ck. (Hwy 121)	BeCM 0.1	2/21/95	16:05	3.1		< 0.010	0.594	0.298	0.885	0.919	S 53
Beaver Ck. (Hwy 121)	BeCM 0.1	3/9/95	10:05	4.5		0.011	0.735	0.844	1.59		J 5300
Beaver Ck. (Hwy 121)	BeCM 0.1	3/14/95	10:55	3.4		0.188	0.567	0.467	1.36	1.12	J 7700
Beaver Ck. (Hwy 121)	BeCM 0.1	3/22/95	13:35	2.3		0.071	0.521	0.352	0.944		520

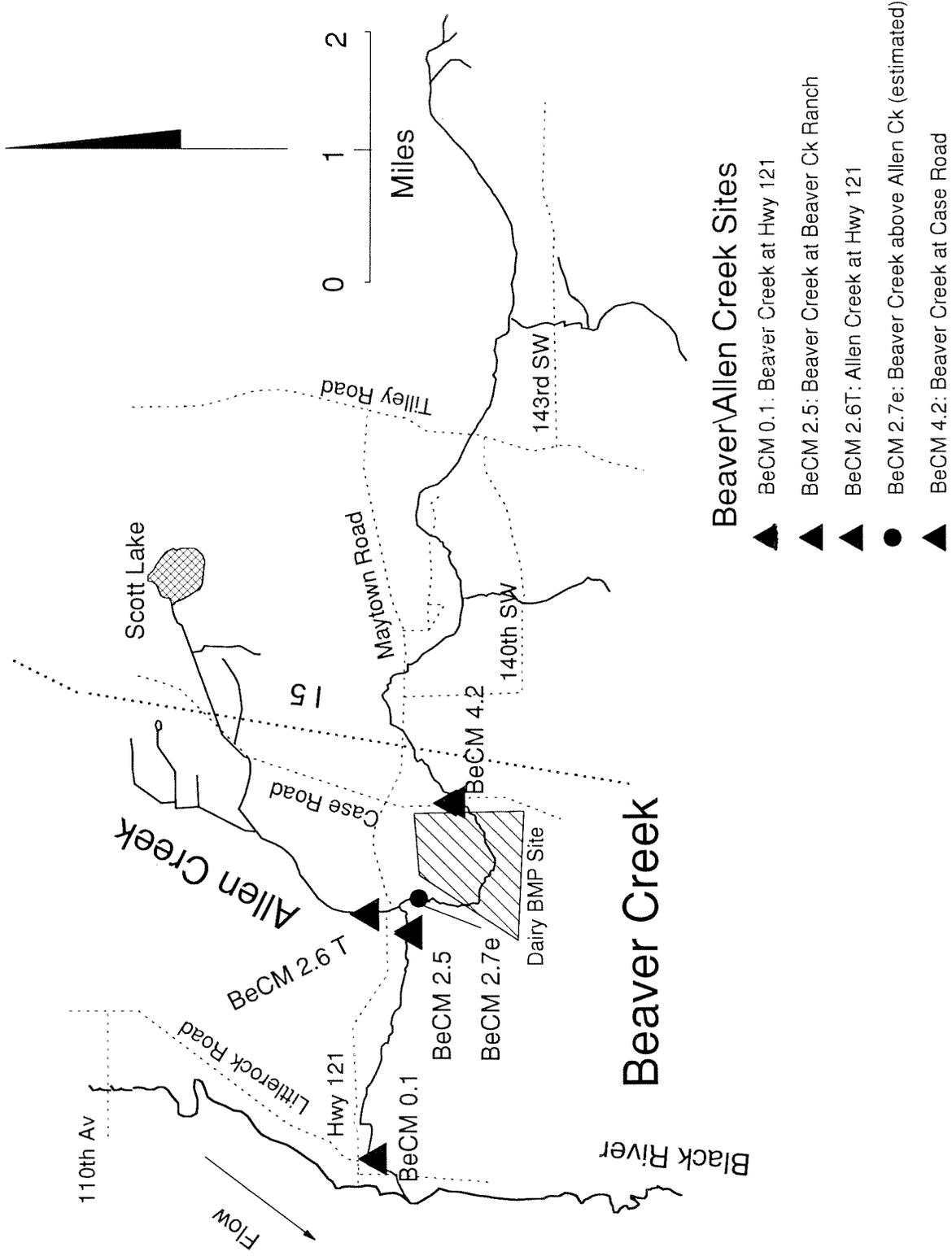
** Total organic nitrogen is calculated by subtracting ammonia and nitrate/nitrite from total persulfate nitrogen.

< Less than the reported result.

J Analyte was positively identified. The associated numerical result is an estimate.

