

***Kitsap County Health District Water Quality Program
Enetai Creek Pollution Identification and Correction Project
December 15, 2009***

Summary

Enetai Creek, formerly known as Dee Creek, is polluted with fecal coliform bacteria. Water quality standards have not completely been met in the twelve years of monitoring by the Kitsap County Health District (Kitsap Health). The stream has been posted with a public health advisory for no contact for several years due to high bacterial levels. Kitsap Health's water quality monitoring results and field surveys strongly suggest that the major sources of bacterial pollution to Enetai Creek are failing onsite sewage systems and pet waste.

In 2007, Enetai Creek was added to the Health District's grant agreement for the Dyes Inlet Restoration/Protection Project funded through the Washington State Centennial Clean Water Fund. It was also added to the project Quality Assurance Project Plan for fecal coliform and optical brighter monitoring from February 2007 through December 2008.

There were 419 properties bordering Enetai Creek contacted during the project with 258 (62%) property surveys completed. There were twelve failing septic systems identified, and of these six systems have been repaired. Two homes have been vacated, and permits are pending for repairs for the remaining four systems.

Kitsap Health water quality data through October 2008 showed an improving trend in the levels of fecal bacteria pollution in Enetai; as a result of this trend, the Health District's public health advisory was removed for 2009.

Introduction and Background

The purpose of the Enetai Creek Pollution Identification and Correction Project was to identify and correct sources of bacterial contamination in the watershed. The project consisted of monitoring Enetai Creek segments for fecal coliform and optical brighteners, and conducting door-to-door pollution identification surveys. Water quality monitoring was conducted pursuant to the Health District's Dyes Inlet Restoration/Protection Project Quality Assurance Project Plan, October 12, 2005. Property surveys were conducted pursuant to the Health District's "Manual of Protocol: Fecal Coliform Bacteria Pollution Identification and Correction, Version 9, November 2003". Optical brightener monitoring was

conducted pursuant to protocols developed by Tom Aley at Ozark Underground Lab. (Aley, 1991)

