

# RIFFLE-POOL COMPLEX AVOIDANCE AND MINIMIZATION SUMMARY

*Mountain Valley Pipeline Project  
January, 2022*

## 1.0 INTRODUCTION

Mountain Valley Pipeline, LLC (“Mountain Valley”) conducted an alternatives analysis to ensure that the Mountain Valley Pipeline Project (the “Project”) avoids aquatic resource impacts to the maximum extent practicable. As documented in the pending permit application to the U.S. Army Corps of Engineers (USACE) and subsequent submissions, the comprehensive alternatives analysis proceeded in a logical fashion from (1) several offsite and non-structural alternatives, including major route alternatives, to (2) hundreds of route adjustments and refinements, to (3) onsite avoidance and minimization measures, including crossing-method alternatives. Through this process, Mountain Valley has demonstrated that there are no practicable alternatives to the proposed impacts.

For the purpose of conducting the onsite avoidance and minimization analysis for the pipeline, Mountain Valley combined streams and/or wetlands that are in very close proximity—such as streams and their adjacent riparian wetlands—into a single “crossing” to be evaluated.<sup>1</sup> This was done because, as a practical matter, the crossing of closely grouped features would be conducted as a single undertaking. Mountain Valley and its engineers relied on available data and their extensive experience in the field to analyze each crossing and determine the appropriate crossing method based on various site-specific circumstances, such as the size of the stream, steepness of the approach slopes, available workspace, time required to complete the crossing under the various methods, local geology, and proximity to residences, roads, or sensitive environmental resources, including “special aquatic sites” defined in 40 C.F.R. Part 230 (the “404(b)(1) Guidelines”).

Two categories of special aquatic sites have been documented in the Project area: wetlands and riffle-pool complexes. Many of the crossings grouped together for the onsite avoidance and minimization analysis included wetlands and/or streams with documented riffle-pool features that may indicate the presence of riffle-pool complexes. Accordingly, for the purpose of the analysis, Mountain Valley assumed that each crossing will or potentially may impact a special aquatic site. The analysis therefore started with the rebuttable presumption that a practicable alternative is available for *each proposed crossing* in accordance with 40 C.F.R. § 230.10(a)(3). This approach to applying the 404(b)(1) Guidelines errs on the side of avoidance and minimization of all aquatic resource impacts, including special aquatic sites.

Nevertheless, several public commenters questioned whether the process outlined above afforded due consideration to riffle-pool complexes. Following consultation with the USACE, Mountain Valley has prepared this *Riffle-Pool Complex Avoidance and Minimization Summary* to better document that impacts to riffle-pool complexes have been avoided and minimized to the extent practicable. This summary includes additional data gathered under the *Baseline Assessment Plan* to support restoration of these resources and supplemental evaluations and field verifications of locations with riffle-pool features to refine the identification of stream segments that constitute riffle-pool complexes. Mountain Valley reviewed and prepared a summary of the prior offsite and onsite alternatives evaluations for each

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<sup>1</sup> Refer to Table 15 of the Individual Permit application (as revised).

proposed impact to a riffle-pool complex. The results summarized below demonstrate that Mountain Valley's comprehensive alternatives analysis avoided riffle-pool complexes to the extent practicable.

## **2.0 PROCESS FOR IDENTIFYING POTENTIAL RIFFLE-POOL COMPLEXES**

To assess for the presence of riffle-pool complexes, Mountain Valley performed an initial screening exercise of the Baseline Assessment data collected in Virginia and West Virginia for potential riffle-pool complex characteristics. Riffle-pool complexes are bedform undulations developed in either supply- or transport-limited systems with gravel beds with slope gradients less than 0.02 (Leopold et al., 1964; Montgomery and Buffington, 1997). The pools offer deeper water habitat during periods of low-flow or ice cover, riffles provide spawning gravels and primary food-production areas, and riffle-pool complexes encourage hyporheic exchange (Tonina and Buffington, 2007). The following steps were performed to identify riffle-pool complexes:

- Step 1 – The slope of all perennial and intermittent streams within the right-of-way (ROW) was assessed using field collected data to determine the potential for riffle-pool complexes. Slopes between 0.02 and 0.001 (2 and 0.1%) were identified for further desktop evaluation.
- Step 2 – A desktop evaluation using aerial imagery/Google Earth was conducted to assess the streams beyond the limits of disturbance for a laterally oscillating bed form pattern with <2% slope and plan view pattern for stream types C, DA, E, and F (Rosgen et al. 2008)
- Step 3 – The baseline data packages for streams determined to have laterally oscillating bedform pattern were reviewed with a specific focus on photos, longitudinal profile data, and pebble counts. Streams with the potential for riffle-pool complexes were flagged for additional field evaluation.
- Step 4 – Streams flagged in Step 3 were visited by an Applied Geomorphologist to confirm the presence of riffle-pool complexes. Of the 59 streams identified through the initial screening exercise in the steps above, 32 had been granted landowner permission for additional study outside the ROW. The field assessment included use of the Ohio Environmental Protection Agency's Qualitative Habitat Evaluation Index (QHEI) protocol. The QHEI is a more detailed subset of the Rosgen and Montgomery & Buffington classifications. The Rosgen and Montgomery & Buffington classification methods, while including riffle-pool complexes in their schemes, evaluate a broader spectrum of stream channels including channel forms of all gradient ranges, ranges of bed material sizes, and various stages of channel evolution that arise throughout the United States. The Ohio QHEI is designed to evaluate a more limited range of stream types, in particular focusing on the quality of habitat provided by riffle-pool complexes. The QHEI identifies the presence, frequency, and depth of pools, glides, riffles, runs, and gravel/cobble substrate and the degree of embeddedness of these features. The QHEI is designed to evaluate streams of the hills and gentle mountains of eastern Ohio, which have a sufficiently similar topographic relief and similar valley forms to the mountains of West Virginia and Virginia where riffle-pool complexes may form to make the protocol valid for use in these areas.

In summary, streams with a slope of less than 2% and a laterally oscillating bedform and which met riffle-pool complex criteria from the QHEI were determined to have riffle-pool complexes. Attachment A contains a summary of the field work results. A total of 27 streams were confirmed as having riffle-pool

complexes; eleven of these crossings are associated with dry-ditch open cuts, and the remaining 16 are associated with travel lanes and access roads.

### **3.0 REVIEW OF ALTERNATIVES ANALYSIS FOR RIFFLE-POOL COMPLEXES**

Mountain Valley has reviewed the avoidance and minimization analysis for each proposed stream impact identified through the process outlined above as having a likely riffle-pool complex. As previously discussed, hundreds of major and minor routing alternatives and alignment adjustments were evaluated through an iterative process that occurred over the course of several years as the then-proposed Project underwent successive rounds of internal, agency, and public review. This review summarizes avoidance and minimization determinations for crossings of streams with riffle-pool complexes.

However, it must be recognized that each such crossing cannot be considered in isolation but rather must be evaluated in the context of a 303-mile linear pipeline. Any shift in the route to avoid a resource at a specific location will necessarily require movement of the route for a distance on each side of the crossing, with the length of the pipeline affected roughly proportional to the magnitude of the shift. Any potential movement of the route will require an evaluation of constructability constraints and new or changed impacts to aquatic or other resources—which may, in turn, trigger additional avoidance actions, including additional routing adjustments. In short, each alignment shift can have a cascading effect on the route. This limits the practical utility of reviewing offsite alignment or routing alternatives for discrete crossings in isolation and without reiterating the extensive iterative process and consideration of offsite factors that led to the selection of that alignment.

To present a practical and informative illustration of the offsite alternatives for each riffle-pool complex, this summary reviews the environmental and practicability constraints within the 300-foot-wide survey corridor for the selected route. That corridor represents an area within which a potential alignment shift would not likely trigger significant changes to the route approaching the crossing. The results of the review are summarized below for each impact type.

#### **3.1 Proposed Open-Cut Impacts for Pipeline Crossings**

Based on the results of the additional riffle-pool field studies (Attachment A), 11 open-cut stream crossings contain riffle-pool complexes. Mountain Valley's alternative analysis determined that the least environmentally damaging practicable alternative for these 11 crossings is the dry-ditch open-cut method. In addition to the relevant factors for each crossing that are summarized in Table 15 of the Individual Permit application, supplemental information for each crossing is provided below.

S-A1a (North Fork Fishing Creek – MP 0.65) – The area surrounding this crossing consists of utility ROW and public roads. North Fork Fishing Creek extends beyond the study corridor, flowing east and west of the currently proposed crossing. Based on the existing site conditions, known stream characteristics, and field observations, it appears that the riffle-pool complex extends upstream and downstream from the crossing location throughout the study corridor. Accordingly, a shift in the alignment would not avoid an impact to the complex. In addition, shifting the alignment to the east would place the pipeline near or on a bridge (County Route 50) and may impact wetland W-A1a, which is currently avoided. Shifting the alignment to the west would impact an adjacent utility line and create a crossing that is not perpendicular with the stream. Additionally, the factors making a trenchless crossing at the current location impracticable would apply equally if the route was adjusted within the study corridor.

S-LL1 (Kawl Creek – MP 68.7) – Due to the crossing being in a steep valley, a shift in either direction would create a sidehill construction scenario, which would complicate the safety and constructability in this location and would not eliminate or alter the factors supporting an open-cut crossing. Kawl Creek extends well beyond the study corridor, flowing northwest and southeast of the current crossing location. Based on the existing site conditions, known stream characteristics, and field observations, it appears that the riffle-pool complex extends upstream and downstream from the crossing location throughout the study corridor. Accordingly, a shift in the alignment would not avoid an impact to the complex. A shift to the west would increase impacts to Kawl Creek due to the stream's current alignment. Additional impacts to forested habitat, private properties, and increased construction duration would occur with a shift in either direction. Adjusting upstream or downstream of this crossing would not make a trenchless crossing practicable either – the same limiting factors would still be applicable.

S-I36 (Hominy Creek – MP 126.85) – The area surrounding this crossing of Hominy Creek is forested and located on steep slopes. Hominy Creek extends beyond the study corridor, flowing northwest and southeast of the current crossing location. Based on the existing site conditions, known stream characteristics, and field observations, it appears that the riffle-pool complex extends upstream and downstream from the crossing location throughout the study corridor. Accordingly, a shift in the alignment would not avoid an impact to the complex. Adjusting the route to the east or west would not eliminate or materially alter the factors making a trenchless crossing impracticable at this location. In addition, shifting the alignment to the west would increase impacts to wetland W-I11a. Shifting the alignment to the east would also move the pipeline closer to wetland W-U7 and may require the pipeline to be installed below this resource, which is currently only impacted with timber mats. Shifting the alignment within the study corridor in this area is not possible without increasing impacts to private properties, special aquatic sites, and forested habitats.

S-E28-West (Teels Creek – MP 258.2) – The area surrounding this crossing of Teels Creek consists of public roads, private residential properties, and forested areas. Teels Creek extends beyond the study corridor, flowing northwest and southeast of the currently proposed crossing. Based on the existing site conditions, known stream characteristics, and field observations, it appears that the riffle-pool complex extends upstream and downstream from the crossing location throughout the study corridor. Accordingly, a shift in the alignment would not avoid an impact to the complex. A northern adjustment would result in impacts to the currently avoided stream S-GH5 and would not avoid impacts to Teels Creek. A southern adjustment would move the pipeline within the public ROW (SR 728) and would require additional tree clearing and sidehill construction. In addition, adjusting the route to the north or south within the study corridor would not eliminate or materially alter the challenges that make a trenchless crossing impracticable. Shifting the alignment within the study corridor in this area is not possible without increasing impacts to private properties, aquatic systems, and forested habitats. A shift would also increase the construction duration in this area.

S-E28-Mid (Teels Creek – MP 259.15) – The area surrounding this crossing of Teels Creek consists of public roads, private residential structures, forested areas, and wetland resources. Teels Creek extends beyond the study corridor, flowing east and west of the current crossing location. Based on the existing site conditions, known stream characteristics, and the information associated with other crossings of Teels Creek, it appears that the riffle-pool complex extends upstream and downstream from the crossing location throughout the study corridor. Accordingly, it does not appear that a shift in the alignment would avoid an impact to the complex. Adjusting the route to the east or west within the study corridor would not eliminate or materially alter the challenges that make a trenchless crossing impracticable. An eastern

adjustment likely would result in impacts to the currently avoided stream S-E33. A western adjustment would move the pipeline closer to residential structures and would require reinstalling the road crossing in a less favorable configuration. Shifting the alignment within the study corridor in this area is not possible without increasing impacts to private properties, public ROW, aquatic systems, and forested habitats.

S-E28-East (Teels Creek – MP 259.4) – Teels Creek extends well beyond the Project limits, flowing north and south of the current crossing location. Based on the existing site conditions, known stream characteristics, and the information associated with other crossings of Teels Creek, it appears that the riffle-pool complex extends upstream and downstream from the crossing location throughout the study corridor. Accordingly, it does not appear that a shift in the alignment would avoid an impact to the complex. A northern adjustment would create impacts to wetland W-E9, which is currently avoided. A southern adjustment would impact stream S-EF2 (which is currently avoided), would create additional forest clearing, and would require sidehill construction. Shifting the alignment within the study corridor in this area is not possible without increasing impacts to private properties, aquatic systems, and forested habitats. A shift would also increase the construction duration in this area. Adjusting the route to the north or south within the study corridor would not eliminate or materially alter the challenges of a trenchless crossing.

S-D23 (Teels Creek – MP 261) – Teels Creek extends well beyond the study corridor, flowing north and south of the currently proposed crossing. Based on the existing site conditions, known stream characteristics, and the information associated with other crossings of Teels Creek, it appears that the riffle-pool complex extends upstream and downstream from the crossing location throughout the study corridor. Accordingly, it does not appear that a shift in the alignment would avoid an impact to the complex. Adjusting upstream or downstream of this crossing would not make a trenchless crossing practicable either – the same limiting factors would still be applicable. A northern adjustment would result in additional impacts to Teels Creek and place the stream parallel to the pipeline. A southern adjustment would also increase impacts to Teels Creek based on the stream's alignment in this area. Shifting the alignment within the study corridor at this location would eliminate the opportunity to stabilize the eroded banks along this portion of Teels Creek. An alignment shift would increase impacts to forested habitat, private properties, aquatic resources, and extend the construction duration

S-CD6 (Little Creek – MP 262.6) – The areas adjacent to the crossing are undeveloped forested land or undisturbed rangeland, with residential structures located north and south of the alignment. Little Creek extends beyond the study corridor, flowing northeast and southwest of the currently proposed crossing. Based on the existing site conditions, known stream characteristics, and field observations, it appears that the riffle-pool complex extends upstream and downstream from the crossing location throughout the study corridor. Accordingly, a shift in the alignment would not avoid an impact to the complex. Adjusting the pipeline upstream or downstream of the current crossing would not make a trenchless practicable crossing. A shift to the north could also result in impacts to the currently unaffected stream S-CD6-Braid and would create a non-perpendicular crossing, while a shift to the south would increase the required bore-pit depth due to the increasing slope. Also, shifting the current alignment would eliminate the opportunity to stabilize the eroded banks along this portion of Little Creek. Shifting the alignment within the study corridor in this area is not possible without increasing impacts to private properties, impacts to forested habitats, and the construction duration.

