

4b Analysis for Daniels, Indianola, Kitsap, Jump Off Joe, Kinman, Enetai, and Lofall Creeks

The Washington Department of Ecology (Ecology) Integrated Report (IR), which was submitted to EPA in May 2008, has excluded ten listings for fecal coliform in the following creeks from the 303(d) list and placed these waterbodies in category 4b of the IR.

Daniels Creek—53094, 53095

Indianola Creek—53113

Kitsap Creek—53110

Jump Off Joe Creek—53117

Kinman Creek—38667

Enetai Creek—43034, 53101, 53102

Lofall Creek--53091

These are new listings. Ecology's basis for excluding these waterbodies from the 303(d) list is outlined in this evaluation.

Identification of Segment and Statement of Problem Causing Impairment

These creeks are located in various parts of Kitsap County. Daniels Creek drains to Liberty Bay, which has ten Category 5 listings and seven Category 2 listings for fecal coliform. Indianola and Kitsap Creeks drain to Port Madison, which has three Category 2 fecal coliform listings and one Category 5 Enterococci listing. Jump Off Joe, Kinman, and Lofall Creeks drain to Hood Canal, which has a Category 5 dissolved oxygen listing at the mouth of Lofall Creek and not far from the mouths of Jump Off Joe and Kinman Creeks.

The fecal coliform pollution in these streams was identified by Kitsap County through its on-going monitoring program. The most likely sources are failing septic systems, but pollution could also be coming from poor livestock management and manure runoff.

Description of Pollution Controls and How They Will Achieve Water Quality Standards

In 1993, the Kitsap County Board of Commissioners adopted Ordinance 156-1993, establishing the Kitsap County Surface and Stormwater Management Program (KCSSWM). The goals of the program are to:

- Protect public health and natural resources.
- Minimize institutional costs.
- Obtain support for the program from other municipalities, tribal governments, and county residents.
- Meet state and federal regulatory requirements.
- Provide a permanent funding source to address nonpoint source pollution.

The county's intent is to meet Washington's numeric criteria for fecal coliform by eliminating anthropogenic sources and to stay in compliance in the future through an on-going monitoring and correction program.

Surface and Stormwater Management Program (SSWM) fees are assessed on properties in the unincorporated area of Kitsap County. Fees appear on annual property tax billings. The 2008 budget for the SSWM is \$5.6 million.

Funds are shared by the Kitsap County Public Works Department, which oversees the entire program; the Kitsap County Health District, which performs water quality monitoring, pollution identification and control, and wellhead protection programs; the Kitsap County Department of Community Development, which uses the funds for watershed planning; and the Kitsap Conservation District, which helps with agricultural landowner technical assistance, education, and source control.

The PIC Program uses water quality monitoring data to identify priority water bodies for clean up. The primary focus of the monitoring program is to assess long-term pollution trends associated with human sewage and animal waste from nonpoint sources. Health district staff sample water quality monthly at approximately 95 stations on 54 streams and bimonthly at 67 marine stations. Field equipment measures turbidity, dissolved oxygen, pH, and temperature. Fecal coliform samples are analyzed by an Ecology accredited laboratory. Data are used to identify areas in need of pollution control and to evaluate the effectiveness of the correction program.

Clean up projects are designed to address the causes and sources of bacterial water pollution in specific geographic areas that the trend monitoring program has identified. SSWM provides funding for PIC projects. The goal of each PIC project is to:

- Protect public health.
- Protect shellfish resources.
- Preserve, protect, and restore surface water quality.

The best management practices (BMPs) being used to improve water quality include a requirement to properly operate and maintain on-site systems. The Health District is actively engaged in on-site system education, dye testing of suspect systems, and enforcement of Kitsap County Board of Health Ordinance 2008-11, *On-Site Sewage System and General Sewage Sanitation Regulations*, which requires proper design, installation, repair, operation and maintenance of on-site septic systems.

Several enforceable pollution controls will assure that compliance with water quality standards is achieved.