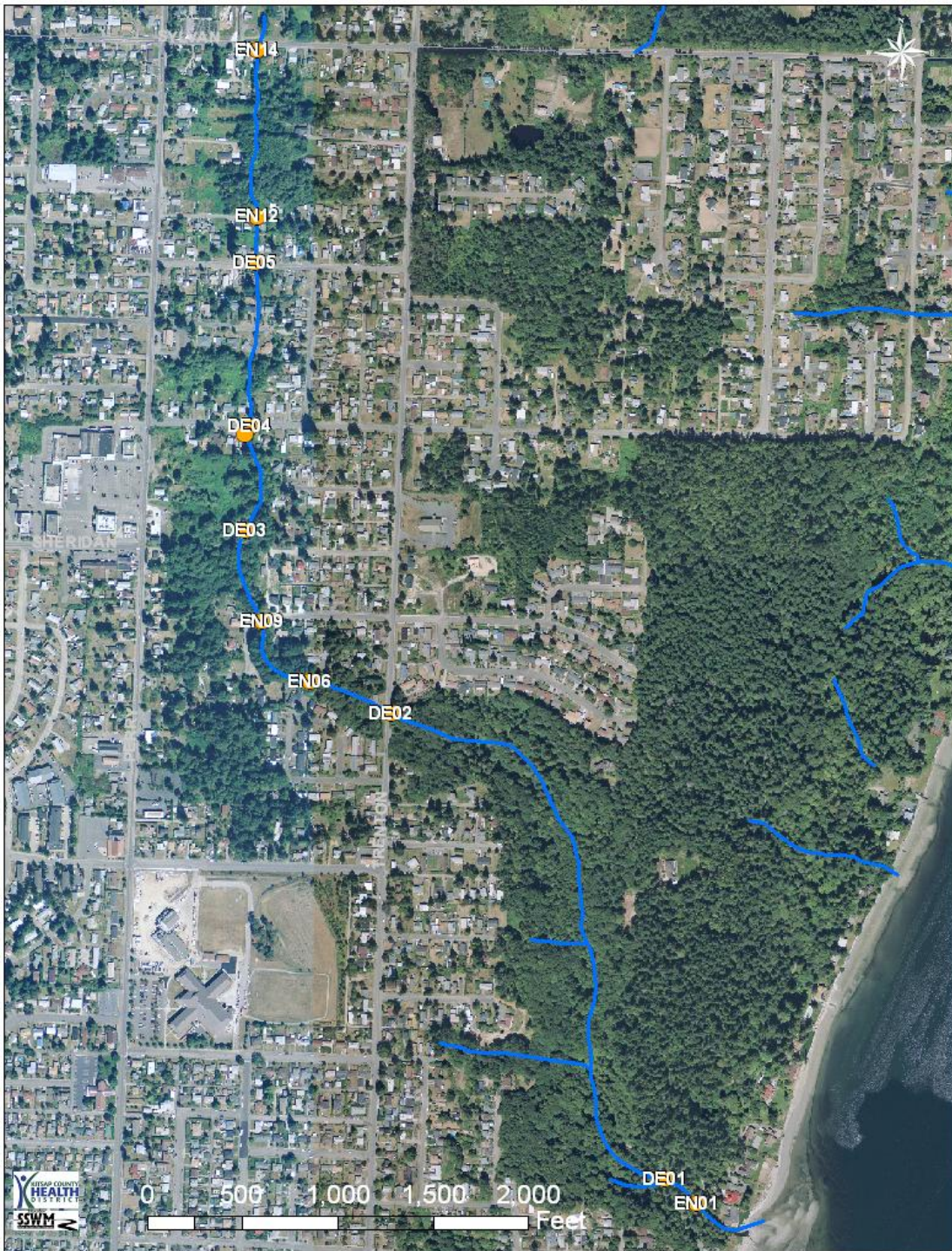
Monitoring Station Locations

Kitsap Health trend and impact monitoring stations for Enetai Creek are described in Table 1 and shown in the map Figure 1. During the project additional investigative monitoring stations were selected to assist in determining potential areas of fecal pollution.

Table 1. Enetai Creek Trend and Impact Monitoring Stations

<i>Station ID</i>	<i>Location Description</i>
DE01	Intersection of Enetai Beach Road - Main stem
DE02	Trenton Street stream crossing, downstream side between 2451 and 2555 Trenton
DE03	Helm Street, upstream side, on the corner near address 2423 Helm
DE04	30 th Street stream crossing, downstream side next to 2403 30 th
DE05	Franklin Street stream crossing, downstream next to 2413 Franklin
EN01	Upstream side of road past 2012 Enetai Beach road
EN05	Trenton street stream crossing
EN09	Upstream tributary of DE03
EN12	Upstream 2411 Denny way
EN14	Downstream of 2325 Sylvan way