X High background count, count may be an underestimate.

S Other bacteria present, count may be an underestimate.



Beaver\Allen Creek Sites

- ▲ BeCM 0.1: Beaver Creek at Hwy 121
- ▲ BeCM 2.5: Beaver Creek at Beaver Ck Ranch
- ▲ BeCM 2.6T: Allen Creek at Hwy 121
- BeCM 2.7e: Beaver Creek above Allen Ck (estimated)
- ▲ BeCM 4.2: Beaver Creek at Case Road

Figure 1. Beaver and Allen Creek Sampling Sites

Total phosphorus levels were slightly elevated at BeCM 2.5 and BeCM 0.1 on September 13 and 14, 1994. On those days total phosphorus levels were slightly higher than 0.10 mg/L. Phosphorus concentrations above 0.10 mg/L in flowing waters may stimulate algal growth (EPA, 1986), and may represent a significant input to the Black River which is subject to a 0.05 mg/L TMDL target for total phosphorus (Pickett, 1994).

Total persulfate nitrogen and nitrite/nitrate levels were considerably higher at the two downstream Beaver Creek stations. Figure 2 illustrates Beaver Creek ammonia, nitrite/nitrate, organic nitrogen, and total persulfate nitrogen loading in pounds per day for the most upstream site at BeCM 4.2, a site just below the BMP area and upstream of Allen Creek at Beaver CM 2.7e, and a site at the mouth at BeCM 0.1. The organic nitrogen component was calculated by subtracting ammonia and nitrite/nitrate from total persulfate nitrogen. The loadings in Beaver Creek at BeCM 2.7e were estimated by subtracting the loading at the mouth of Allen Creek from the loading at BeCM 2.5.

In the reach between BeCM 4.2 and BeCM 2.7e, ammonia loadings decreased during three out of four sample events, nitrite/nitrate loading increased during all four sample events, and organic nitrogen loading increased slightly during two out of four sample events. Increases in nitrite/nitrate and organic nitrogen are attributed to the pre-BMP site between BeCM 4.2 and BeCM 2.7. For the reach between BeCM 2.7e and BeCM 0.1, ammonia loading increased during three out of four sample events, nitrite/nitrate, and total organic nitrogen loading increased during all four sampling events.

Wet Season Sampling

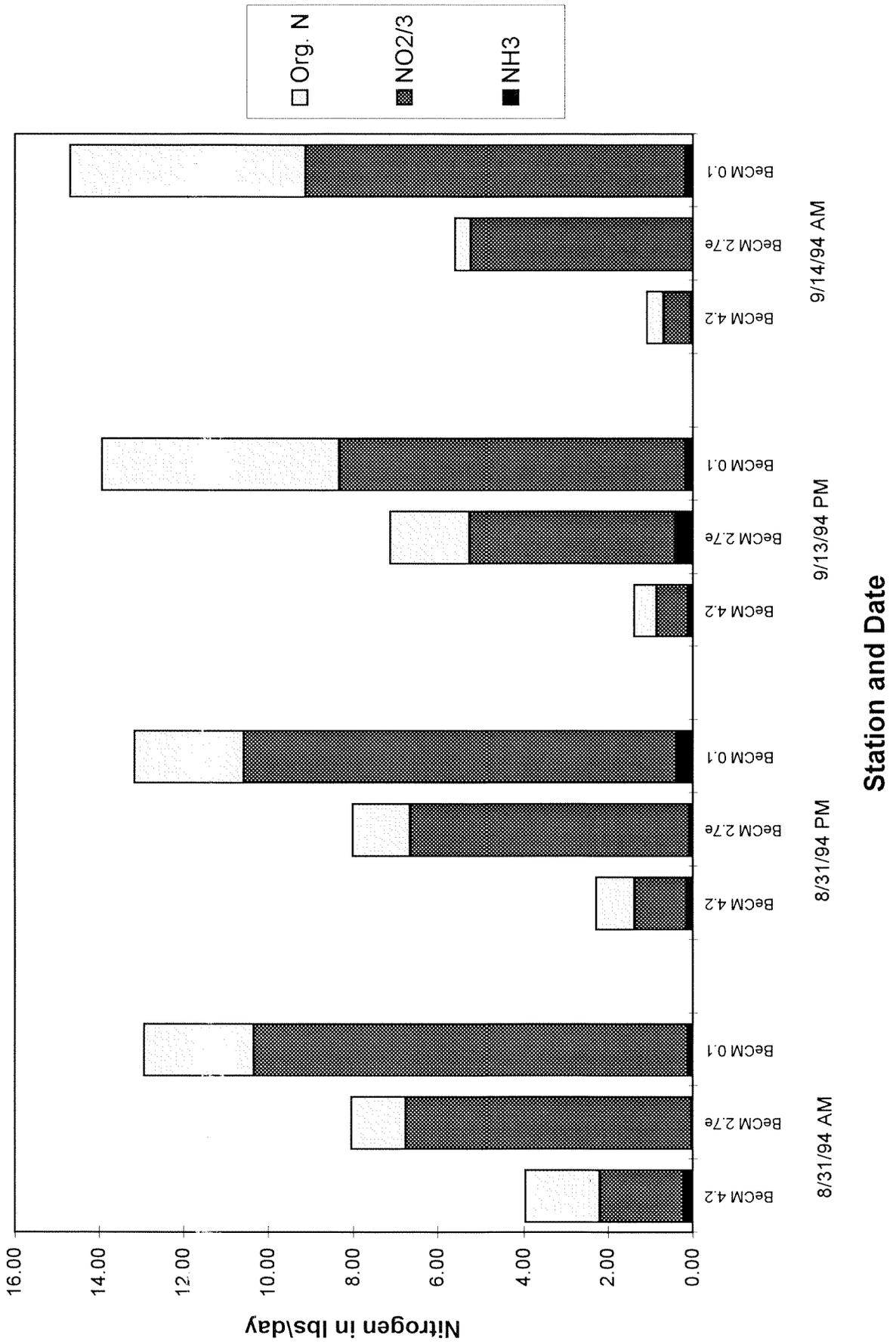
During winter sampling, temperature, ammonia, and turbidity levels met water quality standards for all sites. Turbidity levels from the upstream station at BeCM 4.2 were used as background.