- Kitsap County Ordinance 156-1993, establishing the Surface and Stormwater Management Program, which created an on-going, stable source of funding.
- Kitsap County Board of Health Ordinance 2008-11, *On-Site Sewage System and General Sewage Sanitation Regulations*, which requires proper design, installation, repair, operation and maintenance of on-site septic systems.

- Kitsap County Board of Health Ordinance 2004-2, *Solid Waste Regulations*, which regulate handling and disposal of animal manure and pet waste; animal waste violations are enforced by the Health District under this ordinance.

Kitsap County Health District has recently added Daniels, Indianola, Kitsap, Jump Off Joe, Kinman, Enetai, and Lofall Creeks to the PIC program. Progress so far includes:

- Daniels Creek—two failing septic systems have been identified and repaired in the past two years. Three additional septic systems are being investigated at this time.
- Indianola Creek—the Health district will initiate a sanitary survey of approximately 25 homes in October 2008.
- Kitsap Creek—six properties that border the stream have been surveyed. No failing septic systems or other fecal coliform sources were identified.
- Jump Off Joe Creek—One hundred thirteen properties have been inspected, and three failing septic systems identified. Two of the three failing septic systems have been repaired. This project is scheduled for completion in December 2011. The project is funded by a Centennial Clean Water fund grant from Ecology.
- Kinman Creek—Nine properties bordering Kinman Creek will be surveyed by December 31, 2008. This project is part of the Health District’s Upper Hood Canal PIC Project, funded by a Centennial Clean Water fund grant from Ecology.
- Enetai Creek—this project is being done in two phases. During phase 1, 71 properties were surveyed and five failing septic systems were identified and repaired. Phase 1 was funded by Ecology. During phase 2, 123 properties were surveyed and three failing septic systems identified. Repairs are pending for all three failures. Phase 2 is scheduled for completion in December 2008.
- Lofall Creek—nineteen properties have been surveyed and two failing septic systems identified. Repairs are pending. This project will be complete in December 2008. This project is part of the Health District’s Upper Hood Canal PIC Project, funded by a Centennial Clean Water Fund grant from Ecology.

Estimate or Projection of Time When Water Quality Standards Will be Met

The designated uses for all of these waters are Core Summer Salmonid Habitat and Extraordinary Primary Contact Recreation. Washington’s fecal coliform bacteria standard for these waters has two parts. Fecal coliform organism levels shall not exceed a geometric mean value of 50 colonies/100mL, with not more than 10% of all samples (or any single sample when less than 10 sample points exist) exceeding 100 colonies/100 mL.

Daniels Creek

As shown by the data below, water quality in Daniels Creek has fluctuated, which is to be expected in a small watershed with failing septic systems.

Fresh Water Stream Fecal Coliform (FC) Results Daniels Creek (DC01)

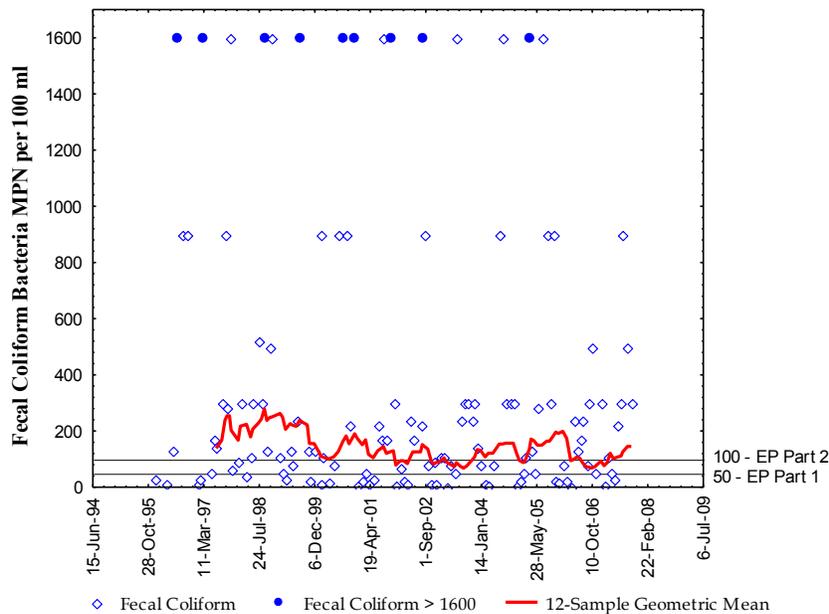
| Water year | Number of Samples | Range (FC/100ml) | GMV ¹ (FC/100ml) | # Samples > 100 FC/100ml | % Samples > 100 FC/100ml | Meets WQ Standard ² |
|------------|-------------------|------------------|-----------------------------|--------------------------|--------------------------|--------------------------------|
| 96 | 5 | 13 - >1600 | 149 | 3 | 60% | No |
| 97 | 9 | 13 - >1600 | 178 | 6 | 67% | No |
| 98 | 12 | 42 - >1600 | 238 | 9 | 75% | No |
| 99 | 10 | 30 - >1600 | 192 | 7 | 70% | No |
| 00 | 10 | 13 - >1600 | 152 | 6 | 60% | No |
| 01 | 11 | 8 - >1600 | 100 | 6 | 55% | No |
| 02 | 12 | 4 - >1600 | 136 | 7 | 58% | No |
| 03 | 12 | 2 - 1600 | 76 | 6 | 50% | No |
| 04 | 11 | 8 - 1600 | 148 | 7 | 64% | No |
| 05 | 12 | 8 - >1600 | 164 | 8 | 67% | No |
| 06 | 12 | <2 - 900 | 72 | 6 | 50% | No |
| 07 | 12 | 8 - 900 | 145 | 8 | 67% | No |

