

WRSA Non-wadeable Field Guide AKA the “Boatocol”

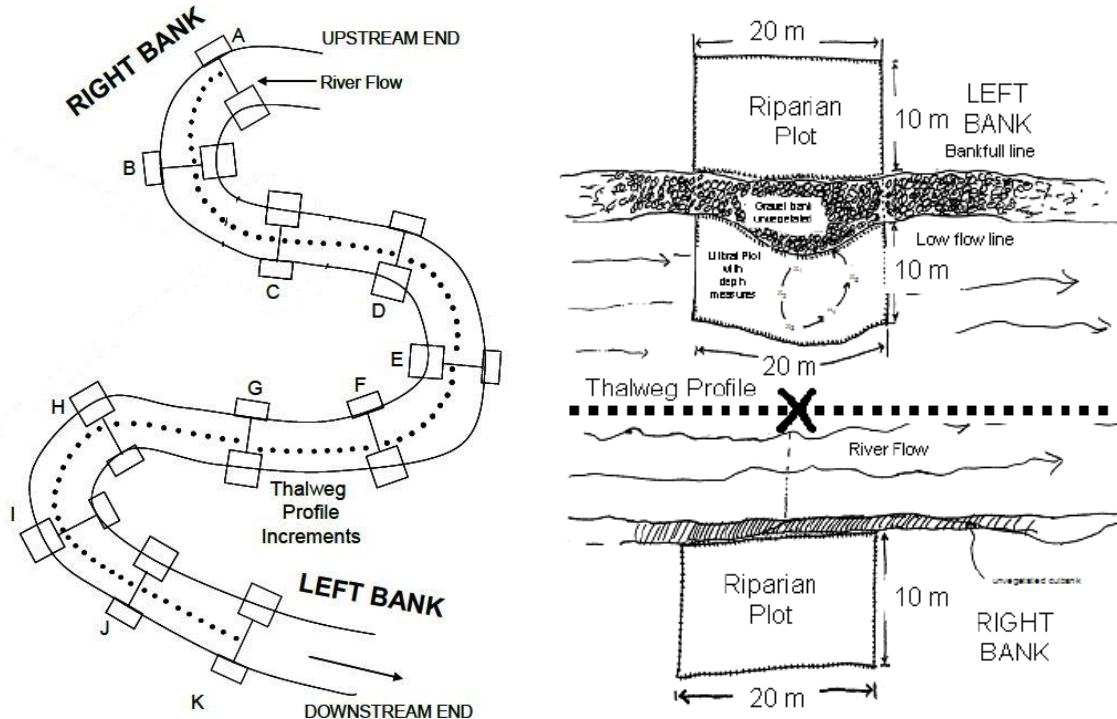
Outline

1. Pre-hitch tasks
 - a. General reach layout
 - b. Determining transect locations
2. Field Protocol
 - a. Thalweg Profile
 - i. At 10 equally spaced intervals between each of 11 transects (100 along entire reach):
 1. Record presence of backwater and off-channel habitats
 2. Determine dominant substrate
 3. Record presence of snags
 4. Measure thalweg depth
 - b. Cross-Sections
 - i. Measure/estimate at one random bank of 11 transects at equal intervals along entire reach length:
 1. Wetted and mid-channel bar widths
 2. Bankfull width
 3. Incision and bankfull height
 4. Bank angle and stability
 5. Riparian canopy cover (densiometer)
 6. Channel constraint
 - c. Littoral Survey
 - i. In 20 m long littoral plot extending streamward 10 m from bank measure/estimate:
 1. Littoral depth
 2. Dominant and subdominant substrate size class
 3. Shoreline substrate
 4. Large woody debris
 5. Areal fish cover
 6. Macroinvertebrates
 - d. Riparian Survey
 - i. In 20 m long riparian plot extending 10 m landward (both banks):
 1. Estimate areal cover class and type of riparian vegetation in canopy, mid-layer, and ground layers
 - e. Human influences
 - f. Assessments of Entire Reach
 - i. Channel Constraint
 - ii. Debris Torrents
 - iii. General Assessment
 - iv. Water Quality
3. Post-sampling and -hitch tasks
 - a. Equipment and boat clean-up
 - b. Data review
4. Tips and Special Situations
 - a. Tips

Pre-hitch Tasks

General Reach Layout

Sampling reach is 40 times the wetted width at the X-site, with a 500m minimum and 4km maximum reach.



