Standard Operating Procedure EAP118, Version 1.3

Watershed Health Monitoring Program: Visual Assessment of Human Influence

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Purpose of this document

The Washington State Department of Ecology develops Standard Operating Procedures (SOPs) to document agency practices related to sampling, field and laboratory analysis, and other aspects of the agency's technical operations.

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Washington State Department of Ecology

Environmental Assessment Program

Watershed Health Monitoring Program: Standard Operating Procedures for Visual Assessment of Human Influence

Version 1.3

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EAP118

Please note that the Washington State Department of Ecology's Standard Operating Procedures (SOPs) are adapted from published methods, or developed by in-house technical and administrative experts. Their primary purpose is for internal Ecology use, although sampling and administrative SOPs may have a wider utility. Our SOPs do not supplant official published methods. Distribution of these SOPs does not constitute an endorsement of a particular procedure or method.

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Although Ecology follows the SOP in most instances, there may be instances in which the Ecology uses an alternative methodology, procedure, or process.

SOP Revision History

Revision Date	Rev number	Summary of changes	Sections	Reviser(s)
2/24/17	1.1	Removed draft dates, Changed title, added footers, updated glossary terms and references, general formatting	All	Meghan Rosewood-Thurman
2/24/17	1.2	Changed cite to 2005 Simplified sentence Simplified paragraph. Hyperlinked to Policy 1-15 Added reference to wide site layout Reworded 2nd sentence Figure caption: replaced “highlighted: with “boxed” Note: added comma Simplified paragraph. Removed 9.2 which was redundant. Added spaces after initials Replaced cite with the most recent one (2005) as cited in EMAP reports. No link is available. Updated the link with one provided by EPA Public Access Reference Service	2.1 4.1 4.2 5.2 6.1.2 6.2.1 6.3.1 6.3.2 9.1 10.10 10.11 10.12	Glenn Merritt
2/24/17	1.3	Added Reviewers names, fixed index station term	Signature Page	Meghan Rosewood-Thurman
7/30/18	1.3	Updated links and references Edited for publishing	All	Ruth Froese

1.0 Purpose and Scope

1.1 This document is the Environmental Assessment Program (EAP) Standard Operating Procedure (SOP) for visually assessing human influence adjacent to rivers and streams during a Data Collection Event (DCE) for the Watershed Health Monitoring (WHM) program.

1.2 This SOP includes procedures for sites sampled with the *Narrow* and *Wide* protocols. See SOP EAP106 (Merritt, 2017), which describes the site verification and layout procedures for the WHM *Narrow Protocol* and SOP EAP105 (Hartman, 2017a) which describes site layout for the *Wide Protocol.* It is also used by the Ambient Biological Monitoring Program.

2.0 Applicability

2.1 This SOP was adapted from field methods of the Environmental Protection Agency's Environmental Monitoring and Assessment Program (Peck et al., 2005, 2006)

2.2 This SOP is used in conjunction with several others to complete a DCE for the WHM program. This method is applied to right and left banks of the main channel at all 11 major transects. Follow the method outlined in this SOP only after the site verification and layout procedures have been completed (Merritt, 2017 and Hartman, 2017a)

2.3 Data collected with the method outlined in this SOP are used to calculate physical habitat metrics that quantify the type and proximity of riparian disturbance at a site (Janisch, 2013).

3.0 Definitions

3.1 Bankfull margin: A term used to describe the limit of the stream channel. It is a line on the bank that coincides with the water's elevation during bankfull flow.

3.2 Bankfull Stage: This stage is delineated by the elevation point of incipient flooding, indicated by deposits of sand or silt at the active scour mark, break in stream bank slope, perennial vegetation limit, rock discoloration, and root hair exposure (Endreny, 2003).

3.3 DCE: The *Data Collection Event* is the sampling event for the given protocol. Data for a DCE are indexed using a code which includes the site ID followed by the year, month, day, and the time (military) for the start time of the sampling event. For example: WAM06600-000222-DCE-YYYY-MMDD-HH:MM. One DCE should be completed within one working day, lasting 4–6 hours, on average.

3.4 EAP: Environmental Assessment Program

3.5 Ecology: The Washington State Department of Ecology

3.6 Human Influence Types:

3.6.1 Wall/Dike/Revetment/Riprap/Dam: A group of manmade structures that are durable and immovable; they are used to protect banks from erosion or provide support for bridges, buildings, or roads.

