Section 4
Initial Site Procedures

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When a field team first arrives at a non-wadeable site, they must first determine if the stream or river meets certain criteria for sampling and data collection. They must inspect the selected river reach for appropriate access, safety, and general river conditions. After locating public or private launch sites, the rafts or boats are unloaded and the vehicles are shuttled to and from launch locations. Certain conditions at the time of the visit may warrant the collection of only a subset of field measurements and samples. The crew then measures the width of the non-wadeable stream or river at several points and lays out the reach boundaries on a map, within which all subsequent sampling and measurement activities are conducted.

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4.1 Site Verification Activities

4.1.1 Locating the Index Site

Non-wadeable stream and river sampling points were chosen from the "blue line" network represented on 1:100,000- scale USGS maps, following a systematic randomized design developed for EMAP sampling. Sample sites were then marked with an "X" on finer-resolution 1:24,000-scale USGS maps. This spot is referred to as the "index site" or "X-site". The latitude/longitude of the X-site will be listed on an information sheet that is part of the dossier compiled for each river (see Section 3).

Complete a verification form for each non-wadeable stream or river visited (regardless of whether you decide to sampling it), following the procedures described in Table 4-1. While traveling from a base location to a site, record a detailed description of the route

Table 4-1. Site Verification Procedures.

1. Find the stream or river location in the field corresponding to the "X" marked on a 7.5" topographic map (X-site) that is provided with the dossier for each site. Record the routes taken and other directions on the Verification Form so that someone can visit the same location in the future.
2. Use a GPS receiver to record the latitude and longitude of transects "A" and "K," and if possible, confirm the X-site with the coordinates provided in the dossier for the site. Record these on the Verification Form.
3. Use all available means to insure that you are at the correct stream or river as marked on the map, including: 1:24,000 USGS map orienteering, topographic landmarks, county road maps, local contacts, etc.
4. While scouting access and shuttling vehicles, reconnoiter the river channel upstream and downstream from the X-site, and assign one of the following sampling status categories to the stream. Record the category on the Verification Form.

Target Categories

A. Regular Wadeable Stream: - The stream can be sampled with wadeable stream procedures.
B. Regular-Partial Boatable and Wadeable Combination: If over half the reach is non-wadeable, sample it with the non-wadeable protocols.
C. Regular-Boatable: A stream too deep to be safely sampled by wading following our wadeable stream protocols. The stream or river can be sampled with Non-Wadeable procedures.
D. Intermittent Stream: The flow of water is not continual, but the channel is wet. Sample using modified procedures.
E. Dry Channel: A discernible stream channel is present but there is no water at the site. Sample using modified procedures.
F. 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-target Categories

A. No Stream Channel (map error): No water body or stream channel is present at the coordinates provided for the X-site.
B. Impounded stream: The stream is submerged under a lake or pond due to man-made or natural (e.g., beaver dam) impoundments.
C. Marsh/Wetland: 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.

