Stream Watch Visual Survey Instructions

The Stream Watch Visual Survey is based on assessment parameters from the EPA's Rapid Bioassessment Protocol Habitat Assessment, Georgia Adopt a Stream Visual Survey, and the Center for Watershed Protection's Unified Stream Assessment (USA). This simple assessment is designed to collect basic information on existing in-stream and riparian conditions and will be used by the watershed group and Baltimore County to identify major concerns and assess habitat.

This appendix directs the volunteer on completing the Visual Survey form. The Stream Watch Visual Survey is composed of four basic parts:

- *General collection information*: section location and ID, volunteer names, date, weather conditions, and emergency response
- *Visual assessment*: ten questions on a range of in-stream and riparian characteristics
- *Section Sketch*: plan view of adoptive section showing any structures or features of interest
- *Comments*: Restoration recommendations, section highlights, requests for watershed group action

This appendix provides an introduction to the Visual Survey, a review of important elements of the Visual Survey field form, and the Visual Survey field form.

General Collection Information

Watershed Group Name. Friends of Patapsco Valley & Heritage Greenway (FPVHG) should appear here.

Adopted Section ID. You should have registered for your stream section site(s). When you do this, the FPVHG will tell you your pre-assigned section ID. This section ID allows the County to identify the exact location of your section and track data you collect.

Stream Walker Name(s). List all individuals who assisted in performing the survey. If there are too many to list, list several, beginning with the section registrant and all trained individuals. Please indicate the total number of investigators.

Date and Time. Document the date and how long it took you to complete the survey. Vegetation and stream flow will vary depending on the time of year. This information is important for the watershed group to properly track your effort and interpret the results.

Photo documentation. Circle yes or no. You are not required to take photos of features in your section, however, photo documentation can be a valuable tool in describing conditions and in documenting changes. Photos can also be useful for educational and outreach purposes.

Rain and Current Conditions. Please describe rain patterns over the previous 24 hours and indicate current conditions. The weather conditions can dramatically affect the results of your Visual Survey. For example, heavy or sometimes even light rain can result in altered stream flow conditions (reduction or increase in riffle numbers), clearing or deposition of organic debris, appearance of unusual odors, oils, or foam, and changes in water clarity.

Surrounding Land Use. Check the box describing the predominant land use surrounding your reach. You may check more than one box if uses differ on either side of the stream. Institutional land use includes schools, cemeteries, hospitals, etc.

Emergency Conditions Reported. Circle yes or no and describe what condition or follow-up action you reported to the County or watershed organization.

Visual Assessment

Descriptions of many of these parameters were taken from the Georgia Adopt a Stream Visual Survey (2002) guidance document.

1. Water Flow. Note the average conditions of flow for your adoptive section.

2. Water Odor. Note whether you detect any odors (including those not listed on the form) that are associated with the water in the surrounding area.

3. Water Clarity. Based upon visual observation, note the general clarity of the water column throughout your adoptive section (be sure to observe area prior to disturbance). Clear indicates high clarity and lack of color. Stained generally refers to clear but reddish or brownish color often associated with tannic acids (think iced tea). Turbidity is defined as a cloudy condition in water due to the suspension of silt or fine particles of organic matter. It affects light penetration and the productivity of algae and aquatic plants. The settling of solids alters the nature of the substrate, possibly resulting in habitat destruction. Lack of water clarity or the presence of color may be caused by algae, suspended solids, dyes, or chemical discharges.

4. Aquatic Plants in Stream. Here you are looking for the amount of algae or vascular aquatic plants present in the stream. Excessive nutrient loading often results in blooms of aquatic plants. Please note the relative presence of attached (rooted) or floating plants. A stream should have a light coating of algae on the rocks and other submerged material, visible only when standing within a few feet

of the rock. The presence of stringy or clumps of floating algae is not typical in a healthy stream.

5. Wildlife in or Around Stream. Make note of the wildlife you see or evidence you observe (see browse, beaver activity) both in the stream and in the floodplain.

6. Natural Organic Material in Stream. This assessment measures availability of physical habitat for aquatic organisms, including fish and macroinvertebrates. The potential for the maintenance of a healthy fish community and its ability to recover from disturbance is dependent on the variety and abundance of suitable habitat and cover available. Look for logs, fallen trees, or parts of trees that provide structure and attachment for aquatic macroinvertebrates and hiding places for fish. Thick root mats from trees and shrubs at or beneath the water surface also provides ideal habitat for aquatic animals. Also, please note the presence of major log and debris jams created during storm events. Sometimes, these may block flows and cause backup of floodwaters and/or bank erosion.