S-C19 (Maggodee Creek – MP 269.4) – Maggodee Creek extends well beyond the Project limits, flowing to the north and to the south of the current location. Based on the existing site conditions, known stream characteristics, and field observations, it appears that the riffle-pool complex extends upstream and

downstream from the crossing location throughout the study corridor. Accordingly, a shift in the alignment would not avoid an impact to the complex. The steep slopes associated with the crossing extend a significant distance upstream and downstream of the crossing, further complicating the potential for a trenchless crossing or upland avoidance. Adjusting to the north or south of the proposed centerline would not eliminate or materially alter the factors that make a trenchless crossing impracticable at the current location. Shifting the alignment within the study corridor would result in impacts to additional forested habitat and private residential properties, would move the line closer to residences, and may impact a cultural resource site that is in proximity of the crossing.

S-H13 (Harpen Creek – MP 290.5) – Harpen Creek extends well beyond the study corridor, flowing northeast and southwest of the currently proposed crossing. Based on the existing site conditions, known stream characteristics, and field observations, it appears that the riffle-pool complex extends upstream and downstream from the crossing location throughout the study corridor. Accordingly, a shift in the alignment would not avoid an impact to the complex. In addition, a large emergent wetland system is located southeast of the crossing and extends upstream and downstream; shifting in either direction would create additional impacts to this special aquatic site and to Harpen Creek. In addition, shifting to the north may create impacts to stream S-H14, which the existing alignment currently avoids. Shifting the alignment within the study corridor in this area is not possible without increasing impacts to private properties, forested habitats, and increasing the construction duration. Adjusting to the north or south of the proposed centerline would not eliminate or materially alter the factors making a trenchless crossing impracticable at the current location.

S-Q3 (Pole Bridge Branch – MP 296.5) – Pole Bridge Branch extends well beyond the study corridor, flowing northeast and southwest of the currently proposed crossing. Based on the existing site conditions, known stream characteristics, and field observations, it appears that the riffle-pool complex extends upstream and downstream from the crossing location throughout the study corridor. A large forested wetland system is located northwest of the crossing; shifting upstream or downstream would create additional impacts to this special aquatic site, with a northern shift increasing the impacts to the wetland and a southern shift increasing impacts to Pole Bridge Branch and stream S-Q2. Shifting the alignment within the study corridor in this area is not possible without increasing impacts to private properties, forested lands, and extending the construction duration. Adjusting to the north or south of the proposed centerline would not eliminate or materially alter the factors making a trenchless crossing impracticable at the current location.

### **3.2 Proposed Timber Mat Impacts for Proposed Trenchless Crossings and Travel Lanes**

Where routing considerations necessitated crossing a stream, Mountain Valley assumed that the crossing included a special aquatic site and evaluated opportunities to avoid or substantially minimize that impact using a trenchless crossing method. Trenchless crossings avoid the instream impact associated with dewatering the stream and open cutting the streambed. But, in many areas, the right-of-way serves as the travel lane for moving construction equipment and materials. Trenchless crossings do not eliminate the need to move equipment and materials across waterbodies. Timber mat crossings allow equipment to safely cross streams without the impacts to streambed and banks that would be caused if the streams were forded. Instream impacts are not wholly avoided, however, as there typically are minimal impacts associated with installation and removal of timber mats. As stated above, the purpose of a timber mat crossing is to span the stream while avoiding and minimizing impacts to the stream and streambed. The impacts associated with a span are typically limited to the support structures (headers) along the stream's edge and the stream section flowing directly adjacent to the headers. The span does not impact the entire

stream width; impacts are limited to the stream section directly adjacent to the streambank, thereby minimizing impacts to instream habitat, including riffle-pool complexes. In some instances, the headers are located entirely outside of the stream flow, completely avoiding impacts to the instream habitat and riffle-pool complexes.

Stream S-J32 (Big Beaver Creek) has riffle-pool complexes that will be avoided via trenchless methods but will require minor impacts associated with timber mats. Because the impacts to these resources have been avoided to the extent practicable using trenchless crossing methods, there are no other practicable onsite avoidance measures to evaluate. Impacts to the riffle-pool complexes cannot be completely avoided, but they are significantly reduced by employing the same methods that are discussed above – limiting the impacts to the stream section immediately adjacent to the stream bank and avoiding impacts to the entire stream width.

The following streams also contain riffle-pool complexes that will be avoided via trenchless method, but a travel lane is required to maintain access through the Project area. These resources will be spanned, with no fill anticipated within the ordinary highwater mark except for incidental fallback or other minor inadvertent impacts. Mountain Valley has adopted a conservative approach and has included the travel lane in the temporary impacts total to account for potential stream meandering below the span while the crossing is installed and to mitigate for the duration of the temporary crossing.

- S-IJ88 (Bottom Creek)
- S-NN17 (Sinking Creek)
- S-OO6 (Craig Creek)

### **3.3 Proposed Timber Mat Impacts for Travel Lane at a Completed Crossing**

Stream S-IJ10 (Little Creek) – The pipeline crossing below this stream was installed under the Project’s previous Nationwide Permit (NWP) 12 authorization. But in order to maintain access through the Project area, a timber mat crossing of this resource is required. Impacts to the resource will be reduced by limiting the impacts to the stream section immediately adjacent to the stream bank, avoiding impacts to the entire stream width, and restoring the area when the timber mat is no longer needed.

### **3.4 Existing Timber Mat/Travel Lane/Access Road Impacts**

The following resources have existing timber mat/travel lane/access road crossings that were installed under the Project’s previous NWP 12 authorization. Each crossing spans the stream with the impacts being limited to the banks and the stream section immediately adjacent to the banks. The support structures (headers) are typically installed on the banks and extend below the ordinary high water mark. The impacted banks and portion of the stream would be restored once the Project is complete. Mountain Valley has also included these impacts in the Individual Permit application and the supplemental, voluntary *Stream and Wetland Restoration, Monitoring, and Mitigation Framework* (“*Mitigation Framework*”). This will help ensure the crossings’ impacts are of temporary duration, properly restored, and monitored to document the return to its pre-crossing condition.

Because impacts to these resources were previously taken under the NWP 12 authorization, there are no opportunities available to avoid or minimize the impacts (aside from restoring the impacts in accordance with the *Mitigation Framework*).

- S-A100 (Left Fork Holly Creek)
- S-DD3 (Owens Creek)
- S-G4 (Harpen Creek)
- S-C3 (Harpen Creek)

The following resources have existing timber mat/travel lane/access road crossings that were installed under the Project's previous NWP 12 authorization. However, these crossings have been placed outside of the ordinary high water mark. Mountain Valley has adopted a conservative approach and has included these crossings in the temporary impacts total to account for potential stream meandering below the span while the crossing is installed and any incidental impacts and to mitigate for the duration of the temporary crossing. Impacts to riffle-pool complexes are avoided.

- S-J62 (Right Fork Big Elk Creek)
- S-B6a (Indian Run)<sup>2</sup>
- S-J43 (Right Fork Freemans Creek)
- S-J46 (Fink Creek)
- S-G20 (Poplar Camp Creek)
- S-QQ2 (Sinking Creek)

### **3.5 Existing Rock-and-Flume Crossing**

Like the resources listed above, the fill associated with the one rock-and-flume crossing—S-A10a (Little Rockcamp Run)—was installed under the Project's previous NWP 12 authorization. The impacts associated with this stream were included in the Individual Permit application and the supplemental, voluntary *Mitigation Framework*. This will ensure the crossing's impacts are of temporary duration, properly restored, and monitored to document the return to its pre-crossing condition.

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<sup>2</sup> Stream S-B6a (Indian Run) has an existing timber mat and access road crossing.



## References:

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Tonina, D and J.M. Buffington. 2007. Hyporheic exchange in gravel bed rivers with pool-riffle morphology: Laboratory experiments and three-dimensional modeling. *Water Resources Research*

## **Attachment A**



# TETRA TECH

## **Mountain Valley Pipeline Project Riffle-Pool Complex Field Assessment November and December 2021**

In November and December 2021, Tetra Tech conducted field surveys of 59 streams—24 in West Virginia and 35 in Virginia—that were initially identified as potentially containing a riffle-pool complex during the supplemental baseline evaluations. Each identified stream was assessed by a fluvial geomorphologist to determine the stream type, based on specific stream characteristics.

### **Riffle-Pool Complex Identification Method**

The general characteristics of riffle-pool streams, as described by Rosgen (1994) and Montgomery & Buffington (1997),<sup>1</sup> were used to identify candidate streams via a desktop analysis using topographic maps and aerial imagery. These characteristics include a gradient of less than 2%, an oscillating pattern, and water flowing in an unconfined floodplain. However, a desktop analysis is insufficient to determine if a stream is a riffle-pool complex. Thus, candidate streams were visited in the field to evaluate more detailed characteristics to help verify the stream type. More detailed characteristics, recognizable in the field, of riffle-pool complexes include a typical pool-riffle frequency of 5 to 7 channel widths and bed material dominated by gravel and cobble.

The field assessment included use of the Ohio Environmental Protection Agency's Qualitative Habitat Evaluation Index (QHEI) protocol. The QHEI is a more detailed subset of the Rosgen and Montgomery & Buffington classifications. The Rosgen and Montgomery & Buffington classification methods, while including riffle-pool complexes in their schemes, evaluate a broader spectrum of stream channels including channel forms of all gradient ranges, bed material sizes ranges, and various stages of channel evolution that arise throughout the United States. The Ohio QHEI is designed to evaluate a more limited range of stream types, in particular focusing on the quality of habitat provided by riffle-pool complexes. The QHEI identifies the presence, frequency, and depth of pools, glides, riffles, runs, and gravel/cobble substrate and the degree of embeddedness of these features. The QHEI is designed to evaluate streams of the hills and gentle mountains of eastern Ohio, which have a sufficiently similar topographic relief and similar valley forms to the mountains of West Virginia and Virginia to make the protocol valid for use in these areas.

If a stream showed the characteristics of a type different than a riffle-pool complex, then it was identified as that type. Other types typically included step-pool and plane-bed per Montgomery &

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<sup>1</sup> D.R. Montgomery & J.M. Buffington, *Channel-reach Morphology in Mountain Drainage Basins*, 109(5) Geological Society of America Bulletin (1997), available at <https://pubs.geoscienceworld.org/gsa/gsabulletin/article-pdf/109/5/596/3382709/i0016-7606-109-5-596.pdf>; David. L. Rosgen, *A Classification of Natural Rivers*, 22 Catena 169 (1994), available at [https://wildlandhydrology.com/resources/docs/Stream%20Classification/Rosgen\\_1994\\_A\\_Classification\\_of\\_Natural\\_Rivers.pdf/](https://wildlandhydrology.com/resources/docs/Stream%20Classification/Rosgen_1994_A_Classification_of_Natural_Rivers.pdf/).

Buffington. Because the variety of stream channel forms are a continuum, many streams do not fall cleanly into one of the Rosgen or Montgomery & Buffington classes.

Many of the assessed stream reaches were missing one or more of the features that define a riffle-pool complex or had features that were poorly defined. Reaches that exhibited one or more of the following characteristics were classified as “poorly formed riffle-pool complex,” implying that they do not provide the habitat expected of a functioning riffle-pool complex.

- A pool-riffle sequence frequency greater than 7 channel widths,
- Riffles embedded with fine sediment,
- Overly shallow pools,
- Pools not present,
- A lack of coarse material to form riffles,
- Riffles present only due to being forced by large woody debris jams, and
- Pools present only due to scour under large woody debris jams.

In a functioning riffle-pool complex, the riffles are sufficiently free of embedded fine sediment such that benthic macroinvertebrates can find refuge in the spaces between the gravels and cobbles. The pools are sufficiently deep to provide fish habitat during drought conditions. There is sufficient turbulent flow over the riffles to promote oxygenation of the water. Bed substrate is sufficiently stable so that habitats are not changing with every moderate flow event. Sufficient coarse gravel and cobble substrate material are present to create benthic macroinvertebrate home and fish nesting habitats.

### **Continuation of the Channel Form Beyond the Assessment Reach**

In general, assuming that a channel form continues for any distance beyond sight of the assessment reach is speculation – with the degree of confidence decreasing in proportion to the distance from the observed reach. Observed streams may be under the influence of changes in flow and changes in sediment load from upstream land-use impacting features. For example, old defunct mill dams, non-permitted dams, beaver dams, non-permitted heavy machinery operating in the channel, livestock in the channel, broken sewage pipes draining to the stream, channelized reaches, large woody debris jams, trash jams, culverted reaches, hill slopes mass wasted into the channel, rapid grade transitions such as cascade to riffle-pool, and excessive fine sediment loads from tributaries have been encountered during previous projects where the entire stream reach has been assessed over a several mile stream walk. These features typically are not discernable in topographic maps and aerial photos, especially for streams that are obscured by tree canopy. That being said, a review of topographic maps and aerial photos can serve as an indication of whether the channel gradient, channel planform pattern, and land use upstream or downstream of a field verified riffle-pool complex reach are consistent or inconsistent with the conditions of the verified reach within the 125-foot field study corridor (as supplemented by observation of portions of the reach extending outside of but readily visible from the field study corridor). Therefore, consistent, observed features without an indication of impacting land-use features imply the riffle-pool complex within the 300-foot study corridor would be present beyond the assessed reach.

Based supplemental baseline data, the following tables list all the streams that contained a potential riffle-pool complex. The third column confirms the presence of riffle-pool complex or another channel type.

**Table 1: West Virginia Stream Channel Type Assessment**

Stream ID	NHD Stream Name	Channel Type <sup>1</sup>
S-A1a	North Fork Fishing Creek	Poorly formed riffle-pool complex
S-A125	Price Run	Plane bed
S-J62	Right Fork Big Elk Creek	Poorly formed riffle-pool complex
S-J51	Little Tenmile Creek	Plane bed
S-A10a	Little Rockcamp Run	Poorly formed riffle-pool complex
S-B3a	Rockcamp Run	Plane bed
S-B6a TM <sup>2</sup>	Indian Run TM	Poorly formed riffle-pool complex
S-B6a TM <sup>2</sup>	Indian Run TM	Poorly formed riffle-pool complex
S-A111	Laural Run	Plane bed
S-J43	Right Fork Freemans Creek	Poorly formed riffle-pool complex
S-J46	Fink Creek	Riffle-pool complex
S-K43 TM <sup>3</sup>	Cove Lick TM	Plane bed
S-K43 TM <sup>3</sup>	Cove Lick TM	Plane bed
S-H160	Indian Fork	Plane bed
S-L51	Barbecue Run	Step pool
S-L60	Left Fork Knawl Creek	Plane bed
S-LL1	Knawl Creek	Poorly formed riffle-pool complex
S-H132	Little Kanawha River	Plane bed
S-A100	Left Fork Holly River	Riffle-pool complex
S-B34	Amos Run	Step pool
S-E58	Little Glade Run	Plane bed
S-J32	Big Beaver Creek	Riffle-pool complex
S-I36	Hominy Creek	Riffle-pool complex
S-D31	Indian Creek	Plane bed

1 – As determined by the Project's Geomorphologist's field investigations

2 – Stream S-B6a is crossed by a timbermat and an access road.

3 - Stream S-K43TM is crossed by timbermat and an access road.