The site at BeCM 4.2 did not meet the water quality criterion for pH on December 26, 1994. The pH was 6.2, just below the standard. The site at BeCM 2.5 did not meet the standard for pH on November 14, 1994, with a low pH of 5.2.

Fecal coliform levels at the two downstream Beaver Creek sites, BeCM 2.5 and BeCM 0.1, did not meet water quality standards. Wet season fecal coliform results are summarized below.

Site Location	Geometric mean below 100 cfu/100 mL?	10 % or less of all samples for calculating GM exceed 200 colonies/100 mL?
BeCM 4.2	Yes (GM=32)	Yes, no samples exceed 200
BeCM 2.6T	Yes (GM=47)	Yes, 10% exceed 200
BeCM 2.5	No, (GM=1,300)	No, 80% exceed 200
BeCM 0.1	No, (GM=840)	No, 80% exceed 200

Figure 2. Nitrogen Levels for Beaver Creek Dry Season Sampling 1994-95.



In the Black River Wet Season Nonpoint Source Total Maximum Daily Load Study (Coots, 1994) a target fecal coliform (FC) load allocation for the mouth of Beaver Creek was set at 0.131×10^{12} FC per day. If loading were reduced to this level during critical conditions, the criteria for fecal coliform would be met at the mouth of Beaver Creek (critical conditions are defined as soil saturated conditions on a rising hydrograph with 0.5" of rainfall occurring in the preceding 48 hours). For the Black River TMDL study, the observed fecal coliform critical load at the mouth of Beaver Creek was a geometric mean of 1.58×10^{12} FC per day. The geometric mean fecal coliform load at the mouth of Beaver Creek for wet season 1994-95 was 2.5×10^{12} FC per day.

Figure 3 presents ammonia, nitrite/nitrate, organic nitrogen, and total persulfate nitrogen loading in pounds per day for each site. During the winter season, flow discharge measurements for BeCM 2.5 could not be safely obtained. Flows for BeCM 2.5 were estimated by totaling flows from BeCM 4.2 and BeCM 2.6T. Allen Creek is the only significant tributary between BeCM 4.2 and BeCM 2.5. Additional flow along that stretch could come from ground water inputs and overland flow during heavy rain events. If the discharge at BeCM 2.5 was under-estimated, then the nitrogen loadings presented for BeCM 2.7e in Figure 3 would be an under-estimate.

Figure 3 shows an increase in total nitrogen in the reach between BeCM 4.2 and BeCM 2.7e; increases in nitrite/nitrate were especially notable. For the reach between BeCM 2.7e and BeCM 0.1, increases in total nitrogen, ammonia, and nitrite/nitrate loading were noted during four out of ten sample events, and organic nitrogen loading increased during nine out of ten sample events. Dry and wet season increases in nitrogen were noted between BeCM 2.7e and BeCM 0.1. This indicates a source or sources of nitrogen between BeCM 2.7e and BeCM 0.1.