Determining Transect Locations (“Setting up the Reach”)

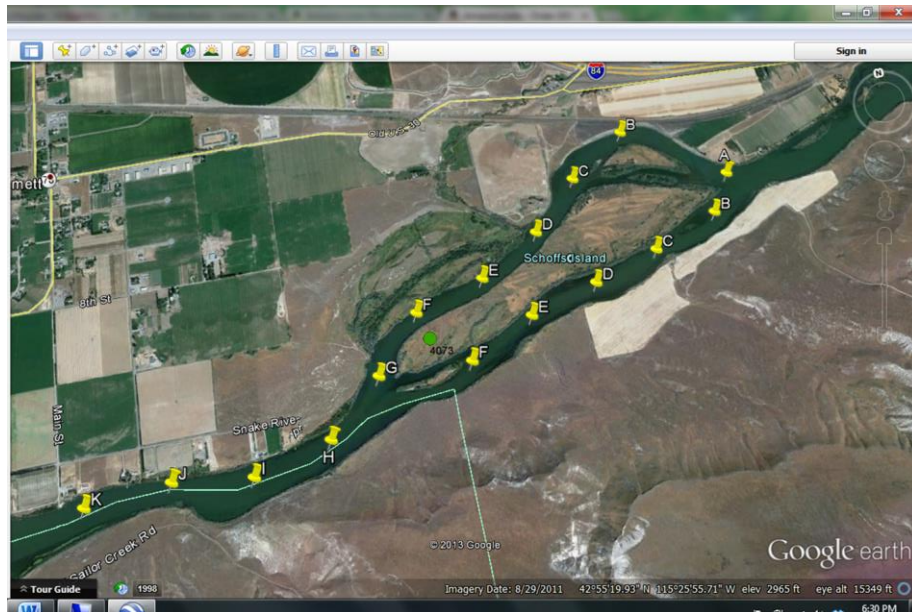
1. Using Google Earth, locate the X-site using the coordinates provided for the site
2. Determine the average wetted width of the channel using 5 places of “typical” width within approximately 5 channel widths upstream and downstream of the X-site using the ruler/path tool
3. Multiply average wetted width by 40 to determine reach length (maximum length of 4km)
4. From the X-site, measure a distance of 20 channel widths downstream using the ruler/path tool. Be careful to measure all of the bends of the river/stream; do not artificially straighten out the line of measurement. The downstream endpoint is marked as Transect K. Measure 20 channel widths upstream from the X-site; the upstream end of the reach is marked as Transect A. Record the GPS coordinates of the midpoint of these transects
5. Measure 1/10 of the reach length downstream from Transect A, and mark this spot as Transect B. Continue marking the 11 transects A - K in increments of 1/10 of the reach

length. Enter the waypoints of the midpoint of these transects into a GPS unit so transects are easy to find on the sampling day (or at the very least, record them on paper and enter them while in transit)

6. Assign the sampling bank at Transect A randomly (e.g., use the seconds display on a digital watch to select the initial sampling station: 0 - 4 = Left Bank, 5 - 9 = Right Bank). From here, three stations will be on the first (randomly selected) side of the river, then 2 on the other, then 2 on the first side, and so on through Transect K. Note that left and right sides of the stream are determined while you are facing downstream. It is at these locations that you will collect benthic macroinvertebrate and periphyton samples.

Sampling banks can be determined on the day of sampling

- a. If an island splits the channel at a transect, sample and assign bank GPS coordinates within the channel that has the most flow (you may have to “estimate” which channel has the most flow using channel widths from google earth)



