

Chapter 2

Site Selection



Before you start monitoring water quality, you must first select a site to monitor. This chapter will explore many factors for selecting an appropriate stream site to monitor. Specifically, we will discuss:

- Varying reasons for selecting a specific site
- Factors to consider when selecting a stream site
- How to identify your site on data submissions
- How to acquire your biological monitoring equipment



SELECT A LOCATION OF YOUR CHOICE

- ⦿ Learn the condition of a local stream
- ⦿ Favorite recreational stream
- ⦿ Pollution concerns
- ⦿ Priority for state agencies
- ⦿ Bridge a monitoring gap



FIND A MONITORING GAP



mostreamteam.org/interactive-map.html, 2019

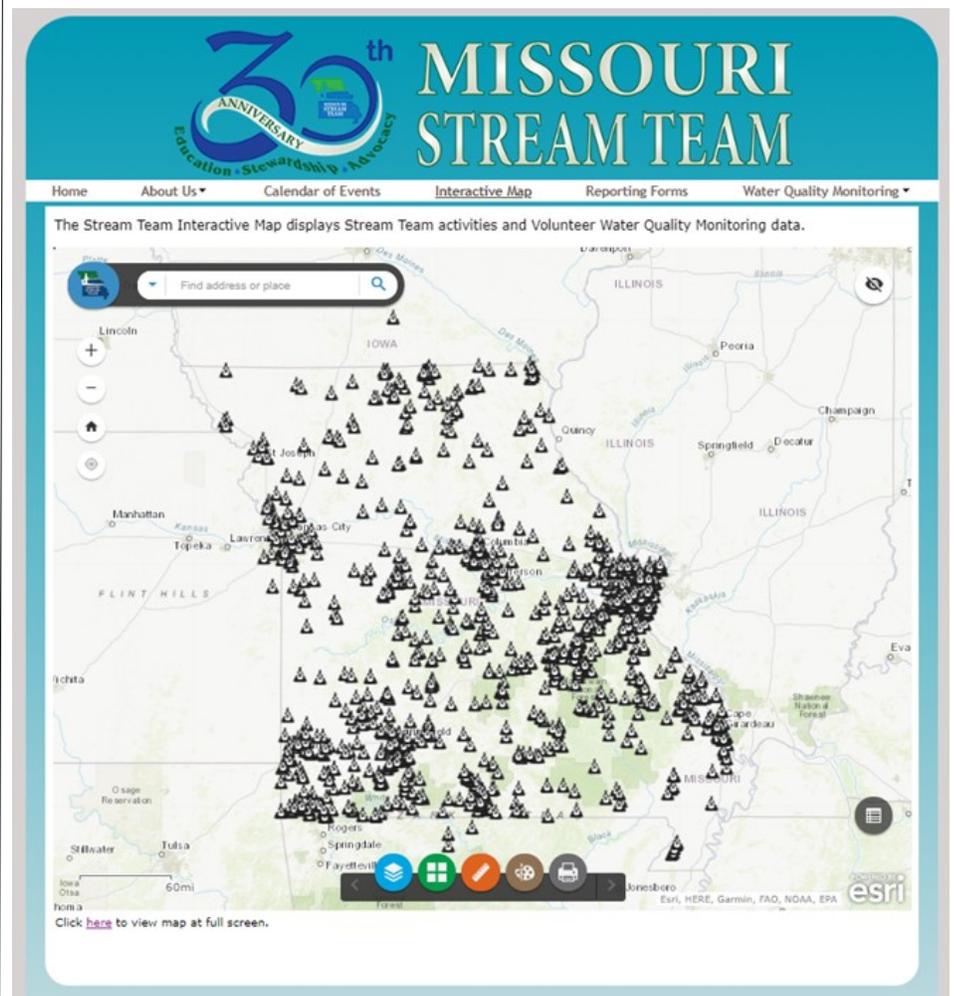


Choosing a Stream Site to Monitor

When selecting a site to monitor, choose one you are invested in or that is special to you. Monitors often choose a local stream, maybe one in their own back yard or city park. Monitors are often anglers or paddlers and select their preferred recreational stream. Other volunteers may be concerned about a heavily polluted stream or may want to fill a gap in the Stream Team’s current water monitoring efforts. Whatever your reasons, we appreciate your efforts in monitoring the quality of the state’s water resources.