3.6.2 Buildings: Structures built where people live or work; examples include houses, trailer homes, barns, garages, and sheds.

3.6.3 Unpaved Motor Trail: Gravel or dirt paths used by cars, trucks, ATVs, dirt bikes, or tractors.

3.6.4 Clearing or Lot: Areas where native vegetation has been cleared; spaces that do not fit within a more specific human influence type.

3.6.5 Human Foot Path: A path worn solely by human foot traffic.

3.6.6 Paved Road/Railroad: Paved roads surfaced with concrete, asphalt, or chip seal; the railroad category includes the tracks as well as modified surfaces adjacent to the tracks.

3.6.7 Pipes (inlet/outlet): Any pipe that withdraws water from the stream or discharges fluid back into the waterbody.

3.6.8 Landfill/Trash: Any manmade object that has been discarded.

3.6.9 Park/Lawn: An area where native vegetation has been cleared and grass is maintained for aesthetic or recreational purposes.

3.6.10 Row Crops: An area where the native vegetation has been cleared and row crops are grown.

3.6.11 Pasture/Range/Hay Field: An area where the native vegetation has been cleared and livestock are kept. This is also an area where grass is grown to be harvested as animal feed.

3.6.12 Logging Operations: Any signs of recent logging activity such as cut tree stumps, staging of logging equipment, or storage of logs; evidence of historic logging activity should not be categorized as logging operations, but should be noted in comments.

3.6.13 Mining Activity: Any signs of mining activity such as adits, tailings piles, excavation of alluvial deposits (placer mining), or discarded mining equipment.

3.7 Index station: The distinct point location mapped by the site coordinates obtained from the Washington Master Sample List. The index station is called “X” and is generally located at major transect F; however the point may occur at any elevation in the stream between transects A and K.

3.8 Major Transect: One of 11 equidistant transects across the length of a site. These transects run perpendicular to the thalweg and are labeled as follows: A (furthest downstream), B, C, D, E, F, G, H, I, J, and K (furthest upstream).

3.9 Narrow Protocol: The set of Watershed Health Monitoring SOPs that describe data collection at wadeable sites with an average bankfull width of less than 25 m at the index station.

3.10 QAMP: Quality Assurance Monitoring Plan. The QAMP for WHM is Cusimano *et al.*, 2006. An updated version is in early stages of development.

3.11 Site: A site is defined by the coordinates provided to a sampling crew and the boundaries established by the protocol's site layout method (Hartman, 2017a (SOP EAP105) for the Wide Protocol; Merritt, 2017 (SOP EAP106) for the Narrow Protocol). Typically, a site is centered on the index station and equal in length to 20 times the average of 5 bankfull width measurements. Sites cannot be longer than 2 km or shorter than 150 m. Narrow protocol sites range from 150 m to 500 m long. Wide Protocol sites are up to 2 km long and most-frequently longer than 500m. The most downstream end of a site coincides with major transect A; the most upstream end coincides with major transect K.

3.12 Thalweg: Path of a stream that follows the deepest part of the channel (Armantrout, 1998). For WHM, we emphasize Armantrout's use of the word "path" because the thalweg longitudinal profile excludes (sometimes deeper) side pools that are not part of the dominant flow path.

3.13 Thalweg station or transect: One of one hundred (100) equidistant measurement locations in the thalweg, across the length of a site. For example the thalweg stations at/above each major transect are named as follows:

- A0, A1, A2, A3, A4, A5, A6, A7, A8, A9,
- B0. B1, B2, B3, B4, B5, B6, B7, B8, B9,
- C0, C1, C2, C3, C4, C5, C6, C7, C8, C9,
- …
- J0, J1, J2, J3, J4, J5, J6, J7, J8, J9, and
- K0.

3.14 WHM: Watershed Health Monitoring, a status and trends monitoring program within the Environmental Assessment Program at the Washington State Department of Ecology.

3.15 Wide Protocol: The set of WHM SOPs that describes the sample and data collection at non-wadeable sites or sites wider than 25 m bankfull width. It is an abbreviated version of the Narrow Protocol and is typically accomplished by use of rafts.

4.0 Personnel Qualifications/Responsibilities

4.1 This SOP pertains to all EAP field staff collecting and entering data for the WHM program.

4.2 All field staff must comply with the requirements of the EAP Safety Manual (Ecology, 2017).

4.3 All field staff must have completed the annual WHM program field training and be familiar with the set of SOPs that combine to describe a full DCE for the WHM program.

