

4.0 INITIAL SITE PROCEDURES

When a field team first arrives at a stream site, they must first confirm they are at the correct site. Then they determine if the stream meets certain criteria for sampling and data collection activities to occur. They must decide whether the stream is unduly influenced by rain events which could affect the representativeness of field data and samples. Certain conditions at the time of the visit may warrant the collection of only a subset of field measurements and samples. Finally, if it is determined that the stream is to be sampled, the team lays out a defined reach of the stream within which all subsequent sampling and measurement activities are conducted.

4.1 SITE VERIFICATION ACTIVITIES

4.1.1 Locating the Index Site

Stream sampling points were chosen from the “blue line” stream network represented on 1:100,000- scale USGS maps, following a systematic randomized selection process developed for WSA stream sampling (Stevens and Olsen, 2004). Each point is referred to as the “index site” or “**X-site**”. The X-site is the mid-point of the sampling reach. The latitude/longitude of the X-site was listed on a regional sampling site spreadsheet that was distributed to the EPA Regional Coordinators on a regional site information CD in February 2004. The Regional Coordinators will make copies of the CD and distribute the CDs to each Cooperator within his/her region. The CD includes overlay maps of each X-site. The overlay maps include the state and county name where the X-site is located, along with the titles of the corresponding 1:100,000 and 1:24,000 scale USGS topographic maps. The overlay maps should be used in conjunction with 1:24,000-scale USGS topographic maps to locate and reference the sample point on the appropriate stream. (See accompanying *Site Evaluation Guidelines* document.)

While traveling from a base location to a site, record a detailed description of the route taken on page 1 of the Verification Form (Figure 4-1). This information will allow others to find the site again in the future. Upon reaching the X-site for a stream, confirm its location and that the team is at the correct stream. Use all available means to accomplish this, and record the information on page 1 of the Verification Form (Figure 4-1). Complete a verification form for each stream visited (regardless of whether you end up sampling it), following the procedures described in Table 4-1.

4.1.2 Determining the Sampling Status of a Stream

Not all chosen stream sites will turn out to be streams. On the basis of previous synoptic surveys, it was found that the maps are not perfect representations of the stream network. After the stream and location of the X-site are confirmed, evaluate the stream reach surrounding the X-site and classify the stream into one of three major sampling status categories (Table 4-1). The primary distinction between “Sampleable” and “Non-Sampleable” streams is based on the presence of a defined stream channel and water content.

STREAM VERIFICATION FORM - STREAMS/RIVERS

Reviewed by (Initial): *SP*

SITE NAME: PILOT CREEK DATE: 07/01/2001 VISIT: 0 1 2 3

SITE ID: WXXP99-9999 TEAM: XX-1

STREAM/RIVER VERIFICATION INFORMATION

Stream/River Verified by (X all that apply): GPS Local Contact Signs Roads Topo. Map
 Other (Describe Here): Not Verified (Explain in Comments)

Coordinates	Latitude North	Longitude West	Type of GPS Fix	Are GPS Coordinates w/ 10 Sec. of map?
MAP Degrees, Minutes, and Seconds OR Decimal Degrees	<u>3.8 1.0 2.5</u>	<u>114 2.5 1.0</u>	<input type="checkbox"/> 2D	<input checked="" type="checkbox"/> Yes
GPS Degrees, Minutes, and Seconds OR Decimal Degrees	<u>3.8 1.0 2.6</u>	<u>114 2.5 1.5</u>	<input checked="" type="checkbox"/> 3D	<input type="checkbox"/> No

DID YOU SAMPLE THIS SITE?

