Landowner Water Quality Sampling Program Guidelines

Whatcom Conservation District and Whatcom County Public Works

Background

In Whatcom County there are over 90 routinely monitored water quality stations and currently only 20% of those meet the standard for Fecal coliform bacteria. Fecal coliform is a group of bacteria which are present in large numbers in the intestines of warm blooded animals and humans. When these bacteria are in the natural environment, it is usually in the form of excrement, feces, or poop. One bacteria group you may have heard of, *E. coli*, is a type of fecal coliform. Because fecal coliform is present in all warm blooded animal and human feces, it is used to indicate fecal pollution. While usually not harmful themselves, their presence in creeks suggests that disease-causing microorganisms might also be present and pose a health risk. People can be exposed to these pathogens through direct water contact, such as swimming, wading, or eating shellfish from waters with high bacteria levels.

Many landowners have expressed an interest in collecting their own water samples for fecal coliform analysis. This will allow the landowner to compare their own surface water samples to those collected by Whatcom County Public Works (WCPW) and Washington Department of Ecology (WDOE).

These guidelines provide an overview of equipment, and techniques, for collecting and analyzing samples. The following sections are included:

- When to Sample
- Determining Sampling Location
- Preparing Sampling Equipment
- Sample Collection
- Sample Storage and Delivery
- Understanding Your Results

When do I sample?

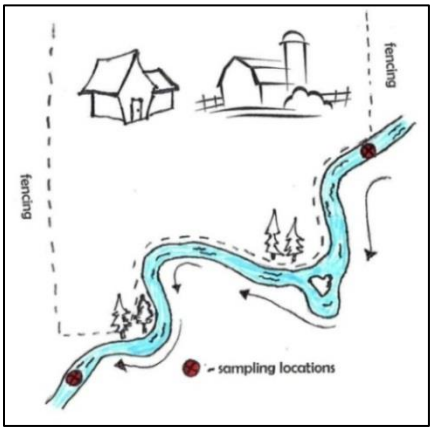
By registering with the Whatcom Conservation District (WCD) you will receive an email with sampling dates, locations and results of the WCPW and WDOE routine monitoring for Fecal Coliform bacteria. For each watershed there are different sampling timelines, some are once and month, other might be every week. WCD will let you know as soon as possible so you can align your sampling efforts on the same day as WCPW and WDOE. If you do not have an email address contacts Aneka Sweeney at 360-526-2381 to arrange an alternative.

Where should I sample?

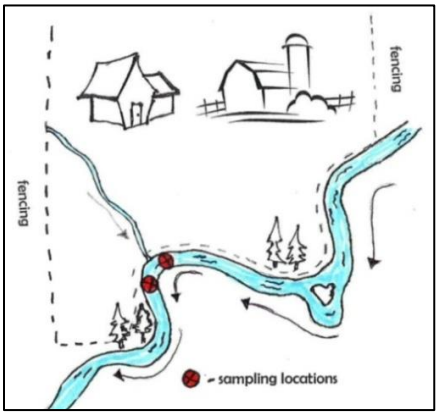
There are two primary strategies for landowners collecting water quality samples for bacteria analysis. These are 1) measuring bacteria levels upstream and downstream of your property or 2) measuring bacteria levels from a specific pipe, ditch, or other channel entering the creek. If high bacteria levels are found using the first strategy, following up with the second strategy helps determine the source of the bacteria.

<u>Selecting Sample Collection Point</u>

In addition to selecting your sampling sites, it is important to collect your sample from a portion of the waterbody that represents the general character of the creek at that point. A representative site will have adequate flow, be well-mixed, and deep enough that you will not disturb the bottom of the creek while collecting the sample. Do not collect a sample from a back eddy, stagnant water, or a site that is less than about three inches deep.



Sampling Strategy 1: Property Characterization. The first sampling strategy helps characterize bacterial contributions from your overall property. For this strategy, collect a sample at the upstream end where the creek enters your property and a sample at the downstream end where the creek exits your property.



Sampling Strategy 2: Characterizing a Pipe, Ditch, or Other Channel. The second sampling strategy helps characterize bacterial contributions from a specific pipe, ditch, or other channel. For this strategy, collect a sample directly from the end of the channel, if feasible. If a sample cannot be collected directly from the channel without potential contamination, collect one sample from the creek above the point the channel enters the creek and one sample below that point where the water is well-mixed.