**Table 2: Virginia Stream Channel Type Assessment**

<b>Stream ID</b>	<b>NHD Stream Name</b>	<b>Channel Type<sup>1</sup></b>
S-CC1	Cherrystone Creek	Step pool
S-G9	UNT to Jonnikin Creek	Step pool
S-D3	UNT to Jonnikin Creek	Plane bed
S-E17	UNT to Blackwater River	Step pool
S-G20	Poplar Camp Creek	Riffle-pool complex
S-II2	Little Creek	Step pool
S-IJ10	Little Creek	Poorly formed riffle-pool complex
S-II4	UNT to North Fork Blackwater River	Plane bed
S-IJ88	Bottom Creek	Riffle-pool complex
S-C21	Bradshaw Creek	Plane bed
S-NN17	Sinking Creek	Riffle-pool complex
S-OO6	Craig Creek	Riffle-pool complex
S-QQ2	Sinking Creek	Poorly formed riffle-pool complex
S-S5	Stony Creek	Plane bed
S-DD3	Owens Creek	Riffle-pool complex
S-CD6	Little Creek	Riffle-pool complex
S-C14	Teels Creek	Plane bed
S-EF12	Teels Creek	Plane bed
S-E28 - East	Teels Creek	Riffle-pool complex
S-E28 - Mid	Teels Creek	Riffle-pool complex
S-E28 - West	Teels Creek	Riffle-pool complex
S-C19	Maggodee Creek	Riffle-pool complex
S-C17	Teels Creek	Embedded reach
S-D22	UNT to Teels Creek	Embedded plane bed
S-D23	Teels Creek	Riffle-pool complex
S-IJ43	Mill Creek	Plane bed
S-RR13	Craig Creek	Step pool
S-G2	Little Cherrystone Creek	Plane bed
S-Q3	Pole Bridge Branch	Riffle-Pool Complex
S-EF26	Little Cherrystone Creek	Plane bed
S-H54	UNT to Little Cherrystone Creek	Step pool
S-G4	Harpen Creek	Riffle-pool complex
S-H13	Harpen Creek	Riffle-pool complex
S-C3	Harpen Creek	Riffle-pool complex
S-C7	UNT to Rocky Creek	Plane bed

1 – As determined by the Project’s Geomorphologist’s field investigations

# Spread A Stream S- A1a

# Wetzel County



Photo Type: Downstream View  
Location: 39.55394, -79.80.54519  
Photo Orientation: E (81 degrees)  
Stream Type: Poorly formed riffle-pool complex



Photo Type: Upstream View  
Location: 39.55402, -80.54509  
Photo Orientation: N (5 degrees)  
Stream Type: Poorly formed riffle-pool complex



Photo Type: Riffle, Upstream  
View Location: 39.50331, -80.53331  
Photo Orientation: NE (62 degrees)  
Stream Type: Plane bed

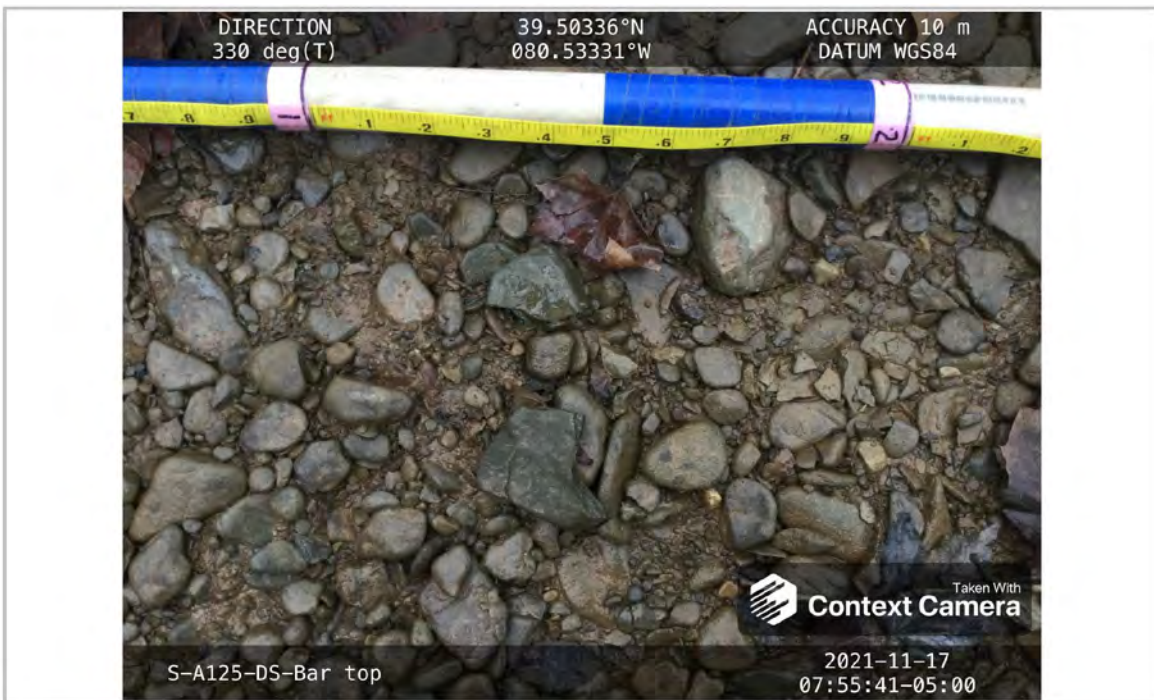


Photo Type: Substrate  
Location: 39.50336, -80.53331  
Photo Orientation: NW (330 degrees)  
Stream Type: Plane bed





Photo Type: Riffle, Upstream View  
Location: 39.44425, -80.48284  
Photo Orientation: N (15 degrees)  
Stream type: Poorly formed riffle-pool complex



Photo Type: Riffle, Upstream View  
Location: 39.44422, -80.48283  
Photo Orientation: N (18 degrees)  
Stream type: Poorly formed riffle-pool complex



Photo Type: Riffle, Upstream View  
Location: 39.44422, -80.48283  
Photo Orientation: N (18 degrees)  
Stream type: Poorly formed riffle-pool complex

# Spread A Stream S- J51

# Harrison County

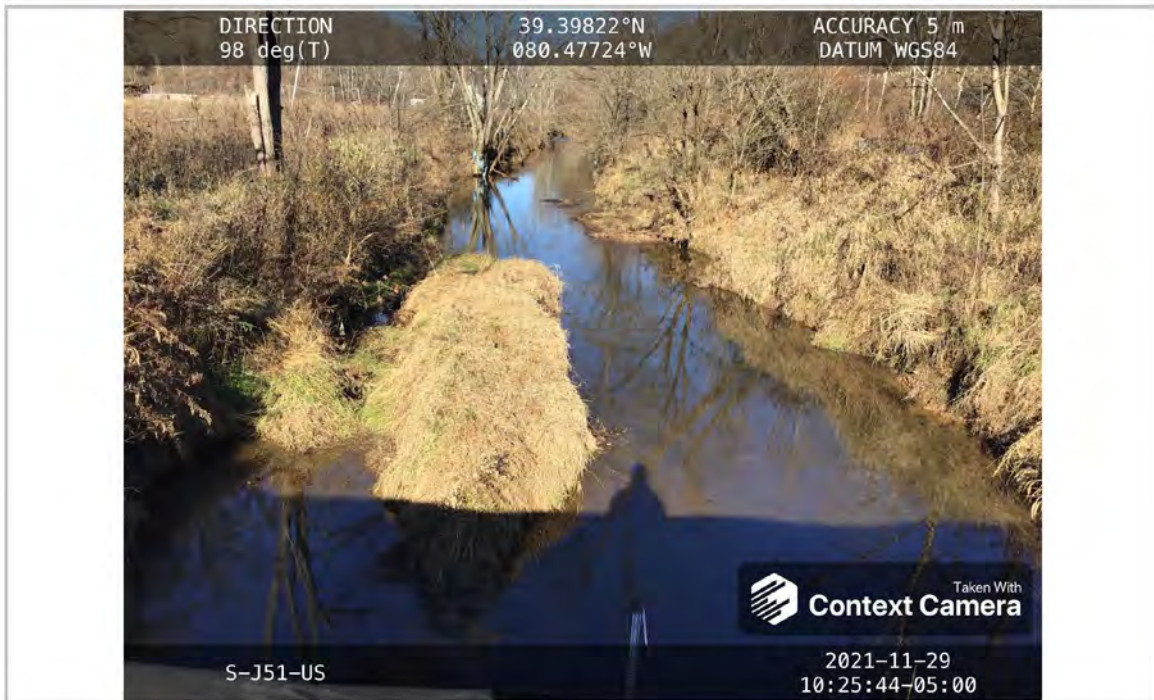


Photo Type: Upstream View  
Location: 39.39822, -80.47724  
Photo Orientation: E (98 degrees)  
Stream Type: Plane bed



Photo Type: Downstream View  
Location: 39.39820, -80.47707  
Photo Orientation: N (340 degrees)  
Stream Type: Plane bed

# Spread A Stream S- A10a

# Harrison County



Photo Type: Downstream View  
Location: 39.37033, -80.48589  
Photo Orientation: S (181 degrees)  
Stream Type: Poorly formed riffle-pool complex



Photo Type: Upstream View  
Location: 39.37024, -80.48542  
Photo Orientation: N (22 degrees)  
Stream Type: Poorly formed riffle-pool complex



Photo Type: Downstream View  
Location: 39.35895, -80.49376  
Photo Orientation: SE (132 degrees)  
Stream Type: Plane bed



Photo Type: Downstream View  
Location: 39.35898, -80.49372  
Photo Orientation: S (173 degrees)  
Stream Type: Plane bed



Photo Type: Upstream View  
Location: 39.31709, -80.52612  
Photo Orientation: SW (224 degrees)  
Stream Type: Poorly formed riffle-pool complex



Photo Type: Upstream View  
Location: 39.31710, -80.52612  
Photo Orientation: SW (233 degrees)  
Stream Type: Poorly formed riffle-pool complex



Photo Type: Downstream View  
Location: 39.31676, -80.52574  
Photo Orientation: S (162 degrees)  
Stream Type: Poorly formed riffle-pool complex

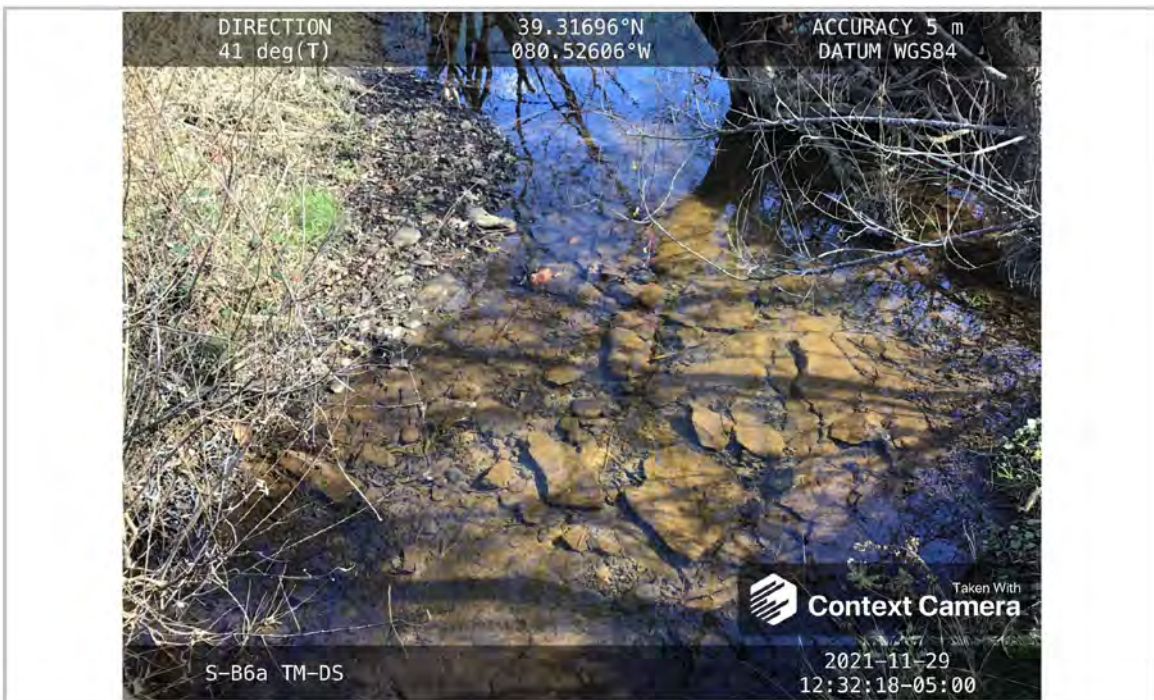


Photo Type: Downstream View  
Location: 39.31696, -80.52606  
Photo Orientation: NE (41 degrees)  
Stream Type: Poorly formed riffle-pool complex

# Spread A Stream S- B6a-TM

# Harrison County



Photo Type: Upstream View  
Location: 39.31724, -80.52717  
Photo Orientation: E (107 degrees)  
Stream Type: Poorly formed riffle-pool complex



Photo Type: Downstream View  
Location: 39.31730, -80.52715  
Photo Orientation: NW (300 degrees)  
Stream Type: Poorly formed riffle-pool complex



# Spread B Stream S- A111

# Doddridge County



Photo Type: Substrate  
Location: 39.20055, -80.55409  
Photo Orientation: NE (59 degrees)  
Stream Type: Plane bed



Photo Type: Downstream View  
Location: 39.20063, -80.55394  
Photo Orientation: SW (244 degrees)  
Stream Type: Plane bed



Photo Type: Substrate  
Location: Unavailable  
Photo Orientation: Unavailable  
Stream type: Poorly formed riffle-pool complex



Photo Type: Upstream View  
Location: 39.12051, -80.58105  
Photo Orientation: W (285 degrees)  
Stream type: Poorly formed riffle-pool complex



Photo Type: Upstream View  
Location: 39.12050, -80.58117  
Photo Orientation: W (277 degrees)  
Stream type: Poorly formed riffle-pool complex