Field Protocol

Thalweg Profile

1. Determine the interval between transects based on mean wetted width used to determine reach length (this should be done prior to leaving on the hitch when creating reach maps)
 - a. Transect spacing = 4X mean wetted width
 - b. Example: wetted width is 40m, so spacing is $4 \times 40 = 160$ m (total reach = 1600 m)
2. Determine the interval between thalweg profile observation points
 - a. Interval between observation points = 0.4X mean wetted width
 - i. Example: from above, $0.4 \times 40 = 16$ m
 - b. Determine the exact location to take measurements using the GPS or by estimating your position
3. Beginning at upstream transect, float downstream along the thalweg
 - a. When approximating the thalweg, float along the river course that is judged to be the *deepest*, but is also SAFE to navigate
4. Record the following parameters every 0.4 wetted-width intervals (example: every 16 m) such that 10 observations are recorded between each reach transect:
 - a. Depth using either a sounding rod or handheld sonar
 - b. Substrate type using either sounding rod, visual estimate, or *knowledge*
 - i. Bedrock/hardpan, boulder, cobble, gravel, sand, silt/clay/muck, other
 - c. Presence of any snags (really supposed to drag here, but that's usually impractical)
 - d. Presence of any off-channel (side channels or backwaters)

Cross-sections

1. At each transect, measure/estimate the following from the appropriate, random bank
 - a. Wetted and mid-channel bar widths
 - i. Using a laser rangefinder, measure the wetted width of the channel
 - ii. Wetted width is the width of the channel containing free-standing water
 1. Record separately the width of any mid-channel bars by rangefinding both banks of the bars and subtracting these values from each other
 2. If any islands exist, treat them like bars, but flag these measurements and indicate in the comments that the "bar" is an island
 - a. If unable to see across full width of river when island separates a side channel, record width of main channel, flag observation, and note in comments that width pertains only to main channel
 - b. Bankfull width

- i. Using a laser rangefinder, measure the bankfull width of the channel
- ii. Look for the following evidence:
 1. Obvious slope break that differentiates channel from flat floodplain terrace higher than channel
 2. Transition from exposed stream sediments to terrestrial vegetation
 3. Moss growth on rocks along banks
 4. Presence of drift material caught on overhanging vegetation
 5. Transition from flood- and scour-tolerant vegetation to relatively intolerant veg
- c. Incision and bankfull height
 - i. Hold the stadia rod vertically, with its base planted at the water's edge
 - ii. Examine both banks, then determine the channel incision as:
 1. Height up from the water surface to elevation of the first terrace of the valley floodplain (first flat depositional feature above bankfull)
 - iii. Use hand-level to measure this height by backsighting it onto the surveyor's rod
 1. Record this height as "incised height"
 - iv. While still holding stadia rod, and backsighting with hand-level, examine both banks to measure and record the height of bankfull flow above the present water level
 1. Record this height as "bankfull height"
 - v. Repeat steps for each cross-section transect
- d. Bank angle and stability
 - i. Bank angle is estimated in the area from wetted channel margin up to 5 m into the bankfull channel margin
 1. Visually estimate the bank angle of the randomly chosen bank
 - a. V = vertical/near vertical/undercut ($>75^\circ$ or undercut)
 - b. S = steep ($30-75^\circ$)
 - c. G = gradual ($5-30^\circ$)
 - d. F = flat ($<5^\circ$)
 - ii. Bank Stability is measured in area extending from scour line up to the first flat or depositional feature at or above bankfull, and 25 cm upstream and downstream from transect
 1. Assess bank type, cover, and stability:
 - a. Bank Type:
 - i. **Depositional (D)**: This applies to all streambanks associated with sand, silt, clay, or gravel deposited by the stream. These are recognizable as "bars" in the channel margins adjacent to the greenline, typically lenticular-shaped mounds of deposition on the bed of the stream channel adjacent to or on the streambank.

