

Washington State Department of Ecology

Environmental Assessment Program

Standard Operating Procedure for Visual Characterization of Riparian Vegetation  
Structure for the Extensive Riparian Status and Trends Monitoring Program

Version 1.0

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SIGNATURES ON FILE

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

SOP Revision History

Revision date	Rev number	Summary of changes	Sections	Reviser(s)
5/22/2009	1	Numerous edits	All	Liz Werner
7/14/2009	2	Numerous edits	All	Brian Engeness
9/5/2009	3	Numerous edits	All	Martha Maggi
10/5/2009	4	Numerous edits	All	Brian Engeness
11/17/2009	5	Removed underlining	All	Bill Kammin

# Standard Operating Procedure for Visual Characterization of Riparian Vegetation Structure for the Extensive Riparian Status and Trends Monitoring Program

## **1.0 Purpose and Scope**

- 1.1 This document is the Environmental Assessment Program Standard Operating Procedure (SOP) for Visual Characterization of Riparian Vegetation Structure observed at an established Extensive Riparian Status and Trends (ERST) monitoring program site.
- 1.2 The estimation of riparian vegetation composition supplements canopy cover data. By assessing the type and amount of riparian vegetation, assumptions can be made about the seasonality of canopy cover, future canopy cover, and degree of site disturbance.

## **2.0 Applicability**

- 2.1 This SOP was adapted from Environmental Protection Agency's Environmental Monitoring and Assessment Program (EMAP) Field Manual (Peck et al., 2003) for use within the Extensive Riparian Status and Trend Monitoring Program (ERST). The scale of the project requires that the frequency of sampling is reduced. The sampling area and frequency were modified to be congruent with other sampling occurring simultaneously as part of ERST.

## **3.0 Definitions**

- 3.1 Bank: any land surface above the bankfull edges that adjoins a body of water and contains it except during large-scale flood events; banks form above the bankfull edges as a conglomeration of vegetation, roots, rocks, and other structures.
- 3.2 Bankfull edge: the line on the bank that coincides with the water's elevation during bankfull stage.
- 3.3 Bankfull stage: the point at which a river or stream completely fills its channel, just before water begins to flow into the flood plain; bankfull stage is defined by the flow during moderate-sized floods that occur an average of every 1.5 years.
- 3.4 Barren, Dirt or Duff: any exposed ground that includes rock, bare dirt, mosses, and duff layer.
- 3.5 Big Trees: trees greater than or equal to 30 cm DBH.

- 3.6 Diameter at Breast Height (DBH): the diameter of a tree taken outside the bark 4.5 feet above the ground on the uphill side of the tree.
- 3.7 Left Bank: the left-hand bank when facing downstream.
- 3.8 Non-woody Plants: herbaceous plants, grasses, ferns, etc.
- 3.9 Right Bank: the right-hand bank when facing downstream.
- 3.10 Riparian zone: the area encompassing the channel and 30 m from the channel (perpendicular to flow) on either side.
- 3.11 Site: the area in which the study is being conducted; determined by the location of the randomly selected point on the stream.
- 3.12 Small Trees: trees less than 30 cm DBH.
- 3.13 Transect: a line which crosses perpendicular to stream flow across the bankfull channel; each site for the ERST project has six transects.
- 3.14 Unstable Bank: bank that is actively eroding or falling away. Banks are unstable if they show any of the following indicating features.
- 3.14.1 Breakdown: blocks of bank broken away and lying adjacent to bank breakage.
- 3.14.2 Slumping: bank or a portion of the bank has slipped down; cracks may or may not be obvious.
- 3.14.3 Fracture: a crack on the bank indicating that a block of bank is about to slump/move into stream.
- 3.14.4 Note: uprooted or tilted trees, erosion, uncovered banks (free of vegetation, roots, and cobble), and water-saturated soils may indicate unstable banks.
- 3.15 Woody Plants: trees and shrubs, including saplings.

#### **4.0 Personnel Qualifications/Responsibilities**

- 4.1 Staff must have knowledge of the contents of all SOP's relating to the Extensive Riparian Status and Trends Monitoring Program.

4.2 Staff members must understand the notations on the datasheet (see Appendix A). Each staff member should be adequately trained to identify bankfull and the estimated dimensions and heights, as well as basic vegetation classes, and to use the appropriate abbreviations.

4.3 The staff member's aptitude for field tasks is more important than job class.

## **5.0 Equipment and Supplies**

5.1 Waterproof "Transect Dimensions, Canopy Cover, Riparian Vegetation" datasheet (Appendix A)

5.2 Waterproof field notebook

5.3 Pencils

## **6.0 Summary of Procedure**

6.1 Record vegetation assessments at each of the six transects.

6.2 Left Bank

6.2.1 From the transect (see the Standard Operating Procedure for Establishing a Study Reach in Rivers and Streams for the Extensive Riparian Status and Trends Monitoring Program), face the left bank and estimate a 5 m distance following the bankfull edge (BFE) upstream, and a 5 m distance following the BFE downstream. Then estimate a distance 10 m perpendicular to the direction of the stream flow from the left BFE (this distance extends away from the stream, into the riparian zone on the left bank). The resulting 100 m<sup>2</sup> area is the plot to be assessed. The 100 m<sup>2</sup> plot blankets the features of the area. A visual estimation of the area is adequate, and the actual dimensions do not need to be marked off.