Inaccessible Categories

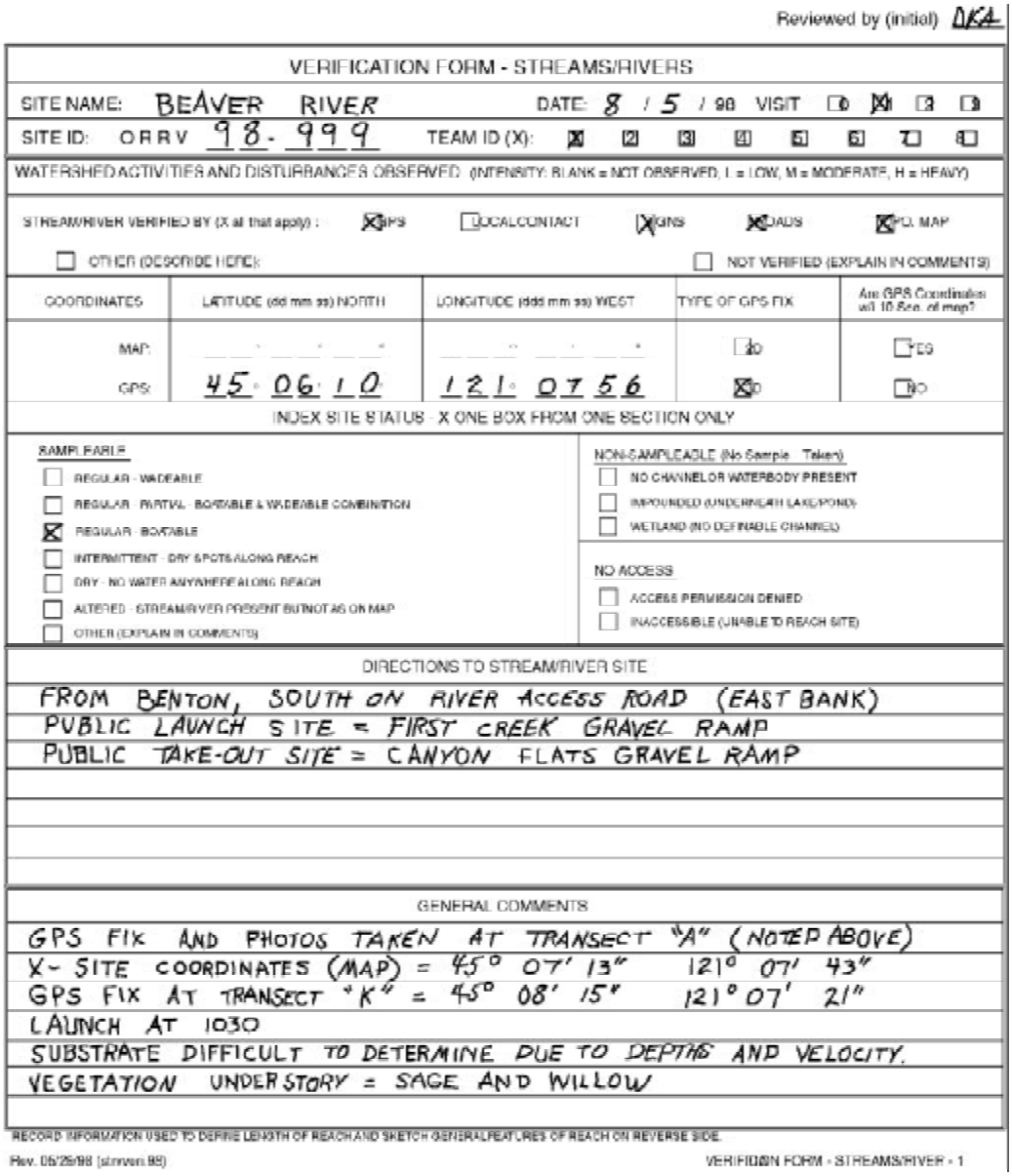
A. Physical Barriers: If you are physically unable to reach the X-site because of poor or no river access, or other obstacles that prohibit safe sampling.
B. No Permission: You are denied access to launch sites by the landowners.

5. Do not sample "Non-target" or "Inaccessible" sites. Place an "X" in the appropriate box in the "Non-Sampleable" section of the Verification Form and provide an explanation in the comments section.

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 locating the sample reach and X-site for a stream or river, confirm its location and that the team is at the correct stream or river. Use all available means to accomplish this, and record the information on page 1 of the Verification Form (Figure 4-1).

4.1.2 Determining the Sampling Status of a Non-wadeable Stream or River

Not all chosen non-wadeable sites will turn out to be streams or rivers. On the basis of previous synoptic surveys, it was found



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VERIFICATION FORM - STREAMS/RIVERS

SITE NAME: BEAVER RIVER DATE: 8 / 5 / 98 VISIT ☐ ☒ ☐ ☐

SITE ID: ORRV 98-999 TEAM ID (X): ☒ ☐ ☐ ☐ ☐ ☐ ☐ ☐

WATERSHED ACTIVITIES AND DISTURBANCES OBSERVED (INTENSITY: BLANK = NOT OBSERVED, L = LOW, M = MODERATE, H = HEAVY)