<input checked="" type="checkbox"/> YES If YES, check one below SAMPLEABLE (Choose method used) <input checked="" type="checkbox"/> Wadeable - Continuous water, greater than 50% wadeable <input type="checkbox"/> Boatable <input type="checkbox"/> Partial - Sampled by wading (Explain in comments) <input type="checkbox"/> Partial - Sampled by boat (Explain in comments) <input type="checkbox"/> Wadeable Interrupted - Not continuous water along reach <input type="checkbox"/> Boatable Interrupted - Not continuous water along reach <input type="checkbox"/> Altered - Stream/River Present but not as on Map	<input type="checkbox"/> NO If NO, check one below NON-SAMPLEABLE-PERMANENT <input type="checkbox"/> Dry - Visited <input type="checkbox"/> Dry - Not visited <input type="checkbox"/> Wetland (No Definable Channel) <input type="checkbox"/> Map Error - No evidence channel/waterbody ever present <input type="checkbox"/> Impounded (Underneath Lake or Pond) <input type="checkbox"/> Other (explain in comments) NON-SAMPLEABLE-TEMPORARY <input type="checkbox"/> Not boatable - Need a different crew <input type="checkbox"/> Not wadeable - Need a different crew <input type="checkbox"/> Other (Explain in comments) NO ACCESS <input type="checkbox"/> Access Permission Denied <input type="checkbox"/> Permanently Inaccessible (Unable/Unsafe to Reach Site) <input type="checkbox"/> Temporarily Inaccessible-Fire, etc. (Explain in comments)
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GENERAL COMMENTS:

DIRECTIONS TO STREAM/RIVER SITE: From Barnesville, go East on County Road 996 ~5 miles to Smithtown Road. Turn South and travel 0.6 miles to gravel road on left. Turn onto gravel road and drive 0.5 miles to house on right side of road. Owner will unlock gate to road leading to stream near the X-site location.

Figure 4-1. Verification Form (page 1).

TABLE 4-1. SITE VERIFICATION PROCEDURES

1. Find the stream location in the field corresponding to the X-site coordinates and the "X" marked on a 7.5" topographic map (X-site) prepared for each site. Record the routes taken and other directions on the Verification Form so that others can visit the same location in the future.
2. Use a GPS receiver to confirm the latitude and longitude at the X-site with the coordinates for the site (datum = NAD 27). Record these on the Verification Form.
3. Use all available means to insure that you are at the correct stream as marked on the map, including: 1:24,000 USGS map orienteering, topographic landmarks, county road maps, local contacts, etc.
4. Scan the stream channel upstream and downstream **from the X-site**, decide if the site is sampleable and mark the appropriate box on the verification form. If the channel is dry at the X-site, determine if water is present within 75 m upstream and downstream of the X-site. Assign one of the following sampling status categories to the stream. Record the category on the Verification Form.

Sampleable Categories

Wadeable: The stream can be sampled with wadeable stream protocols, continuous water flow and > 50% of the sample reach is wadeable.

Partial Sampled by Wading: Over half the reach cannot be safely sampled by wadeable protocols. Sample using modified procedures.

Wadeable Interrupted: The flow of water is not continual, but there is water in the sample reach (e.g. isolated pools). Sample using modified procedures. Record as Wadeable Interrupted.

Altered Channel: There is a stream at the location marked with the X-site on the map, but the stream channel does not appear the way it is drawn on the map. An example would be a channel rerouting following a flood event that cut off a loop of the stream. Establish a new X-site at the same relative position in the altered channel. Make careful notes and sketches of the changes on the Verification Form.

Non-Sampleable Categories

PERMANENT:

Dry Channel: A discernible stream channel is present but there is no water anywhere within a 150-m reach centered on the X-site. If determined at the time of the sampling visit, record on the field form as "Dry-Visited"; if site was determined to be dry (or otherwise non-perennial) from another source and/or field verified before the actual sampling visit, record as "Dry-Not visited".

Non-wadeable: The site can only be sampled by boat following non-wadeable river protocols.

Wetland (No definable stream channel): There is standing water present, but no definable stream channel. In cases of wetlands surrounding a stream channel, define the site as Target but restrict sampling to the stream channel.

Map Error: No evidence that a water body or stream channel was ever present at the coordinates provided for the X-site.