6.2.2 Visually divide the vegetation, by height into three independent layers:

6.2.2.1 Vegetation that is above 5 m (>5 m)

6.2.2.2 Vegetation that is between 0.5 m and 5 m in height (0.5 – 5 m)

6.2.2.3 Vegetation that is below 0.5 m (<0.5 m)

6.2.3 Characterize vegetation that is above 5 m (>5 m)

6.2.3.1 Within the 100 m<sup>2</sup> plot, categorize the vegetation in the layer above 5 m (>5 m). Ignore vegetation in the lower two layers. Categorize vegetation as deciduous (**D**), coniferous (**C**), broadleaf evergreen (**E**), mixed (**M**), or none (**N**). Enter the appropriate letter in the "LB, Vegetation Type (> 5m)" cell on the datasheet that corresponds to the transect you are at.

Note: Consider the layer “mixed” if more than 10% of the aerial coverage is made up of the alternate vegetation type.

- 6.2.3.2 Within the 100 m<sup>2</sup> plot, quantify the percent cover supplied by big trees in the layer above 5 m. Consider “cover” to be the amount of shade that would be cast on a plane 5 m above the ground by the vegetation category that is being assessed if the sun was directly overhead. Enter **0** if cover is Absent (0%), **1** if Sparse (<10%), **2** if Moderate (10% - 40%), **3** if Heavy (40% - 75%), or **4** if Very Heavy (>75%). Record this number in the corresponding “LB, Big Trees (>5m)” cell on the datasheet.
- 6.2.3.3 Repeat this percent cover assessment for small trees in the layer above 5 m (>5 m). Enter **0**, **1**, **2**, **3**, or **4** in the corresponding “LB, Small Trees (>5m)” cell on the datasheet.
- 6.2.4 Characterize vegetation that is between 0.5 m and 5 m in height (0.5 - 5m)
- 6.2.4.1 Within the 100 m<sup>2</sup> plot, categorize the vegetation in the 0.5 – 5 m layer as deciduous, coniferous, broadleaf evergreen, mixed, or none. Enter **D**, **C**, **E**, **M**, or **N** in the corresponding “LB, Vegetation Type (5 – 0.5m)” cell on the datasheet.
- 6.2.4.2 Within the 100 m<sup>2</sup> plot, quantify percent cover supplied by the vegetation on Woody Plants that is between 0.5 m and 5 m. For this layer, “cover” is the amount of shade that would be cast on a plane 0.5 m from the ground if the sun was directly overhead. Enter **0** if Absent (0%), **1** if Sparse (<10%), **2** if Moderate (10% - 40%), **3** if Heavy (40% - 75%), or **4** if Very Heavy (>75%). Record this number in the corresponding “LB, Woody Plants (0.5 - 5m)” cell on the datasheet.
- 6.2.4.3 Repeat this percent cover assessment for the vegetation on Non-woody Plants that is between 0.5 m and 5 m. Enter **0**, **1**, **2**, **3**, or **4** in the corresponding “LB, Non-woody Plants (0.5 - 5m)” cell on the datasheet.
- 6.2.5 Characterize vegetation that is below 0.5 m
- 6.2.5.1 Within the 100 m<sup>2</sup> plot, quantify percent cover supplied by the vegetation on Woody Plants that is below 0.5 m. For this layer, “cover” is the amount of shadow that would be cast on the ground if the sun was directly overhead. Enter **0** if Absent (0%), **1** if Sparse (<10%), **2** if Moderate (10% - 40%), **3** if Heavy (40% - 75%), or **4** if Very Heavy (> 75%). Record this number in the corresponding “LB, Woody Plants (<0.5m)” cell on the datasheet.

- 6.2.5.2 Repeat this percent cover assessment for the vegetation on Non-woody Plants that is below 0.5 m. Enter **0, 1, 2, 3,** or **4** corresponding “LB, Non-Woody Plants (<0.5 meter)” cell on the datasheet.
- 6.2.6 Characterize Barren, Bare Dirt or Duff
  - 6.2.6.1 Within the 100 m<sup>2</sup> plot, quantify the percent ground area not covered by vegetation. Moss should be included as Barren, Dirt or Duff. Enter **0** if vegetation is Absent (0%), **1** if Sparse (< 10%), **2** if Moderate (10% - 40%), **3** if Heavy (40% - 75%), or **4** if Very Heavy (> 75%). Record this number in the corresponding “LB, Barren, Bare Dirt or Duff” cell on the datasheet.
- 6.2.7 Characterize Bank Stability
  - 6.2.7.1 From the transect, assess the Left Bank Stability 5 m upstream and 5 m downstream using the definitions in Section 3.13.
  - 6.2.7.2 Record Unstable Bank to the nearest ten percent as a percent of bank length. Enter **0%, 10%, 20%, 30%, 40%, 50%, 60%, 70%, 80%, 90%,** or **100%** in the corresponding “LB Unstable Bank (%)” cell on the datasheet.
- 6.3 Right Bank
  - 6.3.1 Repeat steps 6.2 through 6.2.7.2 for the Right Bank.
- 6.4 Review all notes for completeness before leaving the site.

