USACE AID#_____ DWQ #_____ Site #____ (indicate on attached map)

STREAM QUALITY ASSESSMENT WORKSHEET

Provide the following information for the stream reach under assessment:

1. Applicant's name:_____ **2.** Evaluator's name:_____

3. Date of evaluation:_____ **4.** Time of evaluation:_____

5. Name of stream:_____ **6.** River basin:_____

7. Approximate drainage area:_____ **8.** Stream order:_____

9. Length of reach evaluated:_____ **10.** County:_____

11. Site coordinates (if known): prefer in decimal degrees. **12.** Subdivision name (if any):_____

Latitude (ex. 34.872312): _____ Longitude (ex. –77.556611):_____

Method location determined (circle): GPS Topo Sheet Ortho (Aerial) Photo/GIS Other GIS Other_____

13. Location of reach under evaluation (note nearby roads and landmarks and attach map identifying stream(s) location):_____

_____

14. Proposed channel work (if any):_____

15. Recent weather conditions:_____

16. Site conditions at time of visit:_____

17. Identify any special waterway classifications known: ___Section 10 ___Tidal Waters ___Essential Fisheries Habitat

___Trout Waters ___Outstanding Resource Waters ___ Nutrient Sensitive Waters ___Water Supply Watershed ____(I-IV)

18. Is there a pond or lake located upstream of the evaluation point? YES NO If yes, estimate the water surface area:_____

19. Does channel appear on USGS quad map? YES NO **20.** Does channel appear on USDA Soil Survey? YES NO

21. Estimated watershed land use: ___% Residential ___% Commercial ___% Industrial ___% Agricultural

___% Forested ___% Cleared / Logged ___% Other (_____)

22. Bankfull width:_____ **23**. Bank height (from bed to top of bank):_____

24. Channel slope down center of stream: ___Flat (0 to 2%) ___Gentle (2 to 4%) ___Moderate (4 to 10%) ___Steep (>10%)

25. Channel sinuosity: ____Straight ___Occasional bends ___Frequent meander ___Very sinuous ___Braided channel

Instructions for completion of worksheet (located on page 2): Begin by determining the most appropriate ecoregion based on location, terrain, vegetation, stream classification, etc. Every characteristic must be scored using the same ecoregion. Assign points to each characteristic within the range shown for the ecoregion. Page 3 provides a brief description of how to review the characteristics identified in the worksheet. Scores should reflect an overall assessment of the stream reach under evaluation. If a characteristic cannot be evaluated due to site or weather conditions, enter 0 in the scoring box and provide an explanation in the comment section. Where there are obvious changes in the character of a stream under review (e.g., the stream flows from a pasture into a forest), the stream may be divided into smaller reaches that display more continuity, and a separate form used to evaluate each reach. The total score assigned to a stream reach must range between 0 and 100, with a score of 100 representing a stream of the highest quality.

Total Score (from reverse):_____ **Comments:**_____

_____

_____

_____

_____

Evaluator's Signature_____ **Date**_____

This channel evaluation form is intended to be used only as a guide to assist landowners and environmental professionals in gathering the data required by the United States Army Corps of Engineers to make a preliminary assessment of stream quality. The total score resulting from the completion of this form is subject to USACE approval and does not imply a particular mitigation ratio or requirement. Form subject to change – version 06/03. To Comment, please call 919-876-8441 x 26.