(Continued)

TABLE 4-1 (Continued)

Non-Sampleable Categories

PERMANENT:

Impounded stream: The stream is submerged under a lake or pond due to man-made or natural (e.g., beaver dam) impoundments. If the impounded stream, however, is still wadeable, record the stream as “Altered” and sample.

Other: The site is non-target for reasons other than those above. Examples would include underground pipelines or a non-target canal.

A sampling site must meet **both** of the following criteria to be classified as a non-target canal:

- i. The channel is constructed where no natural channel has ever existed.
- ii. The sole purpose/usage of the reach is to transfer water. There are no other uses of the waterbody by humans (e.g., fishing, swimming, boating).

TEMPORARY:

Other: The site could not be sampled on that particular day, but is still a target site. Examples might include a recent precipitation event that has caused unrepresentative conditions.

No Access to Site Categories

Access Permission Denied: You are denied access to the site by the landowners.

Permanently Inaccessible: Site is unlikely to be sampled by anyone due to physical barriers that prevent access to the site (e.g., cliffs).

Temporarily Inaccessible: Site cannot be reached at the present time due to barriers that may not be present at some future date (e.g. forest fire, high water, road temporarily closed, unsafe weather conditions)

5. Do not sample non-target or “Non-sampleable” or “No Access” sites. Place an “X” in the “NO” box for “Did you sample this site?” and check the appropriate box in the “NON-SAMPLEABLE” or “NO ACCESS” section of the Verification Form; provide detailed explanation in comments section.

Even if there is no water at the X-site coordinates, the site may still be sampleable as an “interrupted flow” stream (Section 4.3.1). If the channel is dry at the X-site coordinates, determine if there is water present within 75 m upstream and downstream of the X-site. If there are isolated pools of water within the 150-m reach, proceed to sample using the modified procedures outlined in Section 4.3.1. If the entire reach is dry, classify the site as “Dry-visited” on the verification form. NOTE: Do not “slide” the reach (Section 4.3) for the sole purpose of obtaining more areas of water to sample (e.g., the downstream portion of the reach has water, but the upstream portion does not).

If a site is located on a canal and it meets the following criteria, then it is considered to be non-target:

1. The channel within the sampling reach is totally constructed at a location where no natural channel has ever existed.

2. The sole purpose and usage of the waterbody is to move water. There are no other human uses, such as fishing, swimming, or boating.

If both of these conditions are met, classify the site as “NON-SAMPLEABLE-PERMANENT, Other” on the verification form and identify the site as a non-target canal in the comments section. If you are in doubt about whether a site is a non-target canal, or if you think the waterbody might represent an important resource for aquatic biota, then sample it if you have permission.

Record the sampling status and pertinent site verification information on the Verification Form (Figure 4-1). If the site is non-sampleable or inaccessible, the site visit is completed, and no further sampling activities are conducted.

4.1.3 Sampling During or After Rain Events

Avoid sampling during high flow rainstorm events. For one, it is often unsafe to be in the water during such times. In addition, biological and chemical conditions during episodes are often quite different from those during baseflow. On the other hand, sampling cannot be restricted to only strict baseflow conditions. It would be next to impossible to define “strict baseflow” with any certainty at an unstudied site. Such a restriction would also greatly shorten the index period when sampling activities can be conducted. Thus, some compromise is necessary regarding whether to sample a given stream because of storm events. To a great extent, this decision is based on the judgment of the field team. Some guidelines to help make this decision are presented in Table 4-2. The major indicator of the

influence of storm events will be the condition of the stream itself. If a field team decides a site is unduly influenced by a storm event, do not sample the site that day. Notify the field coordinator or other central contact person to reschedule the stream for another visit.

