PHASE I

The Meadows Center for Water and the Environment
Texas State University

Texas Stream Team

ADVANCED ENVIRONMENTAL MONITORING FORM

For Office Use Only
Partner ID: _____
Date Received: _____
Date Approved: _____
Approved by (name): _____

Email to: TxStreamTeam@txstate.edu
Send to: Texas Stream Team
The Meadows Center - Texas State University
601 University Drive
San Marcos, TX 78666-4616

Sample Date (M M D D Y Y Y Y)

Sample Time (military) (H H M M)

Site ID # 1 0 0 0 1

Sample Depth (meters) (not total depth)

Community Scientist's Name _____

Site Description Training

Group or Affiliation _____

Field Observations:

- [ ] FLOW SEVERITY: 1-no flow 2-low 3-normal 4-flood 5-high 6-dry
- [ ] ALGAE: 1-absent 2-rare (<25%) 3-common (26-50%) 4-abundant (51-75%) 5-dominant (>75%)
- [ ] WATER SURFACE: 1-clear 2-scum 3-foam 4-debris 5-sheen
- [ ] WATER CONDITIONS: 1-calm 2-ripples 3-waves 4-white caps
- [ ] PRESENT WEATHER: 1-clear 2-cloudy 3-overcast 4-rain
- [ ] DAYS SINCE LAST SIGNIFICANT PRECIPITATION (runoff)
- [ ] TIDE STAGE (coastal only) 1-low 2-falling 3-slack 4-rising 5-high
- [ ] RAINFALL ACCUMULATION (inches within the last 3 days)
- [ ] WATER COLOR: 1-no color 2-light green 3-dark green 4-tan 5-red 6-green/brown 7-black
- [ ] WATER CLARITY: 1-clear 2-cloudy 3-turbid
- [ ] WATER ODOR: 1-none 2-oil 3-acrid (pungent) 4-sewage 5-rotten egg 6-fishy 7-musky

Streamflow Estimate:

- [ ] FLOW MEASUREMENT METHOD: 1-flow gauge station 2-streamflow estimate
- [ ] WIDTH (ft)
- [ ] DEPTH (ft) — AVERAGE

Depth 1: _____ Depth 5: _____ Depth 9: _____
Depth 2: _____ Depth 6: _____ Depth 10: _____
Depth 3: _____ Depth 7: _____
Depth 4: _____ Depth 8: _____

- [ ] TIME (sec) — AVERAGE

Time 1: _____ Time 2: _____ Time 3: _____

- [ ] VELOCITY (ft/s) = *10ft / AVG TIME* — AVERAGE
- [ ] DISCHARGE (cfs) = *WIDTH x AVG DEPTH x AVG VELOCITY*

Turbidity:

- [ ] NEPHELOMETRIC TURBIDITY UNITS (NTU)

TURBIDITY TUBE: _____ (centimeters)

_____ *cm* ÷ 100 = _____ meters

Filtered ☐ Yes ☐ No

Nitrate-Nitrogen:

- [ ] VALUE (ppm or mg/L)

Sample 1: _____ ppm or mg/L

IF ≥ 2.00 *ppm* --> **Sample 2:** _____ ppm or mg/L

Phosphate:

- [ ] VALUE (ppm or mg/L)

Sample 1: _____ *ppb* ÷ 1000 = _____ ppm or mg/L

IF ≥ 700 *ppb* --> **Sample 2:** _____ *ppb* ÷ 1000 = _____ ppm or mg/L

Comments:

Please do not fill out the remaining sections if you are also submitting a Core Environmental Monitoring Form with this information.

TOTAL TIME SPENT SAMPLING AND TRAVELING
[ ] Minutes

TOTAL ROUNDTRIP DISTANCE TRAVELED
[ ] Miles

TOTAL NUMBER OF PARTICIPANTS
[ ]

I certify that all procedures, including the items listed in the Quality Control Checklist on the following page and in the manual, have been followed.

_____
CERTIFIED COMMUNITY SCIENTIST'S SIGNATURE

_____
DATE

Prepared in cooperation with the Texas Commission on Environmental Quality and the United States Environmental Protection Agency. Revised January 24, 2024.

