

# Bacteria Monitoring with WRK

## **Background Information**

*Escherichia coli* is a rod-shaped bacteria (belonging to a group of bacteria known as fecal coliform bacteria) which lives in the lower intestines of warm-blooded mammals and is necessary for the proper digestion of food. The presence of *E. coli* is well-correlated with the presence of many waterborne microorganisms and pathogens which can cause diseases such as gastroenteritis, dysentery, typhoid fever, and cholera. Large amounts of *E. coli* found in surface water indicate fecal contamination from warm-blooded animals.

*E. coli* itself cannot cause illness unless it is introduced into an open wound or the urinary tract. Certain strains, such as the infamous *E. coli* O157:H7, can be toxigenic, meaning they create a toxic by-product which can harm humans. These strains are generally found in improperly prepared food and can be fatal to children and seniors.

## **Willamette Riverkeeper's Bacteria Monitoring Program**

In order to encourage safe use of the Willamette River, Willamette Riverkeeper tests *E. coli* levels twice a month at 19 high-priority sites along the Lower and Mid-Willamette. At each site WRK volunteers collect 100 mL water samples in sealed, sterile containers. Samples are delivered to the Willamette Riverkeeper office for processing and analysis.

The resulting data is shared with the public on the WRK website (updated twice monthly at the end of the sampling period). WRK also submits this data to the Oregon Department of Environmental Quality's permanent LASAR database for use in administrative and research purposes.

- Sites presenting chronically high levels of bacteria will be further surveyed by WRK staff to ascertain the source of contamination.

## **Contact Info**

If you have any questions at all while sampling, need the combination to the lock on the shed, or just want to schedule a drop-off time, I can be reached here:

Email: [julia@willmetteriverkeeper.org](mailto:julia@willmetteriverkeeper.org) (checked frequently!)

Office Phone: 503-223-6418

## **Maps and Results**

A map of all sites is available on our e. coli webpage:

<http://www.willamette-riverkeeper.org/WRK/ecolisites&reports.html>

Click "view in larger map" to see it in GoogleMaps and print directions to your site.

You'll also find a summary of our 2010 *E. coli* results on this webpage. 2011 results will be posted to the page as they come in!

# Procedure

## **Equipment**

- 12' telescoping pole (optional)
- Cooler
- Ice pack
- Distilled Water
- Permanent Marker
- Data collection sheet
- 120mL sterilized jar for sample
- 120 mL sterilized jar for duplicate
- 120 mL sterilized jar for blank

## Considerations

- *E. coli* levels will often be high after periods of rain when sewage outfalls overflow and fecal matter on land is washed into the river
- Remember that the sample must remain untainted by the sampler. Never touch any surface that contacts the sample water.
- Bottles should have tape over the cap or some seal or marking to indicate that they have been sterilized.
- Samples must be kept on ice between grabbing and processing.

## **Timing**

We will collect samples every other week between April 10 and September 30. You will receive a reminder email on the Friday before our sampling week begins.

Timing can be tricky because the samples need to be processed by WRK staff no more than 24 hours after they are taken, and then they need to be analyzed exactly 24 hours after they are processed. It is best for us to process the samples as soon as possible after taking them.

The procedure for sample delivery is:

1. Call, text, or email at least 24 hours ahead of time to let me know what time you will be bringing in samples – this way we can be prepared to process them. If you plan to bring samples at the same time each sampling week, we can make a standing appointment.
2. Please plan to bring samples in to the office (or drop them off in the shed if no one is around) on **Tuesday, Wednesday, or Thursday between 9am and 5pm**. If this isn't possible, just let us know and we can make other arrangements.

## **Sample Collection**

1. Use a permanent marker to label bottle with site location, date and time. Attach the sterile 120 ml bottle to the sampling pole (if you're using one).
2. Remove the seal and unscrew the lid from a clean, sterile 120ml bottle **without** touching the bottle neck or cap threads. If you accidentally touch the inside of the bottle use a new one. Do not use bottle if seal is broken.
3. Gently fill the bottle by holding it in the river with the opening facing upstream. Pour out excess water but make sure that the bottom of the water's surface (the "meniscus curve") is at or slightly above the 100 ml line.
4. Using a permanent marker, label the bottle with your name, the site name, and the date and time sample was collected.

5. Fill out an *E. Coli* Sampling Field Data Sheet completely. Include the sites and sample times of any blanks or duplicates you've done. The datasheet is available in our office, or as a .pdf on our website: [http://www.willamette-riverkeeper.org/WRK/documents/Ecoli\\_data\\_sheet.pdf](http://www.willamette-riverkeeper.org/WRK/documents/Ecoli_data_sheet.pdf).
6. Keep samples on ice and submit samples to WRK office within 24 hours of collection. Samples that are allowed to get too warm (over 4 °C) cannot be analyzed as they will produce inaccurate test results.
7. Drop off the sample at Willamette Riverkeeper office. If no one is in the office, you may leave the sample in a cooler in the shed.

## Quality Control

Willamette Riverkeeper uses **Field Blanks** and **Duplicates** to check the quality of our data. The Water Quality Coordinator will let you know via email when you need to complete a blank or duplicate the next week.

***Field Duplicates:*** *(Take one your 1<sup>st</sup> sampling day and one every 20 samples thereafter):*

Your first sample collected and every 10<sup>th</sup> sample collected thereafter should be field duplicate. A field duplicate is a second stream sample collected at the same time and place by one sampler or team (you can choose any site for this – if you sample at multiple sites, it's not necessary to take multiple duplicates).

Duplicates are used to estimate laboratory analysis precision and to indicate any wide variation in conditions at your site. They are analyzed alongside regular samples and should result in comparable bacteria counts.

Collect a field duplicate exactly the same way you collected the sample. Label the bottle as you would a regular sample, but add a “D” to indicate that this sample is the duplicate, and record it in the appropriate spot on the data sheet.

***Field Blanks*** *(Take one your 1<sup>st</sup> sampling day and one every 20 samples thereafter):*

One field blank should be collected by each sampler (or set of partners) your first sampling day and then once every 20 samples thereafter at **one** of the assigned sites. If you sample at more than one site, it is not necessary to do multiple blanks – just choose one site.

Blanks are analyzed alongside the regular samples and are used to identify contamination during sample collection or analysis. They should result in bacteria counts of less than 1 MPN/100mL.

Field Blank Collection:

1. Make sure that the bottle is sealed.
2. Write site name, time, date and the letter “B” on the bottle to indicate it is a field blank.
3. Attach the sterile 120 ml bottle to the sampling pole (if you normally use one).
4. Rather than taking a sample of river water, gently pour distilled water into the bottle to the 100mL mark. Recap the bottle.
5. Record the site and sample time for the blank on your datasheet.
6. Transport the field blank as you would a regular sample.