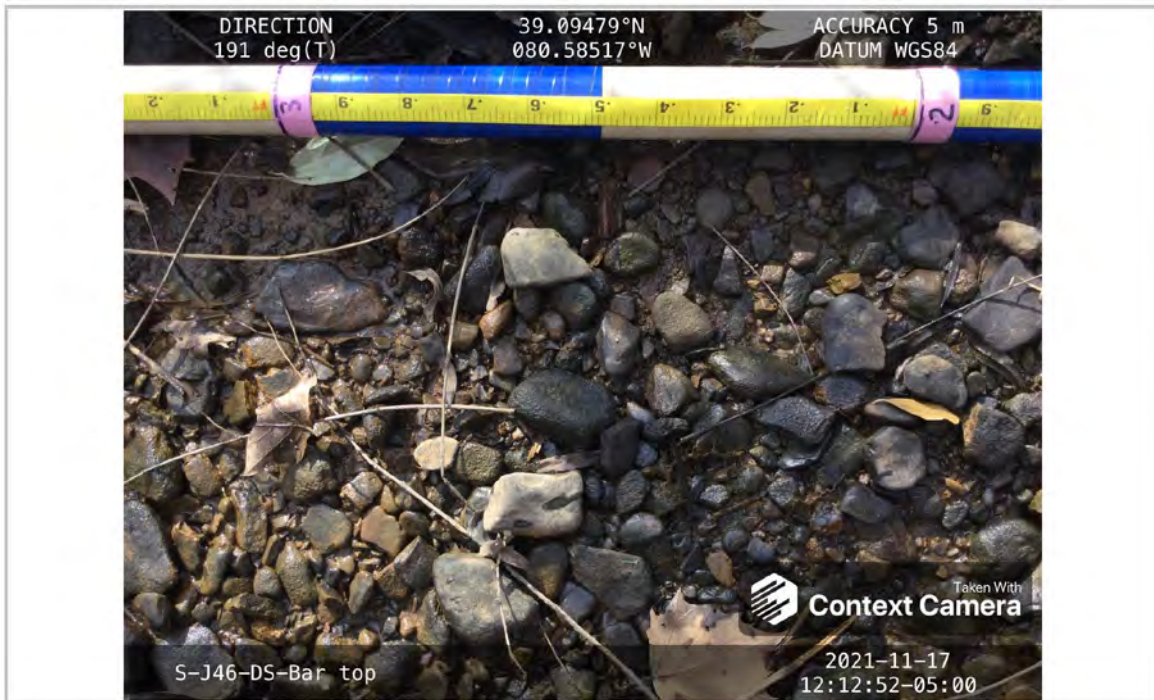


Photo Type: Substrate  
Location: 39.09479, -80.58517  
Photo Orientation: S (191 degrees)  
Stream type: Riffle-pool complex



Photo Type: Upstream View  
Location: 39.09479, -80.58517  
Photo Orientation: E (108 degrees)  
Stream type: Riffle-pool complex

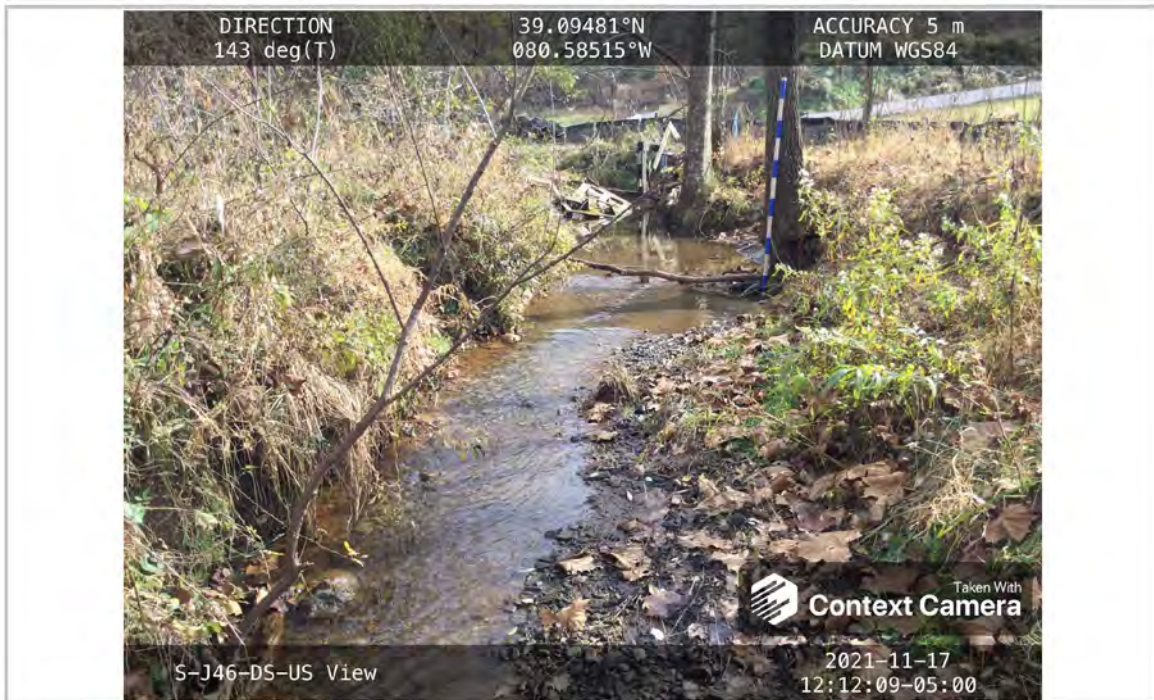


Photo Type: Upstream View  
Location: 39.09481, -80.58515  
Photo Orientation: SE (143 degrees)  
Stream type: Riffle-pool complex

# Spread B Stream S-K43 TM

# Lewis County



Photo Type: Upstream View  
Location: 39.00191, -80.59667  
Photo Orientation: SE (137 degrees)  
Stream Type: Plane bed

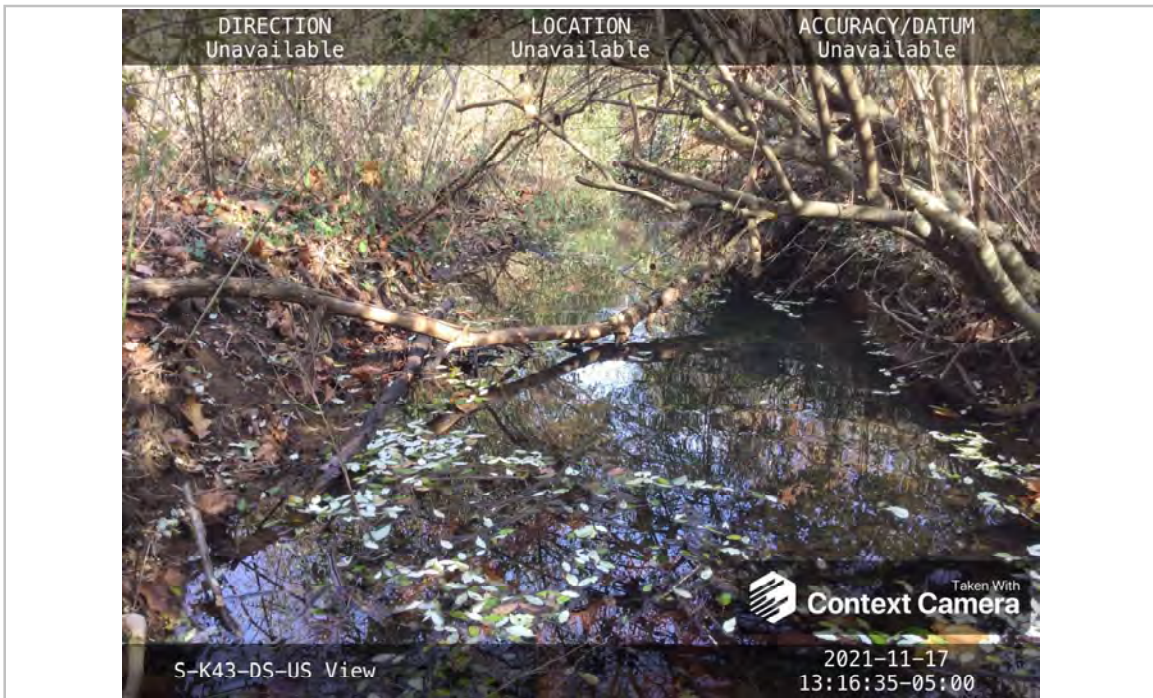


Photo Type: Upstream View  
Location: Unavailable  
Photo Orientation: Unavailable  
Stream Type: Plane bed



Photo Type: Downstream View  
Location: 39.00215, -80.59589  
Photo Orientation: W (253 degrees)  
Stream Type: Plane bed



Photo Type: Downstream View  
Location: 39.00213, -80.59586  
Photo Orientation: W (271 degrees)  
Stream Type: Plane bed



Photo Type: Upstream View  
Location: 39.00210, -80.59584  
Photo Orientation: E (109 degrees)  
Stream Type: Plane bed



Photo Type: Upstream View  
Location: 39.00208, -80.59579  
Photo Orientation: S (168 degrees)  
Stream Type: Plane bed



# Spread B Stream S- H160

# Lewis County

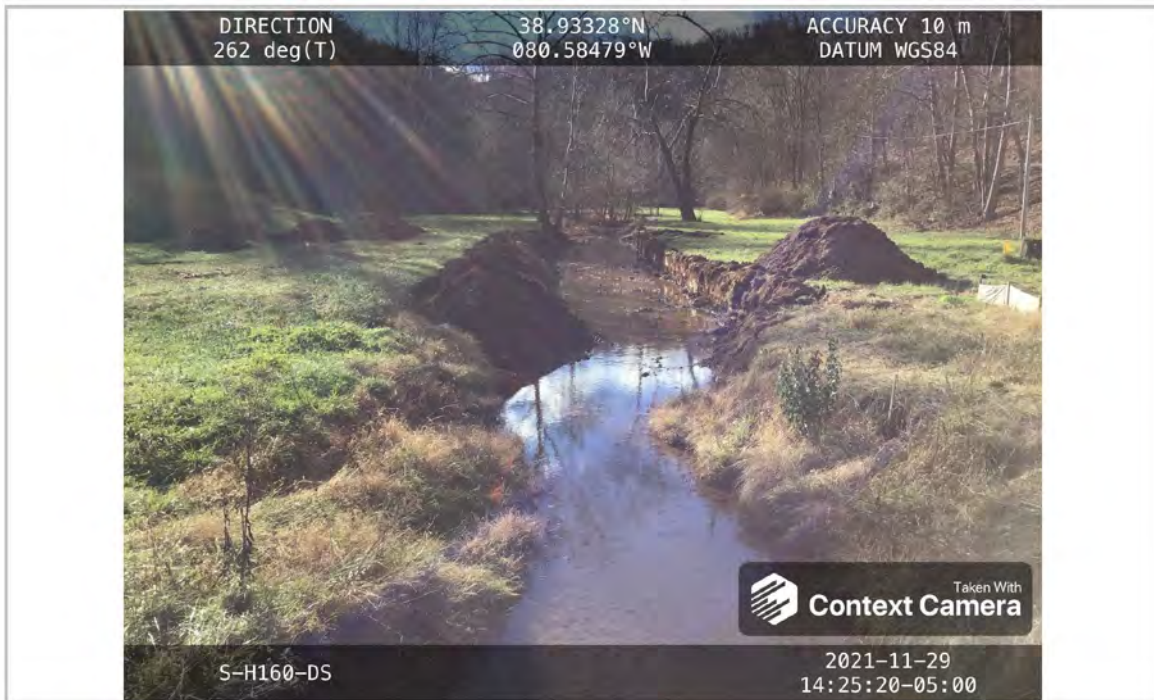


Photo Type: Downstream View  
Location: 38.93328, -80.58479  
Photo Orientation: W (262 degrees)  
Stream Type: Plane bed  
Notes: Earth disturbance not associated with the MVP Project



Photo Type: Downstream View  
Location: 38.93331, -80.58492  
Photo Orientation: W (252 degrees)  
Stream Type: Plane bed  
Notes: Earth disturbance not associated with the MVP Project

# Spread C Stream S- L51

# Braxton County



Photo Type: Upstream View  
Location: 38.83888, -80.52057  
Photo Orientation: N (1 degree)  
Stream Type: Step pool



Photo Type: Upstream View  
Location: 38.83920, -80.52005  
Photo Orientation: N (13 degrees)  
Stream Type: Step pool

# Spread C Stream S- L60

# Braxton County



Photo Type: Downstream View  
Location: 38.82410, -80.52506  
Photo Orientation: SE (139 degrees)  
Stream type: Plane bed



Photo Type: Downstream View  
Location: 38.82406, -80.52507  
Photo Orientation: SE (147 degrees)  
Stream type: Plane bed



Photo Type: Downstream View  
Location: 38.82402, -80.52511  
Photo Orientation: S (171 degrees)  
Stream type: Plane bed



Photo Type: Downstream View  
Location: 38.82402, -80.52511  
Photo Orientation: SW (208 degrees)  
Stream type: Plane bed



Photo Type: Downstream View  
Location: 38.82417, -80.52515  
Photo Orientation: NW (314 degrees)  
Stream type: Plane bed  
Notes: Tires and instream debris not associated with the MVP Project



Photo Type: Downstream View  
Location: 38.82409, -80.52528  
Photo Orientation: W (275 degrees)  
Stream type: Plane bed  
Notes: Tires and instream debris not associated with the MVP Project



Photo Type: Downstream View  
Location: 38.82359, -80.52537  
Photo Orientation: SE (147 degrees)  
Stream type: Poorly formed riffle-pool complex



Photo Type: Downstream View  
Location: 38.82366, -80.52541  
Photo Orientation: SE (149 degrees)  
Stream type: Poorly formed riffle-pool complex



Photo Type: Downstream View  
Location: 38.82362, -80.52528  
Photo Orientation: NE (51 degrees)  
Stream type: Poorly formed riffle-pool complex



Photo Type: Downstream View  
Location: 38.82362, -80.52530  
Photo Orientation: SE (120 degrees)  
Stream type: Poorly formed riffle-pool complex



Photo Type: Upstream View  
Location: 38.75148, -80.51483  
Photo Orientation: S (175 degrees)  
Stream type: Plane bed



Photo Type: Upstream View  
Location: 38.75147, -80.51484  
Photo Orientation: SW (203 degrees)  
Stream type: Plane bed





Photo Type: Upstream View  
Location: 38.75152, -80.51480  
Photo Orientation: S (180 degrees)  
Stream type: Plane bed



Photo Type: Downstream View  
Location: 38.67667, -80.47793  
Photo Orientation: S (180 degrees)  
Stream type: Riffle-pool complex

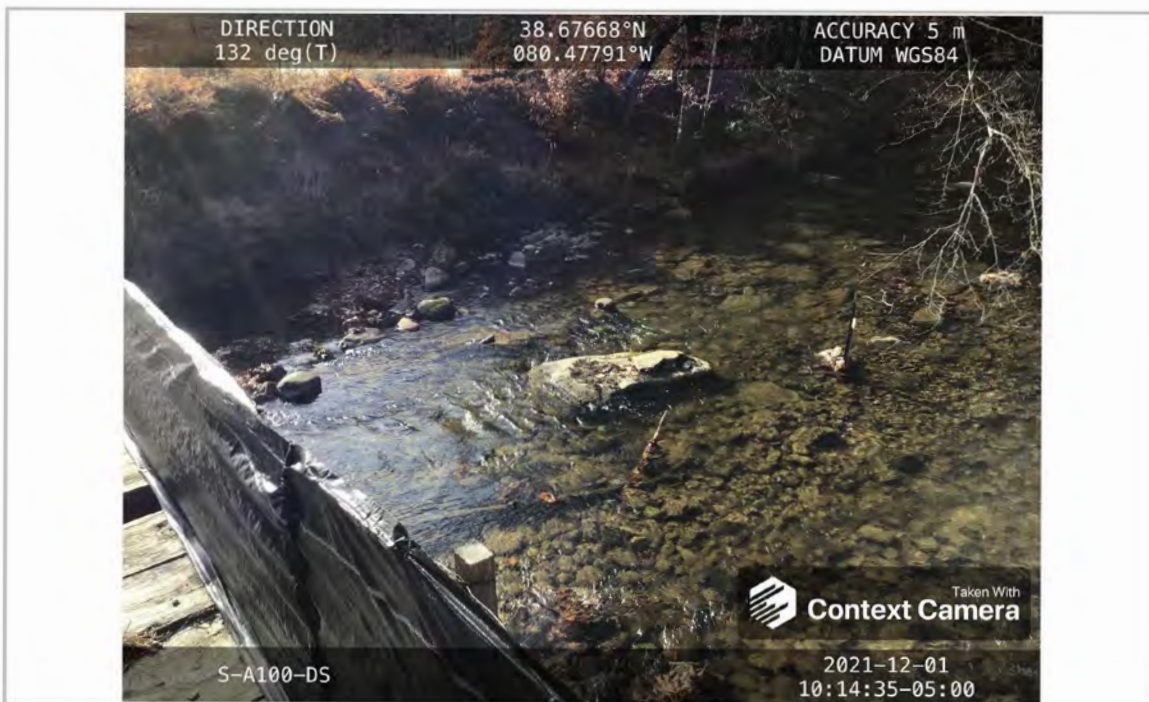


Photo Type: Downstream View  
Location: 38.67668, -80.47791  
Photo Orientation: SE (132 degrees)  
Stream type: Riffle-pool complex