STREAM/RIVER VERIFIED BY (X all that apply): ☒ GPS ☐ LOCAL CONTACT ☒ IGNS ☒ QUADS ☒ CO. MAP

☐ OTHER (DESCRIBE HERE) ☐ NOT VERIFIED (EXPLAIN IN COMMENTS)

COORDINATES	LATITUDE (dd mm ss) NORTH	LONGITUDE (ddd mm ss) WEST	TYPE OF GPS FIX	Are GPS Coordinates w/i 10 Sec. of map?
MAP:	___ ___ ___	___ ___ ___	☐ 2D	☐ YES
GPS:	45 06 10	121 07 56	☒ 3D	☐ NO

INDEX SITE STATUS - X ONE BOX FROM ONE SECTION ONLY

SAMPLEABLE
- ☐ REGULAR - WADEABLE
- ☐ REGULAR - PARTIAL - BOATABLE & WADEABLE COMBINATION
- ☒ REGULAR - BOATABLE
- ☐ INTERMITTENT - DRY SPOTS ALONG REACH
- ☐ DRY - NO WATER ANYWHERE ALONG REACH
- ☐ ALTERED - STREAM/RIVER PRESENT BUT NOT AS ON MAP
- ☐ OTHER (EXPLAIN IN COMMENTS)

NON-SAMPLEABLE (No Sample Taken)
- ☐ NO CHANNEL OR WATERBODY PRESENT
- ☐ IMPOUNDED (UNDERNEATH LAKE/POND)
- ☐ WETLAND (NO DEFINABLE CHANNEL)

NO ACCESS
- ☐ ACCESS PERMISSION DENIED
- ☐ INACCESSIBLE (UNABLE TO REACH SITE)

DIRECTIONS TO STREAM/RIVER SITE

FROM BENTON, SOUTH ON RIVER ACCESS ROAD (EAST BANK)
PUBLIC LAUNCH SITE = FIRST CREEK GRAVEL RAMP
PUBLIC TAKE-OUT SITE = CANYON FLATS GRAVEL RAMP

GENERAL COMMENTS

GPS FIX AND PHOTOS TAKEN AT TRANSECT "A" (NOTED ABOVE)
X-SITE COORDINATES (MAP) = 45° 07' 13" 121° 07' 43"
GPS FIX AT TRANSECT "K" = 45° 08' 15" 121° 07' 21"
LAUNCH AT 1030
SUBSTRATE DIFFICULT TO DETERMINE DUE TO DEPTHS AND VELOCITY.
VEGETATION UNDERSTORY = SAGE AND WILLOW

RECORD INFORMATION USED TO DEFINE LENGTH OF REACH AND SKETCH GENERAL FEATURES OF REACH ON REVERSE SIDE.

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

that the maps are far from perfect representations of the stream network. A significant part of EMAP is the estimation of the actual extent of stream and river length in the area. After the river and location of the X-site are confirmed, evaluate the river reach surrounding the X-site and classify the stream into one of three major sampling status categories (Table 4-1). The primary distinction between "Non-target" and "Target" streams and rivers is the flow and size characteristics of the water body and adequate access to a river site.

Record the site class and pertinent site verification information on the Verification Form (Figure 4-1). If the site is non-target 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. First, 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

4.1.4 Site Photographs

Taking site photographs (digital cameras may be convenient because no film processing is required) 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 or river, start the sequence with one photograph of an 8.5 × 11 inch piece of paper with the stream ID and date printed in large letters. After the photo of the stream ID information, take one photograph at the up river transect (A) and one at the X-site. Take any additional photos you find interesting after these first three pictures. For pictures of aquatic vertebrates (see Section 12) or other small objects, place the paper with the stream ID and date in each snapshot.

4.2 Laying out the Sampling Reach

Unlike chemistry, which can be measured at a point, most of the biological and

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.
- 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.

habitat structure measures require sampling a certain length of a non-wadeable stream or river to get a representative picture of the ecological community. Previous EMAP pilot studies have suggested that a length of 40-100 times the channel width is necessary to collect at least 90% of the fish species occurring in the stream or river reach. In western streams a support reach that is 100 channel widths long around the X-site is required to characterize the community and habitat associated with the sampling point while 40 channel widths has been found to be adequate in eastern streams. 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 (or the midpoint of the reach) 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

Table 4-3. Laying Out The Sampling Reach.