## **7.0 Records Management**

- 7.1 Blank datasheets available to print are located in  
Y:\SHARED Files\Engeness\ERST\Data Sheets
- 7.2 All hard copies of completed datasheets from a specific site are filed together.
- 7.3 Datasheets are scanned and saved in folders according to year of survey and site type (Type N or Type F). These folders are located in

Y:\SHARED Files\Engeness\ERST\Type F07E  
 Y:\SHARED Files\Engeness\ERST\Type F08W  
 Y:\SHARED Files\Engeness\ERST\Type N08W  
 Y:\SHARED Files\Engeness\ERST\Type N09E

7.4 Data is entered into Access Database tables. These databases are located in Y:\SHARED Files\Engeness\ERST\Database Stuff\ERST\_DATABASES

## **8.0 Quality Control and Quality Assurance Section**

8.1 Data collection

8.1.1 Select 10% of the total number of sites for QA and take all field measurements twice; the second time with a different staff member collecting data. Record the QA measurements on separate data sheets. For the sake of efficiency, reassess the site immediately after the first assessment.

8.1.2 Ensure data sheets are completely filled out.

8.2 Data entry: After transferring data to a database file, two staff members check each entry of each record. Alternatively, enter the data twice and compare the tables.

## **9.0 Safety**

9.1 Safety Equipment

9.1.1 Hard hat

9.1.2 Field vest

9.1.3 Wading Boots / Chest Waders

9.1.4 Compass

9.1.5 Whistle

9.1.6 First aid kit

9.1.7 Weather protection (i.e., raingear, sun protection, extra clothing)

9.2 Field team must always consist of at least two staff members.

9.3 Applicable Ecology Safety Policies

9.3.1 Accessing Private Property: Follow Ecology Executive Policy 1-11.

9.3.2 Field work Notification Procedures: Follow procedure outlined in EAP Safety Manual on pages 1-19 through 1-22.

9.3.3 Working in Rivers and Streams: Follow procedure outlined on pages 1-35 and 1-36.

9.4 Use a CB radio to communicate with traffic on logging roads.

## 10.0 References

- 10.1 Ecology, 2006. Environmental Assessment Program Safety Manual. Olympia, WA.
- 10.2 Ehinger, W., McConnell, S., Schuett-Hames, D., Black, J. 2007. Study plan: Extensive Riparian Status and Trends monitoring program. Draft. Prepared for CMER's Riparian Scientific Advisory Group.
- 10.3 Kaufmann, P., Robison, E. 1998. Physical Habitat Assessment. Environmental Monitoring and Assessment Program – Surface Waters: Field Operations and Methods for Measuring the Ecological Condition of Wadeable Streams pp 77-118. EPA/620/R-94/004F. U.S. Environmental Protection Agency, Washington D.C.
- 10.4 Peck, D., J.M. Lazorchak, and D.J. Klemm (editors), 2003. Environmental Monitoring and Assessment Program-Surface Waters: Western Pilot Study Field Operations Manual for Wadeable Streams. U.S. Environmental Protection Agency, Western Ecology Division, Corvallis, OR.  
<http://www.epa.gov/emap/html/pubs/docs/groupdocs/surfwatr/field/ewws m01.pdf>

**11.0 Appendices**

11.1 Appendix A. Transect Dimensions, Canopy Closure, Riparian Vegetation Cover Datasheet

ERST TYPE N F Westside MM/DD \_\_\_\_\_ 2009 CREW \_\_\_\_\_ Site ID # \_\_\_\_\_

Transect Dimensions, Canopy Closure, Riparian Vegetation Cover															
Tr.	DIMENSIONS(m)				CANOPY CLOSURE				Notes:						
	WW	BFW	BAR	THD	Up	Left	Down	Right							
1															
2															
3															
4															
5															
6															
RIPARIAN VEGETATION COVER				T - 1 LB	T - 1 RB	T - 2 LB	T - 2 RB	T - 3 LB	T - 3 RB	T - 4 LB	T - 4 RB	T - 5 LB	T - 5 RB	T - 6 LB	T - 6 RB
Vegetation Type ( > 5m )															
Big Trees ( > 5m )															
Small Trees ( > 5m )															
Vegetation Type ( 5 - 0.5m)															
Woody Plants ( 0.5 - 5m )															
Non-Woody Plants ( 0.5 - 5m )															
Woody Plants ( < 0.5m)															
Non-Woody ( < 0.5m )															
Barren, Bare Dirt or Duff															
Unstable Bank ( % )															

Vegetation Type (D = deciduous, C = coniferous, E = broadleaf evergreen, M = mixed, N = none). For big/small trees, woody/non-woody dirt/duff use: 0 = Absent (0%), 1 = Sparse (<10%), 2 = Moderate (10-40%), 3 = Heavy (40-75%), 4 = Very Heavy (>75%)