

To: WRIA 35 Planning Committee	
From: Jory Oppenheimer and Kari Vigerstol	Project: WRIA 35 Level II – Water Quality
CC: Ben Floyd, HDR/EES; John Koreny, HDR/EES	
Date: March 10, 2005	Job No: 22592

RE: PATAHA CREEK FECAL COLIFORM – COMPLIANCE WITH WATER QUALITY STANDARDS

This technical memorandum addresses fecal coliform in Pataha Creek based on our review of existing data and water quality standards. The purpose of this assessment was to determine whether the recent fecal coliform data collected in Pataha Creek exceeded water quality standards. The main topics addressed in this memorandum include:

- Summary of the existing monitoring program and data
- Fecal coliform standards for Pataha Creek
- Basis for 303(d) listing of Pataha Creek
- Results of the assessment of existing fecal coliform data
- Conclusions
- Recommendations

PATAHA CREEK PROJECT STUDY AREA

The Pataha Creek watershed is about 115,000 acres located in Garfield and Columbia Counties. The upper elevation of the watershed is 5,600 feet. The elevation at the mouth of the creek is at an elevation of 800 feet (HDR/EES 2005). Major tributaries of Pataha Creek include Dry Pataha Creek, Sweeney Gulch, Balmaier Gulch, Tatman Gulch, and Dry Hollow.

Agricultural production is the primary land use in the Pataha Creek subbasin. Agricultural includes pasture, grains, hay and livestock production (HDR/EES 2005). Major non-irrigated crops include winter wheat, spring grain, peas, and bluegrass seed, while irrigated agriculture occurring in the bottomlands along Pataha Creek includes hay, small grains, and rotation pasture. In the furthest upstream sections of the subbasin forest is the major land cover. The City of Pomeroy, with a population of just over 1500 people, is located on Pataha Creek in the northeastern area of the subbasin (Figure 1).

EXISTING MONITORING PROGRAMS DATASETS

Table 1 summarizes the water quality monitoring programs that have sampled for fecal coliform in Pataha Creek and its tributaries. The monitoring stations are shown in Figure 2. The Washington Department of Ecology has two sites, one on the lower section of Pataha Creek at Archer Road and another in the upper portion of the watershed on Pataha Creek at Rosy Grade

(DOE 2005). Each site was sampled monthly for various water quality parameters in two separate water years, the first site in 1997 and the second in 2002. Washington State University (WSU) began water quality sampling and spot flow sampling at several sites in the Pataha Creek subbasin in 1998 (HDR/EES 2005). From 1998 to 2001 sampling sites Sampling was conducted at three sites on Pataha Creek from 1998 to 2001. Two samples a month were taken at each site and testing parameters include temperature, total suspended solids, fecal coliform, dissolved oxygen, and pH.

**Table 1.
Summary of Existing and Past Water Quality Monitoring Programs in Pataha Creek and its Tributaries**

Stations	Agency	Period of record	Location
35F070	Ecology	1997	Pataha Creek at Archer Rd
35F110	Ecology	2002	Pataha Creek at Rosy Grade
Pataha 1	WSU	1998-2001, 2003-2004	Pataha Creek below Dry Hollow confluence
Pataha 3	WSU	1998-2002, 2003-2004	Pataha Creek at Marengo
Pataha 4	WSU	1998-2001, 2003-2004	Pataha Creek upstream of Sweeney Gulch confluence
Pataha 5	WSU	1998-2001, 2003-2004	Pataha Creek near Columbia Center

FECAL COLIFORM STANDARDS FOR PATAHA CREEK

The Surface Water Quality Standards for Washington State designate Asotin Creek as a Class A (excellent) waterbody (WAC 173-201A)¹. The fecal coliform standards for Class A waters includes two parts². The first part, a geometric mean, is similar to an average. The standards are based on the geometric mean of all the samples collected over a year (or season). The water quality standard for Class A waters is less than 100 colony forming units (cfu)/100 ml for the geometric mean of all the samples collected.

The second part of the fecal coliform standard requires that 10 percent of the samples collected over the year (or season) are less 200 cfu/100 ml. For example, if 10 samples are collected during a year, not more than one sample should be above 200 cfu/100 ml.

¹ This 1997 version of the surface water quality standards was revised in 2003 by Ecology. However, the 2003 version is currently under review by EPA. The fecal coliform criteria are the same for both versions of the standards

² As stated in the 1997 version of the Surface Water Standards (WAC 173-201A) for Class A waters - "Fecal coliform organism levels shall both not exceed a geometric mean value of 100 colonies/100 mL, and not have more than 10 percent of all samples obtained for calculating the geometric mean value exceeding 200 colonies/100 mL."

BASIS FOR 303(d) LISTING

Pataha Creek is listed as an impaired water body for fecal coliform on Ecology's 1998 and 2002/2004 303(d) lists. The rationale for the 303(d) listing of Asotin Creek is summarized in Table 2. The 303(d) listing prepared in 1998 is the most current approved by EPA. Ecology will likely submit a revised 303(d) list (2002/2004) to EPA for approval as part of the 303(d) program under the provisions of the Federal Clean Water Act in April 2005 (Ken Koch, Ecology, personal communication, 2005).