Photo Type: Downstream View  
Location: 38.67665, -80.47783  
Photo Orientation: S (182 degrees)  
Stream type: Riffle-pool complex



Photo Type: Downstream View  
Location: 38.67666, -80.47784  
Photo Orientation: SW (234 degrees)  
Stream type: Riffle-pool complex



Photo Type: Substrate  
Location: 38.49387, -80.56133  
Photo Orientation: S (177 degrees)  
Stream type: Step pool

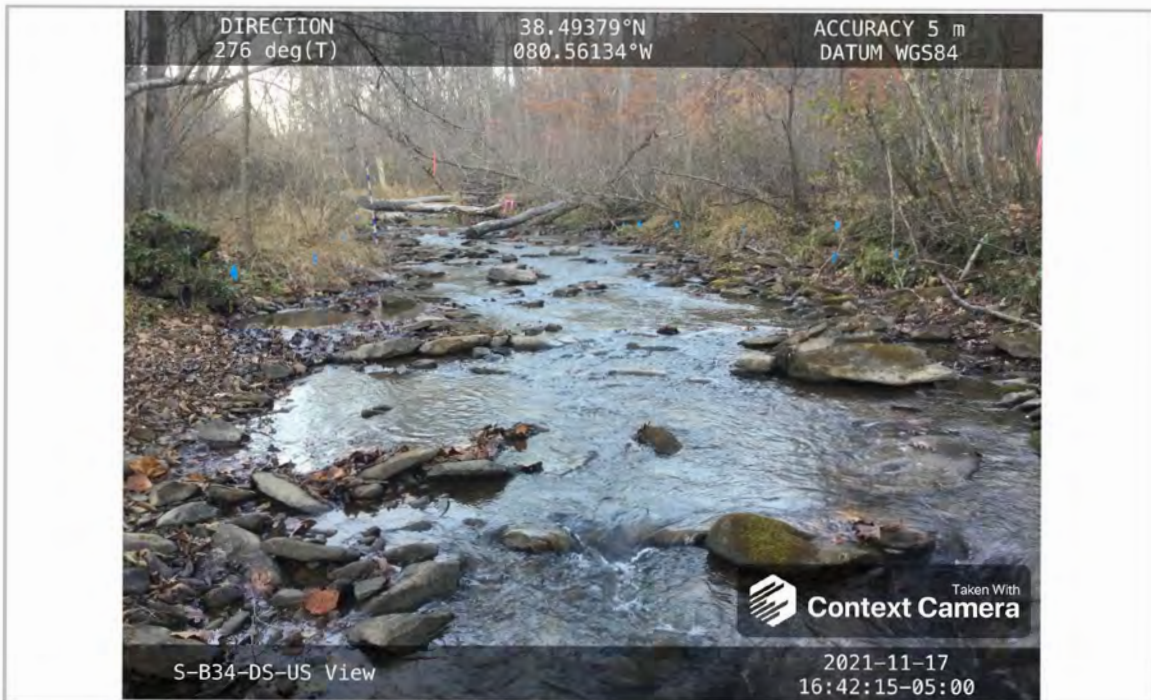


Photo Type: Upstream View  
Location: 38.49379, -80.56134  
Photo Orientation: W (276 degrees)  
Stream type: Step pool



Photo Type: Upstream View  
Location: 38.49379, -80.56134  
Photo Orientation: W (277 degrees)  
Stream type: Step pool



Photo Type: Upstream View  
Location: 38.44358, -80.55188  
Photo Orientation: N (353 degrees)  
Stream Type: Plane bed



Photo Type: Downstream View  
Location: 38.33175, -80.67051  
Photo Orientation: E (101 degrees)  
Stream type: Riffle-pool complex



Photo Type: Downstream View  
Location: 38.33175, -80.67051  
Photo Orientation: E (79 degrees)  
Stream type: Riffle-pool complex



Photo Type: Downstream View  
Location: 38.33182, -80.67044  
Photo Orientation: NE (66 degrees)  
Stream type: Riffle-pool complex



Photo Type: Downstream View  
Location: 38.33182, -80.67041  
Photo Orientation: E (85 degrees)  
Stream type: Riffle-pool complex





Photo Type: Downstream View  
Location: 37.55414, -80.71088  
Photo Orientation: SE (142 degrees)  
Stream Type: Plane bed



Photo Type: Downstream View  
Location: 36.89393, -79.44573  
Photo Orientation: S (176 degrees)  
Stream Type: Step pool

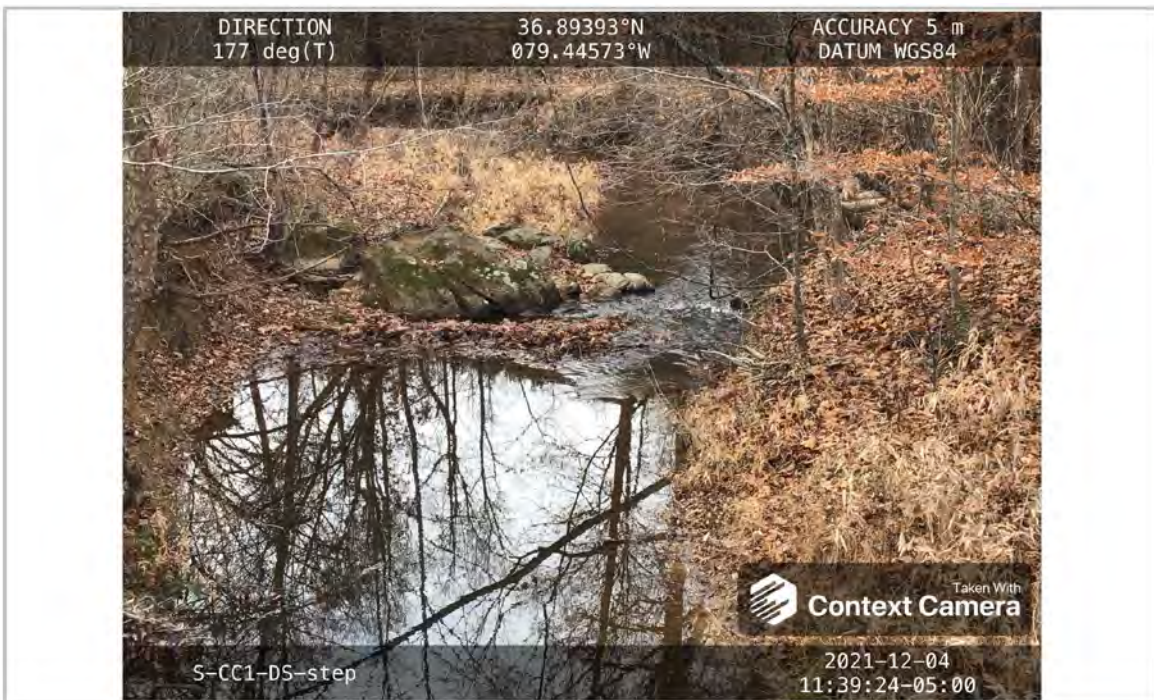


Photo Type: Downstream View  
Location: 36.89393, -79.44573  
Photo Orientation: S (177 degrees)  
Stream Type: Step pool



Photo Type: Downstream View  
Location: 36.95930, -79.58651  
Photo Orientation: S (168 degrees)  
Stream type: Step pool



Photo Type: Upstream View  
Location: 36.95947, -79.58637  
Photo Orientation: NE (43 degrees)  
Stream type: Step pool



Photo Type: Upstream View  
Location: 36.96560, -79.60554  
Photo Orientation: N (358 degrees)  
Stream Type: Plane bed



Photo Type: Downstream View  
Location: 36.96558, -79.60549  
Photo Orientation: S (169 degrees)  
Stream Type: Plane bed



Photo Type: Downstream View  
Location: 37.00047, -79.74285  
Photo Orientation: SE (138 degrees)  
Stream type: Step pool



Photo Type: Upstream View  
Location: 37.00047, -79.74292  
Photo Orientation: NW (303 degrees)  
Stream type: Step pool



Photo Type: Downstream View  
Location: 37.01737, -79.75990  
Photo Orientation: NE (49 degrees)  
Stream type: Riffle-pool complex

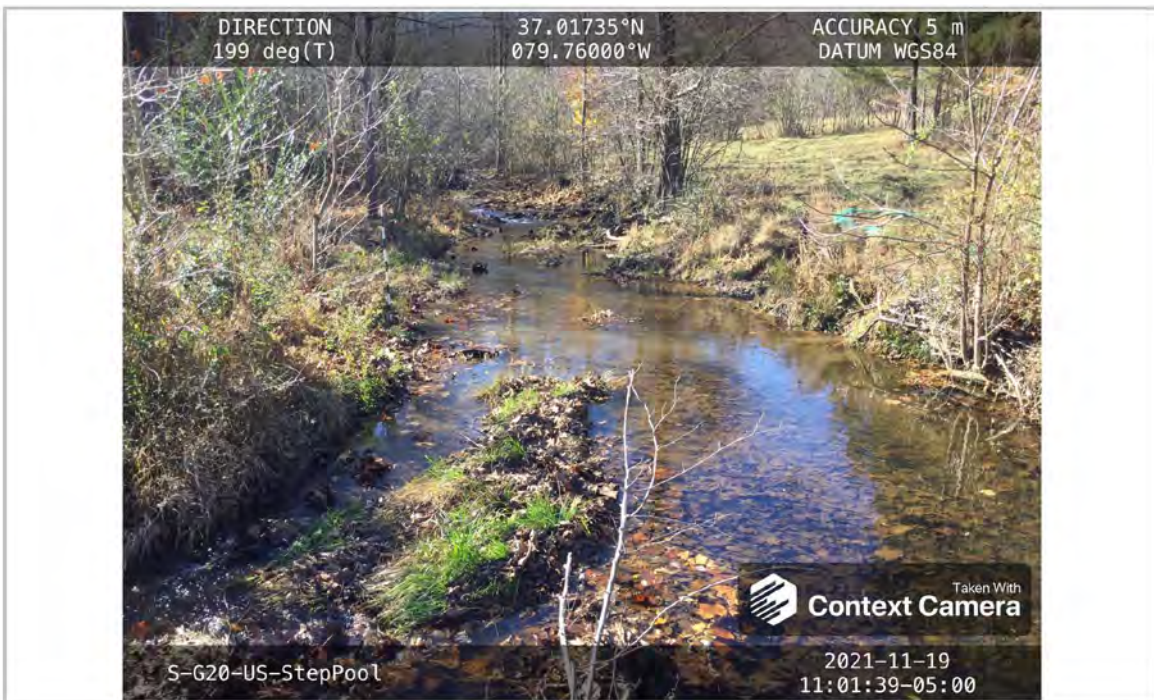


Photo Type: Upstream View  
Location: 37.01735, -79.76000  
Photo Orientation: S (199 degrees)  
Stream type: Riffle-pool complex



Photo Type: Downstream View  
Location: 37.04916, -79.90859  
Photo Orientation: NE (58 degrees)  
Stream type: Step pool



Photo Type: Upstream View  
Location: 37.04921, -79.90859  
Photo Orientation: W (248 degrees)  
Stream type: Step pool

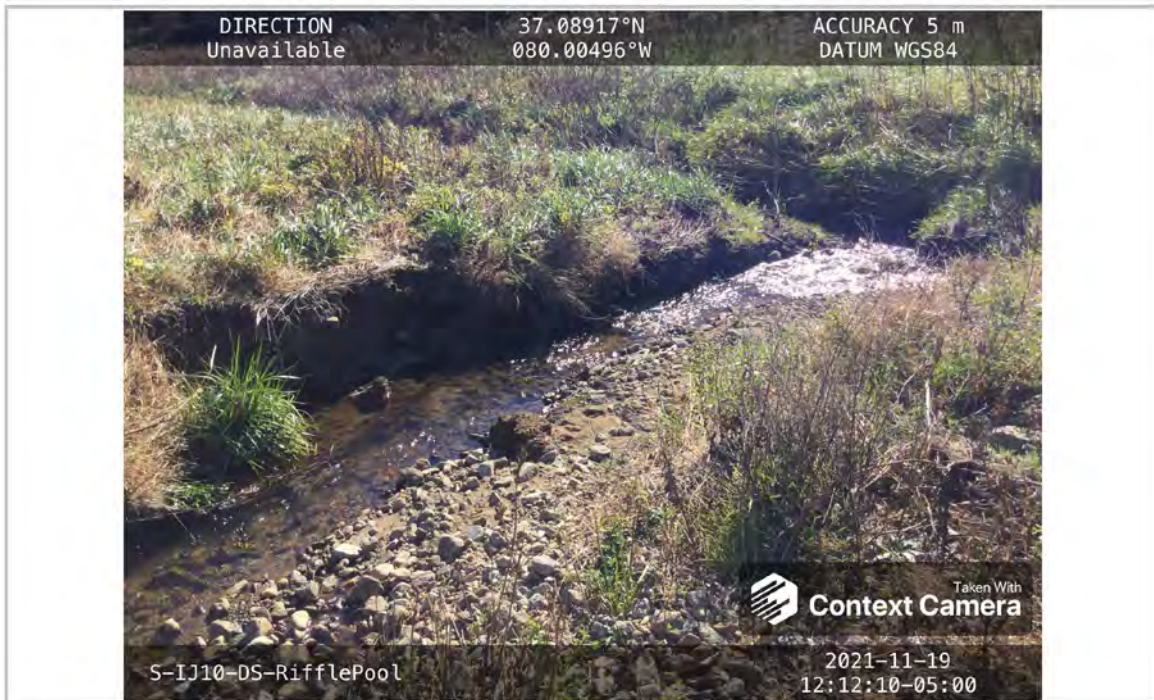


Photo Type: Downstream View  
Location: 37.08917, -80.00496  
Photo Orientation: Unavailable  
Stream type: Poorly formed riffle-pool complex



Photo Type: Upstream View  
Location: 37.08914, -80.00495  
Photo Orientation: NW (297 degrees)  
Stream type: Poorly formed riffle-pool complex





Photo Type: Downstream View  
Location: 37.11559, -80.06033  
Photo Orientation: S (158 degrees)  
Stream type: Plane bed



Photo Type: Upstream View  
Location: 37.11561, -80.06028  
Photo Orientation: NW (336 degrees)  
Stream type: Plane bed