TABLE 4-2. GUIDELINES TO DETERMINE THE INFLUENCE OF RAIN EVENTS

- If it is running at bank full discharge or the water seems much more turbid than typical for the class of stream do not sample it that day.
 - Do not sample that day if it is temporarily unsafe to wade in the majority of the stream reach. If the majority of the stream reach is permanently unsafe, then classify it as a “partially wadeable” stream and sample the portions that can be safely waded.
 - Keep an eye on the weather reports and rainfall patterns. Do not sample a stream during periods of prolonged heavy rains.
 - If the stream seems to be close to normal summer flows, and does not seem to be unduly influenced by storm events, go ahead and sample it, even if it has recently rained or is raining.
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4.1.4 Site Photographs

Taking site photographs is an optional activity, but should be considered if the site has unusual natural or man-made features associated with it. If you do take any photographs at a stream, start the sequence with one photograph of an 8.5 × 11 inch piece of paper with the site ID, stream name, and date printed in large, thick letters. After the photo of the site ID information, take at least two photographs at the X-site, one in the upstream direction and one downstream. Take any additional photos you find interesting after these first three pictures. Keep a log of your photographs and briefly describe each one.

4.2 LAYING OUT THE SAMPLING REACH

Unlike chemistry, which can be measured at a point, most of the biological and habitat structure measures require sampling a certain length of a stream to get a representative picture of the ecological community. A length of 40 times the channel width is necessary to characterize the biotic assemblages and habitat associated with the sampling reach. Establish the sampling reach about the X-site using the procedures described in Table 4-3. Scout the sampling reach to make sure it is clear of obstacles that would prohibit sampling and data collection activities. Record the channel width used to determine the reach length, and the sampling reach length upstream and downstream of the X-site on page 2 of the Verification Form as shown in Figure 4-2. Figure 4-3 illustrates the principal features of the established sampling reach, including the location of 11 cross-section transects used for physical habitat characterization (Section 7), and specific sampling points on each cross-section transect for later collection of benthic macroinvertebrate samples (Section 6).

TABLE 4-3. LAYING OUT THE SAMPLING REACH

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1. Use a surveyor's rod or tape measure to determine the wetted width of the channel at five places considered to be of "typical" width within approximately 5 channel widths upstream and downstream from the X-site. Average the five readings together and round to the nearest 1 m. If the average width is less than 4 m, use 150 m as a minimum sample reach length. Record this width on page 2 of the Verification Form.

For channels with "interrupted flow", estimate the width based on the unvegetated width of the channel (again, with a 150 m minimum).

2. Check the condition of the stream upstream and downstream of the X-site by having one team member go upstream and one downstream. Each person proceeds until they can see the stream to a distance of 20 times the average channel width (equal to one-half the sampling reach length, but a minimum of 75 m) determined in Step 1 from the X-site.

For example, if the reach length is determined to be 150 m, each person would proceed 75 m from the X-site to lay out the reach boundaries.

3. Determine if the reach needs to be adjusted about the X-site due to confluences with higher order streams (downstream), lower order streams (upstream), impoundments (lakes, reservoirs, ponds), physical barriers (e.g., falls, cliffs), or because of access restrictions to a portion of the initially-determined sampling reach.

(Continued)

TABLE 4-3 (Continued)

If such a confluence, barrier, or access restriction is present, note the distance and flag the confluence, barrier, or limit of access as the endpoint of the reach. Move the other endpoint of the reach an equivalent distance away from the X-site. **The X-site must still be within the reach after adjustment.** The total reach length does not change, but the reach is no longer centered on the X-site.

NOTE: Do not slide the reach to avoid man-made obstacles such as bridges, culverts, rip-rap, or channelization, or in streams with interrupted flow to obtain more inundated areas to sample.