With approximately 110,000 miles of rivers and streams in Missouri, there are numerous stream sites to monitor. Do not be discouraged if the site you have in mind has already been selected by another monitor. Often, sites have been abandoned and are available for a new volunteer to begin monitoring again. To help you locate those gaps, use the Stream Team Interactive Map at:

mostreamteam.org/interactive-map.html

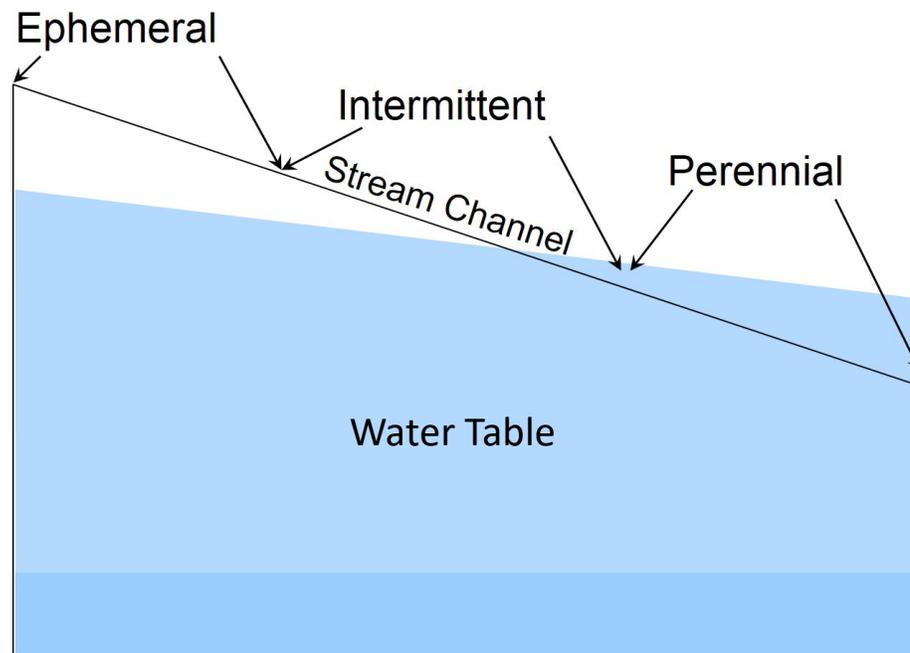


Factors to Consider When Choosing a Site

The diagram below describes three types of streams:

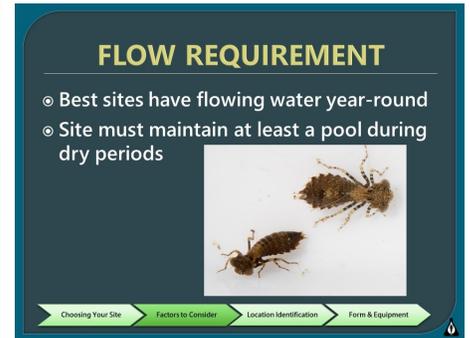
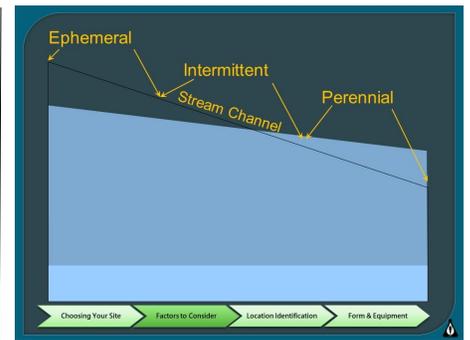
- **Perennial Streams** are fed continuously by a water table and will flow all year long.
- **Ephemeral Streams** exist above a water table. These streams only contain water after a precipitation or snow melt event. They are sometimes called wet-weather streams.
- **Intermittent Streams** receive groundwater flow only part of the year. The flow stops when the water table drops below the channel.

Stream Team protocol is designed for perennial streams, or streams with continuous flow.



