ADVANCED TRAINING CHECKLIST

1. INTRODUCTION

- ☐ Introduction from trainer – name, email, position, organization, etc.
- ☐ Distribute sign-in sheet and allow participants to introduce themselves (recommended for smaller classes or if time allows).
- ☐ Explain citizen science water quality monitoring.
- ☐ Explain the Texas Stream Team Program and Partnerships.
- ☐ Explain Texas Stream Team and Partnership goals, services, mission, etc.

2. TRAININGS & DATA USES

- ☐ Provide a brief overview of the different types of citizen scientist certification training courses available through Texas Stream Team: Standard Core, Probe Core, *E. coli*, Riparian Evaluation, Macroinvertebrate Bioassessment, TEEAC, and Trainer.
- ☐ Provide examples of data uses: increased understanding of overall quality of watersheds; data summary reports; partner data sharing; research projects; etc.

3. KEY CONCEPTS

- ☐ Review a watershed and concept of stream order. Consider using the "watershed wiggle" to describe the stream order concept.
- ☐ Review the major Texas River Basins and how they relate to individual watersheds.
- ☐ Review point source and nonpoint source (NPS) pollution and the differences between them. Discuss examples of NPS: pet waste, trash, fertilizers, herbicides, toxic chemicals from residential/agricultural runoff, etc.

4. TURBIDITY & SUSPENDED SOLIDS

- ☐ Define turbidity and units of measurement: cloudiness/haziness of a fluid, Jackson Turbidity Unit (JTU).
- ☐ Describe what suspended particles are and its effects on the water system: heat absorption, sunlight penetration, increase contamination, risks to aquatic life, etc.
- ☐ Explain sources of high turbidity: runoff, algae, bottom feeders, swimmers, tubers, erosion, etc.
- ☐ Demonstrate protocol used to test for turbidity and how to record the results on the environmental monitoring form.

5. ORTHOPHOSPHATE

- ☐ Briefly explain orthophosphate, units of measurement, and screening level: essential nutrient for plants and animals that continually cycles through the ecosystem, milligrams per liter (mg/L), 0.37 mg/L.

- ☐ Describe what is being tested for with the orthophosphate test and why this method is used: testing detects the amount of readily available phosphate in water, excludes phosphate bound in plants and animal tissues, professional testing of phosphate bound up in plant/animal tissue is too expensive so volunteer monitoring used for problem identification.
- ☐ Explain sources of orthophosphate: withering soil and rocks, discharge from wastewater treatment plants, failing septic systems, etc.
- ☐ Demonstrate protocol used to test for orthophosphates and how to record the results on the monitoring form.
- ☐ Recommend to filter water early on in analysis if water transparency is recorded as "cloudy" or "turbid" as filtering samples may take up to thirty minutes to complete. Other samples should be processed while the sample is being filtered.

6. NITRATE-NITROGEN

- ☐ Define nitrate-nitrogen, units of measurement, excessive quantities, standards, screening level, and relevant natural processes: essential nutrient for plants and animals, mg/L, above 10mg/L, 1.95 mg/L.
- ☐ Provide examples for sources of nitrate-nitrogen: wastewater treatment facility outfalls, runoff, failing septic systems, industrial discharges, etc.
- ☐ Demonstrate protocol used to test for nitrate-nitrogen and how to record results on the monitoring form.
- ☐ Recommend to filter water early on in analysis if water transparency is recorded as "cloudy" or "turbid" as filtering samples may take up to thirty minutes to complete. Other samples should be processed while the sample is being filtered.
- ☐ Emphasize the importance of adding the nitrate tablets in the shade/dark as sunlight, even filtered, will skew results.
- ☐ Demonstrate how to use the Octa-Slide Viewer, match the sample color to a color standard, and record the result on the monitoring form.
- ☐ Explain and demonstrate protocol used to dispose of solution.

7. EUTROPHICATION

- ☐ Describe what occurs when excessive amounts of orthophosphate and/or nitrate-nitrogen are introduced to a water body: eutrophication.
- ☐ Briefly explain eutrophication: water body becomes overly enriched with minerals and nutrients that induce excessive growth of algae.
- ☐ Explain the direct effects of eutrophication: less dissolved oxygen, less photosynthesis, subsurface vegetation death, blocks sunlight, etc.

8. *E. COLI* (OPTIONAL)

- ☐ Define *E. coli*: bacteria, indicator species.
- ☐ Explain the units of measurements: CFU/100mL (colony forming units per 100 milliliters).
- ☐ Describe the one-time sample standard compared to the standard for the 303(d) list: one-time is 394 CFU/100mL & 303(d) list is geometric mean of 126 CFU/100mL.
- ☐ Define geometric mean and how it differs from the arithmetic mean.
- ☐ Provide examples of sources for *E. coli*: agriculture, wildlife, sewage spills, pets, etc.

- ☐ Demonstrate protocol used to obtain a sample test using a Whirl-pak® Write-On Bags (fill to 100mL line): making sure to avoid contamination by surface scums, sediment and making sure to leave a small pocket of air.
- ☐ Explain how to avoid cross contamination and why it's important: dishes should be taped shut and kept out of reach of children, pets, and wildlife. Citizen scientists should wash hands before and after handling plates.
- ☐ Demonstrate how to properly label the petri dishes: initials, time, location, type (field blank, 1mL, 3mL, 5mL)
- ☐ Explain why a field blank is required during testing: to assess potential contamination from sample handling, airborne materials, equipment, media, and other sources. There should be no *E. coli* colony growth on the field blank samples.
- ☐ Demonstrate protocol used to obtain a Field Blank sample using a pretreated Petri dish and 1mL of sterile diluent.
- ☐ Demonstrate protocol used to accurately create a 1mL, 3mL, and 5mL plated sample and procedure used to determine which sample size is best to test for: usually 1mL and 5mL, but if 5mL produces > 60 colonies, use 3mL.
- ☐ Demonstrate protocol used to incubate the samples: samples must be transported, processed and placed in incubator within 6 hours of sample collection and required a steady incubation of 38°C, between 28 to 31 hours only (no more or less). Record the hold time on the monitoring form making sure not to report samples that are not processed within the time limit.
- ☐ Explain protocol used to accurately count colonies paying close attention to the dark purple/dark blue colonies with a deep indigo center (reference the field guide).
- ☐ Demonstrate protocol used to calculate the number of colonies per 100mL sample and how to record the results on the monitoring form.
- ☐ Explain protocol used to dispose of expired Easygel media: pour a teaspoon of bleach into the bottle, cap, shake well, place the bottle in a sealable plastic bag, and dispose in household trash.

9. MONITORING FORM REMINDERS

- ☐ Verify that all field observations, calibrations, and parameters tested are properly recorded on each trainee's monitoring form.
- ☐ Explain the required sections requesting total time spent sampling and traveling, total roundtrip distance traveled, and total number of participants and how to record it on the monitoring form.

10. CONCLUSION

- ☐ Did everyone provide their contact information? Explain that an email address is required in order to obtain an electronic copy of your certificate.
- ☐ Did the trainer provide details on site selection, the Waterways Dataviewer and Datamap, calendar, Community Forum and Blog, and videos?
- ☐ Did the trainer make sure everyone completed the Measures of Success survey?
- ☐ Did everyone leave with a copy of their instructions/packet and clear idea on how to start monitoring.
- ☐ Were all questions answered?