4.4 All field staff must be familiar with the electronic data recording tablet and web-based field forms that one uses to record and submit data for the WHM program.

4.5 The field lead directing sample collection must be knowledgeable of all aspects of the project's Quality Assurance Monitoring Plan (QAMP) to ensure that credible and useable data are collected. All field staff should be briefed by the field lead or project manager on the sampling goals and objectives prior to arriving to the site.

4.6 All field staff must comply with Ecology SOP EAP070 *Minimizing the Spread of Aquatic Invasive Species* to the level described in the QAMP (Parsons, et al., 2016).

5.0 Equipment, Reagents, and Supplies

5.1 Field tablet, electronic field forms

5.2 Disinfection solutions, brushes, or other equipment necessary to minimize the spread of invasive species from site to site. See EAP Policy 1-15 for more information.

5.3 Stadia rod or measuring tape

6.0 Summary of Procedure

6.1 Pre-sampling Preparation

6.1.1 File an 'Ecology Field Plan'. Forms are available and should be posted on the EAP SharePoint site: http://teams/sites/EAP/Field%20Schedules/Forms/AllItems.aspx

6.1.2 Establish the 11 major transects and determine the appropriate protocol to use (narrow vs wide) before assessing human influence. Follow the method outlined in this SOP only after completing site verification and layout procedures SOP EAP106 (Merritt, 2017) or SOP EAP105 (Hartman, 2017a).

6.2 General Considerations and Cautions

6.2.1 Never compromise your personal safety or that of field partners to complete a DCE. Always plan ahead to avoid hazards such as falling and drowning.

6.2.2 Be aware of wildfire activity. It may pose a safety threat or may change or limit access to certain areas.

6.3 Narrow Protocol Method for Visual Assessment of Human Influence

6.3.1 Assess human influence type and proximity at each major transect. Figure 1 shows where the human influence form resides within each transect page of the WHM electronic field forms.

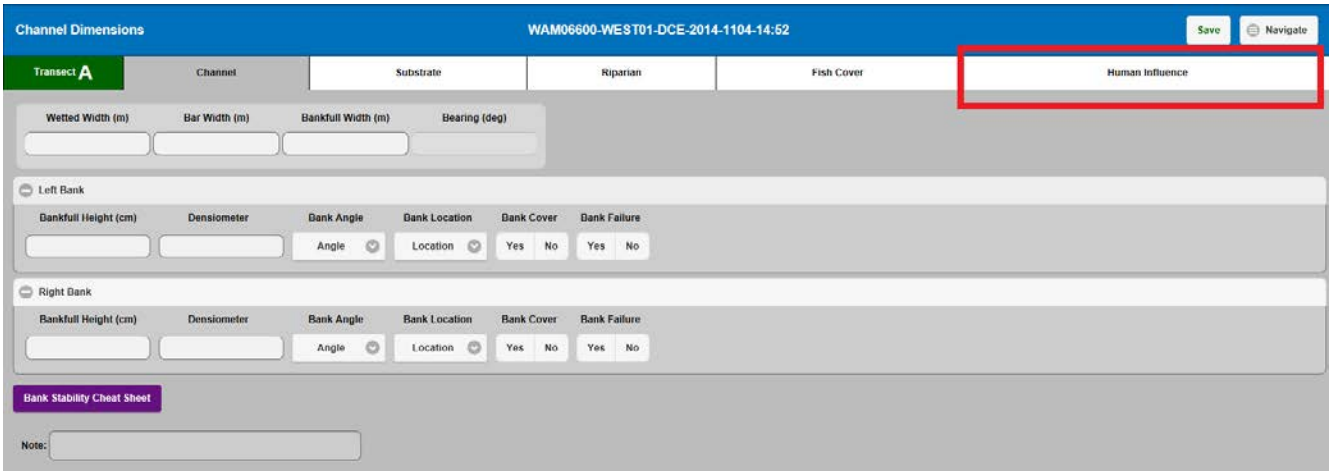

Figure 1: Human influence tab within transect page A. Human influence tab is boxed in red.