Shaded entries indicate an exceedance of the applicable water quality standard (Chapt.173 - 201A-030 WAC)

¹ Geometric mean value

² State FC Standard - FC levels shall not exceed a GMV of 50 FC/100ml and not have more than 10% of all samples exceed 100 FC/100 ml.

Fecal Coliform Bacteria Trend Analysis Daniels Creek (Station DC01), 1996 - 2007 Stationary Trend



We expect the county's work on Daniels Creek to achieve compliance with standards by 2010.

Indianola Creek

Data indicate that water quality in Indianola Creek has fluctuated a lot, but has sometimes been in compliance with the standard. This is to be expected in a small watershed with

intermittent septic system failures, and indicates the need for an on-going monitoring program such as Kitsap County's.

Fresh Water Stream Fecal Coliform (FC) Results Indianola Creek (IN01)

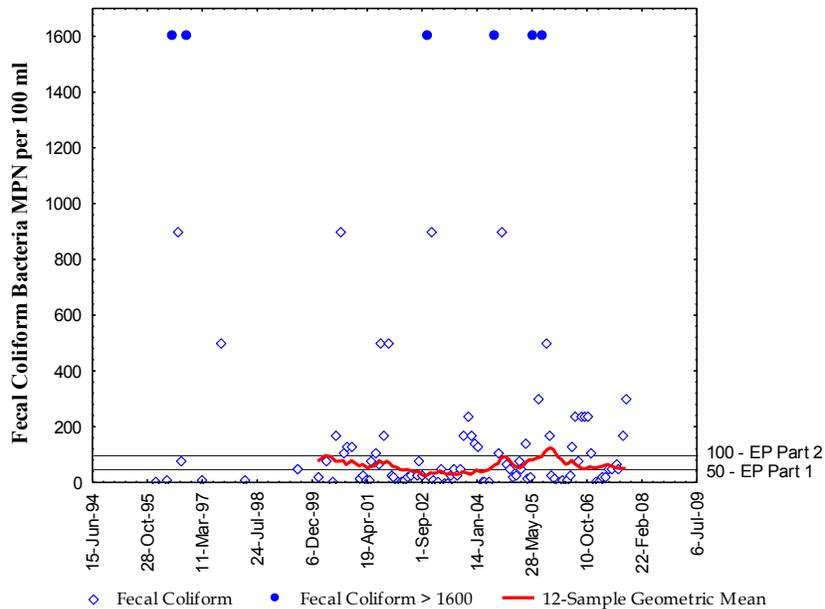
| Water year | Number of Samples | Range (FC/100ml) | GMV ¹ (FC/100ml) | # Samples > 100 FC/100ml | % Samples > 100 FC/100ml | Meets WQ Standard ² |
|------------|-------------------|------------------|-----------------------------|--------------------------|--------------------------|--------------------------------|
| 96 | 5 | 5 - ≥1600 | 94 | 2 | 40% | No |
| 97 | 3 | 11 - ≥1600 | 206 | 2 | 67% | No |
| 98 | 1 | 10 - 10 | 10 | 0 | 0% | Yes |
| 99 | 2 | 50 - 50 | 50 | 0 | 0% | Yes |
| 00 | 6 | 8 - 900 | 79 | 3 | 50% | No |
| 01 | 11 | 13 - 500 | 64 | 5 | 45% | No |
| 02 | 12 | 4 - 500 | 24 | 1 | 8% | Yes |
| 03 | 12 | 2 - ≥1600 | 39 | 3 | 25% | No |
| 04 | 11 | 4 - ≥1600 | 87 | 7 | 64% | No |
| 05 | 12 | 17 - ≥1600 | 108 | 5 | 42% | No |
| 06 | 12 | 4 - 240 | 49 | 5 | 42% | No |
| 07 | 12 | 7 - 300 | 51 | 4 | 33% | No |