ADVANCED FIELD QUALITY CONTROL CHECK LIST

Community scientists are required to check all applicable boxes for each monitoring event to verify the procedures are followed. If the monitoring event fulfills a Field Audit Session, the trainer must observe the community scientist conducting the monitoring event and document observations in the comments field. The trainer will also sign to verify Field Audit Session was conducted.

General Procedures

- ☐ Samples were transported on ice if testing did not occur at monitoring site.
- ☐ Gloves were worn or hand sanitizer was applied throughout.
- ☐ None of the chemical reagents used for testing were expired.
- ☐ All chemical reagents were stored at room temperature or in an environment protected from extreme weather prior to use.
- ☐ Sampling was conducted at approximately the same time/day as previous sampling events at this site, preferably before noon or after 4pm (16:00).
- ☐ Monitoring sample was collected from the centroid of flow with minimal streambed disturbance.
- ☐ All equipment was rinsed twice with sample water before the test was conducted.
- ☐ All equipment was rinsed twice with deionized water after testing was completed.
- ☐ All relevant measurements were recorded in appropriate fields on monitoring form.

Field Observations:

- ☐ **Algae:** Recorded algae observed on the water surface and below the water surface.
- ☐ **Water Color:** Observed water color in a plastic cup or bucket with a white background.
- ☐ **Water Clarity:** Observed the relative cloudiness of the water from bridge or banks.
- ☐ **Water Odor:** Tested by wafting from plastic cup or bucket.
- ☐ **Present Weather:** Marked cloudy if there is a least one cloud in the sky.

Streamflow Estimate

- ☐ A cross section of the waterbody was chosen that is consistent in depth and free of ripples, backwater, and pools.
- ☐ Water depth was measured in 2-foot increments across the width of the water body.
- ☐ The 10-foot downstream measurement was measured from the centroid of the cross section for the streaflow estimate method.
- ☐ The timer was started from the moment the whiffle ball/floating object touched the water. Not from the moment it was released.
- ☐ Discharge was recorded with one decimal place if <10 cfs. If >10 cfs the value was recorded to the nearest whole number.

Turbidity

- ☐ Sample was collected in the centroid of the waterbody, facing upstream, with minimal streambed disturbance.
- ☐ Water was released from tube until the disk became barely visible.
- ☐ Turbidity tube value was reported in meters.

Phosphate

- ☐ Sample was properly filtered, if water clarity was marked cloudy or tubid.
- ☐ The phosphate value was civerted accurately from ppb to ppm or mg/L.

Nitrate-Nitrogen

- ☐ Sample was properly filtered, if water clarity was marked cloudy or tubid.
- ☐ Sample tubes were completely inverted to dissolve the tablets.
- ☐ Tube with Nitrate #2 Tablet was immediately placed in protective sleeve if testing occurred outdoors.

Field Audit Session

This section should be filled out by a certified trainer ONLY if a Field Audit Session was conducted. Field Audit Sessions are required at a minimum every two years.

Legible Trainer Full Name:_____ Trainer Signature:_____

Trainer Comments:

_____

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PHASE II

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Texas State University

Texas Stream Team

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Send to: Texas Stream Team
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601 University Drive
San Marcos, TX 78666-4616

ADVANCED ENVIRONMENTAL MONITORING FORM

Sample Date (M M D D Y Y Y Y)

Sample Time (military) (H H M M)

Site ID # 1 0 0 0 1

Sample Depth (meters) (not total depth)

Community Scientist's Name _____

Site Description Training

Group or Affiliation _____

Field Observations:

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- [ ] FLOW MEASUREMENT METHOD: 1-flow gauge station 2-streamflow estimate
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- [ ] TIME (sec)

AVERAGE

Time 1: _____ Time 2: _____ Time 3: _____

- [ ] VELOCITY (ft/s) = *10ft / AVG TIME*

AVERAGE

- [ ] DISCHARGE (cfs) = *WIDTH x AVG DEPTH x AVG VELOCITY*

Turbidity:

- [ ] NEPHELOMETRIC TURBIDITY UNITS (NTU)

TURBIDITY TUBE: _____ (centimeters)