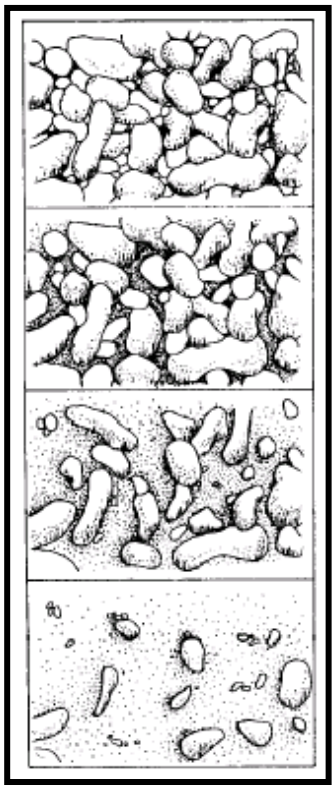

Figure A.1: Increasing Embeddedness (Top to Bottom)

7. Embeddedness (in the riffle). Riffles are areas, often downstream of a pool, where the water is breaking over rocks or other debris causing surface agitation. Riffles are critical for maintaining high species diversity and abundance of insects for most streams, and are vital spawning and feeding grounds for some fish species. Embeddedness measures the degree to which gravel and cobble substrate are surrounded by fine sediment (Figure A.1). It relates directly to the suitability of the stream substrate as habitat for macroinvertebrates, fish spawning, and egg incubation. This assessment should be used only in riffle areas and in streams where this is a natural feature. The measure is the depth to which objects are buried by sediment. This assessment is made by picking up pieces of gravel or cobble with your fingertips at the fine sediment layer. Pull the rock out of the streambed and estimate what percentage of it was buried. Some streams have been so smothered by fine sediment that the original stream bottom is not visible. Test for complete burial of a streambed by probing with a sturdy stick or rebar. Do not use your bare hands, as there may be broken glass or other dangerous objects hidden by the sediment *(Description, figure, and definition provided by Georgia Adopt a Stream Visual Survey; taken from USDA NRCS Stream Visual Assessment Protocol National Water and Technical Center Technical Note 99-1).*

8. Average Channel Dimensions. Once you have a feel for your adoptive section, find a location that represents the average channel shape and measure bank heights (from top of water) to bottom and top of channel width, and the

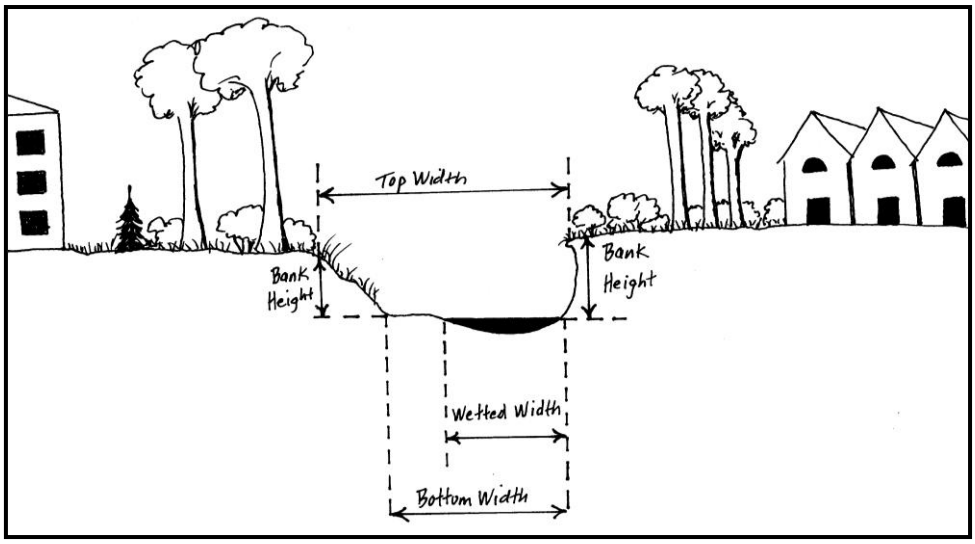

Figure A.2: Cross Section of Stream Showing Where to Measure Channel Dimensions

wetted width. Figure A.2 shows where these measurements should be taken. **Side of stream is determined by facing downstream.**

9. Impacts. While you may not be an expert of stream ecology, you should be able to note any major structural or habitat impacts to your adoptive section. Noting the lack of forested buffers, severe bank erosion (loss of property, high banks, active erosion), concrete channels, or leaking sewer lines is important. Major emergencies should be reported to the proper local authorities. Less critical impacts should be checked on this form and communicated to the watershed group. The location of these impacts should be drawn on your stream sketch.

10. Average Section Characteristics. The remaining questions in this survey are mostly drawn from the EPA's Rapid Bioassessment Protocol Habitat Assessment. Listed are eight parameters that are easy to quickly assess and can be characterized as optimal, suboptimal, marginal, or poor conditions. Detailed descriptions of these parameters are provided below.

10a. In-Stream Habitat Quality. Includes the relative quantity and variety of natural structures in the stream, such as cobble (riffles), large rocks, fallen trees, logs and branches, and undercut banks, available as refuge, feeding, or sites for spawning and nursery functions of aquatic macrofauna. Also takes into account mixture of pools, riffles, and runs. A wide variety and/or abundance of submerged structures in the stream provide macroinvertebrates and fish with a large number of niches, thus increasing habitat diversity. As variety and abundance of cover decreases, habitat structure becomes monotonous, diversity decreases, and the potential for recovery following disturbance decreases. Riffles and runs are critical for maintaining a variety and abundance of insects in most high-gradient streams and serving as spawning and feeding refuge for certain

fish. The extent and quality of the riffle is an important factor in the support of a healthy biological condition in high-gradient streams. Riffles and runs offer a diversity of habitat through variety of particle size, and, in many small high-gradient streams, will provide the most stable habitat. Snags and submerged logs are among the most productive habitat structure for macroinvertebrate colonization and fish refuge however, “new fall” will not yet be suitable for colonization.