STREAM QUALITY ASSESSMENT WORKSHEET

	#	CHARACTERISTICS	ECOREGION POINT RANGE			SCORE
			Coastal	Piedmont	Mountain	
PHYSICAL	1	**Presence of flow / persistent pools in stream** (no flow or saturation = 0; strong flow = max points)	0 – 5	0 – 4	0 – 5	
	2	**Evidence of past human alteration** (extensive alteration = 0; no alteration = max points)	0 – 6	0 – 5	0 – 5	
	3	**Riparian zone** (no buffer = 0; contiguous, wide buffer = max points)	0 – 6	0 – 4	0 – 5	
	4	**Evidence of nutrient or chemical discharges** (extensive discharges = 0; no discharges = max points)	0 – 5	0 – 4	0 – 4	
	5	**Groundwater discharge** (no discharge = 0; springs, seeps, wetlands, etc. = max points)	0 – 3	0 – 4	0 – 4	
	6	**Presence of adjacent floodplain** (no floodplain = 0; extensive floodplain = max points)	0 – 4	0 – 4	0 – 2	
	7	**Entrenchment / floodplain access** (deeply entrenched = 0; frequent flooding = max points)	0 – 5	0 – 4	0 – 2	
	8	**Presence of adjacent wetlands** (no wetlands = 0; large adjacent wetlands = max points)	0 – 6	0 – 4	0 – 2	
	9	**Channel sinuosity** (extensive channelization = 0; natural meander = max points)	0 – 5	0 – 4	0 – 3	
	10	**Sediment input** (extensive deposition= 0; little or no sediment = max points)	0 – 5	0 – 4	0 – 4	
	11	**Size & diversity of channel bed substrate** (fine, homogenous = 0; large, diverse sizes = max points)	NA*	0 – 4	0 – 5	
STABILITY	12	**Evidence of channel incision or widening** (deeply incised = 0; stable bed & banks = max points)	0 – 5	0 – 4	0 – 5	
	13	**Presence of major bank failures** (severe erosion = 0; no erosion, stable banks = max points)	0 – 5	0 – 5	0 – 5	
	14	**Root depth and density on banks** (no visible roots = 0; dense roots throughout = max points)	0 – 3	0 – 4	0 – 5	
	15	**Impact by agriculture, livestock, or timber production** (substantial impact =0; no evidence = max points)	0 – 5	0 – 4	0 – 5	
HABITAT	16	**Presence of riffle-pool/ripple-pool complexes** (no riffles/ripples or pools = 0; well-developed = max points)	0 – 3	0 – 5	0 – 6	
	17	**Habitat complexity** (little or no habitat = 0; frequent, varied habitats = max points)	0 – 6	0 – 6	0 – 6	
	18	**Canopy coverage over streambed** (no shading vegetation = 0; continuous canopy = max points)	0 – 5	0 – 5	0 – 5	
	19	**Substrate embeddedness** (deeply embedded = 0; loose structure = max)	NA*	0 – 4	0 – 4	
BIOLOGY	20	**Presence of stream invertebrates** (see page 4) (no evidence = 0; common, numerous types = max points)	0 – 4	0 – 5	0 – 5	
	21	**Presence of amphibians** (no evidence = 0; common, numerous types = max points)	0 – 4	0 – 4	0 – 4	
	22	**Presence of fish** (no evidence = 0; common, numerous types = max points)	0 – 4	0 – 4	0 – 4	
	23	**Evidence of wildlife use** (no evidence = 0; abundant evidence = max points)	0 – 6	0 – 5	0 – 5	
Total Points Possible			100	100	100	
TOTAL SCORE (also enter on first page)						

* These characteristics are not assessed in coastal streams.