_____ *cm* ÷ 100 = _____ meters

Filtered ☐ Yes ☐ No

Nitrate-Nitrogen:

- [ ] VALUE (ppm or mg/L)

Sample 1: _____ ppm or mg/L

IF ≥ 2.00 *ppm* --> **Sample 2:** _____ ppm or mg/L

Phosphate:

- [ ] VALUE (ppm or mg/L)

Sample 1: _____ *ppb* ÷ 1000 = _____ ppm or mg/L

IF ≥ 700 *ppb* --> **Sample 2:** _____ *ppb* ÷ 1000 = _____ ppm or mg/L

Comments:

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[ ] Minutes

TOTAL ROUNDTRIP DISTANCE TRAVELED
[ ] Miles

TOTAL NUMBER OF PARTICIPANTS
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Streamflow Estimate

- ☐ A cross section of the waterbody was chosen that is consistent in depth and free of ripples, backwater, and pools.
- ☐ Water depth was measured in 2-foot increments across the width of the water body.
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PHASE III

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Texas State University

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ADVANCED ENVIRONMENTAL MONITORING FORM

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Site ID # 1 0 0 0 1

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- ☐ Turbidity tube value was reported in meters.

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Field Audit Session

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Legible Trainer Full Name:_____ Trainer Signature:_____

Trainer Comments:

_____

_____

The Meadows Center for Water and the Environment
Texas State University

Texas Stream Team

ADVANCED FIELD GUIDE – STREAMFLOW & TURBIDITY

Equipment Needed

- Turbidity Tube (60 cm or 120 cm)
- Bucket (optional)
- Yard or meterstick (with standard units)
- Timer (stopwatch, cell phone, or wristwatch)
- Whiffle ball or other floating object such as a rubber duck, stick, leaf, etc.
- Measuring tapes (2)
- Water shoes/sandals or waders

Streamflow

Flow Gauge Station Method

1. Check if the monitoring site is ≤0.25 mile of a stream gauge. You can check the United States Geological Society, International Boundary and Water Commission's, or your local river authority to see a list of flow gauging stations.
2. Measure the distance from the monitoring station using free software such as Google Earth, implementing the measurement tool.
3. If the monitoring site is ≤0.25 mile of a gauge, record the *Discharge* from the gauge for the same day and approximate time the monitoring event was conducted. Record the *Flow Measurement Method* on the Monitoring Form.
   a. If the nearest gauge is >0.25 mile of the monitoring site, proceed with the protocols below to estimate streamflow discharge.

Streamflow Estimate Method

Never measure streamflow in swiftly moving, deep water, or in hazardous weather conditions. Take a buddy with you for safety purposes. If you are concerned for your safety, do not proceed.

1. Select a cross section of the waterbody with laminar flow to measure, avoiding pools, ripples, backflows, etc., that would impact the waterbody's true flow. Choose a section between 5 – 20 feet wide if possible.
2. Measure the width of the waterbody in feet. Measure only the water from the edge of the left bank to the edge of the right bank. Round to the nearest 0.25 inch and document on Monitoring Form.
3. Measure the depth of the waterbody at the midpoint of 2 feet wide increments along the entire width of the waterbody. Average the depth measurements and document on Monitoring Form.
4. Measure 10 feet downstream (following the current) from the centroid of flow.
5. Calculate the time it takes for an object to travel downstream. There are two ways to do this:
   A. Buddy method is used if you have a buddy.
      1. Have one person stand upstream at the beginning of the 10-foot measurement, and the other downstream.
      2. The person upstream drops the whiffle ball/floating object into the current.
      3. The person downstream times how long it takes the object to travel 10 feet using the timer, then retrieves and returns the object to the starting point. Record the time on the Monitoring Form.
      4. Repeat the process 3X and average the recorded times.
   B. Sampling alone is used if you do not have a buddy.
      1. Mark where the 10-foot measurement is downstream. You can insert a stick into the sediment so that it is visible above the water surface, or stack rocks. Be sure to remove any sticks/rocks after completing the measurement.
      2. Stand upstream (at the beginning of the 10- foot measurement). Instead of a whiffle ball, use a dry stick or a natural object that can float to prevent littering.
      3. Drop the floating object into the current.
      4. Use the timer to time how long it takes the object to travel 10 feet. Record the time on the Monitoring Form.
      5. Repeat the process 3X and average the recorded times.
6. Divide the distance (10 ft) by the average time to calculate the *Velocity*.
   a. Velocity (ft/sec) = 10 (ft) ÷ Average Time (sec).
7. Calculate and record the *Discharge* in cubic feet per second (cfs).
   a. Discharge (cfs) = Width of Waterbody (ft) x Average Depth (ft) x Average Velocity (ft/sec)