Photo Type: Downstream View  
Location: 37.16846, -80.13820  
Photo Orientation: SW (246 degrees)  
Stream type: Riffle-pool complex



Photo Type: Upstream View  
Location: 37.16843, -80.13821  
Photo Orientation: E (78 degrees)  
Stream type: Riffle-pool complex



Photo Type: Downstream View  
Location: 37.25184, -80.25908  
Photo Orientation: S (189 degrees)  
Stream type: Plane bed



Photo Type: Upstream View  
Location: 37.25187, -80.25909  
Photo Orientation: N (9 degrees)  
Stream type: Plane bed

# Spread G Stream S- NN17

# Giles County

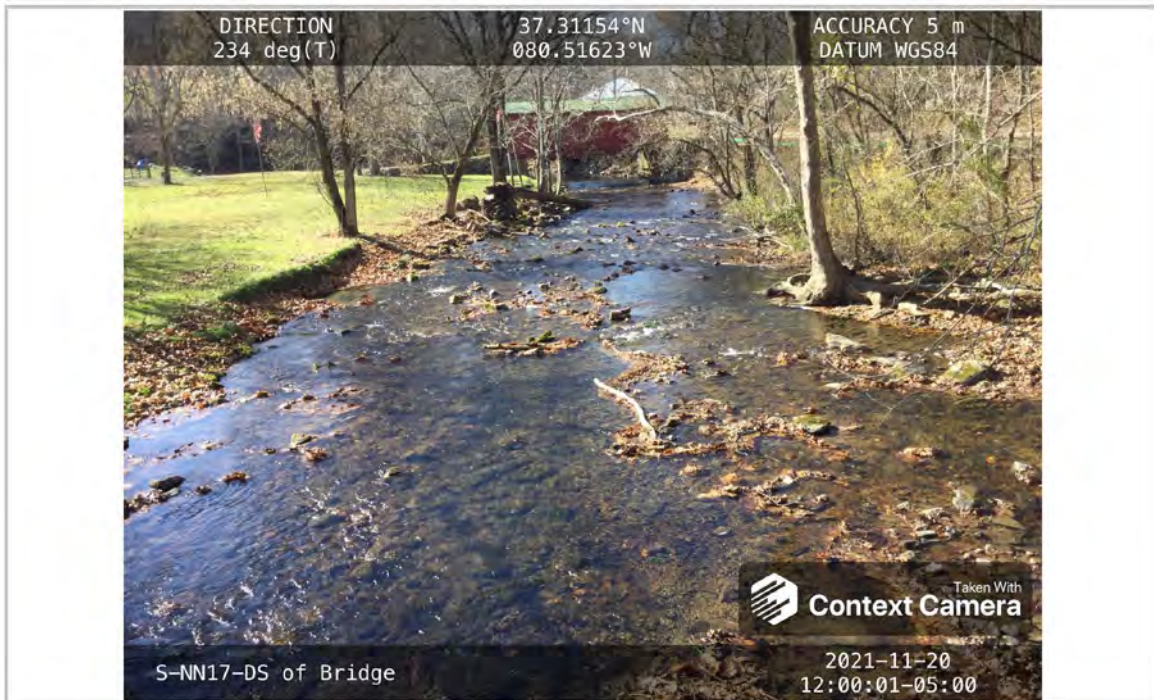


Photo Type: Downstream View  
Location: 37.31154, -80.51623  
Photo Orientation: SW (234 degrees)  
Stream type: Riffle-pool complex



Photo Type: Upstream View  
Location: 37.31160, -80.51607  
Photo Orientation: E (80 degrees)  
Stream type: Riffle-pool complex



Photo Type: Downstream View  
Location: 37.31358, -80.40464  
Photo Orientation: N (21 degrees)  
Stream type: Riffle-pool complex

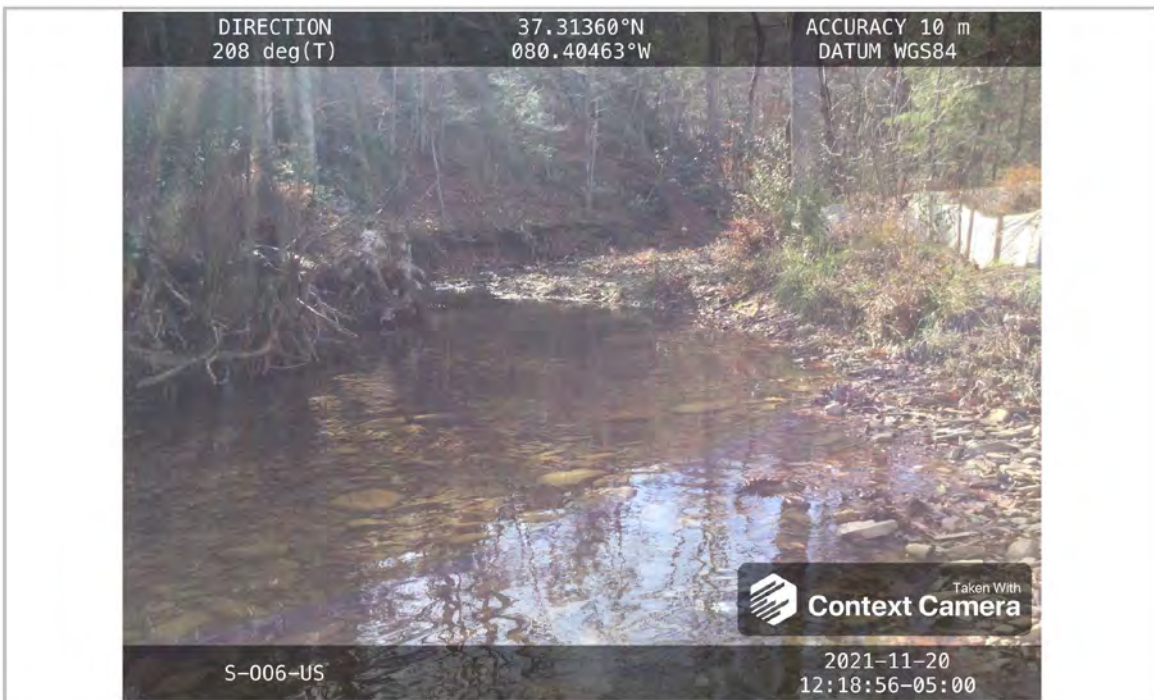


Photo Type: Upstream View  
Location: 37.31360, -80.40463  
Photo Orientation: SW (208 degrees)  
Stream type: Riffle-pool complex

# Spread G Stream S- QQ2

# Craig County



Photo Type: Downstream View  
Location: 37.33318, -80.42950  
Photo Orientation: W (268 degrees)  
Stream type: Poorly formed riffle-pool complex

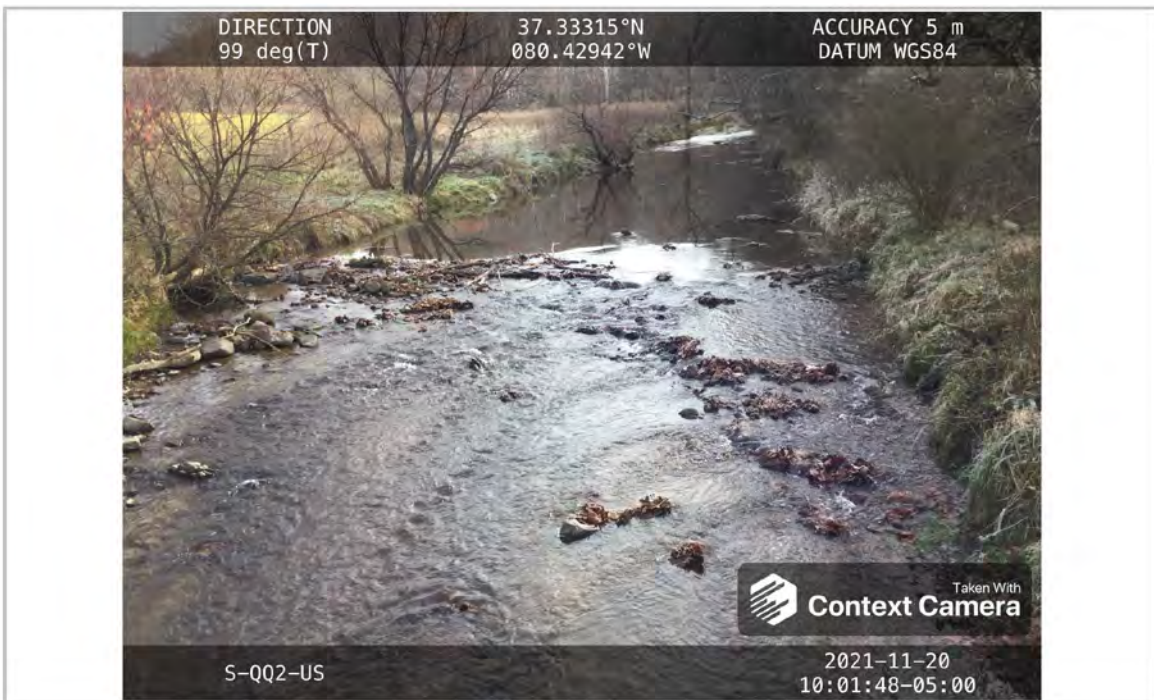


Photo Type: Upstream View  
Location: 37.33315, -80.42942  
Photo Orientation: E (99 degrees)  
Stream type: Poorly formed riffle-pool complex

# Spread G Stream S- S5

# Giles County

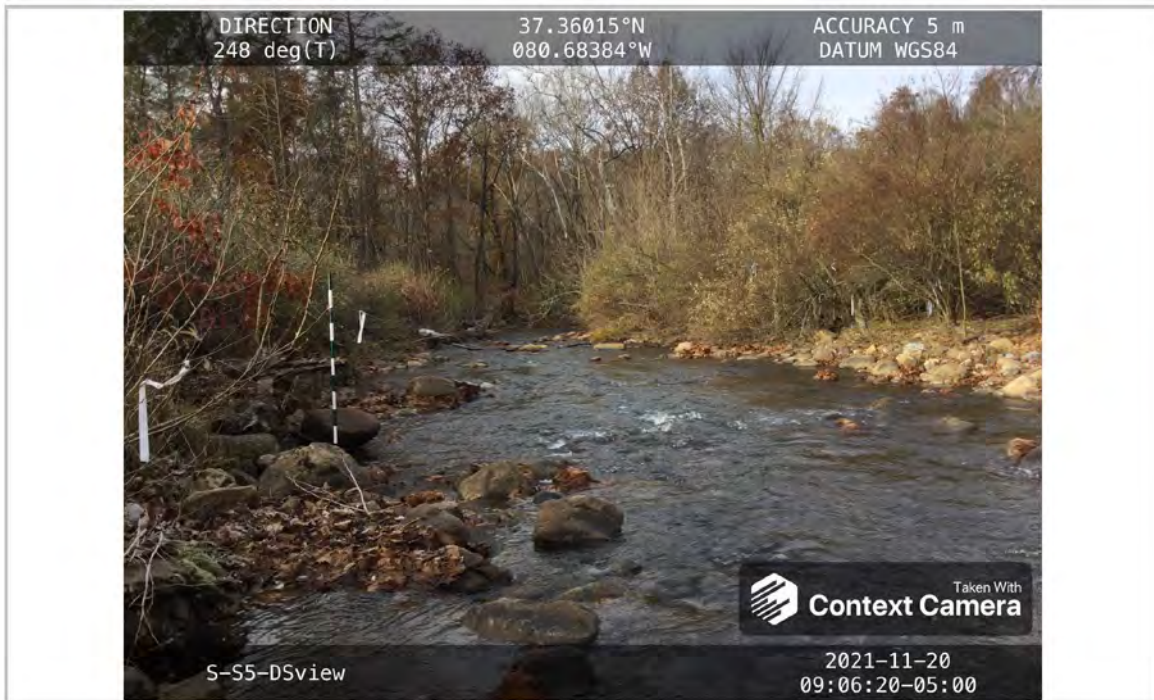


Photo Type: Downstream View  
Location: 37.36015, -80.68384  
Photo Orientation: W (248 degrees)  
Stream type: Plane bed

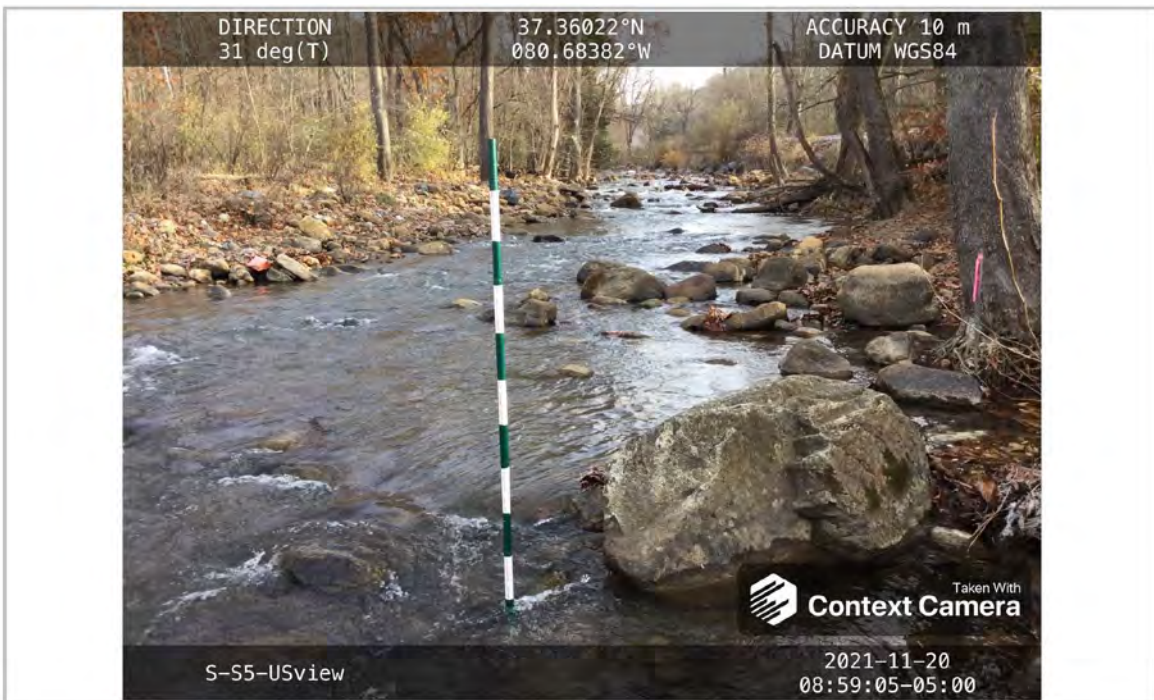


Photo Type: Upstream View  
Location: 37.36022, -80.68382  
Photo Orientation: NE (31 degrees)  
Stream type: Plane bed