**Table 2
Rationale for 303d Listing for Pataha Creek**

Stream Segment ID#	Basis for Listing
1998 303(d) List	
BT00LT	Cusimano, 1992, 2 excursions beyond the upper criterion on 10/15/91 and 10/16/91 at RM 22.9 (150ft below Pomeroy WWTP outfall).
BT00LT	Data collected by Umatilla National Forest (submitted by Jeff Blackwood on 10/29/97) show 1 excursions beyond the lower criterion (geometric mean from 12 samples collected at RM 23) during 10/97.
2002/2004 303(d) List	
16797	Geometric mean of 128 and 50% of samples exceeds the percentile criterion from 8 samples collected in 1997 – Station 35F070 (Pataha Ck at Archer Road) Ecology.
40550	WSU (2001) show excursions beyond the geometric mean criterion in 1999 and 2000 at Station PAT 3 (SR 12 at Marengo Road Bridge).
40551	WSU (2001) show excursions beyond the geometric mean criterion in 1999 and 2000 at Station PAT 4 (Upstream of Sweeny Gulch confluence)
40548	WSU (2001) show excursions beyond the geometric mean criterion in 1999 at Station PAT 1 (SR 261 @ Delaney)
40549	WSU (2001) show excursions beyond the geometric mean criterion in 1999 and 2000 at Station PAT 2 (SR 12 at Dodge Junction)
42532	Hallock (2004) Dept of Ecology ambient monitoring station 35F110 shows 2 of 9 samples (22.2%) in year 2002 exceeded the percentile criterion.

Source: Ecology's 303(d) List web page

RESULTS

Comparison with Fecal Coliform Standards

Figures 3 and 4 compare the fecal coliform concentrations measured in Pataha Creek between 1997 and 2004, with the fecal coliform geometric mean and percentile criteria. Figures 3 and 4 indicate the recent data (collected in 2004) meet the geometric mean criterion, but not all stations comply with the percentile criterion. These data also indicate that the proportion (percentiles) of samples above 200 cfu/100 ml have decreased compared with the data used to place Pataha Creek on the 303(d) list.

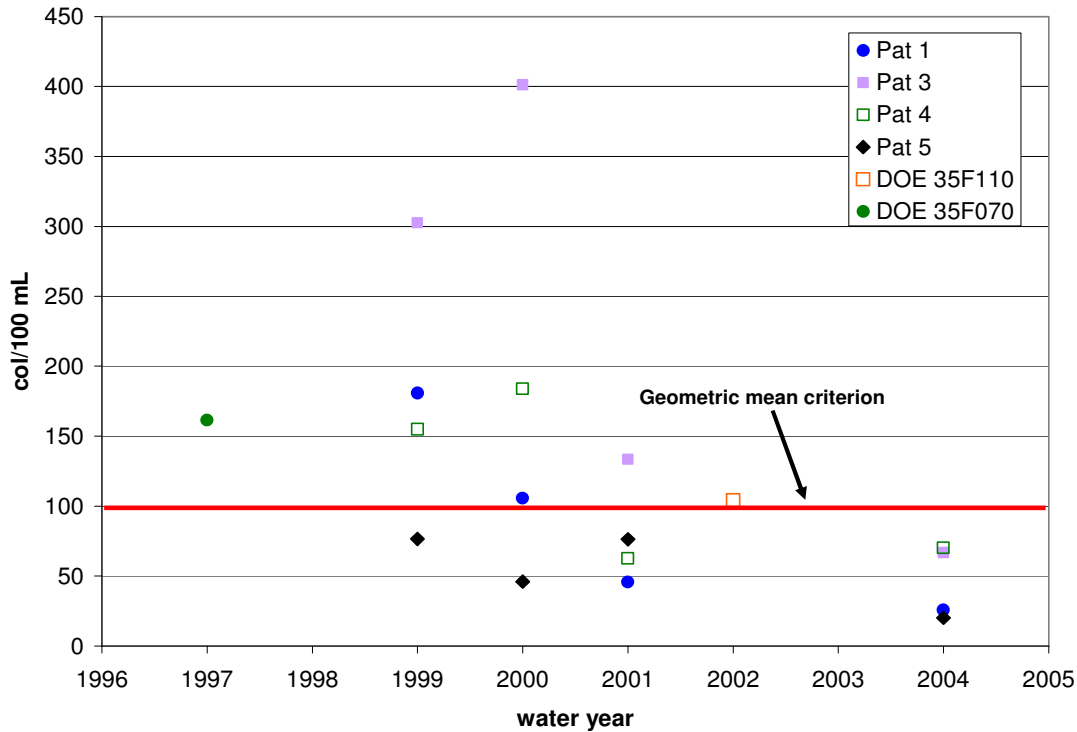


Figure 3 Comparison with geometric mean fecal coliform criterion for Pataha Creek stations

Table 3 summarizes compliance with the fecal coliform standards for the Pataha Creek stations based on the data collected between 1997 and 2004. The table indicates that there were fewer exceedences of the standards in 2004, but fecal concentrations are still above the state standards two of the four Pataha Creek stations.