Shaded entries indicate an exceedance of the applicable water quality standard (Chapt.173 - 201A-030 WAC)

¹ Geometric mean value

² State FC Standard - FC levels shall not exceed a GMV of 50 FC/100ml and not have more than 10% of all samples exceed 100 FC/100 ml.

Fecal Coliform Bacteria Trend Analysis Indianola Creek (Station IN01), 1996 - 2007 Stationary Trend



Because work in the Indianola Creek watershed is just in the sanitary survey stage, we expect the creek to achieve compliance with the standards by 2012.

Kitsap Creek

Data for Kitsap Creek show that water quality deteriorated in the late 1990s and then has been meeting the first part of the standard every other year for the past eight years. This indicates that problems seem to come and go, and may make finding the ultimate source more difficult. Kitsap Health District has surveyed six properties bordering the creek, and found no failing septic systems. It will take further investigation to determine what is happening in this watershed.

Fresh Water Stream Fecal Coliform (FC) Results Kitsap Creek (KT01)

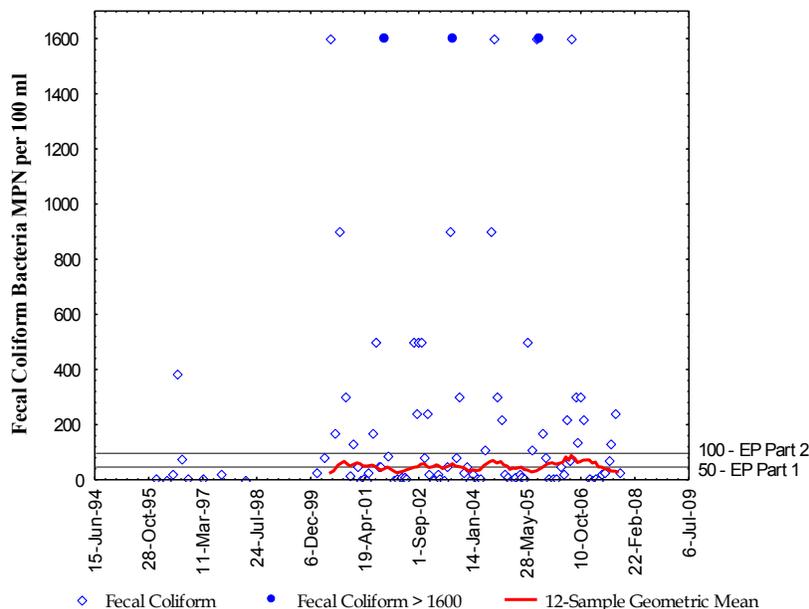
| Water year | Number of Samples | Range (FC/100ml) | GMV ¹ (FC/100ml) | # Samples > 100 FC/100ml | % Samples > 100 FC/100ml | Meets WQ Standard ² |
|------------|-------------------|------------------|-----------------------------|--------------------------|--------------------------|--------------------------------|
| 96 | 5 | 2 - 387 | 22 | 1 | 20% | No |
| 97 | 3 | 4 - 23 | 9 | 0 | 0% | Yes |
| 98 | 1 | 2 - 2 | 2 | 0 | 0% | Yes |
| 99 | 0 | N/A | N/A | N/A | N/A | N/A |
| 00 | 5 | 30 - 1600 | 226 | 3 | 60% | No |
| 01 | 12 | 2 - 500 | 34 | 4 | 33% | No |
| 02 | 11 | <2 - >1600 | 57 | 5 | 45% | No |
| 03 | 12 | <2 - >1600 | 48 | 4 | 33% | No |
| 04 | 11 | <2 - 1600 | 58 | 5 | 45% | No |
| 05 | 12 | 2 - >1600 | 38 | 4 | 33% | No |
| 06 | 12 | 4 - 1600 | 63 | 5 | 42% | No |
| 07 | 12 | <2 - 300 | 27 | 4 | 33% | No |