Figure 1. Enetai Creek monitoring stations and watershed boundary

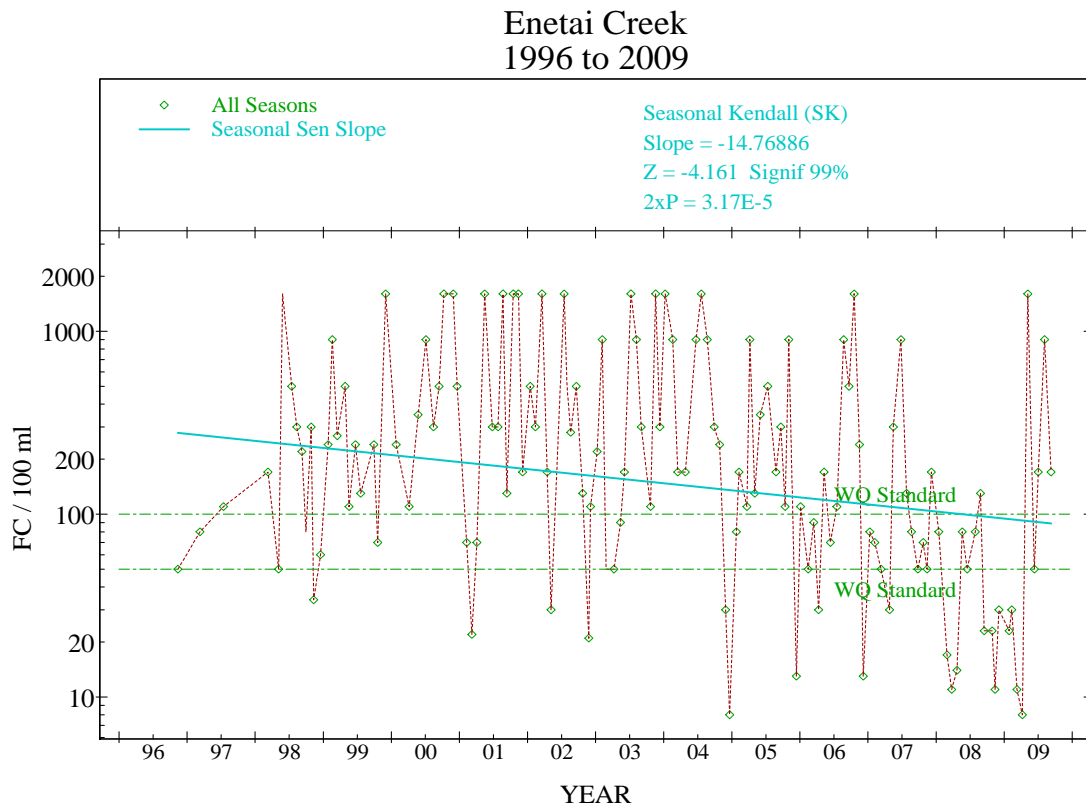


Monitoring Results

Fecal coliform

The Enetai Creek trend graph as seen in **Figure 2**, shows a reduction in the levels of fecal coliform since monitoring began in 1996. The levels also show a decreasing trend during the project period from 2007 to the present.

Figure 2. Fecal coliform (FC) concentrations in Enetai Creek from 1996-2009



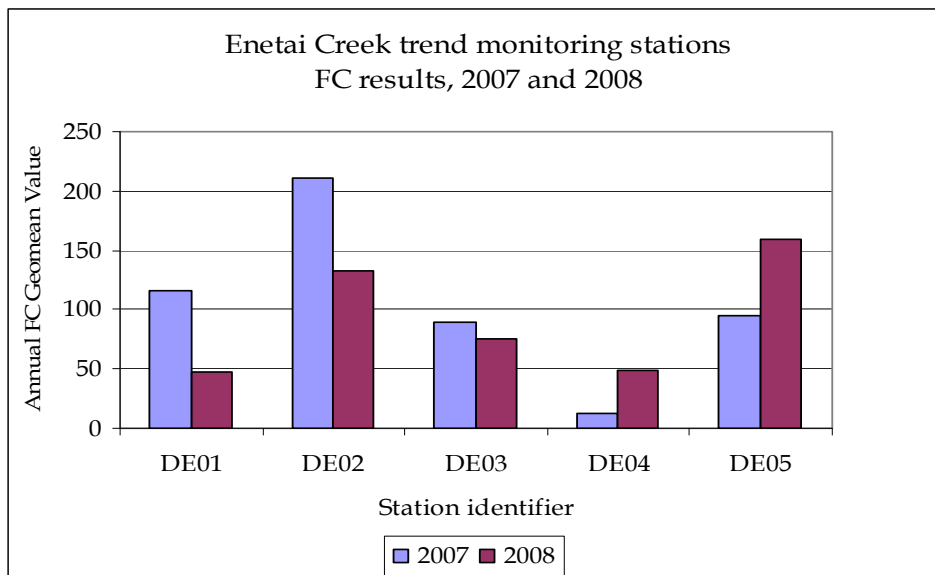
During the current project period there has also been FC reductions at three of the five trend monitoring stations, DE01, DE02 and DE03, as shown in Table 2 and Figure 3.

However only two of the five stations met Part 1 of the water quality standard for FC bacteria (geometric mean not to exceed 50 FC/100ml) in 2008, compared to only one of the five stations meeting the standard in 2007. In 2007 and 2008 none of the stations met Part 2 of the water quality standard (no more than 10% of the samples exceed 100 FC/100 ml).

Table 2. Enetai Creek trend monitoring station water quality results 2007 & 2008

Station	2007 Annual FC Geomean value	Meets Part 1 in 2007	Meets Part 2 in 2007	2008 Annual FC Geomean value	Meets Part 1 in 2008	Meets Part 2 in 2008
DE01	116	No	No	47	Yes	No
DE02	211	No	No	133	No	No
DE03	90	No	No	75	No	No
DE04	13	Yes	No	49	Yes	No
DE05	95	No	No	159	No	No

Figure 3. Enetai creek monitoring station FC results



Optical brighteners

Optical brighteners are fluorescent white dyes that absorb ultraviolet light and emit visible blue light, which make them useful in tracing wastewater that is not being effectively treated. (Aley, 1991). The Health District placed optical brightener pads at selected sample locations for one week or more to detect laundry discharges with optical brighteners according to the optical brightener protocols developed by Aley.