1. Consult the 7.5 minute USGS topographic map in the site dossier. The river width is estimated and the reach boundaries are marked between the two boat launches. The total reach length equals 100 times or 40 times the mean river width.

2. Using a laser rangefinder, measure the non-wadeable stream or river width in several places, specifically the X-site and the two boat launches.

   Perform these duties while verifying the reach location and evaluating raft or boat launch and/or egress sites.

3. Confirm the river width and reach boundaries. If different than dossier information, adjust as necessary by using a map wheel and delineating new reach boundaries on the map. Multiply mean river width by 100 or 40 and delineate 50 or 20 channel widths upstream and downstream of the X-site.

   It is OK to shift the reach up or downriver to maximize effort efficiency and access. However, the X-site must be within the reach to be sampled.

4. Record the river width on page 2 of the Verification Form.

5. Extensive shallows, large log jams, absence of launch sites or vehicle access, and hazardous whitewater may preclude rafting.

6. With the map wheel, determine the distance from the raft or boat put-in location to the beginning of the reach. This is the distance to float or boat before sampling begins.

7. Using the laser rangefinder at the most upriver transect (Transect "A"), measure 10 or 4 channel widths downriver to the next transect (Transect "B"). Continue this while sampling until the final transect (Transect "K").

8. Sample odd numbered STRM_ID's along the left shore (facing downriver); sample even numbered sites along the right shore.

   Large obstructions or hazards may require temporary diversion.

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VERIFICATION FORM - STREAMS/RIVERS

SITE NAME: BEAVER RIVER DATE: 8 / 5 / 98 VISIT ☐1 ☒2 ☐3

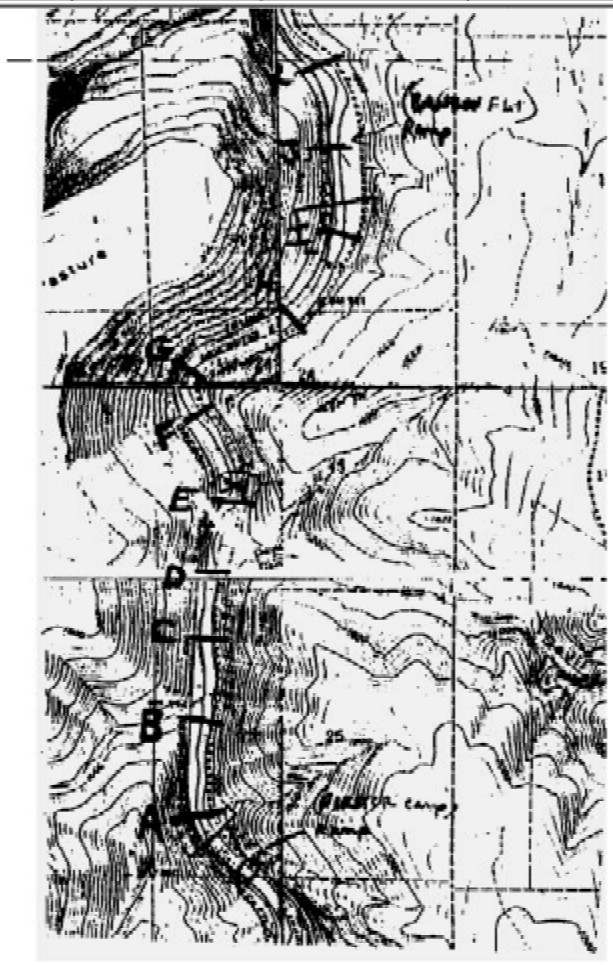
SITE ID: ORRV 98-999 TEAM ID (X): ☒1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7 ☐8

STREAM/RIVER REACH DETERMINATION

CHANNEL WIDTH USED TO DEFINE REACH (M) (XX):	DISTANCE (M) FROM X-SITE		COMMENT
	UPSTREAM LENGTH	DOWNSTREAM LENGTH	
40	1900	~3000	OVERESTIMATED INTERVALS

ARROW INDICATES NORTH

N



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VERIFICATION FORM - STREAMS/RIVERS - 2

Figure 4-2. Verification Form (page 2).