- ii. **Erosional (E):** This applies to all banks that are not “Depositional”, (i.e. cut banks, undercut banks, straight runs with no visible depositional features and outside edge of bends).
- b. Bank Cover:
 - i. **Covered (C):** This applies to banks with at least 50% cover within the plot of the following types or combination thereof :
 - 1. Perennial vegetation (including roots)
 - 2. Cobbles 15 cm or larger
 - 3. Anchored large woody debris (LWD) with a diameter >10 cm
 - 4. Moss **does not** count as cover
 - ii. **Uncovered (U):** This applies to all banks that do not meet the “Covered” criteria.
- c. Bank Stability:
 - i. Record the single most prominent feature of the following 5 types. To qualify, a feature must be obvious and span at least one-fourth (13 cm) of a plot width or greater. Additionally, keep in mind that these features (absent, fracture, slump, slough, and eroding) are on a continuum of stability where absent is the most stable and eroding is the least:
 - 1. **Fracture (F):** This applies to the top of the bank where a visible crack is observed. The fracture has not separated into two separate components or blocks of a bank.
 - 2. **Slump (S):** This applies to a stream bank that has obviously slipped down resulting in a separate block of soil/sod separated from the bank. Slumps may be created by excessive animal trampling.
 - 3. **Slough (SL):** This applies to banks where soil or sod material has been shed or cast off and has fallen from and accumulated near the base of the bank and typically occurs on banks that are steep and bare.
 - 4. **Eroding (E):** This applies to banks that are bare and steep (within 10 degrees of vertical), usually located on the outside curves of meander bends in the stream. Undercut banks are not considered “eroding” banks even if they are scoured or eroded below the elevation of the base of sod or the roots of vegetation, and because such erosion occurs mostly below the scour line (outside the plot frame). Such undercut banks are stable as long as there is no slough, slump, fracture, and/or erosion above the scour line or ceiling of the undercut bank.

5. **Absent (A):** This applies in all other situations, if no feature meets the minimum criteria.

- e. Riparian canopy cover
 - i. Hold densiometer 0.3 m (1 ft) above surface of water (use depth rod to assist)
 - ii. At channel margin, count the number of grid intersection points within the “V” that are covered by either a tree, leaf, high branch, or the bank
 - iii. Take 1 reading each facing upstream (UP), downstream (DOWN), left bank (LEFT), and right bank (RIGHT). Right and left banks defined with reference to facing downstream
 - iv. Record values (0-17) on transect form
 - v. Repeat for each cross-section transect
- f. Channel constraint
 - i. Estimate the distance (m) from shore to edge of riparian vegetation
 - ii. Assign one of the following constraint categories to the river at each transect:
 - 1. Channel is constrained
 - 2. Channel is in broad valley but constrained by incision
 - 3. Channel is in narrow valley but not very constrained
 - 4. Chan is unconstrained in broad valley
 - iii. Record whether or not you could readily see over the bank on the appropriate, randomly chosen side

Littoral Plot Survey

- 1. At each transect, visualize a 20x10 m plot extending 10 m both upstream and downstream from the transect point, and 10 m out towards the thalweg
- 2. Within this plot:
 - a. Record depth (cm) at 5 haphazardly chosen locations
 - i. Note whether depth/stadia rod (pole) or sonar was used to measure depth
 - ii. One can often reach out over the four sides of the raft to take measurements – this ensures some level of “randomness”
 - b. Record dominant and secondary substrate particle types for riverbed within littoral plot:
 - i. Visual observation or, if can’t see bottom, use “feel” from depth measurements or rely on judgement (specified in app)
 - c. Record dominant and secondary substrate type for the shoreline up to 1m back from waterline
 - d. Tally all qualifying, large wood debris (small end diameter 30 cm; length 5 m) whose large end occurs within plot based on the following classes:
 - i. Size classes:
 - 1. Determine diameter based on large end

- a. 0.3-0.6 m
 - b. 0.6-0.8 m
 - c. 0.8-1.0 m
 - d. > 1.0 m
- 2. Determine length on the part that has diameter >30 cm
 - a. 5-15 m
 - b. 15-30 m
 - c. > 30 m
- 3. If the piece is not cylindrical, visually estimate what the diameter would be for a piece of wood with circular cross-section that would have the same volume
- ii. Make separate tallies for wood that is all/partially wet and wood that is dry but spans the bankfull channel but are not in the wetted channel
- iii. *Though not recorded, make notes of large debris dams and/or accumulations that occur outside the plot*
- iv. Note: plot for wood tally is 20m along bank, but extends both 10m out towards thalweg and then all the way to bankfull margin
- e. Survey areal fish cover
 - i. Examine water and banks within littoral plot for features and types of cover listed on the field forms
 - 1. Filamentous algae, macrophytes, big woody debris, small woody debris, live trees, overhanging veg, undercut banks, boulders/ledges, artificial structures
 - ii. For each cover type, estimate areal cover by eye/sounding pole
 - iii. Percent covers may collectively add up to > 100%
- f. Collect macroinvertebrates
 - i. Identify the dominant habitat type using the following categories:
 - 1. Rocky/cobble/gravel/LWD
 - 2. Organic fine mud or sand
 - 3. Macrophyte bed
 - 4. Leaf pack
 - ii. Use kick net to “sweep” through 1 linear meter of the most dominant habitat type within the littoral plot