6.3.2 The proximity of each human influence type is measured within a 10 x 10 meter plot centered along the major transect and coincident with the bankfull margin (Figure 2). Visually approximate the boundaries of this plot. Note that this is the same plot used for assessing riparian vegetation structure for sites sampled with the Narrow Protocol, SOP EAP117 (Hartman, 2017b).

Note: The plot should be 10 x 10 meters from an aerial view. Consider topography when approximating the dimensions of the plot, and when the plot contains bluffs or hills, adjust accordingly.

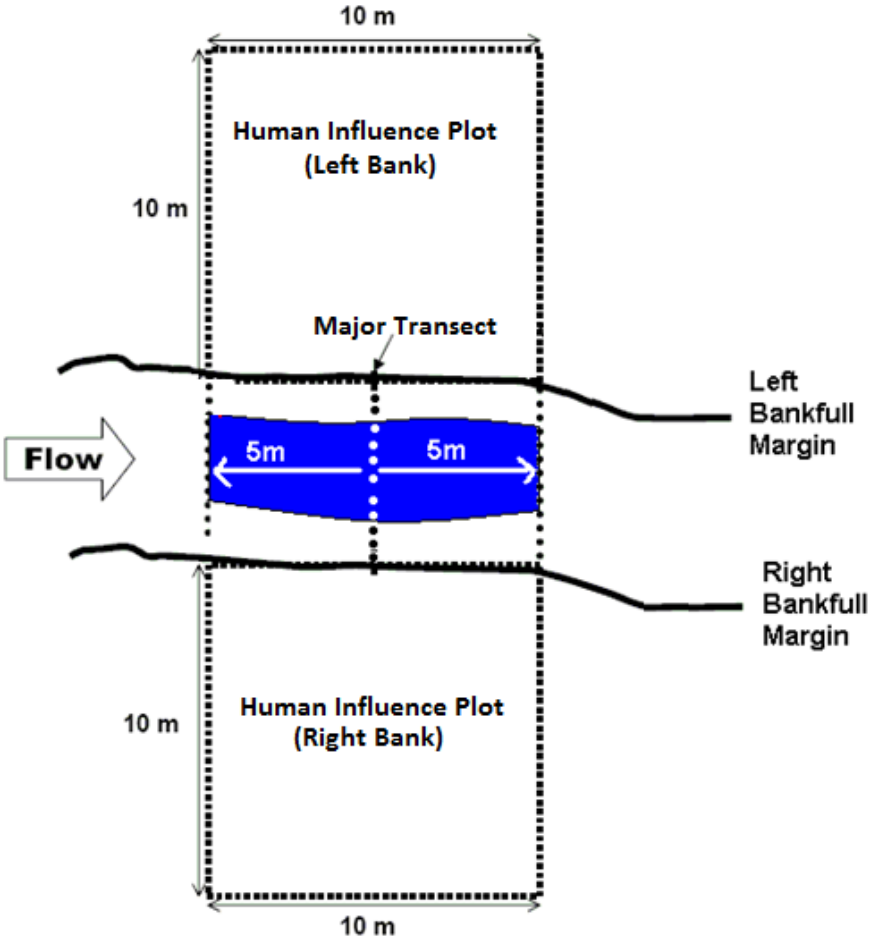

Figure 2: Dimensions of Narrow Protocol human influence plot relative to major transect and bankfull margins.

6.3.3 On the human influence form (Figure 1), within the WHM electronic field forms, record the appropriate proximity class for each of the 13 human influence types on both the right and left banks (Figure 3). Enter (press) **Absent**, **10-30m** (beyond the plot, but within 30 meters of the bankfull margin), **0-10m** (within the 10 x 10 meter plot), or **On Bank** (at least partially within the bankfull channel).

6.3.4 Human influence may be difficult to see from the stream channel. Be aware of your surroundings as you make your way from the vehicle staging area to the stream and make a mental note of any human influence you see adjacent to the site. It may be necessary to physically leave the stream to discern the proximity of human influence. Only do so if there is permission from the landowners and it is safe.

