

# VI. Water Analyses

## A. General Information

Water samples for submission to the laboratories vary as to the type of container and volume appropriate for different tests. Much time can be saved if water is initially sampled in the correct container.

### a. Sample Containers

Sampling containers for testing well water or ponds are available to Extension Service County Agents from the University of Georgia Extension Storekeeper, Hoke Smith Annex (706/542-8844). Wastewater samples should be submitted in the appropriate container, either plastic or glass depending on the tests needed. Research samples should be submitted in appropriate containers – contact AESL if you need bottles. Visit our website for specific sample container requirements (<http://aesl.ces.uga.edu/samplecontainers>).



Many of the chemical parameters are time sensitive, which means that there is a specified amount of time that the sample can be held before testing procedures must begin. Table 1 contains the minimum sample size, preservatives, and maximum holding times for commonly requested water tests. On time sensitive samples (less than 7 days), the laboratory should be contacted for scheduling.

### b. Sample Collection Techniques

In the past, except when testing for lead, the recommended sample collection technique for drinking water from wells was to collect water from the spigot closest to the well head and to let water run for 10-15 minutes before collecting the sample. This procedure was designed to address groundwater quality excluding the effects from the household plumbing, storage tank, well construction, and pump.

Except for microbiology, we now recommend that all drinking water samples be collected from the first draw water out of the kitchen faucet or from the faucet used most often for drinking. Please follow three basic protocols when collecting a drinking water sample:

1. A first draw water sample will be collected (after a minimum of 6 hours, but not more than 12-hour period) during which time there was no water usage prior to the sampling. The GA-EPD recommends that either early morning or evening upon returning home are the best sampling times to ensure that the necessary stagnant water conditions exist.
2. A kitchen or bathroom cold-water faucet is to be used for sampling. If the primary concern is the well pump, draw the water from as near the well head as possible.
3. Place a clean sample container below the faucet and gently open the cold water tap. Completely fill all sample bottles.

For Microbiology testing (i.e. Bacteria), follow 5 basic protocols when collecting a drinking water sample:

1. Select an inside faucet that is clean and not leaking.
2. Remove any faucet attachments such as filters, aerators, screens, splashguards, or water-saver valves.
3. Sanitize the faucet inside and out by dipping the faucet neck into undiluted chlorine bleach (do not use color-safe bleach).
4. Open tap fully and flush the faucet and pipes by running water for 3 minutes. If sampling from a faucet that mixes hot and cold water, run hot water for 3 minutes, then cold water for 3 minutes. Do not turn off the water, but reduce the flow to avoid splashing.
5. Uncap the sample bottle without touching the inside of the cap or bottle, fill the bottle above the 100 mL line, but not completely full and recap. Please note that the white substance in the bottle is a dechlorinating agent, which is essential. Fill the bottle only once; do not rinse.

**Ponds and streams** should be sub-sampled at various depths and positions across the body of water. Sub-samples should then be combined to create one sample. Wastewater samples should be collected per the requirements of the permit.

TABLE 1

## Sampling &amp; Handling Requirements for Commonly Requested Water Tests

Test	Container	Sample Volume (ml)	Preservative	Maximum Regulatory Holding Time *
Ammonia-Nitrogen	P,G	500	Analyze as soon as possible or add H <sub>2</sub> SO <sub>4</sub> to pH <2 then refrigerate	28 d
Acidity	P, G(B)	250	Refrigerate	14 d
Alkalinity	P, G	250	Refrigerate	14 d
BOD	P,G	1000 (1 Liter)	Refrigerate	48 h
COD	P,G	125	Analyze as soon as possible, or add H <sub>2</sub> SO <sub>4</sub> to pH <2 then refrigerate	28 d
Color	P,G	125	Refrigerate	48 h
Chlorine, residual	P,G	500	Analyze immediately	Immediately
Chloride	P	125	Refrigerate	28 d
Conductivity	P,G	500	Refrigerate	28 d
Hardness	P, G	125	H <sub>2</sub> SO <sub>4</sub> to pH<2 then refrigerate	7 d
Herbicides	G(A)	1000 (1 Liter)	Refrigerate	7 d
Mercury	P, G	125	Refrigerate; HNO <sub>3</sub> to pH<2	28 d
Metals (Trace) except Mercury	P	125	HNO <sub>3</sub> to pH<2	6 mo
Nitrate+Nitrite-Nitrogen	P,G	125	Analyze as soon as possible or refrigerate	48 h (28 d for chlorinated samples)
Organic, Kjeldahl Nitrogen	P,G	500	H <sub>2</sub> SO <sub>4</sub> to pH<2 then refrigerate	28 d
Oil and Grease	G, wide-mouth calibrated	1000 (1 Liter)	Add H <sub>2</sub> SO <sub>4</sub> to pH<2 then refrigerate	28 d
pH	P,G	125	Analyze immediately	Immediately
Pesticides	G(A)	1000 (1 Liter)	Refrigerate	7days
Phosphate-Ortho	P, G(A)	125	For dissolved phosphate filter immediately; refrigerate	48 h
Phosphorus, Total	P,G	125	H <sub>2</sub> SO <sub>4</sub> to pH<2 then refrigerate	28 d
Solids	P,G	1000	Refrigerate	7 d
Total Organic Carbon	G	125	HCl to pH<2 then refrigerate	28 d
Turbidity	P,G	125	Refrigerate	48 h

P = plastic (polyethylene or equivalent); G = glass; G(A) = glass, amber; G(B) = glass, borosilicate

## B. Recommended Water Tests

### a. Ambient Surface Water Monitoring

Custom chemical analysis packages based on specific monitoring needs. Typical requests include: alkalinity, ammonia-N, bacteria, BOD, conductivity, organic Kjeldahl Nitrogen, nitrite+nitrate-N, phosphorus, pH, total suspended solids.