Riparian Plot Survey

- 1. At each transect, visualize two plots, one on EACH bank, that extend 10m both up- and downstream, and 10m inland
 - a. Plot should start where perennial vegetation begins or at bankfull margin (whichever is closest to wetted edge)

- b. On steeply-sloping margins, estimate plot dimensions as if they were projected down from aerial view
2. Record *woody* vegetation type for both Canopy and Understory layers on both sides of the channel
 - a. A layer is “mixed” if more than 10% of the areal coverage is of 2+ types
 - b. If dominant type is not woody, label = “none”
3. Conceptually divide riparian vegetation into 3 layers: Canopy, Understory, Ground Cover
4. Within Canopy layer (>5m high):
 - a. Determine separately the areal cover class of large trees (>0.3m diameter breast height) and small trees (<0.3m DBH)
 - b. Estimate cover as amount of shadow cast by layer if sun were directly overhead
5. Within Understory layer (0.5-5m high):
 - a. Determine separately the areal cover class of woody shrubs/saplings and non-woody vegetation as in Step 5
6. Within Ground Cover layer (<0.5m high):
 - a. Determine separately the areal cover class for woody shrubs/saplings, non-woody vegetation, and amount of bare ground or duff
7. The maximum cover in each layer is 100%, so the sum of areal covers for all three layers could add up to 300%

Human Influences

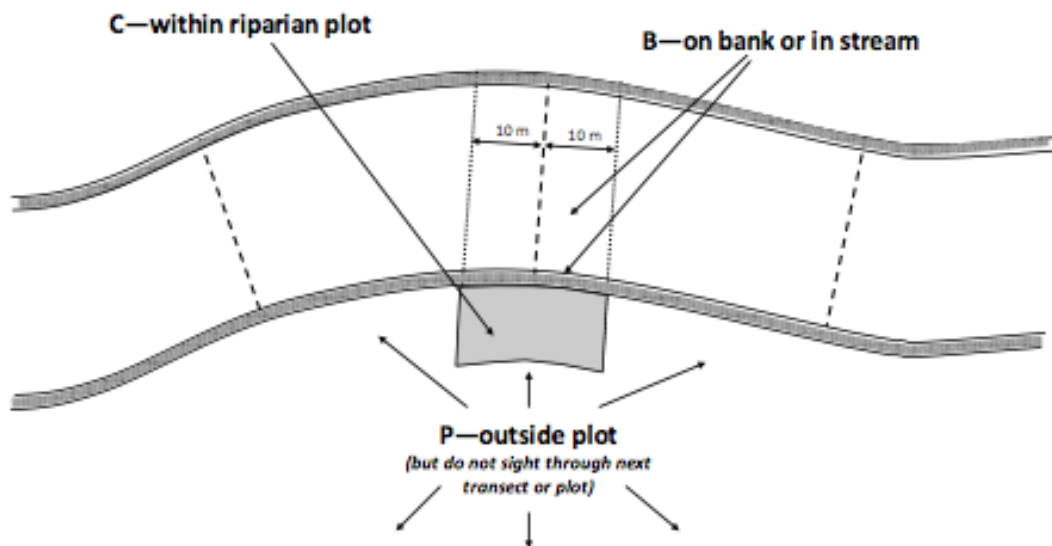


Figure 8.8 Proximity Classes for Human Influences in Non-Wadeable Rivers

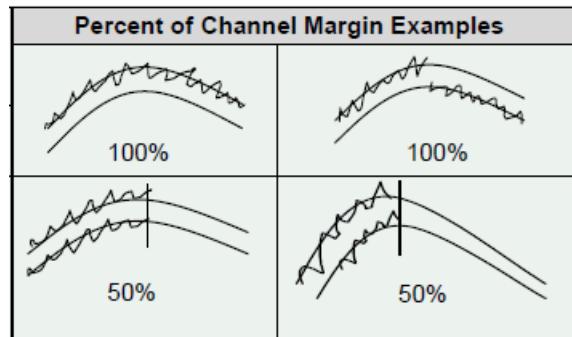
1. At each transect, visualize the plots outlined in Figure 8.8 above
 - a. Channel plot extends 10m up- and downstream and spans from bank to bank