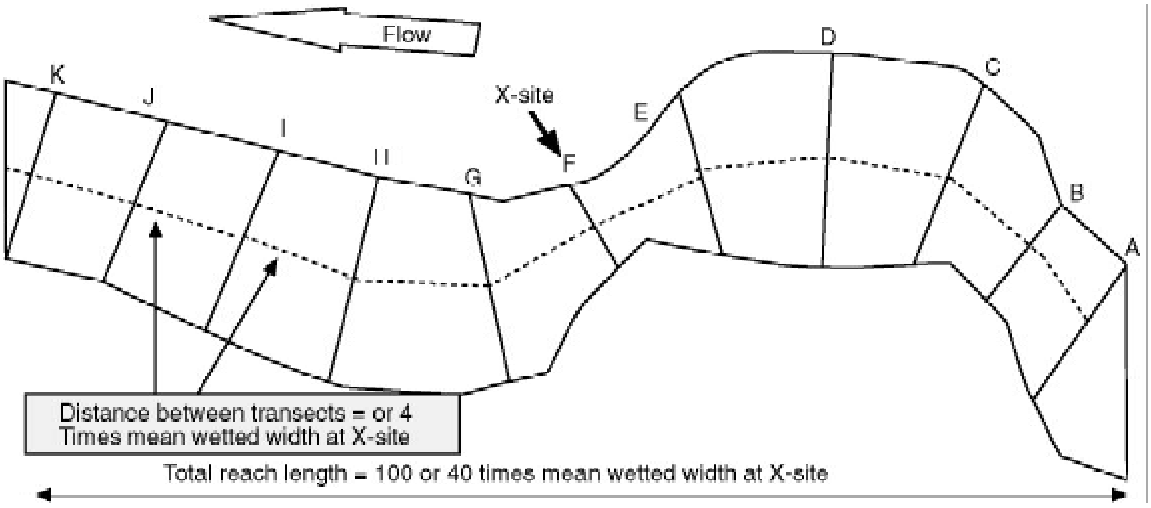


Figure 4-3. Sampling reach features.

transects used for physical habitat characterization (Section 6). Samples for periphyton (Section 7), sediment metabolism (Section 8), benthic macroinvertebrate (Section 9), aquatic vertebrates (Section 10), and tissue (Section 11) are collected only along the designated shoreline (refer to Table 4-3, step 8).

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 accommodate river access or to avoid river hazards or obstacles. If the beginning or end of the reach cannot be sampled due to obstacles or hazards, make up for the loss of reach length by moving ("sliding") the other end of the reach an equivalent distance away from the X-site. Similarly, access points may necessitate sliding the reach. Do not "slide" the reach so that the X-site falls outside of the reach boundaries. Sites which are 100X the average stream may be too time consuming to consider. So the field crew should avoid sliding the reach and decide whether the site really meets site selection criteria. If not, then the reach is not a target site. Also, do not "slide" a reach to avoid man-made obstacles such as bridges, rip-rap, or channelization. These represent features and effects that EMAP is attempting to study.

Before leaving the non-wadeable site, mark all transects on the supplied 7.5 minute topographic map and note that a photocopied version is attached to 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 Equipment And Supplies

A list of the equipment and supplies required to conduct the non-wadeable stream and river verification and to lay out the sampling reach is presented in Figure 4-4. This checklist is similar to the checklist presented in Appendix A, which is used at the base lo-

Equipment and Supplies for Initial Site Activities		
Qty.	**Item**	
1	Dossier of site and access information	
1	Topographic map with "X-site" and proposed width and reach boundaries	
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	Laser rangefinder and clear waterproof bag	
1	Map wheel	
1	Calculator	
1	Metric ruler	
1	Waterproof camera and film	
1 copy	Field operations and methods manual	
1 set	Laminated sheets of procedure tables and/or quick reference guides for initial site activities	

Figure 4-4. Equipment and supplies checklist for initial site activities.