Only one location, DE05, had strongly positive optical brighteners, as shown in Table 3. This station also had the highest fecal coliform levels during the project. A failing onsite sewage system was identified down gradient of this station.

Table 3. Enetai Creek trend monitoring station optical brightener results.

Station	Optical Brightener
DE01	Weak positive
DE02	Weak positive
DE03	Weak positive
DE04	Weak positive
DE05	Strong positive

Property Survey Results

There were **419** properties in the Enetai Creek watershed targeted for surveys. Of these there were **258** (62%) property surveys completed during the project.

Thirty (7%) of the total number of properties were vacant, and 6 (1%) denied access to Health District staff. Approximately 138 properties (33%) did not respond to numerous contacts made by Health District staff. **Table 4** shows the property classification assigned to each property as a result of the completed sanitary surveys.

Table 4. Enetai Creek Property survey results 2007 through 2009

Property classification	Number	Percent
No apparent problem (NAP)	107	42%
No Onsite sewage system records (NR)	76	30%
Non-Conforming system (NC)	50	20%
Suspect system (S)	13	5%
Failure (F)	12	3%
<i>Total</i>	<i>258</i>	<i>100%</i>

Twelve onsite sewage system failures were identified during the project. Six have been repaired, four repairs are pending and two properties have been vacated. The onsite sewage systems at the vacated properties will be required to obtain approved permits prior to occupancy.

During the project staff attempted to walk the entire length of Enetai Creek to identify sources of fecal pollution. The stream walk began at Trenton Avenue adjacent to the DE02 monitoring station. A distance of approximately one third of a mile was traveled before encountering a narrow canyon. Staff were unable to pass through this canyon, and due to heavy brush and limited access further upstream the stream walk could not be completed. However as a result of the stream walk, there were over 20 outfalls identified and sampled. One sample yielded a high FC result. This outfall was located directly upstream of DE02. A dye test was conducted at the onsite sewage system adjacent to this location. The system was found to be failing, and discharging directly into Enetai creek. The system was repaired in November 2009.

Discussion

Station DE05 had the highest FC levels during the project with a geomean of 159 FC/100ml in 2008, and was the only station to have a strong positive optical brighter reading. This station is located immediately down gradient of a failing onsite sewage system that was found on Denny Street during the project. The system

Another failure was found upstream of DE03, likely causing the increase in FC concentrations between DE03 and upstream stations DE04 and DE04A. The doubling of FC concentrations between DE03 and downstream station DE02 may be explained by failures found on Spring Street and Nipsic Street. Also, the elevated levels at DE02 may be due to a failing system that was repaired at a property found during the stream walk.

One fifth of the systems surveyed were found to have non-conforming conditions, related to unpermitted systems and/or unpermitted repairs. Kitsap Health allows property owners and residents to inspect and repair system plumbing between the house, tanks and distribution box. Kitsap County onsite sewage regulations require that only a licensed contractor diagnose and repair components from the distribution box in order to prevent system damage and to protect public health.

Conclusions

Based on the project results, the Health District concludes the following in regard to the bacterial pollution in Enetai Creek:

1. The project was successful in reducing fecal coliform contamination of Enetai Creek. The immediate health risks have been abated with the lifting of the “no contact advisory” for the creek.
2. Concentrations of fecal bacteria within the creek still exceed water quality standards but have been reduced by 40% at the stream mouth since 2007.
3. Fecal pollution is higher at monitoring stations located near failing onsite sewage systems. Optical brightener concentrations were strong near one failing onsite sewage system.
4. Based on project results, onsite sewage systems are a significant source of fecal pollution in Enetai Creek.

Recommendation

Due to the difficulty Kitsap Health staff encountered in contacting property owners, (over one third did not respond to numerous contacts made by staff), additional property surveys are not recommended. In lieu of additional property inspections, Kitsap Health continues to recommend that public sewer service be extended to this area as soon as possible.

References

Aley, Thomas, "The Water Tracer's Cookbook and Related Groundwater Tracing Information, Ozark Underground Laboratory," Protem, Missouri, 1991.

Kitsap County Health District, "Dyes Inlet Restoration/Protection Project Quality Assurance Project Plan," October, 12, 2005.

Kitsap County Health District, "Manual of Protocol: Fecal Coliform Bacteria Pollution Identification and Correction," version 9, November 2003.