4. Starting back at the X-site (or the new midpoint of the reach if it had to be adjusted as described in Step 3), measure a distance of 20 channel widths down one side of the stream using a tape measure. Be careful not to "cut corners". Enter the channel to make measurements only when necessary to avoid disturbing the stream channel prior to sampling activities. This endpoint is the downstream end of the reach, and is flagged as transect "A".
5. At Transect A, use a digital wristwatch and glance at the seconds display to select the initial sample collection point for benthic macroinvertebrates: 1-3="Left", 4-6="Center", 7-9="Right". (If using an watch with a second hand: 12-4="Left", 4-8="Center, and 8-12="Right). Mark "L", "C", or "R" on the transect flagging.
6. Measure 1/10 (4 channel widths in big streams or 15 m in small streams) of the required reach length upstream from transect A. Flag this spot as transect B. Assign the sample collection point (L, C, or R) systematically after the first random selection.

For example, if the sample collection point assigned to transect A was "C", the point for transect B is "R".

7. Proceed upstream with the tape measure and flag the positions of 9 additional transects (labeled "C" through "K" as you move upstream) at intervals equal to 1/10 of the reach length. Continue to assign the sample collection points systematically

For example, if the point assigned to Transect B is "R", the point for transect C is "L", transect D is "C", etc.

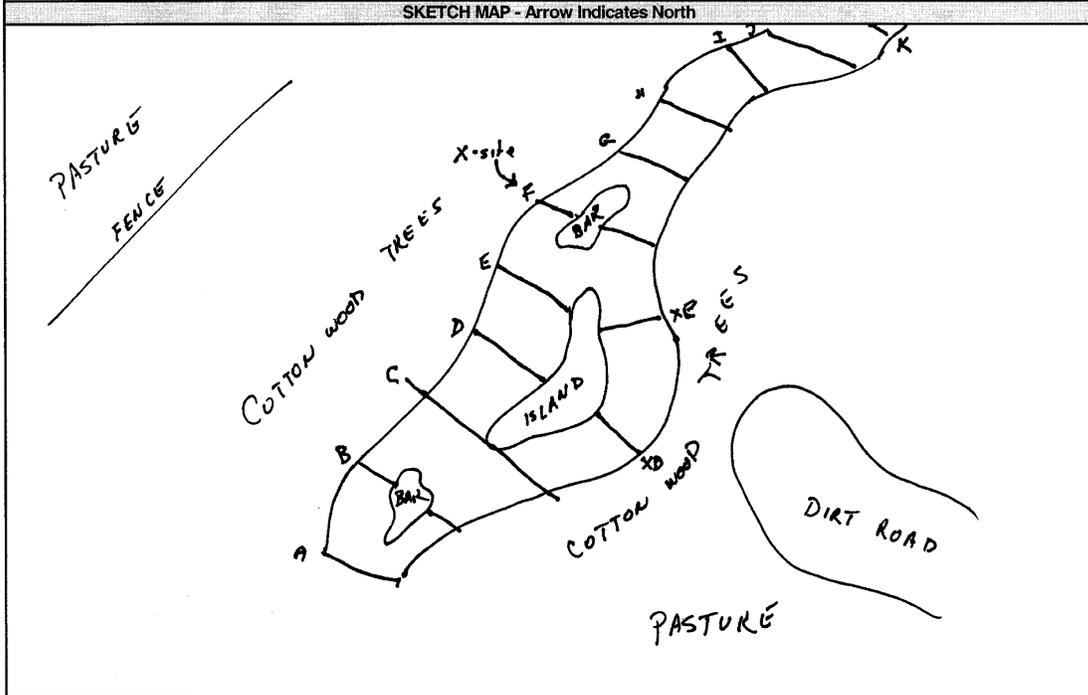
There are some conditions that may require adjusting the reach about the X-site (i.e., the X-site no longer is located at the midpoint of the reach) to avoid features we do not wish to (or physically cannot) sample across. Do not proceed upstream into a lower order stream or downstream into a higher order stream when laying out the stream reach (order is based on 1:100,000 scale maps). Adjust the reach if you run into an impoundment (lake, reservoir, or pond), or an impassible barrier (e.g., waterfall, cliff) while laying out the reach, adjust the reach such that the lake/stream confluence is at one end. Adjusting, or "sliding" the reach involves noting the distance of the confluence, barrier, or other restriction from the X.site, and flagging the confluence, impoundment/stream confluence, or barrier as the endpoint of the reach, and adding the distance to the other end of the reach, such that the total reach length remains the same, but it is no longer centered about the X-site. In cases where you are denied access permission to a portion of the reach, you can adjust the reach to make it entirely accessible; use the point of access restriction as the endpoint of the reach.