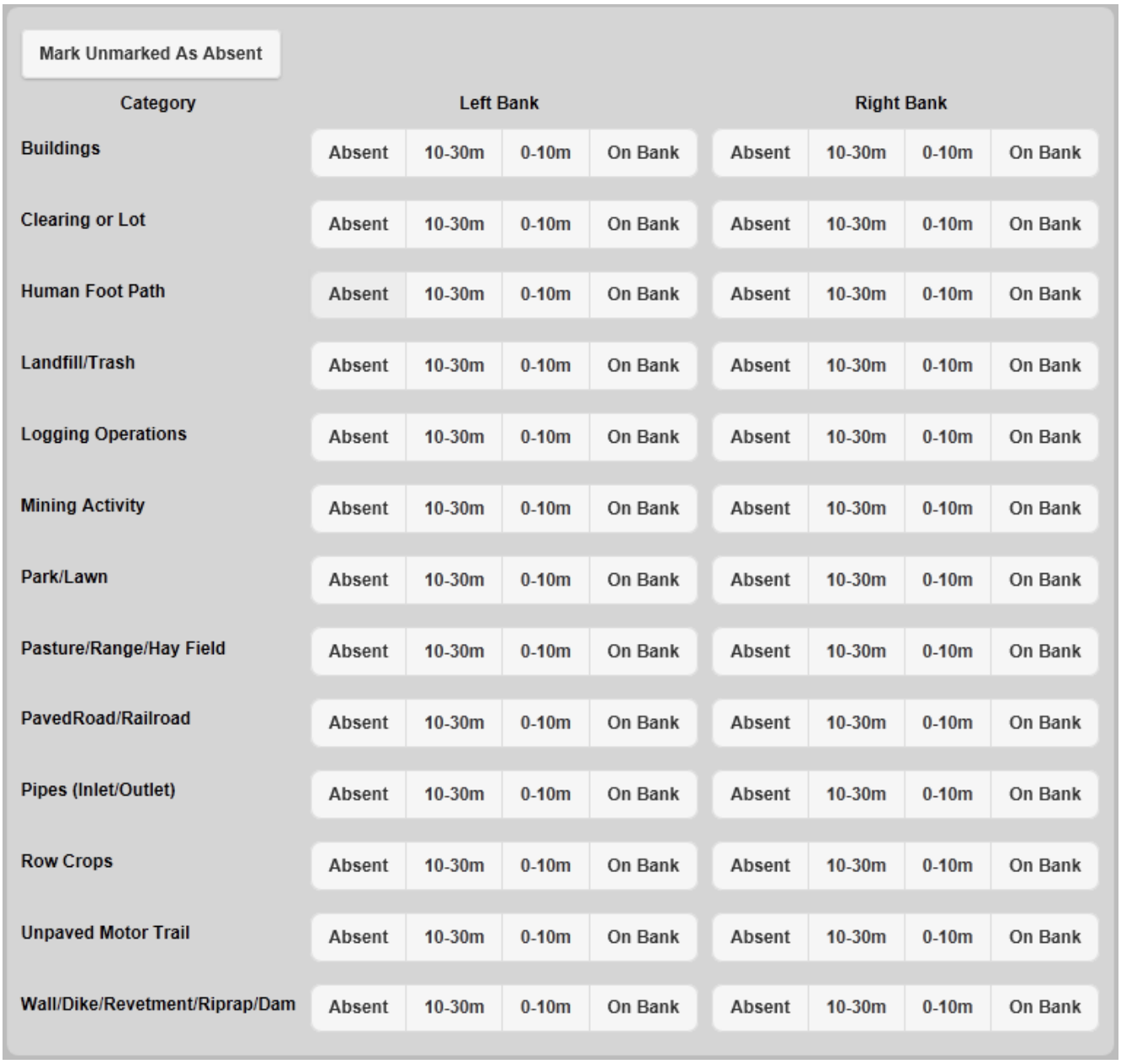

Figure 3: Human influence form

6.3.5 Often there is very little observable human influence at a given transect. For this reason, there is a button on the upper left side of the field form called *Mark Unmarked As Absent*. Pressing this button will mark proximity cod*e Absent* for each unmarked influence type. This is intended to be a time-saving measure. Always be certain there is not human influence before marking all types as absent.

6.4 Wide Protocol Method for Visual Assessment of Human Influence

6.4.1 Assess human influence type and proximity at each major transect. Figure 1 shows where the human influence form resides within each transect page.

6.4.2 The proximity of each human influence type is measured within a 10 x 20 meter plot centered along the major transect and coincident with the bankfull margin (Figure 4). Visually approximate the boundaries of this plot. Note that this is the same plot used for assessing riparian vegetation structure for sites sampled with the Wide Protocol SOP EAP117 (Hartman, 2017b).