Shaded entries indicate an exceedance of the applicable water quality standard (Chapt.173 - 201A-030 WAC)

¹ Geometric mean value

² State FC Standard - FC levels shall not exceed a GMV of 50 FC/100ml and not have more than 10% of all samples exceed 100 FC/100 ml.

Fecal Coliform Bacteria Trend Analysis Kitsap Creek (Station KT01), 1996 - 2007 Stationary Trend



Because the source of the fecal coliform bacteria in Kitsap Creek is still unknown and more source tracking work is required in this watershed, we expect the creek to achieve compliance with the standards in 2012.

Jump Off Joe Creek

Data for Jump Off Joe Creek show that water quality is on an improving trend, and the creek has met the first part of the standard for the past three years.

**Fresh Water Stream Fecal Coliform (FC) Results
Jump Off Joe Creek**

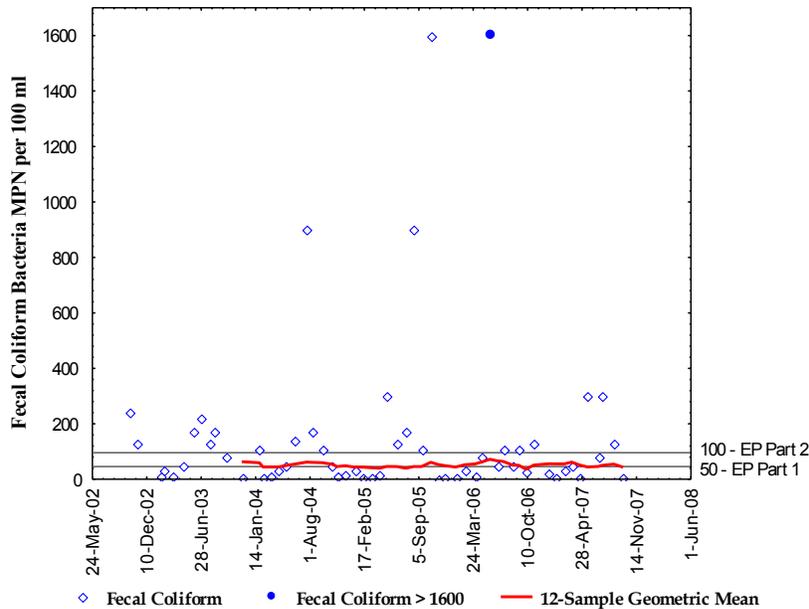
| Water Year | Number of Samples | Range (FC/100ml) | GMV ¹ (FC/100ml) | # Samples > 100 FC/100ml | % Samples > 100 FC/100ml | Meets WQ Standard ² |
|------------|-------------------|------------------|-----------------------------|--------------------------|--------------------------|--------------------------------|
| 03 | 11 | 13 - 240 | 76 | 6 | 55% | No |
| 04 | 10 | 4 - 900 | 53 | 5 | 50% | No |
| 05 | 12 | 4 - 900 | 46 | 5 | 42% | No |
| 06 | 12 | 2 - >1600 | 50 | 4 | 33% | No |
| 07 | 12 | 7 - 300 | 43 | 4 | 33% | No |

Shaded entries indicate an exceedance of the applicable water quality standard (Chapt.173 - 201A-030 WAC)

¹ Geometric mean value

² State standard- FC levels shall not exceed a GMV of 50 FC/100ml and not have more than 10% of all samples exceed 100 FC/100 ml

**Fecal Coliform Bacteria Trend Analysis
Jump off Joe Creek (Station JJ01), 1996 - 2007
Stationary Trend**



This project is scheduled for completion in December 2011, so we expect the creek to achieve compliance with the standards in 2012.