There are some important factors to consider when selecting your site:

- **Flow Requirement:** The best monitoring locations have permanent water flow throughout the year. However, you can still use a stream site if it maintains pools that can support aquatic life during dry periods. This is important so that you will still be able to sample macroinvertebrates during dry periods. If a stream site completely dries up at any time of the year, it will not be a suitable monitoring location.



MONITORING SITE

- 300 ft section with at least one riffle
- Sites should not overlap

Choosing Your Site Factors to Consider Location Identification Form & Equipment

RIFFLE HABITAT

Choosing Your Site Factors to Consider Location Identification Form & Equipment

Factors to Consider When Choosing a Site

Another important factor to consider when selecting your site:

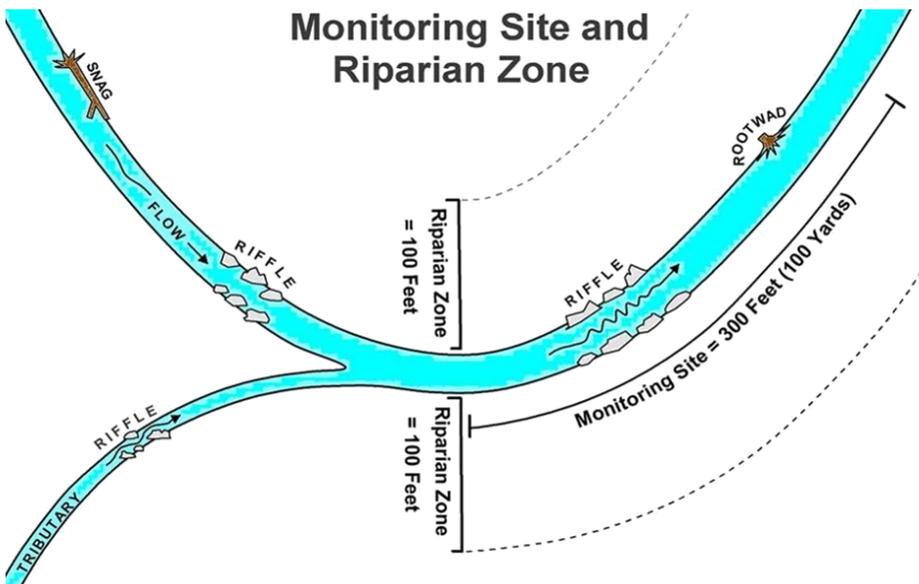
- 300-Foot Section With at Least One Riffle:** Your stream site should be approximately 300 feet long, about the same length as a football field, and not overlap with another stream site. If you decide to monitor two sites on the same stream, be sure the two sites do not overlap. Additionally, your proposed site should include at least one riffle. A riffle is where water breaks over rocks, indicating an elevation drop in the stream bed. Riffles provide an excellent environment when monitoring for macroinvertebrates.



Factors to Consider When Choosing a Site

Other factors to consider when selecting your site include:

- **Goals:** Choose a site that best reflects your personal goals for monitoring a stream.
- **Habitat:** Choose a site that has suitable habitat. The best sites contain riffles. If riffles are not found, you may consider looking for alternative habitats such as a root mat or woody debris.
- **Point and Nonpoint Sources:** If you are concerned about a point or nonpoint source of pollution, you may consider choosing two sites. One above and one below a potential pollution source. The upstream site can be used as a reference to compare downstream data.
- **Tributaries:** To determine the impact of a single tributary, select sites above and/or below the confluence of the tributary. For example, consider the diagram of a proposed site below. The site sits downstream from a tributary and contains a riffle and a root wad. When monitoring your site, always use the same 300-foot stretch. By doing so, your efforts will produce reliable data.



- **Site Accessibility:** You cannot monitor a site you cannot access. Whether your site is on private or public land, you will need to seek permission to access the stream. Use the **Streamside Property Owner Permission Request** (found on the stream team website at mostreamteam.org) to let a private landowner know who you are, what you are doing, and to gain permission to be on their property. To gain permission to monitor along public land, contact the area manager. Stream Team staff can facilitate communication with public land managers.

