QUALITY ASSURANCE / QUALITY CONTROL MEASURES

This document outlines Quality Assurance / Quality Control (QA/QC) measures as required by Blue Water Task Force (BWTF) Standard Operating Procedures, as well as additional measures that can be taken to increase confidence in a chapter's Blue Water Task Force data and results.

BLUE WATER TASK FORCE STANDARD OPERATING PROCEDURES REQUIRED QA/QC METHODS

Please confirm that you are strictly following the BWTF Standard Operating Procedures to avoid any contamination of your samples during sample collection or in the lab.

- **Water Sampling Instructions & Sample Collection Video Demonstration**
- **Written BWTF Lab Instructions for IDEXX Quantitray/Enterolert Method**

Most importantly, make sure the following protocols are strictly adhered to:

When collecting samples in the field,

- ❏ Do you apply hand sanitizer, or put on sterile gloves before collecting a sample?
- ❏ Are you careful not to touch the inside of the bag or bottle once open?
- ❏ Do you enter the water to knee-depth, where possible, careful not to disturb the sediment below?
- ❏ Do you collect your sample on an incoming wave, 6 inches below the surface?
- ❏ Do you check to ensure samples are fully sealed and immediately put on ice?
- ❏ Are samples processed within 6 hours of the time they are collected?

When processing samples in the lab,

- ❏ Are you running a blank control (reagent + distilled water) with every set of samples you process in the lab? And are those controls coming out blank? If you do yield a positive blank control, are you discarding your test results for the week?
- ❏ Before processing a sample, are you inverting the sampling bag 2-3 times to suspend any bacteria that may be sitting at the bottom?
- ❏ Is only one sample open at a time while processing? (to prevent cross-contamination)
- ❏ Are you careful not to touch the inside of the mixing bottle or lid, or the pipette during processing? Are you also minimizing any contact between these items while pipetting, mixing, and pouring samples?
- ❏ When samples are being read, do you confirm the temperature of the incubator is correct?

If your Blue Water Task Force program has not been following any of the above Standard Operating Procedures, please adjust your methods to meet these core QA-QC requirements. Be sure to thoroughly train new volunteers in the field, and do routine check-ins with existing volunteers to ensure proper methodology.

ADDITIONAL QUALITY ASSURANCE / QUALITY CONTROL MEASURES

These additional QA/QC measures are those routinely performed by water testing agencies, like your local county or state health departments, and represent a subset of the QA/QC protocols required by fully certified Quality Assurance Project Plans, or QAPPs. These additional measures are recommended for chapters that desire to establish more confidence in your data because either you are having difficulty getting acceptance of your data by local agencies or officials, or you are reaching large audiences with your results through online platforms or other media strategies. Implementing these measures will add additional costs and volunteer time to your BWTF program, and can be performed regularly, i.e. every time you sample, or periodically as check-ins depending upon your program's particular needs and available resources.

#1. Lab Replicates. Water taken from the same sample container is processed twice and analyzed independently.

Why Lab Replicates? Results from replicate samples are used to measure precision in lab processing and analysis, and to ensure that lab protocols are being accurately adhered to throughout processing. Each time a sample is processed by an individual, there is natural variability in the way that the sample is processed. Lab replicates are a good way to assess and measure this variability.

How: Each lab replicate should be processed and handled as a separate sample. The results of the lab duplicates should fall within a 95% confidence interval, which can be determined here. Once both samples are scored, take note of the upper and lower confidence limits of each sample (labs should maintain data sheets to reference the number of small vs. large fluorescing wells). If Replicate 1 falls within Replicate 2's upper and lower confidence intervals, and vice versa, then the results of both samples statistically agree, and your lab methodology shows acceptable consistency and precision. Results from only one replicate need be entered into the national database. If reporting publicly, reporting the higher MPN value would be precautionary in protecting public health in beach water. If a lab replicate fails, please contact jleduc@surfrider.org for guidance.

Ideal Frequency: Most QAPPs recommend running one lab replicate for every 10 samples. For most chapter-run BWTF programs, it is more reasonable and cost-efficient to run a lab replicate at one sampling site for every sampling run or event, even if you test more or less than 10 sites. Ideally, your chapter can establish a schedule to rotate which sampling locations are used to run a lab replicate.

#2 Positive Controls. Positive control with a known concentration of enterococcus can be purchased for analysis.

Why Positive Controls: Positive Controls test the accuracy of your laboratory methods.

How: Positive enterococcus controls typically come in tablet form. The tablets are submerged in water according to package directions, and that solution is processed as if it were a normal sample. The results must fall within the range determined by the supplier of the positive control. Please note, when processing a positive control, you do not multiply for the dilution factor.

Positive Control Purchasing Options: ***NSI Lab Solutions for $277/10-pack*****.**
Please contact jleduc@surfrider.org for more information if you are interested in purchasing.

Ideal Frequency: 1-2x per year

Want to learn more? Click here.

#3. Chain of Custody. A Chain of Custody (COC) is the chronological documentation that accompanies each set of water samples from the time of collection through to the time of analysis.

Why a Chain of Custody? A Chain of Custody identifies the person - staff or volunteer - that was responsible for the samples during each leg of their journey including: sample collection, drop-off, receipt of samples at the lab, processing and reading the results. Keeping track of custody helps to substantiate the validity of the test results.

How: Either COC seals can be signed by sampler and placed over closed top of sample vessel to remain intact until broken in lab by the person processing the sample, or additional lines can be added to your data sheet to document this info:

- Sampled by (Name & time)
- Received by (Name & time)

Ideal Frequency: A Chain of Custody should be included on each data sheet or attached to each sample.

Example Chain of Custody on BWTF Data Sheet: Example Here

Purchasing Options:
Custody Label for Sampling Bottles: Custody Seal, Environmental Express, $.06/each

Full QA/QC Methods Required in QAPPs
Programs that are covered by Quality Assurance Project Plans are required to perform these additional measures and recordkeeping practices.

- **Temperature Blanks.** Used to ensure samples were adequately cooled during transport to the lab, an additional sample can be collected at the first sampling location, and clearly labeled "Temperature Control Blank." Upon arrival at the lab, the temperature blank sample should not be more than 4℃ / 39.2℉. Ideally, there'd be one blank/cooler.
- **Training Log.** QAPPs require labs to maintain a detailed log with information about program participants' training of SOPs, field and laboratory training, confirming that they display correct performance of the procedure.
- **Maintenance Logs for Quanti-Tray Sealer.** Sealers do require ongoing maintenance. Detailed logs should be kept for routine and annual maintenance of sealer equipment.
- **Maintenance Log & Sterility Checks for Autoclave & Glassware as Applicable.** Dependent on the autoclave model, routine cleaning is necessary. Additional sterility checks may also be required within a QAPP.

- **Incubator Maintenance & Temperature Logs.** Labs should maintain temperature logs of incubators while in use, ensuring that the incubator maintains a steady 41℃ for proper incubation and accurate results. Additionally, the incubator must be re-calibrated semi-annually.
- **Data Communication & Review Plan.** QAPPs require that programs have a plan for the way that data is communicated, however this should already be a part of your BWTF program.

Sources and Additional Resources:

- EPA's Quality Assurance Handbook and Guidance Documents for Citizen Science Projects
- EPA Quality Control and Assessment Measures
- Volunteer Bacteria Monitoring Program Guide, Neighborhood Water Watch, Chattahoochee Riverkeeper QAPP, p 27-50