Kinman Creek

Monitoring data show that Kinman Creek water quality has been variable, although the creek met the first part of the standard for the past two years.

Fresh Water Stream Fecal Coliform (FC) Results Kinman Creek (KN01)

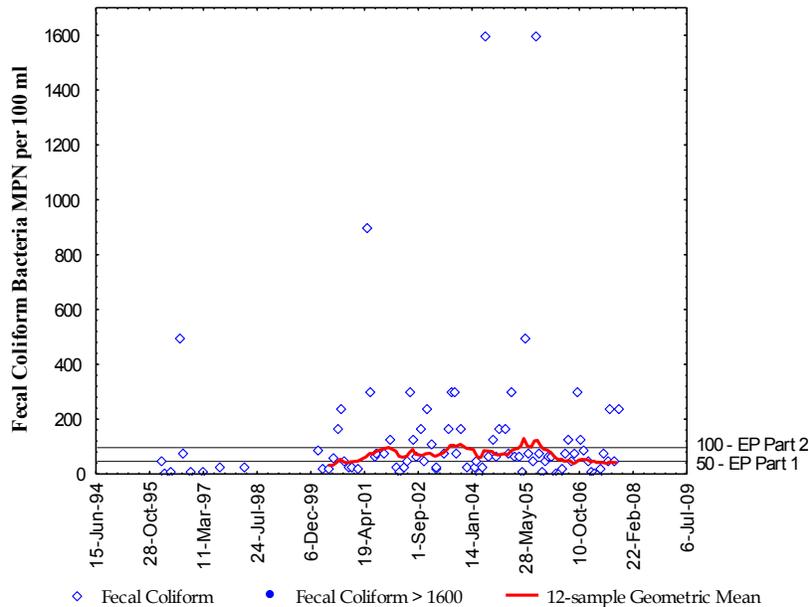
| Water year | Number of Samples | Range (FC/100ml) | GMV ¹ (FC/100ml) | # Samples > 100 FC/100ml | % Samples > 100 FC/100ml | Meets WQ Standard ² |
|------------|-------------------|------------------|-----------------------------|--------------------------|--------------------------|--------------------------------|
| 96 | 7 | 7 - 500 | 35 | 1 | 14% | No |
| 97 | 3 | 11 - 30 | 16 | 0 | 0% | Yes |
| 98 | 1 | 30 - 30 | 30 | 0 | 0% | Yes |
| 99 | 0 | N//A | N//A | N//A | N//A | N//A |
| 00 | 6 | 23 - 240 | 70 | 2 | 33% | No |
| 01 | 8 | 23 - 900 | 79 | 2 | 25% | No |
| 02 | 10 | 11 - 300 | 68 | 4 | 40% | No |
| 03 | 11 | 23 - 300 | 104 | 6 | 55% | No |
| 04 | 10 | 4 - 1600 | 63 | 3 | 30% | No |
| 05 | 11 | 13 - 1600 | 119 | 4 | 36% | No |
| 06 | 12 | 4 - 300 | 42 | 2 | 17% | No |
| 07 | 12 | 2 - 240 | 41 | 3 | 25% | No |

Shaded entries indicate an exceedance of the applicable water quality standard (Chapt.173 - 201A-030 WAC)

¹ Geometric mean value

² State standard- FC levels shall not exceed a GMV of 50 FC/100ml and not have more than 10% of all samples exceed 100 FC/100

Fecal Coliform Bacteria Trend Analysis Kinman Creek (Station KN01), 1996 - 2007 Stationary Trend



The sanitary survey for this project is scheduled to be completed by December 2008. If failing septic systems are found, it will take time to get repairs finished, so we expect the creek to achieve compliance with the standards in 2011.