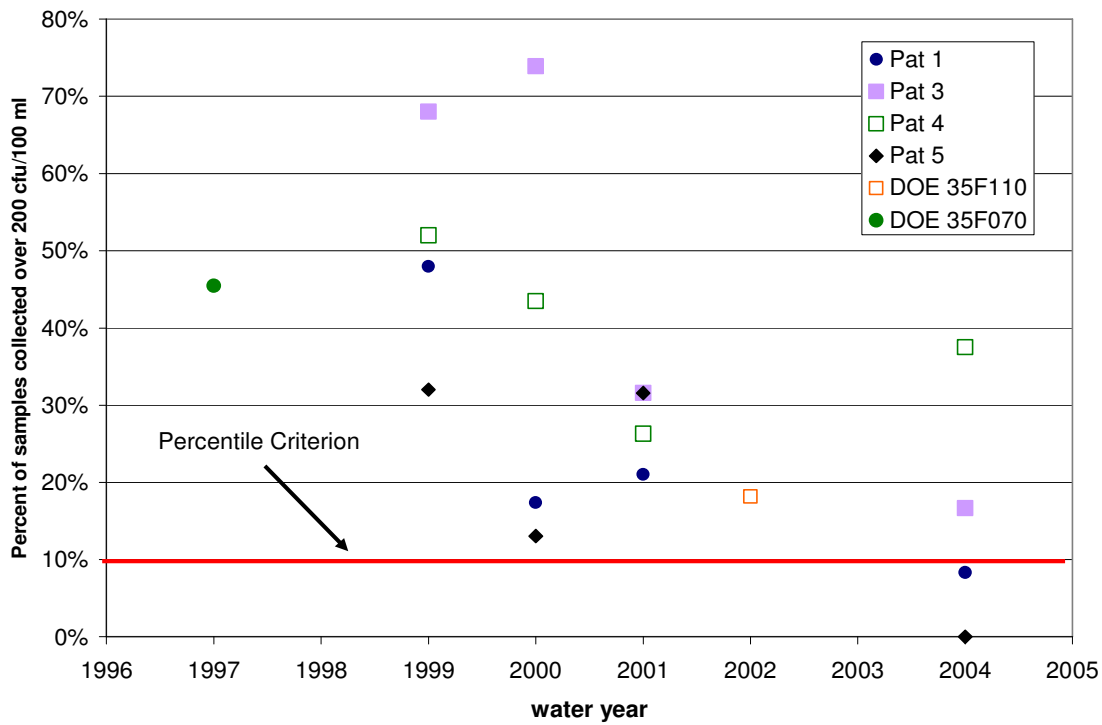


Figure 4 Comparison with the fecal coliform percentile criterion for the Pataha Creek stations

Table 3
Summary of fecal coliform compliance within Pataha Creek

WQ Criteria	1997	1999				2000				2001				2002	2004			
	DOE 35F070	1*	3	4	5	1	3	4	5	1	3	4	5	DOE 35F11 0	1	3	4	5
Geo Mean < 100 cfu/100 ml	X	X	X	X	√	X	X	X	√	√	X	√	√	X	√	√	√	√
<10% samples at 200 cfu/100 ml	X	X	X	X	X	X	X	X	X	X	X	X	X	X	√	X	X	√

*1 = Pat 1, 3 = Pat 3, 4 = Pat 4, 5 = Pat 5,

Legend:

X = exceeds criteria

√ = meets criteria

CONCLUSIONS

The results of our review of existing fecal coliform data and standards indicate that:

- Fecal coliform data collected in Pataha Creek in 2001 and 2004 had lower concentrations than previous years. In 2004, all four stations had geometric means below the Class A fecal coliform criteria of 100 cfu/100 ml.
- Fecal coliform standards are still not being met at in Pataha Creek, because two of the four stations exceeded the percentile criterion of not more than 10 percent of the samples with fecal coliform concentrations greater than 200 cfu/100 ml.

RECOMMENDATIONS

- Submit the 2004 data to Ecology for the 2006 303(d) List. Although not all stations currently comply with the fecal coliform standards, the recent data indicate that two of the four segments now comply with fecal coliform standards. In addition to assessing waterbodies for the 2006 303(d), Ecology will begin scoping for total maximum daily load (TMDL) studies in WRIA 35 this fall.
- Continue water quality improvement projects to bring fecal coliform levels in compliance in Pataha Creek. Levels of fecal coliform in the last two years of monitoring conducted by WSU (2001 and 2004), compared with the earlier years monitored by WSU (1999 and 2000).
- Continue fecal coliform monitoring at the mainstem Pataha Creek to verify the trend of declining fecal coliform levels and develop the data for future 303(d) lists.

REFERENCES

Ecology. 2005. 2002/2004 303(d) web page: <http://www.ecy.wa.gov/programs/wq/303d/index.html>

Ecology 2002. Water Quality Program Policy 1-11. September 2002.

Koch, Ken, Ecology (personal communication).