IMPORTANT CONSIDERATIONS

- Goals
- Suitable Habitat
- Point & Non-point Sources
- Tributaries & Roads

Choosing Your Site → Factors to Consider → Location Identification → Form & Equipment

MONITORING SITE

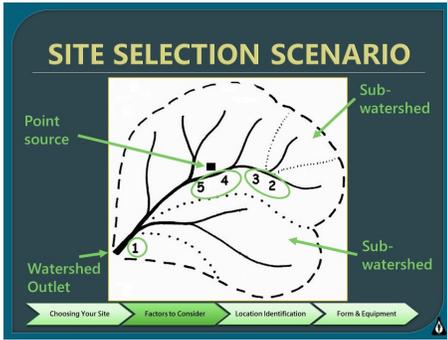
Choosing Your Site → Factors to Consider → Location Identification → Form & Equipment

SITE ACCESSIBILITY

Private Land

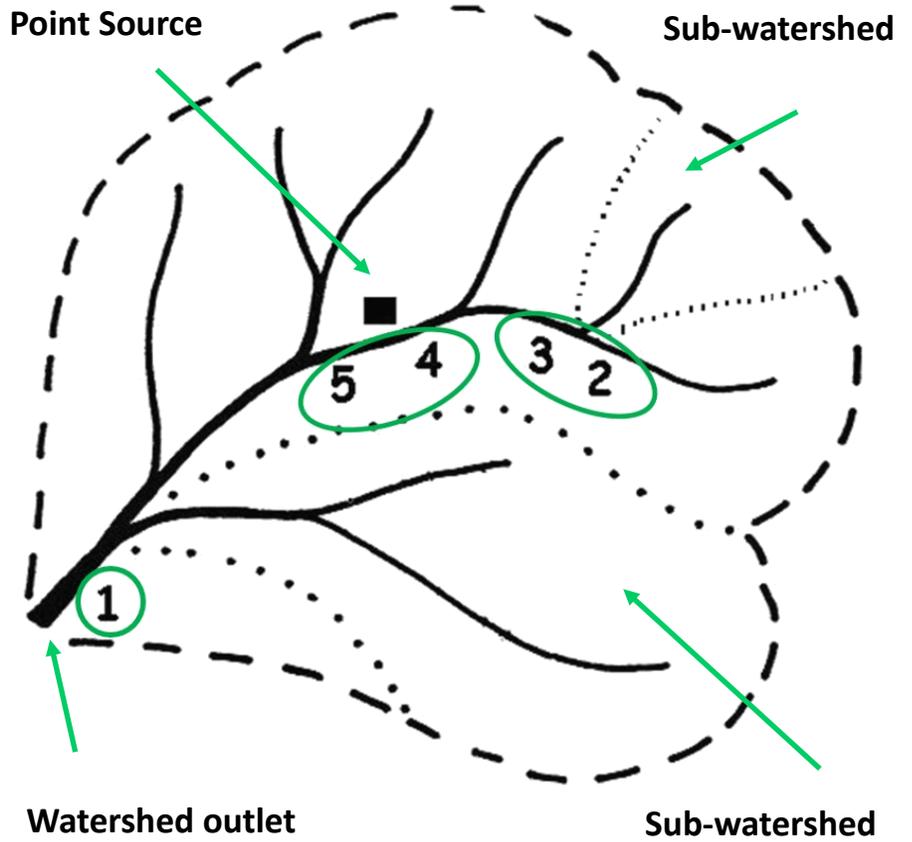
Public Land

Choosing Your Site → Factors to Consider → Location Identification → Form & Equipment



Site Selection Scenario

Consider the diagram of a watershed and the proposed sites below where the black square indicates a point source for pollution. Then, complete the table by describing the rationale for choosing each proposed site.