2. Examine the Channel and Riparian plots, as well as the surrounding area, for the following human influences: (1) walls, dikes, revetments, riprap, dams; (2) buildings; (3) cleared lot, pavement; (4) roads or railroads; (5) inlet or outlet pipes; (6) Hydrologic alteration (irrigation withdrawals, etc.); (7) landfills or trash; (8) parks or maintained lawns; (9) row crops; (10) pastures, rangeland, hay fields, or EVIDENCE of grazing; (11) Grazing exclosures; (12) Livestock grazing (actually observed); (13) logging; (14) mining; and (15) Recreation
3. For each type of influence, record the proximity class:
 - a. B = bank; present within the defined 10m stream segment or on the bank
 - b. C = close; present within the 10x20m riparian plot
 - c. P = present; present (i.e., "I can see it"), but outside the riparian plot
 - d. 0 = absent; not present within
4. Do not include influences that cannot be seen from the cross-section transect or if you have to site through another transect or its 10x20m riparian plot
5. Repeat for other bank

Assessment of Entire Reach

1. Channel Constraint
 - a. Classify reach channel pattern as predominantly (1) a single channel; (2) anastomosing channel; or (3) braided channel
 - i. Single channels may have occasional side channels but feature a predominant single channel
 - ii. Anastomosing channels have relatively long major and minor channels branching and rejoining in a complex network separated by vegetated islands, with no obvious dominant channel
 - iii. Braided channels also have multiple branching and rejoining channels, separated by unvegetated bars. Subchannels are generally small, short, and numerous, often with no obvious dominant channel
 - b. Determine whether channel is:
 - i. Constrained within a narrow valley
 - ii. Constrained by local features within a broad valley
 - iii. Free to move about, but within a relatively narrow valley floor ($< \sim 10 \times$ bankfull width)
 - iv. unconstrained in broad valley/floodplain
 - c. Ascertain the major bank and valley feature that constrains the channel
 - i. Bedrock (i.e. channel is a bedrock-dominated gorge)
 - ii. Hillslope (i.e. channel constrained in narrow V-shaped valley)
 - iii. Terrace (i.e. channel constrained by own incision)
 - iv. Human Bank Alteration (i.e. constrained by rip-rap, landfill, dike, road)
 - v. No constraining features

- d. Estimate the percent of the channel margin in contact with constraining features (for unconstrained channels, this is 0%)



- e. Estimate “typical” bankfull channel width
 f. Visually estimate the average width of the valley floor
 i. If the valley is wider than you can directly estimate, record the distance you can see and mark the bubble on the field form

2. Torrent Evidence

- a. While conducting transect and thalweg profile sampling, examine the stream channel along the entire sample reach, including substrate, banks, and riparian corridor
 b. Check for presence of features described on the Torrent Evidence Form