Turbidity

1. Collect the turbidity water sample by selecting a method most applicable to your monitoring site:
   A. Bucket Grab is used if the centroid of flow is not accessible, or it is not safe to get in the water.
      1) Rinse bucket and tube 2X with sample water.
      2) Use a bucket to collect sample water. Do not disturb the streambed or kick up any sediment. Carefully pour the water collected in the bucket into the tube immediately after collection to prevent settling of suspended materials.
   B. Sample Directly from Waterbody if the centroid of flow is accessible and safe.
      1. Standing in the centroid of flow of the waterbody and downstream of the tube, rinse the tube 2X then dip the tube into the water facing upstream to fill. Do not disturb the streambed or kick up any sediment.
2. Holding the tube vertically, look down the tube from the top to see if the disk at the bottom is visible. If disc is not visible, release water until visible and record the water level in meters on Monitoring Form. If the tube is filled to the top and the disk is completely visible, record the measurement as > the maximum tube length (i.e., >1.2m or >0.6m depending on the length of the tube used).
3. Use the table below to convert the measurement from meters to nephelometric turbidity units (NTUs). Record the value on the Monitoring Form.

Distance from bottom of tube (m)	NTU	Distance from bottom of tube (m)	NTU
<0.0625	>240	>0.2875 to 0.3125	24
0.0625 to 0.07	240	>0.3125 to 0.3375	21
>0.07 to 0.08	185	>0.3375 to 0.3625	19
>0.08 to 0.095	150	>0.3625 to 0.3875	17
>0.095 to 0.105	120	>0.3875 to 0.4125	15
>0.105 to 0.12	100	>0.4125 to 0.4375	14
>0.12 to 0.1375	90	>0.4375 to 0.4625	13
>0.1375 to 0.1625	65	>0.4625 to 0.4875	12
>0.1625 to 0.1875	50	>0.4875 to 0.5125	11
>0.1875 to 0.2125	40	>0.5125 to 0.5375	10
>0.2125 to 0.2375	35	>0.5375 to 0.575	9
>0.2375 to 0.2625	30	>0.575 to 0.6	8
>0.2625 to 0.2875	27	> 0.6	6

Source: Utah Water Watch, Turbidity Tube Conversion Chart

* 1 meter = 100 centimeters

The preparation of this publication is financed and prepared in cooperation through grants from the U.S. Environmental Protection Agency through the Texas Commission on Environmental Quality. Revised June 6, 2023.

The Meadows Center for Water and the Environment
Texas State University

Texas Stream Team

ADVANCED FIELD GUIDE – NITRATE-NITROGEN & PHOSPHATE

Equipment Needed

- Advanced LaMotte Kit (XX01406-02CS)
- IF NEEDED: Filtration Hach supplies (filters, mixing bottles (2), funnel, filtration aid solution, and pipette)
- Gloves
- Deionized (DI) water
- Waste bin
- Sample bucket
- Timer

Water Sample

Sample Collection

Before collecting water sample, rinse bucket 2X with sample water and discard water downstream.

Preservation & Hold Times

Test water sample as soon as possible following sample collection. If transporting a sample is necessary due to weather or other extreme conditions, samples should be placed on ice during transport and analyzed as soon as possible.

Filtration

Filtration must be performed for both nitrate-nitrogen and phosphate if you recorded either "cloudy" or "turbid" on the *Field Observations* section of the Monitoring Form under *Water Clarity*. If the sample is clear, proceed to the Testing Procedures section without filtering.