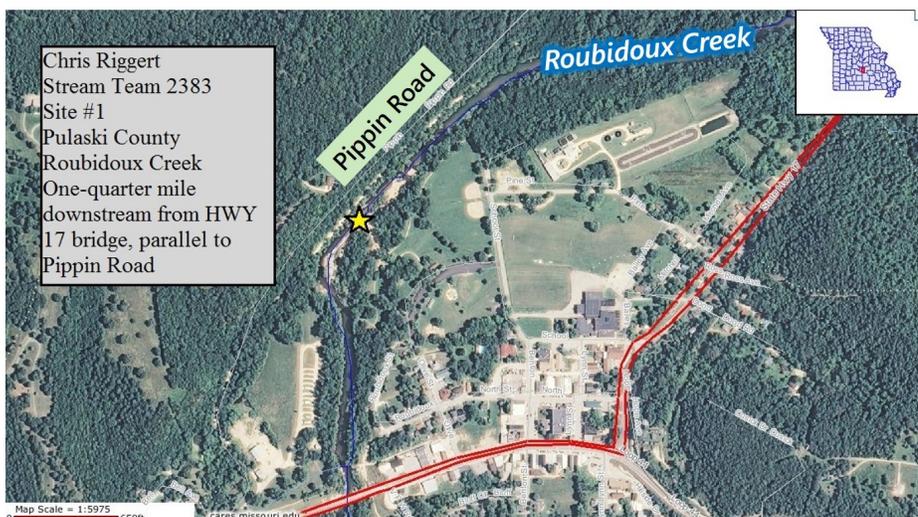
Proposed Monitoring	Rationale for Monitoring Proposed Site
Site 1	
Sites 2 & 3	
Sites 4 & 5	

Site Number and Description

Once you have chosen an appropriate site to monitor, you will need to refer to the site each time you submit data:

- **Site Numbers** are specific to each volunteer monitor. Even though the same site can be monitored by two different volunteers, each volunteer will have an independent number identifying it. For each volunteer monitor, these sites are numbered chronologically starting at Site #1. Everyone's first site will be Site #1. If you decide to monitor an additional site or abandon your first site for another, the next site will be Site #2.
- **Site Descriptions** enable Stream Team staff to locate your site on a map. It is important to be consistent with your site description each time you submit data. When describing your site, use the distance upstream or downstream from roadway crossings, distance and direction from major intersections, or distance and direction from permanent landmarks. For example, *300 feet downstream from Highway AA*. Avoid using physical features such as trees or buildings as these are not on maps and can change.
- **Site Map:** For each new site you monitor, please submit a site map before you begin collecting data. There are many online mapping tools to aid you:
 - Stream Team Interactive Map can be accessed at mostreamteam.org
 - Department of Natural Resources Interactive Map can be found at dnr.mo.gov
 - Google maps can be found at maps.google.com

Below is an example of a map from the Stream Team website with the volunteer's site marked on it. The required information listed on the map will ensure program staff are able to locate your site.



SITE NUMBERING

- Number sites **chronologically**
- Site numbers are assigned to individuals, not Stream Teams
- Site number for your location will never change
 - Your first site will always be your Site #1

Choosing Your Site → Factors to Consider → Location Identification → Form & Equipment

SITE LOCATION DESCRIPTION

- Always use the same **verbal** description
 - GPS coordinates are **NOT** a substitute!
- Describe your site using:
 - Distance up or downstream of roadway crossings
 - Distance and direction from major intersections
 - Distance and direction from **permanent** landmarks

Example: 300 ft DS Hwy AA

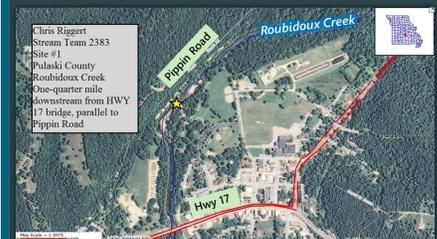
Choosing Your Site → Factors to Consider → Location Identification → Form & Equipment

SITE MAP

- Map with site location **marked and numbered** is required for new site(s)
- Processing **will** be delayed if map is not submitted

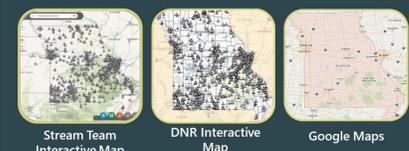
Choosing Your Site → Factors to Consider → Location Identification → Form & Equipment

NEW SITE MAP



Choosing Your Site → Factors to Consider → Location Identification → Form & Equipment

WHERE TO FIND MAPS



Choosing Your Site → Factors to Consider → Location Identification → Form & Equipment

REQUIRED INFO ON ALL DATA SHEETS

INITIAL SITE SELECTION FORM
Submit this form with a map and Stream Discharge data sheet to receive biological monitoring equipment.
 To establish subsequent monitoring sites, submit a map only.