EVIDENCE OF TORRENT SCOURING:	
☐	01 - Stream channel has a recently revegetated corridor two or more times the width of the low flow channel. This corridor lacks riparian vegetation with possible exception of fireweed, even-aged alder or cottonwood seedlings, grasses, or other herbaceous plants.
☐	02 - Stream substrate cobbles or large gravel particles are NOT IMBRICATED. (Imbricated means that they lie with flat sides horizontal and that they are stacked like roof shingles -- imagine the upstream direction as the top of the "roof.") In a torrent scour or deposition channel, the stones are laying in unorganized patterns, lying "every which way." In addition many of the substrate particles are angular (not "water-worn.")
☐	03 - Channel has little evidence of pool-riffle structure. (For example, could you ride a mountain bike down the channel?)
☐	04 - The stream channel is scoured down to bedrock for substantial portion of reach.
☐	05 - There are gravel or cobble berms (little levees) above bankfull level.
☐	06 - Downstream of the scoured reach (possibly several miles), there are massive deposits of sediment, logs, and other debris.
☐	07 - Riparian trees have fresh bark scars at many points along the stream at seemingly unbelievable heights above the channel bed.
☐	08 - Riparian trees have fallen into the channel as a result of scouring near their roots.
EVIDENCE OF TORRENT DEPOSITS:	
☐	09 - There are massive deposits of sediment, logs, and other debris in the reach. They may contain wood and boulders that, in your judgement, could not have been moved by the stream at even extreme flood stage.
☐	10 - If the stream has begun to erode newly laid deposits, it is evident that these deposits are "MATRIX SUPPORTED." This means that the large particles, like boulders and cobbles, are often not touching each other, but have silt, sand, and other fine particles between them (their weight is supported by these fine particles -- in contrast to a normal stream deposit, where fines, if present, normally "fill in" the interstices between coarser particles.)
NO EVIDENCE:	
☐	11 - No evidence of torrent scouring or torrent deposits.

3. General Reach Assessment

- a. Look for signs of disturbance throughout the entire reach
 b. Record these disturbances on the Site Assessment Form

WATERSHED ACTIVITIES AND DISTURBANCES OBSERVED (Intensity: Blank=Not observed, L=Low, M=Moderate, H=Heavy)				BLANK FIELD INDICATES ABSENCE: ☐	
Residential	Recreational	Agricultural	Industrial	Stream Management	
☐ ☐ ☐ Residences ☐ ☐ ☐ Maintained Lawns ☐ ☐ ☐ Construction ☐ ☐ ☐ Pipes, Drains ☐ ☐ ☐ Dumping ☐ ☐ ☐ Roads ☐ ☐ ☐ Bridges/Causeway ☐ ☐ ☐ Sewage Treatment	☐ ☐ ☐ Hiking Trails ☐ ☐ ☐ Parks, Campgrounds ☐ ☐ ☐ Primitive Parks, Camping ☐ ☐ ☐ Trash/Litter ☐ ☐ ☐ Surface Films, Scums, or Slicks	☐ ☐ ☐ Cropland ☐ ☐ ☐ Pasture ☐ ☐ ☐ Livestock Use ☐ ☐ ☐ Orchards ☐ ☐ ☐ Poultry ☐ ☐ ☐ Feedlot ☐ ☐ ☐ Water Withdrawal	☐ ☐ ☐ Industrial Plants ☐ ☐ ☐ Mines/Quarries ☐ ☐ ☐ Oil/Gas Wells ☐ ☐ ☐ Power Plants ☐ ☐ ☐ Logging ☐ ☐ ☐ Evidence of Fire ☐ ☐ ☐ Odors ☐ ☐ ☐ Commercial	☐ ☐ ☐ Liming ☐ ☐ ☐ Chemical Treatment ☐ ☐ ☐ Angling Pressure ☐ ☐ ☐ Dredgong ☐ ☐ ☐ Channelization ☐ ☐ ☐ Water Level Fluctuations ☐ ☐ ☐ Fish Stocking ☐ ☐ ☐ Dams	
SITE CHARACTERISTICS (200m radius)					
WATERBODY CHARACTER					
PRISTINE: ☐ 5 ☐ 4 ☐ 3 ☐ 2 ☐ 1 Highly Disturbed APPEALING: ☐ 5 ☐ 4 ☐ 3 ☐ 2 ☐ 1 Unappealing					
BEAVER					
Beaver Signs: ☐ Absent ☐ Rare ☐ Common Beaver Flow Modifications: ☐ None ☐ Minor ☐ Major					
DOMINANT LAND USE					
Dominant Land Use Around 'X' ☐ Forest ☐ Agriculture ☐ Range ☐ Urban ☐ Suburban/Town If Forest, Dominant Age Class ☐ 0 - 25 yrs. ☐ 25 - 5 yrs. ☐ > 75 yrs.					