1. Rinse 1 mixing bottle 2X with sample water; rinse the other mixing bottle 2X with DI water.
2. Fill the bottle rinsed with sample water to the shoulder with sample water.
3. Add 0.5 mL of Filtration Aid Solution. Swirl to mix.
4. Place the funnel inside the empty bottle rinsed with DI water and insert a filter into the funnel. Pour the water sample from the first bottle into the funnel. Use the filtered water sample or filtrate in the testing procedures below.
5. Rinse funnel and mixing bottles 2X with DI water before storing.

Nitrate-Nitrogen

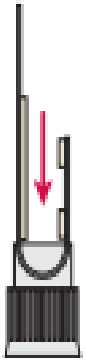
Testing Procedures

1. Rinse test tube and pipette 2X with sample water or filtrate if water sample was filtered.
2. Using a pipette, fill test tube with 5 mL of sample water or filtrate as appropriate.
3. Add 1 Nitrate #1 Tablet to test tube without touching the tablet with your hands/fingers. See instructions and diagram on tablet box, if needed.
4. Cap test tube and invert until tablet dissolves.
5. Add 1 Nitrate #2 Tablet to test tube the same way as step 3 above. Immediately slide the tube into the Protective Sleeve if testing outdoors.
6. Cap and invert for 2 minutes until tablet dissolves.
7. Wait 5 minutes. While you wait, insert the Nitrate-Nitrogen Octa-Slide 2 Bar into the Octa-Slide 2 Viewer.
8. After 5 minutes remove the test tube from the protective sleeve. Insert tube into the Octa-Slide 2 Viewer.
9. Match the resulting sample color to a color standard on the Octa-Slide 2 Bar and record as ppm or mg/L on Monitoring Form.
10. If test result is < 2.00 ppm or mg/L, record on Monitoring Form and proceed to step 12.
11. If test result is ≥ 2.00 ppm or mg/L, run test again to confirm.
    a. If the same/similar result occurs, average the values and record on Monitoring Form.
    b. If the same/similar result does not occur, rerun the test until the same/similar result occurs and record the average on Monitoring Form.
12. Dispose sample water in waste bin and rinse test tube and cap 2X with DI water before storing.

PHOSPHATE

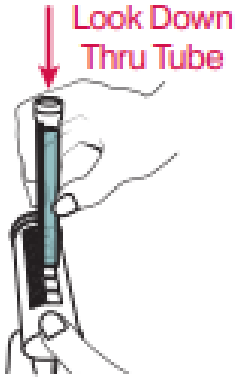
Testing Procedures

1. Rinse test tube and cap 2X with sample water or filtrate if water sample was filtered.
2. Fill test tube with 10 mL of sample water or filtrate as appropriate.
3. Remove one test strip from the vial and immediately cap vial to prevent UV light contamination.
4. Gently bend the strip – DO NOT FOLD – beneath the long rectangular test pad with pads facing inwards. The test strip should now be in the shape of the letter "J".



5. Place the bend of the strip inside the test tube cap. Cap test tube with strip inside.
6. Slowly invert the test tube 5X, making sure air bubble moves from one end of the tube to the other each time the tube is inverted.
7. Remove the cap and test strip.
8. Place the bottom of the test tube on the white boxed area of the color chart located on the vial with the test strips.
9. Look down through the OPEN test tube and compare to the color chart

   Note: *For accurate results, read in natural light.*



10. If test result is < 700 ppb (< 0.7 ppm or mg/L), record the result on Monitoring Form as ppm or mg/L (see unit conversion table below) and proceed to step 12.
    a. If the value falls between two colors on the chart, record the value halfway between the two.
11. If test result is ≥ 700 ppb (≥ 0.7 ppm or mg/L), run test again to confirm.
    a. If the same/similar result occurs, average the values and record on Monitoring Form as ppm or mg/L.
    b. If the same/similar result does not occur, rerun the test until the same/similar result occurs and record the average on Monitoring Form as ppm or mg/L.
12. Dispose sample water in waste bin and rinse test tube and cap 2X with DI water before storing.

Unit conversion: ppm or mg/L = ppb ÷ 1,000							
Parts per billion (ppb)	0	100	200	300	500	1000	2500
Parts per million (ppm or mg/L)	0	0.1	0.2	0.3	0.5	1.0	2.5

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