What equipment do I need?

Sampling Equipment Provided by Whatcom Conservation District:

- Pre-labeled Sample bottles
- Thermometer
- Landowner Sampling Chain of Custody Form (filled out with your Sample Id)
- WCD Cooler with ice or ice packs
- Disposable latex gloves
- Sampling pole for sampling wider stretches of a creek

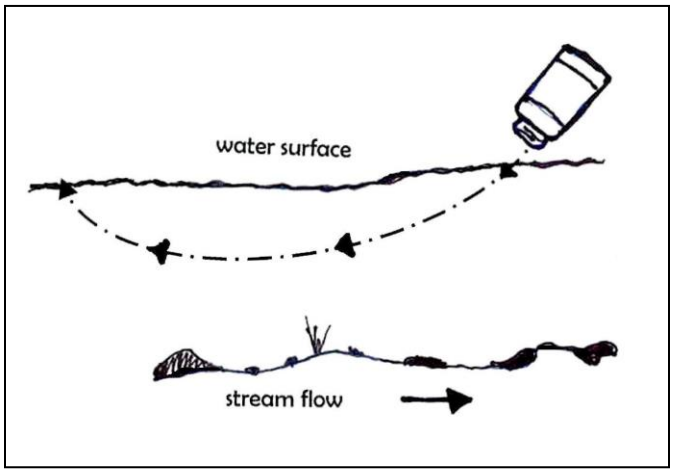
How do I sample?

General Considerations

Bacteria sampling requires careful attention to sampling methods to avoid contamination of the water sample and to ensure that a representative sample is collected. The following guidelines should be consistently followed:

- Do not contaminate the inside of the bottle cap and mouth. These should not be touched by hands or any other surface that may have bacteria exposure.
- Do not rinse the bottle or pour water into it from a container that has not been sterilized.
- Do not disturb the sediment upstream of the sample location, particularly in slow moving waters, as bacteria attach to sediment particles.
- Do not collect samples from the surface layer (top inch of water column), as bacteria can accumulate there. If a surface sample is unavoidable due to shallow depth of the creek (less than about three inches), make note of the conditions on your field data sheet.
- Do not collect samples from stagnant waters or back eddies.
- If contamination is suspected, dump out the bottle and repeat sample collection with a new bottle.

Step-by-Step Methods for sampling



1. Label the bottle with the date before collecting the sample.
2. Record the location, date and time on your Landowner Sampling Chain of Custody Datasheet
3. Choose a collection point, such as the deepest part of the active channel, where a representative sample may be collected.
4. Hold the base of the sample bottle with one hand or in the sampling pole and remove the bottle cap. Hold the bottle cap in one hand and with the other, invert the bottle, submerge it into the water about 6 inches, and then tip the bottle mouth upstream and sweep it toward the water surface.
5. Allow the bottle to fill to approximately the shoulder and take it out of the water. If the bottle is overfilled, immediately pour some water from the bottle. Air space is necessary so that the sample can be shaken and mixed prior to analysis.
6. Replace the cap securely, avoiding touching the inside of the bottle or cap.
7. Immediately place the sample into a cooler with ice.
8. Submerge thermometer in the water you are sampling for 3 min, record results.

Sample Collection from a Shallow Site

- In shallow surface water, ensure that the sample bottle does not touch or disturb the creek bed, potentially contaminating the sample with sediment.
- Submerge the bottle to about the midpoint of the water column and tip upwards toward the direction of the flow.
- Samples should be collected far enough below the surface to avoid contamination from surface film and detritus. If a surface sample is unavoidable due to the shallow depth of the sample location, note this on the Landowner Sampling Chain of Custody Datasheet.

What do I do after I have taken the sample?

- Record the date and time of sample collection as associated with the sample id on the bottle on the Landowner Sampling Chain of Custody Datasheet.
- Record notes about site conditions, adjacent land activities, presence or evidence of pets and wildlife, water condition or sample collection methods.
- Place samples in a cooler with ice immediately after they are collected.

Deliver samples within 6 hours of collection to:

Exact Scientific Services: 1355 Pacific Place, Suite 101, Ferndale**,** (360) 733-1205
Whatcom Conservation District Office: 6975 Hannegan Road, Lynden (360) 526-2381
Clean Water Services: 306 A Front Street, Lynden, (360) 354-2121

How will I get the results?