4. Water Quality

- a. YSI and WQ samples are collected at transect A (top of reach). Temperature probe may be deployed at either the upstream or downstream take-out points
- b. pH, specific conductance, temperature
 - i. As near to mid-channel as possible, in flowing water, lower the probe into the water to a depth of 0.5 m below the water surface. If water depth is < 1 m, take measurements at mid-depth.
 1. Avoid contacting the stream bottom with the YSI, as the instrument is delicate.
 - ii. Use the MODE key to navigate between screens.
 - iii. Record the pH, specific conductance (μS), and temperature ($^{\circ}\text{C}$).
 1. For specific conductance make sure to navigate to the screen where the temperature ($^{\circ}\text{C}$) is flashing in the lower right corner. This indicates the YSI is correcting for temperature (i.e. measuring specific conductance and not conductivity).
- c. Grab sample for nutrients
 - i. Obtain a pair of surgical gloves and place them on both hands.
 - ii. Obtain a 50 ml centrifuge vial (new or acid washed) and rinse it with stream water three times. Be careful not to overly disturb the stream bottom; increasing suspended solids.
 - iii. Using the 50 ml vial, collect water sample at the top (A) transect. Fill the vial 75% full; this will leave head space in the vial for freezing. Note the time the sample was collected in the comment field
 - iv. Fill out water quality label with the full site code and the date written in the following format: **XE-SS-4120, May 06 2014**. Make sure to spell out the month and keep two digits for the day.
 - v. Place on outside of vial. Tape over vial with clear packing tape and put in a plastic bag to prevent water from degrading the label.

- vi. Immediately after collecting and labeling, place the sample on ice/dry ice. If in the field without ice, keep the vial at ambient temperature by suspending it in the water column.
 - 1. For each water quality sample, record the number of hours it was <75% frozen for each day after collection on the datasheet in the cooler.
 - 2. At the end of the trip and before data submission, go back into each site in the app and record the total number of hours it was <75% frozen.
- d. Temperature Probe
 - i. Secure a HOBO temperature logger at either the upstream or downstream take-out point (boat ramps)
 - 1. Use a weight to secure the logger to the riverbed
 - 2. Comment on the data sheets or app where the temperature logger was deployed and the closest transect

Post-sampling and -hitch Tasks

Equipment and Boat Clean-up

1. All equipment and gear must be cleaned and disinfected between sites to reduce the risk of transferring nuisance species and pathogens
 - a. Use a scrub brush (attached to Surber net) to remove all visible mud / organic material from boots and waders before decontamination.
 - b. Use the large Rubbermaid Roughtote provided to make a solution of Sparquat that is at least 4.7%. To do this, fill the Roughtote with 6 gallons of water (1 full water jerry) and add 36oz. of Sparquat (or 6oz. of Sparquat for every gallon of water).
 - c. Soak any gear items that have been in contact with the water for at least 10 minutes. For example waders, boots and bug nets.
 - d. When decontamination is complete, put the used Sparquat solution back into the labeled 7 gal Aquatainer.
 - i. If possible rinse the waders, boots, and other gear with water (not from the stream).
 - e. Before every decontamination session, determine if the Sparquat solution may be reused. To check for potency, use the “Quat Check 1000” test strips that have been provided. When the test strip reads below 600 ppm, you need to make a new solution.
 - f. Discard the Sparquat solution when it is no longer effective, it will need to be discarded down a drain that flows to a treatment facility. The drain at the harbor does NOT flow to a treatment facility. Please use the back sink in the BugLab to dispose of Sparquat back at the lab.
2. Upon return from the field-hitch, the boat and dry boxes should be thoroughly cleaned/rinsed. This can be accomplished fairly quickly by using a self-serve carwash

Review Data Forms and Labels

1. Upon return, field crew leader is responsible for reviewing all data forms and labels for accuracy, completeness, and legibility. Ensure written comments use no shorthand or abbreviations. Cross-

check sample numbers on labels with those recorded on data forms. It is best to conduct this after sampling each site.

Tips and Special Situations

Tips

1. Record thalweg profile data on field forms and transfer the data to the app at a later time – the app often won't load fast enough for all measurements to be recorded before the next set of parameters need to be taken
2. If possible, bring along a mountain/road bike: shuttles can sometimes be completed using a bike to ride back up to the put-in

Special Situations

1. *Slope* on small, nonwadeable systems: determine slope using stadia rod, level, and tripod if feasible in terms of time and distances