Site # 1 Stream _____ County _____
 Site Location _____
 Date _____ Time between _____ Rainfall inches in 7 days _____ Water Temp (°C) _____
 Trained Data Submitter (provide address) _____ Stream Team Number _____
 Participants _____

I do not want biological monitoring equipment

- Please fill out the header information on every data sheet
- Data processing **WILL** be delayed if information is missing

Choosing Your Site
Factors to Consider
Location Identification
Form & Equipment

WEATHER/RAINFALL INFORMATION

- Quick and easy way to get rainfall at your site: weatherunderground.com
- Other Rainfall sources:
 - weather.com
 - noaa.gov
 - Local weather reports from newspapers, airports, radio or television stations
- Use a rain gauge

Choosing Your Site
Factors to Consider
Location Identification
Form & Equipment

Header Information

The **Initial Site Selection Form** and all data sheets contain a header, which need to be filled out in its entirety or else data submission will be delayed. The header consists of the following required sections:

- **Site #:** The site number is specific to the trained data submitter. Every monitor’s first monitoring site is Site #1. Additionally sites monitored are numbered chronologically.
- **Stream:** State the name of the stream which is being monitored.
- **County:** This is the county of the stream monitoring site. Some streams cross county boundaries, so reference a map for the exact county of your site.
- **Site Location:** Provide a physical description of the monitoring site which would allow staff to find the site on a map.
- **Date & Time:** Date is required in month-day-year format. Time is required in military time.
- **Rainfall:** Provide amount of rainfall (in inches) for the 7 days preceding the monitoring date. This information can be measured with a rain gauge near the monitoring site or found online at:
 - wunderground.com***
 - weather.com***
 - noaa.gov***
- **Water Temperature:** Record water temperature in degrees Celsius. Always take temperature measurements in the shade. Temperature is not required on the *Initial Site Selection Form* since thermometers are not issued to monitors until this form is submitted.
- **Trained Data Submitter:** This is the name of the person responsible for the data who has completed the appropriate level of training. Only the trained data submitter may fill out the data sheets.
- **Participants:** List the names of anyone who assisted in collecting the data. These individuals may be trained or untrained.
- **Stream Team Number:** State the Stream Team of the trained data submitter.

Header Information Scenario

Consider the header information in the Initial Site Selection Form below.
Identify 11 inaccuracies of the submitted data.

INITIAL SITE SELECTION FORM

Submit this form with a map and Stream Discharge data sheet to receive biological monitoring equipment.
To establish subsequent monitoring sites, submit a map only.

4079
 Site # Stream Litter Gitters County North County
 Site Location Behind the Smith place by the big oak tree 39° 27' 56" 93° 53' 47.5"
 Date 4/11/ Time (military time) 6:30 Rainfall (inches in last 7 days) trace Water Temp. (°C) 73
 Trained Data Submitter (responsible volunteer) Ms. Brown Stream Team Number ?????
 Participants Fifteen 3rd grade class, was AWESOME!! (What is this?)

HEADER (MIS) INFORMATION

What's wrong with this data sheet?

SITE SELECTION DATA SHEET

Please check the box next to the "Site #". If this is a new site and please be sure to attach a map. (PLEASE PRINT)

Site # 4079 Stream Litter Gitters County North County

Site Location Behind the Smith place by the big oak tree 39° 27' 56" 93° 53' 47.5"

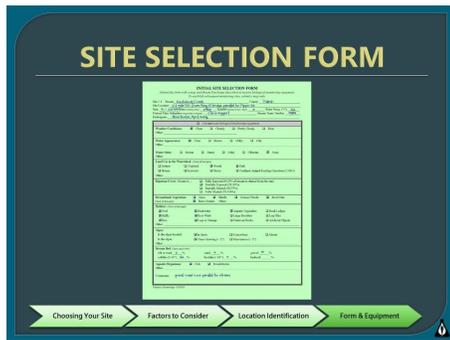
Date 4/11 Time military time 6:30 Rainfall (inches in last 7 days) trace Water Temp (°C) 73

Trained Data Submitter (responsible volunteer) Ms. Brown Stream Team Number ?????