STREAM VERIFICATION FORM - STREAMS/RIVERS (cont.)

Reviewed by (initial): SP

SITE NAME: PILOT CREEK DATE: 07/01/2001 VISIT: 0 1 2 3
 SITE ID: WXXP99- TEAM: XX-1

STREAM/RIVER REACH DETERMINATION			Comment
Channel Width Used to Define Reach (m)	DISTANCE (m) FROM X-SITE		
	Upstream Length	Downstream Length	
<u>3</u>	<u>7.5</u>	<u>7.5</u>	



PERSONNEL		Team Number: <u>XX-1</u>		
NAME	Biomorph	DUTIES Geomorph	Forms	
<u>J. SHMOE</u>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<u>G. WHIZ</u>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<u>E. MAPPER</u>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
<u>S. TREAM</u>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Figure 4-2. Verification Form (page 2)

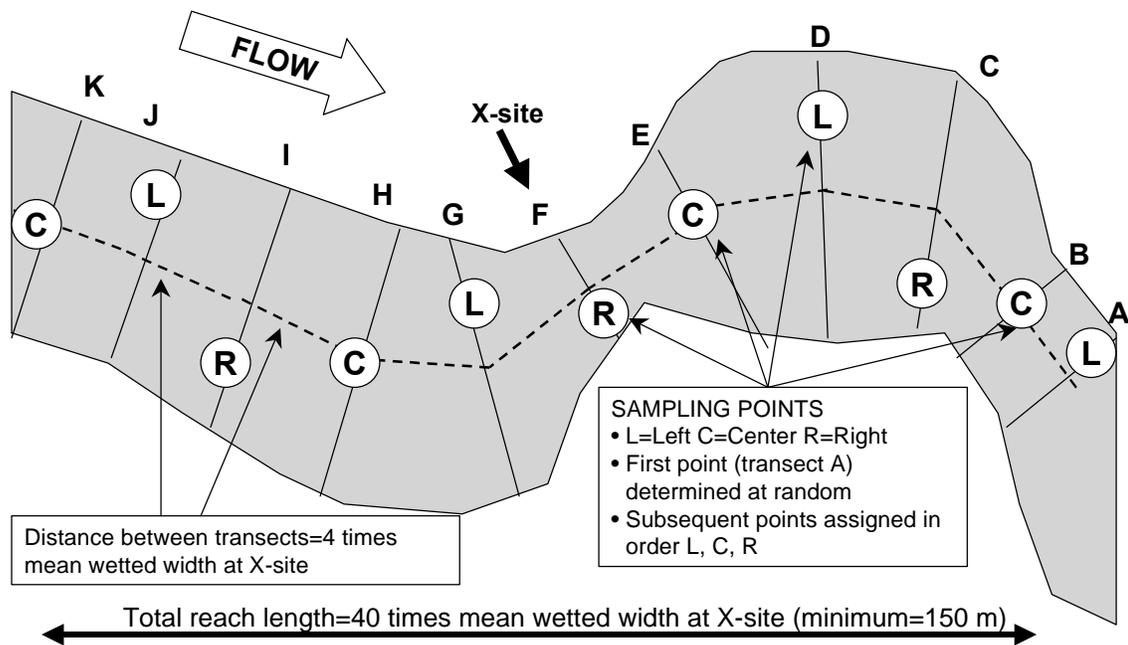


Figure 4-3. Sampling reach features.