Enetai Creek

The data show that Enetai Creek has consistently violated both parts of the fecal coliform standard for the past 12 years.

Fresh Water Stream Fecal Coliform (FC) Results Enetai Creek (DE01)

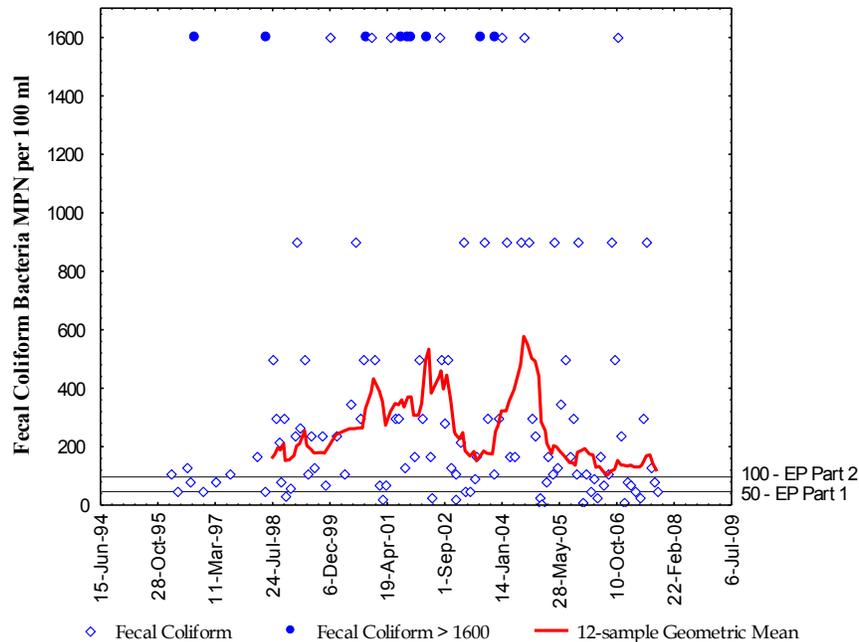
| Water year | Number of Samples | Range (FC/100ml) | GMV ¹ (FC/100ml) | # Samples > 100 FC/100ml | % Samples > 100 FC/100ml | Meets WQ Standard ² |
|------------|-------------------|------------------|-----------------------------|--------------------------|--------------------------|--------------------------------|
| 96 | 5 | 50 - >1600 | 156 | 3 | 60% | No |
| 97 | 3 | 50 - 110 | 76 | 1 | 33% | No |
| 98 | 7 | 50 - >1600 | 232 | 5 | 71% | No |
| 99 | 11 | 34 - 900 | 194 | 9 | 82% | No |
| 00 | 8 | 70 - 1600 | 330 | 7 | 88% | No |
| 01 | 11 | 22 - >1600 | 324 | 8 | 73% | No |
| 02 | 12 | 30 - > 1600 | 445 | 11 | 92% | No |
| 03 | 12 | 21 - > 1600 | 178 | 8 | 67% | No |
| 04 | 11 | 110 - > 1600 | 526 | 11 | 100% | No |
| 05 | 12 | 8 - 900 | 145 | 9 | 75% | No |
| 06 | 12 | 13 - 900 | 122 | 7 | 58% | No |
| 07 | 12 | 13 - 1600 | 116 | 5 | 42% | No |

Shaded entries indicate an exceedance of the applicable water quality standard (Chapt.173 - 201A-030 WAC)

¹ Geometric mean value

² State FC Standard - FC levels shall not exceed a GMV of 50 FC/100ml and not have more than 10% of all samples exceed 100 FC/100 ml.

Fecal Coliform Bacteria Trend Analysis Enetai Creek (Station DE01), 1996 - 2007 Stationary Trend



This is a large project that was done in two phases. Phase 1 is complete. Phase 2 is scheduled to be completed in December 2008. We expect the creek to achieve compliance with standards by 2010.

Lofall Creek

The data indicate that Lofall Creek water quality has gradually been getting worse.