Participants Fifteen 3rd grade class, was AWESOME!! (What is this?)

▶ Choosing Your Site
 ▶ Factors to Consider
 ▶ Location Identification
 ▶ Form & Equipment

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____
11. _____



Initial Site Selection Form

The **Initial Site Selection Form** is the first set of data you will submit. You will only submit this one time and only for your Site #1. This is a basic visual assessment of your site and provides program staff with the information they will need to add your location to the statewide database. **You will not receive your biological monitoring equipment until you have submitted this form.**

The form consists of the following sections:

- **Header:** This section includes required information such as stream name, site number, site description, date and time monitored, name of trained volunteer, and Stream Team number. Additionally, it asks for the amount of rainfall in the last seven days, water temperature (in Celsius), and the name of any other participants assisting you.
- **Weather Conditions:** Record the weather conditions on the date you monitored your stream. You will also need to take an air temperature reading (in Celsius). Be sure to take the air temperature reading in the shade and before taking a water temperature reading.
- **Water Appearance and Odor:** Scoop some stream water in a clear plastic container and document the visual appearance of the water. Smell the sample of the water and note the odor.
- **Land Use in the Watershed:** Select how the watershed surrounding your stream site is used.
- **Riparian Cover:** Riparian cover refers to the vegetation along the streambank. Select the appropriate description for your site. If you are sampling during early spring or winter, imagine the cover during full foliage.
- **Streambank Vegetation:** Note all the kinds of vegetation along the streambank.
- **Habitat:** Document the habitat in the stream at your site by selecting all stream features that apply.
- **Algae:** Note if algae is present and if it is close growing (less than two inches) or if it is filamentous (longer than 2 inches).
- **Stream Bed:** Estimate the percentage of streambed that is covered by the various sized sediments listed. Your percentages should add up to 100%. This may require you to get into the water. You may also want to scoop up a little sediment to determine if there is any silt or sand.
- **Aquatic Organisms:** Note the types of aquatic organisms you find.

INITIAL SITE SELECTION FORM

Submit this form with a map and Stream Discharge data sheet to receive biological monitoring equipment.

To establish subsequent monitoring sites, submit a map only.

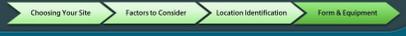
Site # 1 Stream Roubidoux Creek County Pulaski
 Site Location 1/4 mile DS from Hwy 17 bridge, parallel to Pippin Rd.
 Date 9 / 24 / 2014 Time (military time) 0930 Rainfall (inches in last 7 days) 0 Water Temp. (°C) NA
 Trained Data Submitter (responsible volunteer) Chris Riggert Stream Team Number 2383
 Participants Alicia Burke, April Sevy