Do not “slide” the reach so that the X-site falls outside of the reach boundaries. Also, do not “slide” a reach to avoid man-made obstacles such as bridges, culverts, rip-rap, or channelization. These represent important features and effects to study. Also, do not slide the reach to obtain more water to sample if the flow is interrupted (Section 4.3.1).

Before leaving the stream, complete a rough sketch map of the stream reach you sampled on page 2 of the Verification Form (Figure 4-2). In addition to any other interesting features that should be marked on the map, note any landmarks/directions that can be used to find the X-site for future visits.

4.3 MODIFYING SAMPLE PROTOCOLS FOR HIGH OR LOW FLOWS

4.3.1 Streams with Interrupted Flow

The full complement of field data and samples cannot be collected from streams that are categorized as “Interrupted” (Table 4-2). Note that no data should be collected from streams that are completely “Dry” as defined in Table 4-2. Interrupted streams will have some cross-sections amenable to biological sampling and habitat measurements and some that are not. Modified procedures for interrupted streams are presented in Table 4-4.

Samples for water chemistry (Section 5) should be collected at the X-site (even if the reach has been adjusted by “sliding” it). If the X-site is dry and there is water elsewhere in the sample reach, collect the sample from a location having water with a surface area greater than 1 m² and a depth greater than 10 cm.

TABLE 4-4. MODIFICATIONS FOR INTERRUPTED STREAMS

Water Chemistry	
●	If the X-site is dry but there is flowing water or a pool of water having a surface area greater than 1 m ² and a depth greater than 10 cm somewhere along the defined sampling reach, take the water sample at the pool or flowing water location that is nearest to the X-site. Note that the sample wasn't collected at the X-site and where on the reach the sample was collected on the field data form.
●	Do not collect a water sample if there is no acceptable location within the sampling reach. Record a “K” flag for the chemistry sample on the sample collection form and explain why the sample was not collected in the comments section of the form.
Physical Habitat Characterization and Benthic Macroinvertebrates	
●	Obtain a complete thalweg profile for the entire reach. At points where channel is dry, record depth as 0 cm and wetted width as 0 m.
●	At each of the transects (cross sections), sample the stream depending on flow status: <p style="margin-left: 40px;">DRY CHANNEL: No surface water anywhere in cross section; Collect all physical habitat data. Use the unvegetated area of the channel to determine the channel width and the subsequent location of substrate sampling points. Record the wetted width as 0 m. Record substrate data at the sampling points located in the unvegetated, but dry, channel. Do not collect benthic macroinvertebrates from this transect.</p> <p style="margin-left: 40px;">DAMP CHANNEL: No flowing water at transect, only puddles of water < 10 cm deep; Collect all physical habitat data. Do not collect a benthic macroinvertebrate sample.</p> <p style="margin-left: 40px;">WATER PRESENT: Transect has flow or pools > 10 cm deep; Collect all data and measurements for physical habitat and benthic macroinvertebrate indicators, using standard procedures.</p>

Data for the physical habitat indicator (Section 8) are collected along the entire sample reach from interrupted streams, regardless of the amount of water present at the transects. Depth measurements along the deepest part of the channel (the “thalweg”) are obtained along the entire sampling reach providing a record of the "water" status of the stream for future comparisons (e.g., the percent of length with intermittent pools or no water). Other measurements associated with characterizing riparian condition, substrate type, etc. are useful to help infer conditions in the stream when water is flowing.

4.3.2 Partially Wadeable Sites

Some sites are too deep or swift to safely wade the majority or all of the sample reach, and thus impossible to do all of the wadeable sampling protocols. At these sites, keeping safety in mind, the crews should try to do as much sampling and data collection as they can. It might be impossible to do thalweg depth profiles and flow measurements, but it should be possible to do the various assessments that don't require getting in the water (bank characterization, riparian vegetation and disturbance, stream/river assessment, RBP habitat assessment). It is also usually possible to collect a water sample for chemistry and perhaps to do the transect sampling near the bank for benthos. The amount of sampling that can actually be done will depend on the extant conditions. Only sample or measure what can be done **safely**. Make detailed comments on the Verification Form describing what the conditions were like and how much sampling could actually be done. Use the sketch map on the back of the Verification Form to indicate problem areas and where samples were collected if you had to go off transect. If barriers to the site prohibit physically reaching the X-site, then the site is not a Sampleable site but should be coded as "No Access - Inaccessible" on the Verification Form.