Notes on Characteristics Identified in Assessment Worksheet

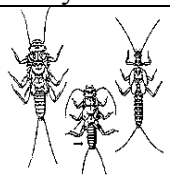
1. Consider channel flow with respect to channel cross-sectional area (expected flow), drainage area, recent precipitation, potential drought conditions, surrounding land use, possible water withdrawals, presence of impoundments upstream, vegetation growth in channel bottom (as indicator of intermittent flow), etc.
2. Human-caused alterations may include relocation, channelization, excavation, riprap, gabions, culverts, levees, berms, spoil piles adjacent to channel, etc.
3. The riparian zone is the area of vegetated land along each side of a stream or river that includes, but is not limited to, the floodplain. Evaluation should consider width of riparian area with respect to floodplain width, vegetation density, maturity of canopy and understory, species variety, presence of undesirable invasive species (exotics), breaks (utility corridors, roads, etc.), presence of drainage tiles, logging activities, other disturbances which negatively affect function of the riparian zone.
4. Evidence of nutrient or chemical discharges includes pipes, ditches, and direct draining from commercial and industrial sites, agricultural fields, pastures, golf courses, swimming pools, roads, parking lots, etc. Sewage, chlorine, or other foul odors, discolored water, suds, excessive algal growth may also provide evidence of discharge.
5. Groundwater discharge may be indicated by persistent pools and saturated soils during dry weather conditions, presence of adjacent wetlands, seeps, and springs feeding channel, reduced soils in channel bottom.
6. Presence of floodplains may be determined by topography and the slope of the land adjacent to the stream, terracing, the extent of development within the floodplain, FEMA designation if known, etc.
7. Indicators of floodplain access include sediment deposits, wrack lines, drainage patterns in floodplain, local stream gauge data, testimony of local residents, entrenchment ratio, etc. Note that indicators may relic and not a result of regular flooding.
8. Wetland areas should be evaluated according to their location, size, quality, and adjacency relative to the stream channel, and may be indicated by beaver activity, impounded or regularly saturated areas near the stream, previous delineations, National Wetland Inventory maps, etc. (Wetlands must meet criteria outlined in 1987 delineation manual and are subject to USACE approval.)
9. Channel sinuosity should be evaluated with respect to the channel size and drainage area, valley slope, topography, etc.
10. To evaluate sediment deposition within the channel consider water turbidity, depth of sediment deposits forming at point bars and in pools, evidence of eroding banks or other sediment sources within watershed (construction sites, ineffective erosion controls). In rare cases, typically downstream of culverts or dams, a sediment deficit may exist and should be considered in scoring.
11. When looking at channel substrate, factor in parent material (presence of larger particles in soil horizons adjacent to the stream), average size of substrate (bedrock, clay/silt, sand, gravel, cobble, boulder, etc.), and diversity of particle size (riprap is excluded).
12. Indications of channel incision and deepening may include a v-shaped channel bottom, collapsing banks, evidence of recent development and increased impervious surface area resulting in greater runoff in the watershed.
13. Evaluation should consider presence of major bank failures along the entire reach under evaluation, including uprooted trees on banks, banks falling into channel, formation of islands in channel as they widen, exposed soil, active zones of erosion, etc.
14. Increased root depth and density result in greater bank stability. Consider the depth and density that roots penetrate the bank relative to the amount of exposed soil on the bank and the normal water elevation.
15. Assessment of agriculture, livestock, and/or timber production impacts should address areas of stream bank destabilization, evidence of livestock in or crossing stream, loss of riparian zone to pasture or agricultural fields, evidence of sediment or high nutrient levels entering streams, drainage ditches entering streams, loss of riparian zone due to logging, etc.
16. Riffle-pool steps can be identified by a series of alternating pools and riffles. Abundance, frequency, and relative depth of riffles and pools should be considered with respect to topography (steepness of terrain) and local geology (type of substrate).
    Coastal plain streams should be evaluated for the presence of ripple-pool sequences. Ripples are bed forms found in sand bed streams with little or no gravel that form under low shear stress conditions, whereas, dunes and antidunes form under moderate and high shear stresses, respectively. Dunes are the most common bed forms found in sand bed streams.
17. Habitat complexity is an overall evaluation of the variety and extent of in-stream and riparian habitat. Types of habitat to look for include rocks/cobble, sticks and leafpacks, snags and logs in the stream, root mats, undercut banks, overhanging vegetation, pool and riffle complexes, wetland pockets adjacent to channel, etc.
18. Evaluation should consider the shading effect that riparian vegetation will provide to the stream during the growing season. Full sun should be considered worst case, while good canopy coverage with some light penetration is best case.
19. Stream embeddedness refers to the extent that sediment that has filled in gaps and openings around the rocks and cobble in the streambed. The overall size of the average particle in the streambed should be considered (smaller rocks will have smaller gaps).
20. Evaluation should be based on evidence of stream invertebrates gathered from multiple habitats. Scores should reflect abundance, taxa richness, and sensitivity of stream invertebrate types. (see attached examples of common stream invertebrates on page 4).
21. Evaluation should include evidence of amphibians in stream channel. Tadpoles and frogs should receive minimum value, while salamanders, newts, etc. may be assigned higher value.
22. Evaluation of fish should consider the frequency and, if possible, the variety of different fish taxa observed.
23. Evaluation of wildlife should include direct observation or evidence (tracks, shells, droppings, burrows or dens, hunting stands, evidence of fishing, etc.) of any animals using the streambed or riparian zone, to include small and large mammals, rodents, birds, reptiles, insects, etc.

Common Stream Invertebrates

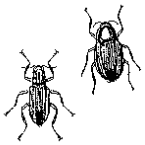
Sensitive Taxa – Pollution sensitive organisms that may be found in good quality water.

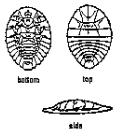

Caddisfly


Mayfly

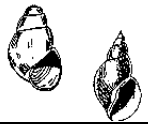

Stonefly


Dobsonfly


Riffle Beetle



Water Penny


Gilled Snail

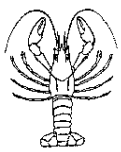
Somewhat Tolerant Taxa – Somewhat pollution tolerant organisms that may be found in good or


Beetle Larva


Clam

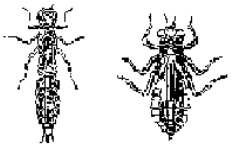

Sowbug


Cranefly


Crayfish

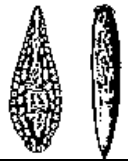

Damselfly Nymph


Scud


Dragon Fly Nymph

Tolerant Taxa – Pollution tolerant organisms that may be found in any quality water.


Blackfly Larva


Leech


Midge Fly Larva


Aquatic Worm


Pouch & Pond Snail