### b. Environmental Research/ Investigation

Helping to quantify today's environmental toxins by specialized equipment:

- Trace metals
- Pesticides

### c. Drinking Water Providers

**Small Distribution Systems (Cities, Restaurants, Mobile Home Parks, etc)**

W33 and W35 Required.

*(Some providers do their own W33 testing)*

### d. Recreational Water

Test Required: W39 *E. coli* or W37 Fecal Coliform. For regulatory purpose, collected 4 consecutive weeks immediately prior to season.

### e. Household Well Water/ Drinking Water

#### **Expanded Water Test (W2):**

Designed to address common well water problems in Georgia such as corrosion, high levels of iron and manganese, saltwater intrusion, and nitrate from various sources. This test package should be done at least once before using a less inclusive test package such as W1.

#### **Basic Water Test (W1):**

Only after a W-2 has been conducted annually.

#### **Total Coliform/*E. Coli* (W35)**

Annually

#### **Hydrogen Sulfide (Refundable Deposit)**

If your water smells like rotten eggs, then you should test for hydrogen sulfide. Call the FEW lab to borrow a hydrogen sulfide test kit.

### f. Waste Water-Permitted /Research

Per permit requirements or per parameter of interest.

### g. Fish Ponds

W1 and W18 recommended.

Occasionally, if water quality is a concern, biological oxygen demand (W24), nitrate-N (W6), total phosphorus (W27), and ammonium-nitrogen (W8) may be necessary.

### **a. Sampling Instructions: Escherichia coli (E. coli) in Drinking Water**

1. **Samples are accepted for analysis on Monday through Thursday from 8:00 a.m. to 4:00 p.m.** and the fee for analysis is \$46.00, including a next-day shipping label. If shipping is not needed, the fee is \$36.00 for the laboratory test. Please make checks out to UGA - FEW Lab.
2. Samples must be accepted for analysis **within 24 hours of the collection time**. Therefore, plan ahead by pre-selecting a day and time to collect your sample that will allow for shipping or travel time.
3. If you have shock chlorinated your well, you must wait until the chlorine has dissipated before collecting sample.
4. Choose an inside faucet that is clean and not leaking.
5. Remove any faucet attachments such as filters, aerators, screens, splashguards or water-saver valves.
6. Sanitize the faucet inside and out by dipping the faucet neck into undiluted chlorine bleach (do not use color-safe bleach).
7. Open tap fully and flush the faucet and pipes by running water for 3 minutes. If sampling from a faucet that mixes hot and cold water, run hot water for 3 minutes, then cold water for 3 minutes.
8. At the end of step #7, reduce the flow to avoid splashing, uncap the sample bottle without touching the inside of the cap or bottle, fill the bottle above the 100-ml line but not completely full (Fill the bottle only once, do not rinse), and recap tightly.
9. Place sample in the sample box, seal sample box, affix UPS shipping label and call UPS at 800-742-5877 to determine your local pick-up/drop off place and time for "Next Day Air" packages. Or hand deliver to the Ag. Services Laboratory, 2300 College Station Road, Athens.

### **b. Sampling Instructions: Escherichia coli (E. coli) in Recreational Water**

1. **Samples are accepted for analysis on Monday through Thursday from 8:00 a.m. to 4:00 p.m.** and the fee for analysis is \$46.00, including a next-day shipping label. If shipping is not needed, the fee is \$36.00 for the laboratory test. Please make checks out to UGA - FEW Lab.
2. Samples **must be accepted for analysis within 24 hours of the collection time**. Therefore, plan ahead by pre-selecting a day and time to collect your sample that will allow for shipping or travel time.
3. Completely fill out the information requested on the opposite side of the form. Essential info. must be completed for sample to be accepted.
4. Select the appropriate sampling area needed to obtain a representative sample for the recreational use of the water. If help is needed making this choice, please contact Dr. Uttam Saha at 706-542-7690.
5. Uncap the sample bottle without touching the inside of the cap or bottle, collect the water sample by holding the bottle near its base in the hand and plunging it, neck downward, below the surface. Turn bottle until neck points slightly upward and mouth is directed toward the current. If there is no current, create a current artificially by pushing bottle forward less horizontally in a direction away from the hand. Collect the sample approximately 1ft below the water surface.
6. The white substance in the bottle is a dechlorinating agent. Please do not rinse the bottle out.
7. It is best to take samples during a range of environmental and climatic conditions, especially during times when maximal pollution occurs.
8. Place sample in the sample box, seal sample box, affix UPS shipping label and call UPS at 800-742-5877 to determine your local pick-up/drop off place and time for "Next Day Air" packages. Or hand deliver to the FEW Laboratory, 2300 College Station Road, Athens, GA 30602.