

## Lake Sampling for Bacteria<sub>1</sub>

### Determining the Location for Taking Samples

When collecting an *E. coli* bacterial sample from a natural swimming area such as a lake or pond, the sample should be collected where the water is approximately one meter deep. Samples should be collected from the left perimeter, the right perimeter, and the center of the swimming area. This "bracketing" of the area ensures that the sample results are indicative of water quality of the entire swim area and not just one particular spot. Note: If the beach area is less than 100 feet, it is generally sufficient to take only two samples, each a third of the distance from either end of the beach.

In the case of a swim area located on a natural flow through watercourse, such as a brook or river, samples should be collected upstream, at the public beach area, and downstream. In streams or rivers in which it is difficult to collect a sample at the desired one-meter depth, locate the deepest area with a moving current and follow the sample procedure.

### Procedure for Collecting Samples

1. Always utilize a sterilized bottle when collecting *E. coli* samples.
2. Remove the cap carefully.
3. Hold the cap in one hand, and with the other hand turn the bottle upside down so the opening is facing the water surface. Make sure you never touch the opening of the bottleneck.
4. With a downward thrust moving away from your body, dip the bottle at least a foot below the surface. Fill the bottle with one sweeping motion and discard a few milliliters to allow some head (air) space.
5. Replace the cap carefully over the bottle and tighten the cap.
6. Mark the site location, the name of the public beach, and the date and time the sample was collected. Make sure to always use a waterproof marking pen.

*It is important to realize that the improper handling of sterilized bottles by the sampler can contaminate the sample, rendering the test results to be inaccurate.*

### TESTING YOUR WATER

EAI Analytical Labs will provide you with your free water testing kit containing: sample bottles, detailed sampling instructions and a tracking form. Bacteria samples bottles are distributed pre-sterilized and all sample bottles contain their necessary preservatives. Kits are available for pickup or they can be mailed to you. If you are interested or have any questions regarding the analysis of your water, please give us a call.

1. The material contained in this fact sheet was excerpted from the New Hampshire Department of Environmental Services web site (<http://www.des.state.nh.us/ws.htm>).

## **Bacteria In Surface Waters<sub>2</sub>**

### **What are coliform bacteria?**

Coliform bacteria are a large assemblage of various species of bacteria that are linked together because of the ease of culturing as a single group. They include both fecal coliform bacteria, or bacteria that are found naturally in the intestines of warm-blooded animals, and non-fecal coliform bacteria. Fecal coliforms include both pathogenic, or disease-causing species, and non-pathogenic species. The presence of fecal coliform bacteria indicates contamination of the waterbody by human and/or animal fecal material.

### **What is *Escherichia coli*?**

*Escherichia coli*, commonly called *E. coli*, is one of the most common species of coliform bacteria. It is a normal component of the large intestines in humans and other warm-blooded animals. It is found in human sewage in high numbers. *E. coli* is used as an indicator organism because it is easily cultured, and its presence in water in defined amounts indicates that sewage MAY be present. If sewage is present in water, disease-causing bacteria may also be present.

### **Why do we measure bacteria?**

Typhoid and cholera epidemics in the mid-19th century led to the discovery that certain gastrointestinal diseases of humans are transmitted via water. The disease-causing organisms leave the infected individual via the feces, which can become discharged into surface waters. They then in turn can be consumed by and infect users of the water. These water-borne diseases include typhoid, cholera, enteric fevers, and bacterial dysentery. It is not feasible, however, to test waters for each possible type of disease-causing bacterium. *E. coli* is used to indicate, on a statistical basis, the likelihood of contracting a disease by consuming or recreating in such waters.

### **What level of *E. coli* is acceptable?**

The acceptable level of *E. coli* is determined by risk analysis based on statistics to protect human health. Drinking water should have no *E. coli* after treatment. *E. coli* levels at designated swimming beaches should not exceed 88 per 100 milliliter (mL) in any one sample, or exceed a three-sample average over a 60-day period of 47/100mL. Recreational waters that are not designated beaches should not have more than 406 *E. coli*/100mL in any one sample, or more than 126/100mL in a 60-day, three-sample average. Occasional higher numbers are not unusual, particularly after storm events and where urban or agricultural runoff occurs. These levels are generally not considered unsafe unless investigation indicates the source to be sewage.

### **Can I drink my lake water?**

Because *E. coli* are present in all warm-blooded animals, including ducks, beaver, and sea gulls, it is highly unlikely that any lake will have zero *E. coli* without treatment. Even with no *E. coli*, lake water is still not safe to be used directly as a source of drinking water. Without adequate treatment there can be no guarantee concerning the safety of the Water.

### **Does *E. Coli* cause swimmers' ear or ear infections?**

No. There are a number of illnesses, particularly related to the eyes, ears, nose, and throat, which may use water as the medium of transmission but in which the disease-causing organism does not necessarily pass through the feces of the infected individual. Just as you may catch a cold by being in the same room as an infected individual, you may catch an ear infection by swimming in a lake with an infected individual. This can occur, even though no sewage is being discharged into the lake. Fortunately, these organisms generally do not survive very long in the Water.

### **How do I test my water?**

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