Note: The plot should be 10 x 20 meters as viewed from above. Consider topography when approximating the dimensions of the plot, and when the plot contains bluffs or hills adjust accordingly.

6.4.3 Repeat steps 6.3.3 through 6.3.5 for sites sampled with the Wide Protocol.

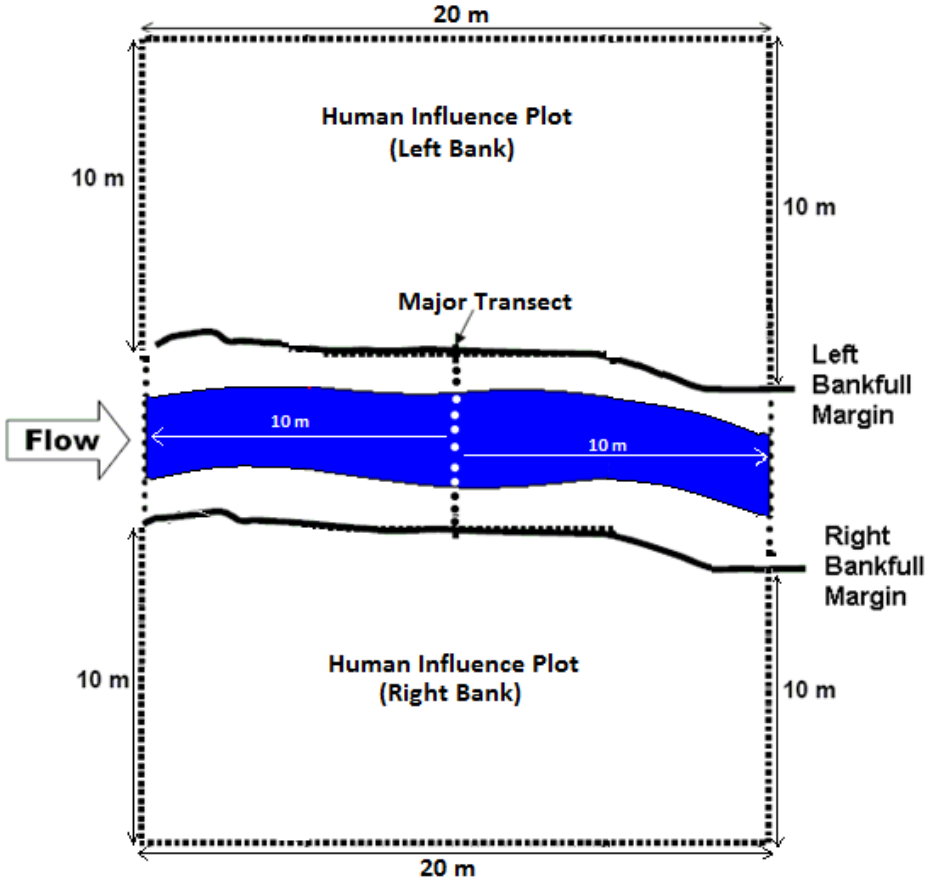

Figure 4: Dimensions of Wide Protocol human influence plot relative to major transect and bankfull margins.

7.0 Records Management

7.1 Refer to SOP EAP125 (Janisch, 2017), which describes the process for validating, loading, and committing completed WHM electronic field forms to the WHM database.

8.0 Quality Control and Quality Assurance Section

8.1 QA/QC procedures are addressed thoroughly in the QAMP for this project.

9.0 Safety

9.1 All field staff must comply with the requirements of the EAP Safety Manual (Ecology, 2017).

10.0 References

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10.12 Peck, D.V., Herlihy, A.T., Hill, B.H., Hughes, R.M., Kaufmann, P.R., Klemm, D.J., Lazorchak, J.M., McCormick, F.H., Peterson, S.A., Ringold, P.L., Magee, T., and Cappaert, M.R., 2006. Environmental Monitoring and Assessment Program-Surface Waters, Western Pilot Study, Field Operations Manual for Wadeable Streams. EPA/620/R-06/003. U.S. Environmental Protection Agency, Washington, D.C. https://publicaccess.zendesk.com/attachments/token/diLwQbRYeH9MHTOw1MHAXK7Ns/?name=EPA+620-R-06-003+%28PB2010-106544%29+-+Surface+Waters+-+Western+Pilot+Study+-+Field+Operations+Manual+for+Wadeable+Streams.pdf