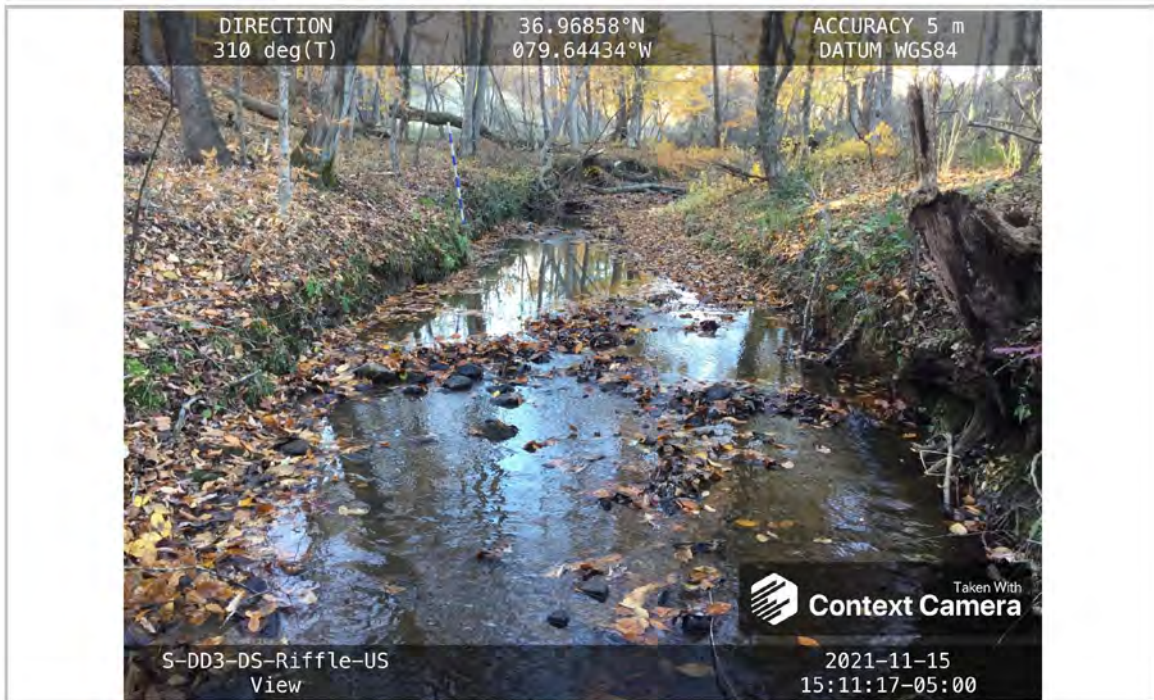


Photo Type: Riffle, Upstream View  
Location: 36.96858, -79.64434  
Photo Orientation: NW (310 degrees)  
Stream type: Riffle-pool complex



Photo Type: Substrate  
Location: 36.96871, -79.64429  
Photo Orientation: NE (30 degrees)  
Stream type: Riffle-pool complex





Photo Type: Riffle, Upstream View  
Location: 37.05780, -79.91349  
Photo Orientation: W (273 degrees)  
Stream type: Riffle-pool complex



Photo Type: Substrate  
Location: 37.05766, -79.91369  
Photo Orientation: NE (54 degrees)  
Stream type: Riffle-pool complex



Photo Type: Substrate

Location: 37.05783, -79.91351

Photo Orientation: NE (62 degrees)

Stream type: Riffle-pool complex



Photo Type: Downstream View  
Location: 37.06388, -79.92184  
Photo Orientation: S (157 degrees)  
Stream type: Plane bed

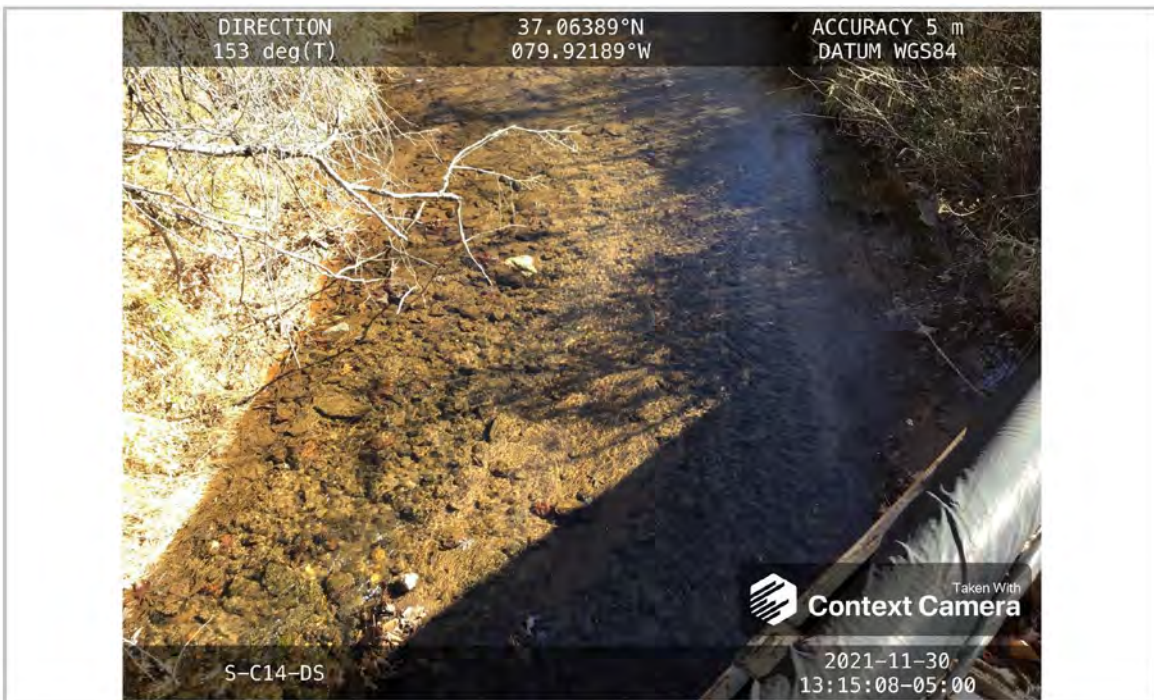


Photo Type: Downstream View  
Location: 37.06389, -79.92189  
Photo Orientation: SE (153 degrees)  
Stream type: Plane bed



Photo Type: Riffle, Upstream View  
Location: 37.07332, -79.94017  
Photo Orientation: W (291 degrees)  
Stream type: Plane bed



Photo Type: Substrate  
Location: 37.07334, -79.94024  
Photo Orientation: NE (43 degrees)  
Stream type: Plane bed

# Spread I Stream S-E28 East

# Franklin County



Photo Type: Downstream View  
Location: 37.08292, -79.94564  
Photo Orientation: SE (135 degrees)  
Stream type: Riffle-pool complex



Photo Type: Upstream View  
Location: 37.08277, -79.94555  
Photo Orientation: NW (336 degrees)  
Stream type: Riffle-pool complex



Photo Type: Riffle, Upstream View  
Location: 37.08522, -79.94866 Photo  
Photo Orientation: NW (336 degrees)  
Stream type: Riffle-pool complex



Photo Type: Substrate  
Location: 37.08548, -79.94867  
Photo Orientation: NE (33 degrees)  
Stream type: Riffle-pool complex

# Spread I Stream S-E28 West

# Franklin County

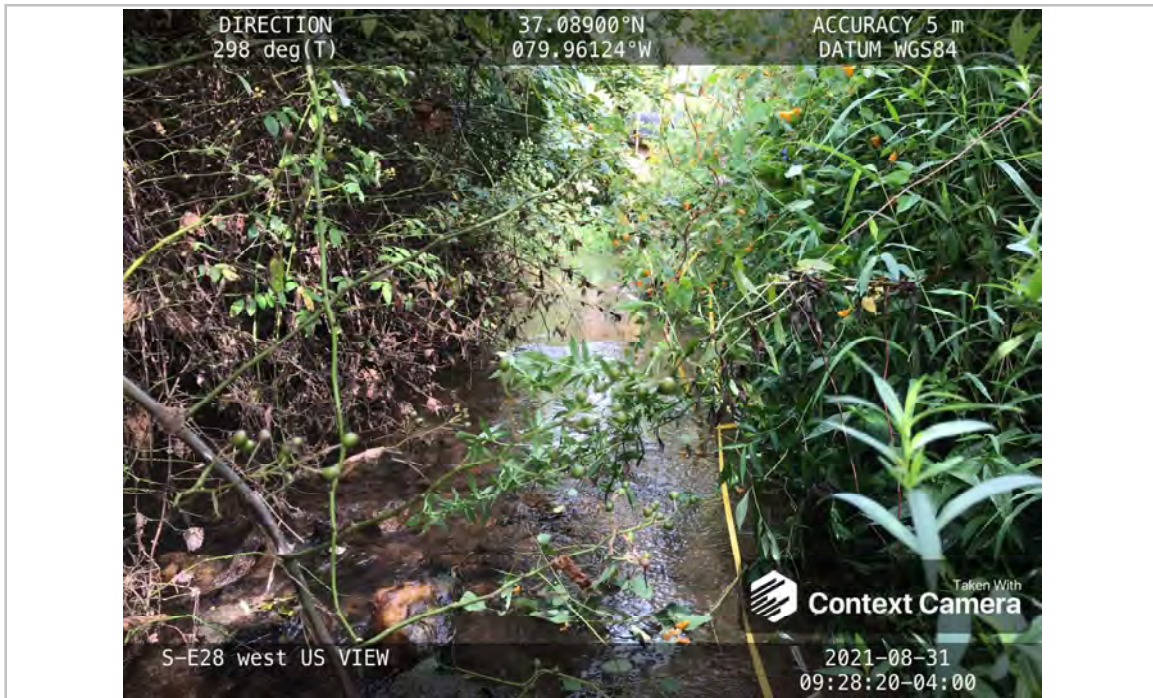


Photo Type: Upstream View  
Location: 37.08900, -79.96124  
Photo Orientation: NW (298 degrees)  
Stream type: Riffle-pool complex



Photo Type: Downstream View  
Location: 37.08902, -79.96124  
Photo Orientation: SE (124 degrees)  
Stream type: Riffle-pool complex



Photo Type: Upstream View  
Location: 37.05646, -79.82983  
Photo Orientation: N (14 degrees)  
Stream type: Riffle-pool complex



Photo Type: Substrate  
Location: 37.05476, -79.82983  
Photo Orientation: SW (241 degrees)  
Stream type: Riffle-pool complex



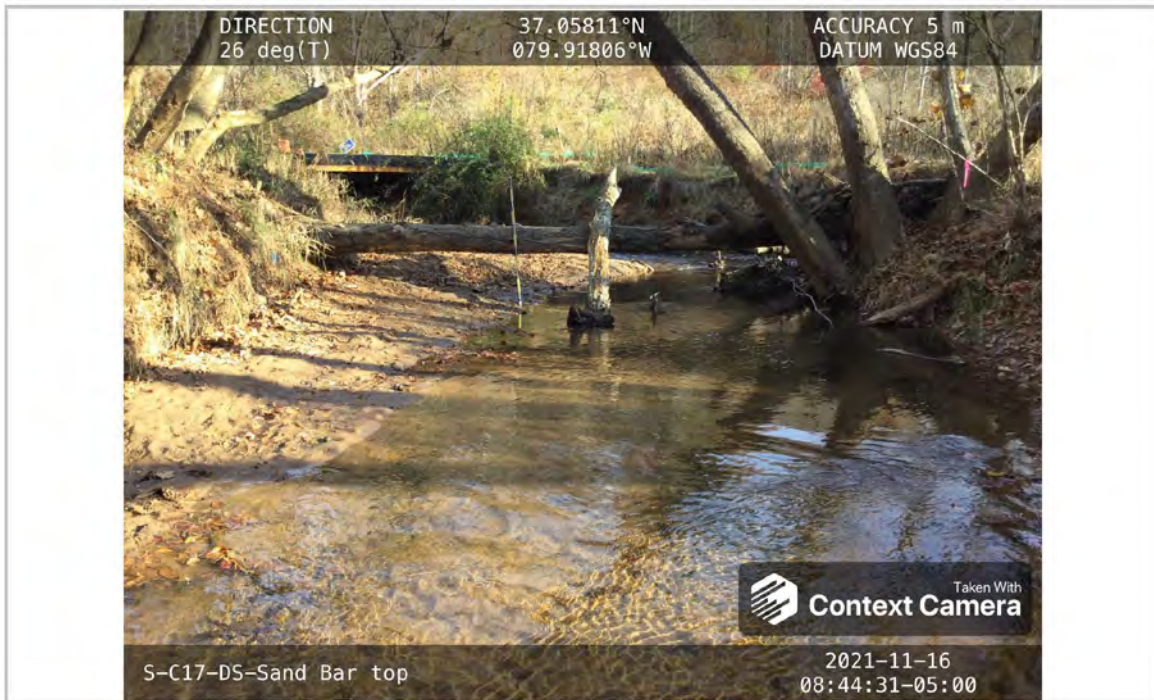


Photo Type: Upstream View  
Location: 37.05811, -79.91806  
Photo Orientation: NE (26 degrees)  
Stream type: Embedded reach



Photo Type: Riffle, Upstream View  
Location: 37.05797, -79.91785  
Photo Orientation: NE (61 degrees)  
Stream type: Embedded reach



Photo Type: Substrate  
Location: 37.05823, -79.91803  
Photo Orientation: North (17 degrees)  
Stream type: Embedded reach



Photo Type: Substrate  
Location: 37.05808, -79.91762  
Photo Orientation: E (69 degrees)  
Stream type: Embedded reach



Photo Type: Riffle, Upstream View  
Location: 37.06997, -79.92988  
Photo Orientation: NE (48 degrees)  
Stream type: Embedded plane bed



Photo Type: Substrate  
Location: 37.06998, -79.92984  
Photo Orientation: SE (114 degrees)  
Stream type: Embedded plane bed



Photo Type: Riffle, Upstream  
View Location: 37.06931, -79.93105  
Photo Orientation: N (3 degrees)  
Stream type: Riffle-pool complex

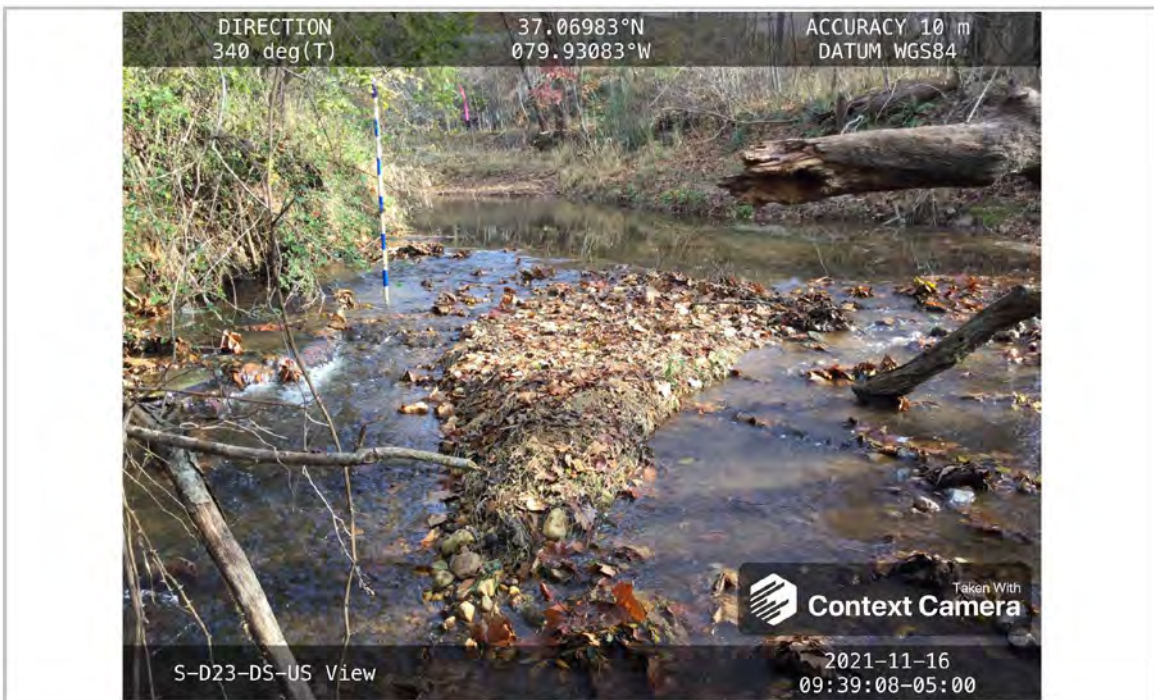


Photo Type: Upstream View  
Location: 37.06983, -79.93083  
Photo Orientation: N (340 degrees)  
Stream type: Riffle-pool complex