Conclusions

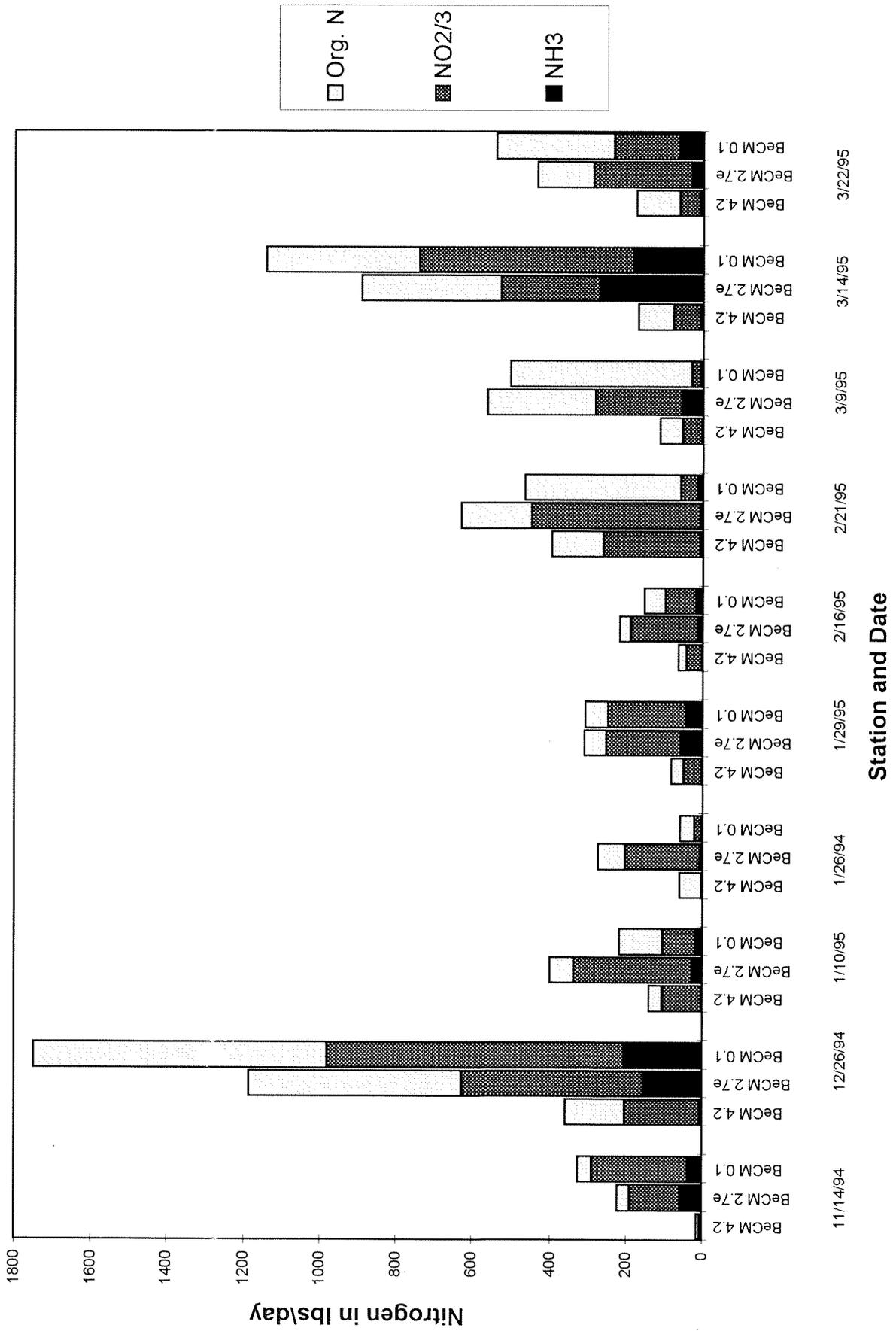
Increases in dry and wet season nitrogen loads and wet season violations in the water quality standard for fecal coliform suggest a source or sources of nitrogen and bacteria between BeCM 4.2 and BeCM 2.5. This result is consistent with earlier studies. The likely source is the dairy located between BeCM 4.2 and BeCM 2.5. This dairy is in the process of implementing BMPs. Construction of a lagoon for wastewater storage began in July 1995 and a new wastewater land application system is being installed.

Surface water post-BMP monitoring of the BMP site is scheduled to begin winter 1995 (Sargeant, 1995), provided BMPs are in place and being effectively implemented. Ecology began a ground water monitoring study of the site in June 1995 (Erickson, 1995). Ground water sampling will continue every other month through October 1996. The ground water report is slated for March 1997. A detailed analysis of the surface water quality data for Beaver and Allen Creeks is planned for the final report in 1998, after several years of data have been collected.

References

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