4.3.3 Braided Systems

Depending upon the geographic area and/or the time of the sampling visit, you may encounter a stream having "braided" channels, which are characterized by numerous sub-channels that are generally small and short, often with no obvious dominant channel (See Section 8.6.1). If you encounter a braided stream, establish the sampling reach using the procedures presented in Table 4-5. Figuring the mean width of extensively braided systems for purposes of setting up the sample reach length is challenging. For braided systems, calculate the mean width as the bankfull channel width as defined in the physical habitat protocol (Section 8). For relatively small streams (mean bankfull width ≤ 15 m) the sampling reach is defined as 40 times the mean bankfull width. For larger streams, (> 15 m), sum up the actual wetted width of all the braids and use that as the width for calculating the 40 channel width reach length. If there is any question regarding an appropriate reach length for the braided system, it is better to err on the excessive side. Make detailed notes and sketches on the Verification Form (Figure 4-2) about what you did. It's important to remember that the purpose of the 40 channel width reach length is to sample enough stream to incorporate the variability in habitat types. Generally, the objective is to sample a long enough stretch of a stream to include 2 to 3 meander cycles (about 6 pool-riffle habitat sequences). In the case of braided systems, the objective of this protocol modification is to avoid sampling an excessively long stretch of stream. In a braided system where there is a 100 m wide active channel (giving a 4 km reach length based on the standard procedure) and only 10 m of wetted width (say five, 2 m wide braids), a 400 m long sample reach length is likely to be sufficient, especially if the system has fairly homogenous habitat throughout its length.

4.4 EQUIPMENT AND SUPPLIES

A list of the equipment and supplies required to conduct the stream verification and to lay out the sampling reach is presented in Table 4-6. This checklist is similar to the checklist presented in Appendix A, which is used at the base location (Section 3) to ensure that all of the required equipment is brought to the stream. Use this checklist to ensure that

equipment and supplies are organized and available at the stream site in order to conduct the activities efficiently.

TABLE 4-5. MODIFICATIONS FOR BRAIDED STREAMS

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1. Estimate the mean width as the bankfull channel width as defined in the physical habitat protocol.
 - 1A. If the mean width is less than or equal to 15 m, set up a 40 channel width sample reach in the normal manner.
 - 1B. If more than 15 m, sum up the actual wetted width of all the braids and use that as the width for calculating the 40 channel width reach length. Remember the minimum reach length is always 150 m.
 - 1C. If the reach length determined in 1B seems too short for the system in question, set up a longer sample reach, taking into consideration that the objective is to sample a long enough stretch of a stream to include at least 2 to 3 meander cycles (about 6 pool-riffle habitat sequences).
 2. Make detailed notes and sketches on the Verification Form about what you did.

TABLE 4-6. EQUIPMENT AND SUPPLIES CHECKLIST FOR INITIAL SITE ACTIVITIES

QTY.	Item
1	Dossier of site and access information
1	Topographic map with "X-site" marked
1	Site information sheet with map coordinates and elevation of X-site
1	GPS receiver and operating manual
	Extra batteries for GPS receiver
1	Verification Form
	Soft lead (#2) pencils
1	Surveyor's telescoping leveling rod
1	50-m fiberglass measuring tape with reel
2 rolls	Surveyor's flagging tape (2 colors)
	Fine-tipped indelible markers to write on flagging
1	Waterproof camera and film (or digital camera)
1 copy	Field operations and methods manual
1 set	Procedure tables and/or quick reference guides for initial site activities (laminated or printed on write-in-the-rain paper)

NOTES