**Fresh Water Stream Fecal Coliform (FC) Results
Lofall Creek (LF01)**

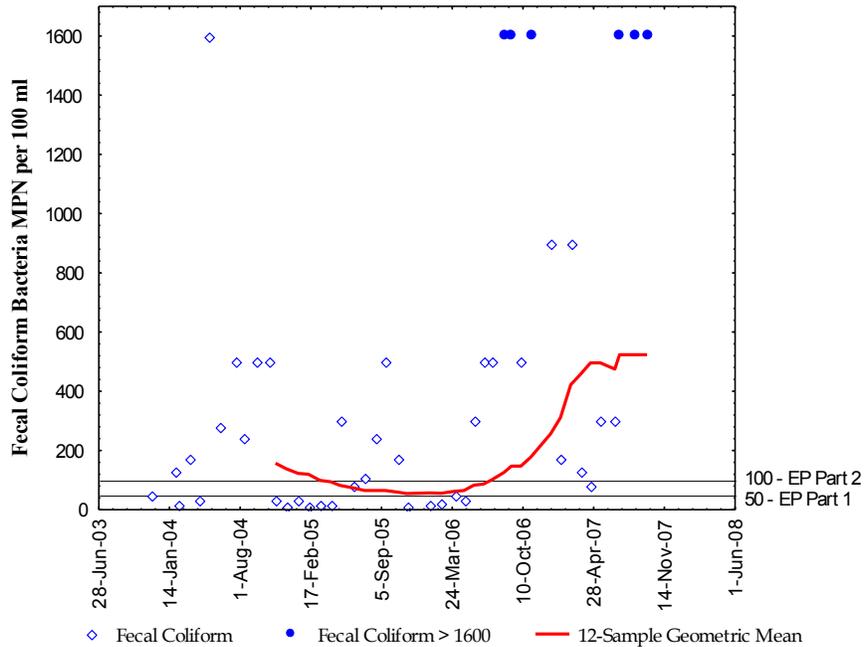
| Water year | Number of Samples | Range (FC/100ml) | GMV ¹ (FC/100ml) | # Samples > 100 FC/100ml | % Samples > 100 FC/100ml | Meets WQ Standard ² |
|------------|-------------------|------------------|-----------------------------|--------------------------|--------------------------|--------------------------------|
| 04 | 10 | 17 - 1600 | 165 | 7 | 70% | No |
| 05 | 12 | 11 - 500 | 65 | 5 | 42% | No |
| 06 | 11 | 11 - > 1600 | 132 | 6 | 55% | No |
| 07 | 12 | 80 - > 1600 | 523 | 11 | 92% | No |

Shaded entries indicate an exceedance of the applicable water quality standard (Chapt.173 - 201A-030 WAC)

¹ Geometric mean value

² State FC Standard - FC levels shall not exceed a GMV of 50 FC/100ml and not have more than 10% of all samples exceed 100 FC/100 ml.

**Fecal Coliform Bacteria Trend Analysis
Lofall Creek (Station LF01), 1996 - 2007
Worsening Trend**



Properties bordering the creek have been surveyed and two failing septic systems were identified. Repairs are pending. We expect the creek to achieve compliance with standards in 2010.

Schedule for Implementing Pollution Controls

As described earlier in this report, Kitsap County's PIC program is an on-going program that is periodically expanded into new areas of the county, such as the watersheds discussed in this analysis. The program has a proven record of success, and its approach of monitoring, education, source identification, and implementation of repairs or other best management practices, all backed up by enforcement authority, is exactly what's needed to solve nonpoint pollution problems and to keep them from happening again.

Monitoring Plan to Track Effectiveness of Pollution Controls

Kitsap County has a countywide monitoring program. Samples are taken monthly and compared to the two parts of the fecal coliform standard. Assessment results are reported to the public and EPA through Ecology's IR report development process.

Commitment to Revise Pollution Controls as Necessary

Ecology will continue to work with Kitsap County to ensure that the PIC program continues and that water quality in the county continues to improve. We fully expect the program to achieve compliance with water quality standards. However, if it does not, Ecology will work with Kitsap County to determine other controls that could be used to achieve compliance.