10b. Stream Shading. Vegetative cover of the water’s surface (trees and shrubs overhanging the stream, not algae covering the surface of it!) reduces the amount of direct sunlight and also provides organic matter for the stream’s food chain. Estimate the % of water surface throughout your adoptive sections covered by shade during the summer (full leafage).

10c. Bank Vegetative Cover. Measures the amount of vegetative protection afforded to the stream bank and the near-stream portion of the riparian zone. The root systems of plants growing on stream banks help hold soil in place, thereby reducing the amount of erosion that is likely to occur. This parameter supplies information on the ability of the bank to resist erosion as well as some additional information on the uptake of nutrients by the plants, the control of in-stream scouring, and stream shading. Banks that have full, natural plant growth are better for fish and macroinvertebrates than are banks without vegetative protection or those shored up with concrete or riprap. Each bank is evaluated separately.

10d. Bank Stability. The process of erosion and sedimentation is natural. However, the rate of erosion is accelerated by human disturbances either to the hydrology of the stream or to the stream buffer (riparian zone). Check all descriptions that apply to the left and right banks of your stream. A stable bank will have vegetation. Banks can lose vegetation due to large amounts of water rushing through the stream channel during storm events or because someone has removed the vegetation, e.g. as a result of development and construction within the riparian zone. Natural banks have gentle slopes. Undercutting of stream banks is natural, though excessive undercutting may lead to stream bank failure. Streams that have a lot of erosion may have steep, U shaped banks. Another sign of rapid erosion is tree and plant roots that are exposed along the stream bank.

This parameter measures whether the stream banks are eroded (or have the potential for erosion). Steep banks are more likely to collapse and suffer from erosion than are gently sloping banks, and are therefore considered to be unstable. Signs of erosion include crumbling, unvegetated banks, exposed tree roots, and exposed soil. Eroded banks indicate a problem of sediment movement and deposition, and suggest a scarcity of cover and organic input to streams. Each bank is evaluated separately.

10e. Channel Stability/Floodplain Connection. Streams and their floodplains work together in a natural setting. Non-impacted streams are designed to overflow when flood flows reach the point of being big enough and fast enough to erode or scour the stream channel. The act of overflowing the stream banks into the floodplain effectively dissipates the erosive flow by spreading the water out across a wider area. Once streams become impacted (through urbanization or other manmade alterations), they often become separated from their floodplain by downcutting or through structural revetments. Once a stream begins to erode downward, the banks get taller and erosive storm flows are trapped in the channel. This parameter is asking you to evaluate the possibility of flows escaping the channel. If banks are low and there is evidence of flooding in the floodplain, chances are that connectivity exists.

10f. Vegetative Buffer Width. Measures the width of natural vegetation from the edge of the stream bank out through the riparian zone. The vegetative zone serves as a buffer to pollutants entering a stream from runoff, controls erosion, and provides habitat and nutrient input into the stream. A relatively undisturbed riparian zone supports a robust stream system; narrow riparian zones occur when roads, parking lots, fields, lawns, bare soil, rocks, or buildings are near the stream bank. Residential developments, urban centers, golf courses, and rangeland are the common causes of anthropogenic degradation of the riparian zone. Conversely, the presence of "old field" (i.e., a previously developed field not currently in use), paths, and walkways in an otherwise undisturbed riparian zone may be judged to be inconsequential to altering the riparian zone and may be given relatively high scores. Each bank is evaluated separately. Consider evaluating buffer widths based on your community's required buffer widths (i.e., 25 feet, 50 feet, 100 feet).

10g. Floodplain Vegetation. This parameter refers to the dominant type of vegetation you see in the riparian corridor (on both sides of the stream).

10h. Floodplain Encroachment. Encroachment differs from vegetative buffer width because it is looking primarily at structural impacts from the perspective of floodplain functioning rather than vegetative width.

Section Sketch

Take a few minutes to draw the major features of your adoption section. You don't need to be an artist! And you don't need to have every detail to scale. You simply need to be able to draw the stream and its immediate surroundings so someone else could envision the major features of your section. Note the physical features of the stream reach, such as riffles, pools, runs, streambanks (bare or eroded), changes to stream shape (rip-rap, gabions, cemented banks), vegetation, stream flow obstructions (dams, pipes, culverts), outfalls, tributaries, landscape features, paths, bridges, and roads. Include comments such as

changes or potential problems, e.g. spills, new construction, type of discharging pipes, etc. See sample sketch.

Comments

Please include any comments you have regarding your adoption section. Your comments will be reviewed by FPVHG stream team and should include a detailed description of any conditions or features of unique value or of concern, any potential restoration projects you may notice, or any information on surrounding land uses or stakeholders you think would be of value to the watershed group. Also, if you had problems completing the survey, please write that down.