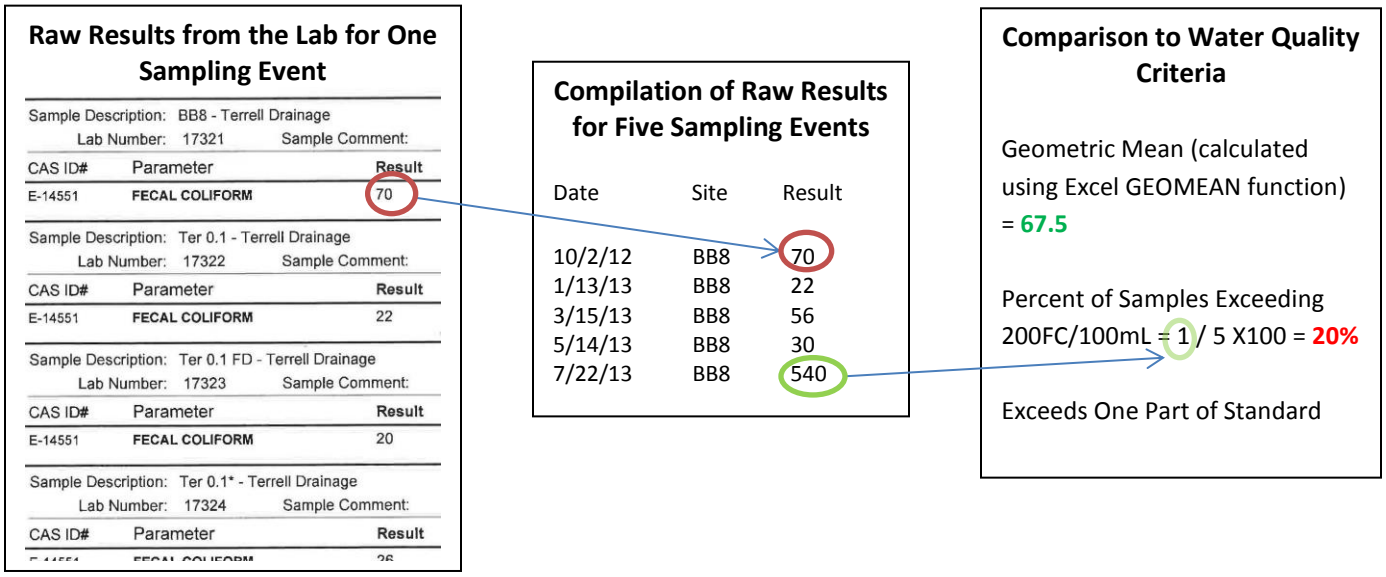
If you registered with Whatcom Conservation District and filled your contact information correctly on your data sheet you will receive your results directly to your email within 48hours with a copy of your data sheet. You will then receive the data from WCPW and WDOE shortly thereafter from WCD.

What do my results mean?