<input type="checkbox"/> I do not want biological monitoring equipment					
Weather Conditions:	<input checked="" type="checkbox"/> Clear	<input type="checkbox"/> Cloudy	<input type="checkbox"/> Partly Cloudy	<input type="checkbox"/> Rain	
Other: _____					
Water Appearance:	<input checked="" type="checkbox"/> Clear	<input type="checkbox"/> Brown	<input type="checkbox"/> Milky	<input type="checkbox"/> Oily	
Other: _____					
Water Odor:	<input type="checkbox"/> Rotten	<input type="checkbox"/> Musty	<input type="checkbox"/> Fishy	<input type="checkbox"/> Chlorine	<input checked="" type="checkbox"/> None
Other: _____					
Land Use in the Watershed: (Check all that apply)					
<input type="checkbox"/> Pasture	<input type="checkbox"/> Cropland	<input checked="" type="checkbox"/> Woods	<input checked="" type="checkbox"/> Park		
<input type="checkbox"/> Homes	<input type="checkbox"/> Factories	<input type="checkbox"/> Stores	<input type="checkbox"/> Confined Animal Feeding Operation (CAFO)		
Other: _____					
Riparian Cover: Stream is ...					
<input type="checkbox"/> Fully Exposed (0-25% of stream is shaded from the sun)					
<input checked="" type="checkbox"/> Partially Exposed (25-50%)					
<input type="checkbox"/> Partially Shaded (50-75%)					
<input type="checkbox"/> Fully Shaded (75-100%)					
Streambank Vegetation: (Check all that apply)					
<input checked="" type="checkbox"/> Trees	<input checked="" type="checkbox"/> Shrubs	<input checked="" type="checkbox"/> Grasses/Weeds	<input checked="" type="checkbox"/> Root Mats		
<input checked="" type="checkbox"/> Bare Ground	Other: _____				
Habitat: (Check all that apply)					
<input checked="" type="checkbox"/> Pool	<input checked="" type="checkbox"/> Backwater	<input checked="" type="checkbox"/> Aquatic Vegetation	<input type="checkbox"/> Rock Ledges		
<input checked="" type="checkbox"/> Riffle	<input checked="" type="checkbox"/> Root Wads	<input type="checkbox"/> Large Boulders	<input type="checkbox"/> Log Piles		
<input checked="" type="checkbox"/> Run	<input checked="" type="checkbox"/> Logs or Stumps	<input type="checkbox"/> Undercut Banks	<input type="checkbox"/> Artificial Objects		
Other: _____					
Algae:					
Is the algae located:	<input checked="" type="checkbox"/> In Spots	<input type="checkbox"/> Everywhere	<input type="checkbox"/> Absent		
Is the algae:	<input checked="" type="checkbox"/> Close-Growing (< 2")	<input type="checkbox"/> Filamentous (> 2")			
Other: _____					
Stream Bed: (Must equal 100%)					
silt or mud <u>5</u> %	sand <u>5</u> %	gravel <u>15</u> %			
cobble (2-10") <u>70</u> %	boulder (>10") <u>5</u> %	bedrock _____ %			
Aquatic Organisms: <input checked="" type="checkbox"/> Fish <input checked="" type="checkbox"/> Invertebrates					
Other: _____					
Comments: <u>gravel road runs parallel to stream</u>					

Volunteer Monitoring - 05/2018

IMPORTANCE OF LOCATION ID

- ⦿ If we don't know where your site is located, data will not be useful to the Program or others interested in your data
- ⦿ For all new sites, these three things **must** match:
 - Site number
 - Site location description
 - Mapped location

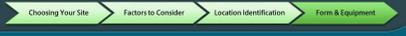


STREAM UNNAMED?

- ⦿ Intermittent Stream
- ⦿ Name too long
- ⦿ No official name

Geographic Names Information System (GNIS)
geonames.usgs.gov/domestic/index.html

- ⦿ Use the name of the next named stream your stream flows into – "Tributary to ..."



HOW TO GET BIOLOGICAL EQUIPMENT

Submit:

- GREEN Initial Site Selection Form
- Map of site
- Discharge data sheet

ATTN families & groups:
 One set of equipment per GREEN Initial Site Selection Form




Required Information on All Data Sheets

Each time you submit any data sheet, be sure to include the following required information. Data processing will be delayed if any information is missing from the data sheet header:

- Stream Name
- Site Number
- Verbal Site Description
- Date Monitored
- Name of Trained Data Submitter
- Stream Team number

Unnamed Streams

The sampling protocol for Missouri Stream Team is designed for perennial streams that have permanent flow throughout the year, but it is possible your stream may not have an official name. In this case, your stream is a tributary to the nearest named stream into which it flows. Most intermittent streams are not officially named on a map, even though it may be known to a local community by a certain name. If this is the case, you may want to research your proposed site online with:

Geological Names Information System (GNIS)
geonames.usgs.gov/domestic/index.html

Importance of Location Identification

It is extremely important to the validity of the data you collect that the location of your site is accurately identified. If your site cannot be located, data will not be useful to the program or other interested parties. All new sites must accurately match their site number, site description, and mapped location. Remember to always submit a map with each new site you adopt.

How to Receive Your Biological Equipment

To receive your biological monitoring equipment, please submit the green *Initial Site Selection Form*, a map of your site, and the *Stream Discharge Data Sheet*. If you represent a group, family, or spouse, you will receive one set of equipment for each person that submits their own Green Initial Site Selection form, map, and Stream Discharge data sheet.