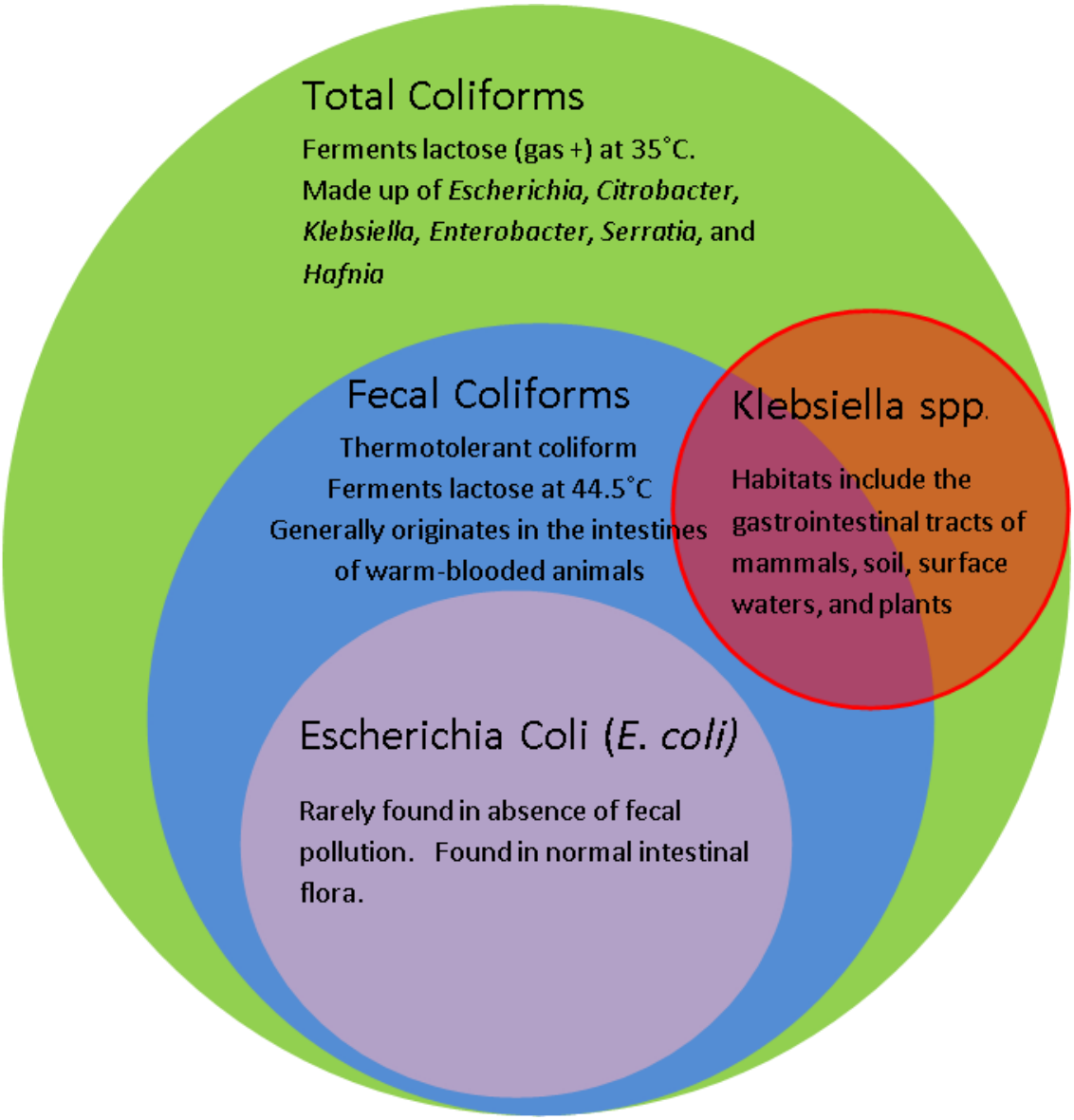
It is best to have at least 5 samples for a specific site to get a true characterization. As a standard, samples exceeding **200 Fecal Coliform/100 mL** and greater than ***126 E. coli/ 100 ml*** are considered exceeding health standards for swimming and consuming shellfish.

How do my results compare with the rest of the county?

There are two criteria within the water quality standard for fecal coliform (FC) The first criterion is a geometric mean less than **100 FC/100mL**. The second criterion is less than **10%** of the samples exceed **200 FC/mL**. In order to compare your results to the water quality criteria, it is best to have at least 5 samples for a specific site. The best characterization will be provided by collecting samples during a variety of environmental conditions (e.g. dry weather, rain event, warm day, cold day, etc.). For each site, compile your results and 1) calculate the geometric mean (using the GEOMEAN function in Microsoft Excel) and 2) determine the percent of samples that exceed 200FC/mL.



Fecal coliform bacteria are living organisms, thus, you will see natural variation in the levels of bacteria observed at your sampling sites. Due to this natural variation, it is important to collect as many samples as possible in order to best characterize the bacteria contribution at your sites. For example, with Whatcom County's routine monitoring program we compare monthly samples for one year (~12 samples) and three years (~36 samples) to the water quality criteria.



For more information: *A Citizen's Guide to Understanding and Monitoring Lakes and Streams* on the Washington State Department of Ecology website provides a comprehensive overview of citizen monitoring. www.ecy.wa.gov

Whatcom County Public Works - Natural Resources
322 N. Commercial, Suite 110
Bellingham, WA 98225
(360) 676-6876

Whatcom Conservation District
6975 Hannegan Road
Lynden, WA 98264
(360) 526-2381

whatcomcd.org