Photo Type: Upstream View  
Location: 37.13843, -80.14010  
Photo Orientation: S (185 degrees)  
Stream type: Plane bed

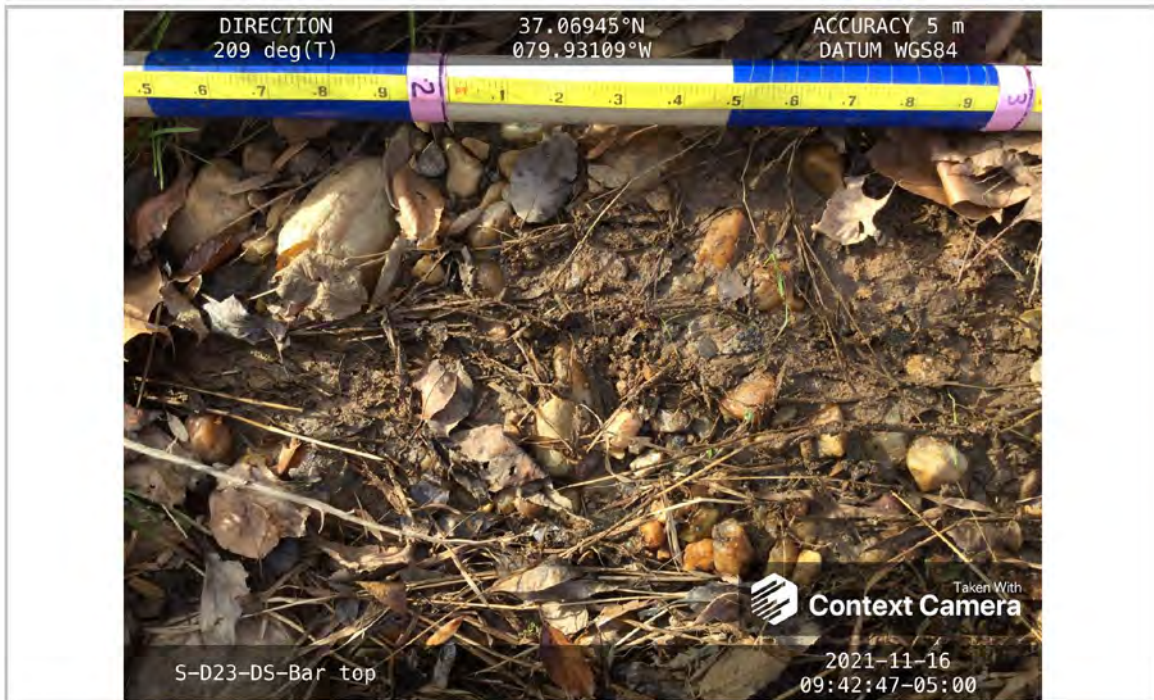


Photo Type: Substrate  
Location: 37.06945, -79.93109  
Photo Orientation: SW (209 degrees)  
Stream type: Riffle-pool complex



Photo Type: Substrate  
Location: 36.06954, -79.93122  
Photo Orientation: N (17 degrees)  
Stream type: Riffle-pool complex



Photo Type: Riffle, Upstream View  
Location: 37.31496, -80.40217  
Photo Orientation: S (197 degrees)  
Stream type: Step pool



Photo Type: Substrate  
Location: 37.31472, -80.40242  
Photo Orientation: NW (301 degrees)  
Stream type: Step pool



Photo Type: Substrate

Location: 37.31493, -80.40223

Photo Orientation: SE (133 degrees)

Stream type: Step pool





Photo Type: Upstream View  
Location: 36.85201, -79.38535  
Photo Orientation: W (278 degrees)  
Stream type: Plane bed



Photo Type: Substrate  
Location: 36.85198, -79.38540  
Photo Orientation: S (177 degrees)  
Stream type: Plane bed



Photo Type: Upstream View  
Location: 36.88417, -79.42835  
Photo Orientation: NE (24 degrees)  
Stream type: Riffle-pool complex



Photo Type: Substrate  
Location: 36.88422, -79.42826  
Photo Orientation: W (265 degrees)  
Stream type: Riffle-pool complex



Photo Type: Riffle, Upstream View  
Location: 36.82784, -79.34950  
Photo Orientation: NW (298 degrees)  
Stream type: Plane bed



Photo Type: Upstream View  
Location: 36.82796, -79.34961  
Photo Orientation: N (359 degrees)  
Stream type: Plane bed

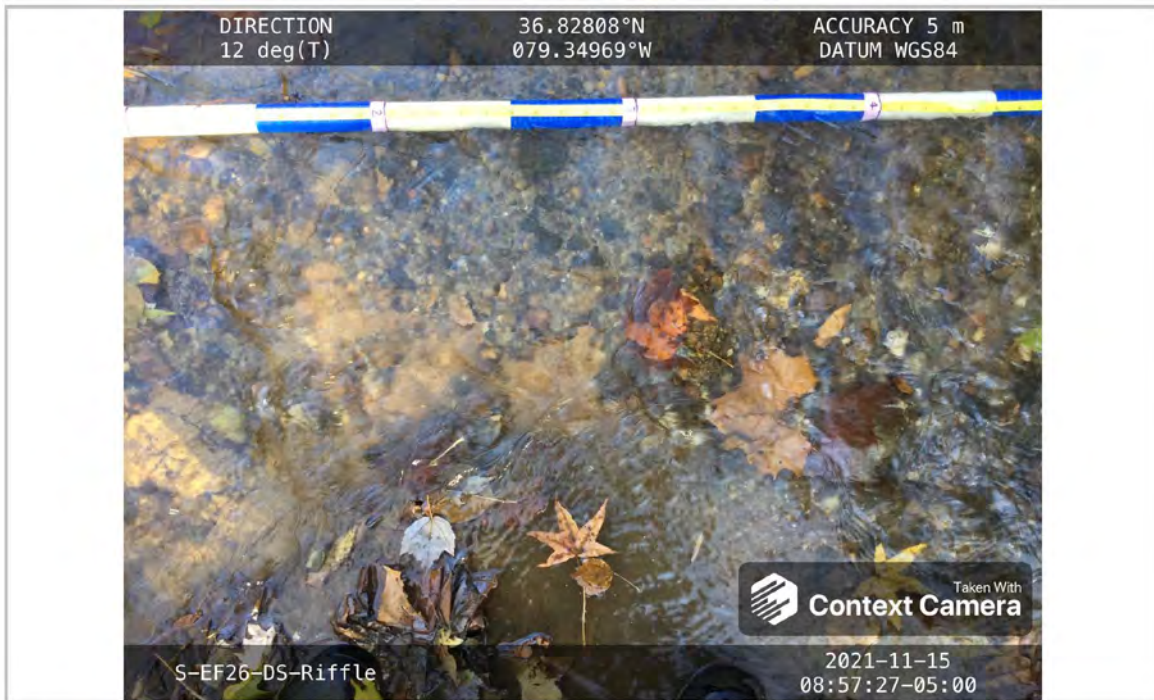


Photo Type: Substrate  
Location: 36.82808, -79.34969  
Photo Orientation: N (12 degrees)  
Stream type: Plane bed



Photo Type: Substrate  
Location: 36.82743, -79.34940  
Photo Orientation: SW (208 degrees)  
Stream type: Plane bed



Photo Type: Riffle, Upstream View  
Location: 36.84187, -79.36620  
Photo Orientation: S (192 degrees)  
Stream Type: Step pool



Photo Type: Substrate  
Location: 36.84187, -79.36616  
Photo Orientation: NE (40 degrees)  
Stream Type: Step pool



Photo Type: Riffle, Upstream View  
Location: 36.91706, -79.49272  
Photo Orientation: SE (114 degrees)  
Stream Type: Riffle-pool complex



Photo Type: Substrate  
Location: 36.91672, -79.49268  
Photo Orientation: E (102 degrees)  
Stream Type: Riffle-pool complex



Photo Type: Riffle, Upstream View  
Location: 36.92487, -79.51748  
Photo Orientation: N (14 degrees)  
Stream type: Riffle-pool complex



Photo Type: Riffle, Downstream View  
View Location: 36.92470, -79.51763  
Photo Orientation: NE (32 degrees)  
Stream type: Riffle-pool complex



Photo Type: Substrate  
Location: 36.92480, -79.51761  
Photo Orientation: W (273 degrees)  
Stream type: Riffle-pool complex





Photo Type: Upstream View  
Location: 36.92973, -79.52610  
Photo Orientation: SW (208 degrees)  
Stream Type: Riffle-pool complex



Photo Type: Downstream View  
Location: 36.92978, -79.52601  
Photo Orientation: NE (28 degrees)  
Stream Type: Riffle-pool complex



Photo Type: Downstream View  
Location: 36.94476, -79.57110  
Photo Orientation: N (346 degrees)  
Stream type: Plane bed



Photo Type: Downstream View  
Location: 36.94461, -79.57138  
Photo Orientation: W (263 degrees)  
Stream type: Plane bed



Photo Type: Downstream View  
Location: 36.94477, -79.57111  
Photo Orientation: W (290 degrees)  
Stream type: Plane bed



**TETRA TECH**

## **Stream Dataforms**

Stream & Location: S-11a

RM:   Date: 11/29/21

Scorers Full Name & Affiliation: LKIMB

River Code: - - STORET #:   Lat./Long.: 39.553946, -80.545046

Office verified location

1) SUBSTRATE Check ONLY Two substrate TYPE BOXES, estimate % or note every type present

BEST TYPES		OTHER TYPES		ORIGIN		QUALITY		15
<input type="checkbox"/> BLDR / SLABS [10]	<input type="checkbox"/> POOL RIFFLE	<input type="checkbox"/> HARDPAN [4]	<input type="checkbox"/> POOL RIFFLE	<input type="checkbox"/> LIMESTONE [1]	<input type="checkbox"/> SILT	<input type="checkbox"/> HEAVY [-2]	Maximum 20	
<input type="checkbox"/> BOULDER [9]	<input type="checkbox"/> COBBLE [8]	<input type="checkbox"/> DETRITUS [3]	<input type="checkbox"/> MUCK [2]	<input type="checkbox"/> TILLS [1]	<input type="checkbox"/> WETLANDS [0]	<input type="checkbox"/> MODERATE [-1]		
<input type="checkbox"/> GRAVEL [7]	<input type="checkbox"/> SAND [6]	<input type="checkbox"/> SILT [2]	<input type="checkbox"/> ARTIFICIAL [0]	<input type="checkbox"/> HARDPAN [0]	<input type="checkbox"/> SANDSTONE [0]	<input type="checkbox"/> NORMAL [0]		
<input type="checkbox"/> BEDROCK [5]	(Score natural substrates; ignore sludge from point-sources)		<input type="checkbox"/> RIP/RAP [0]	<input type="checkbox"/> SANDSTONE [0]	<input type="checkbox"/> LACUSTURINE [0]	<input type="checkbox"/> EXTENSIVE [-2]		
NUMBER OF BEST TYPES: <input type="checkbox"/> 4 or more [2] <input type="checkbox"/> 3 or less [0]				<input type="checkbox"/> SHALE [-1]	<input type="checkbox"/> COAL FINES [-2]	<input type="checkbox"/> MODERATE [-1]	<input type="checkbox"/> NORMAL [0]	
Comments				<input type="checkbox"/> NONE [1]		<input type="checkbox"/> NONE [1]		

Riffles mainly on cobble. Rest of stream mainly pebbles.

2) INSTREAM COVER Indicate presence 0 to 3: 0-Absent; 1-Very small amounts or if more common of marginal quality; 2-Moderate amounts, but not of highest quality or in small amounts of highest quality; 3-Highest quality in moderate or greater amounts (e.g., very large boulders in deep or fast water, large diameter log that is stable, well developed rootwad in deep / fast water, or deep, well-defined, functional pools.

<input type="checkbox"/> UNDERCUT BANKS [1]	<input type="checkbox"/> POOLS > 70cm [2]	<input type="checkbox"/> OXBOWS, BACKWATERS [1]	Cover Maximum 20
<input type="checkbox"/> OVERHANGING VEGETATION [1]	<input type="checkbox"/> ROOTWADS [1]	<input type="checkbox"/> AQUATIC MACROPHYTES [1]	
<input type="checkbox"/> SHALLOWS (IN SLOW WATER) [1]	<input type="checkbox"/> BOULDERS [1]	<input type="checkbox"/> LOGS OR WOODY DEBRIS [1]	
<input type="checkbox"/> ROOTMATS [1]			
Comments			

3) CHANNEL MORPHOLOGY Check ONE in each category (Or 2 & average)

<input type="checkbox"/> HIGH [4]	<input type="checkbox"/> EXCELLENT [7]	<input type="checkbox"/> NONE [6]	<input type="checkbox"/> HIGH [3]	Channel Maximum 20
<input type="checkbox"/> MODERATE [3]	<input type="checkbox"/> GOOD [5]	<input checked="" type="checkbox"/> RECOVERED [4]	<input checked="" type="checkbox"/> MODERATE [2]	
<input checked="" type="checkbox"/> LOW [2]	<input type="checkbox"/> FAIR [3]	<input type="checkbox"/> RECOVERING [3]	<input type="checkbox"/> LOW [1]	
<input type="checkbox"/> NONE [1]	<input checked="" type="checkbox"/> POOR [1]	<input type="checkbox"/> RECENT OR NO RECOVERY [1]		
Comments				

Road next to stream. Recovered channelization.

4) BANK EROSION AND RIPARIAN ZONE Check ONE in each category for EACH BANK (Or 2 per bank & average)

<input type="checkbox"/> NONE / LITTLE [3]	<input type="checkbox"/> WIDE > 50m [4]	<input type="checkbox"/> FOREST, SWAMP [3]	<input type="checkbox"/> CONSERVATION TILLAGE [1]
<input type="checkbox"/> MODERATE [2]	<input type="checkbox"/> MODERATE 10-50m [3]	<input type="checkbox"/> SHRUB OR OLD FIELD [2]	<input type="checkbox"/> URBAN OR INDUSTRIAL [0]
<input type="checkbox"/> HEAVY / SEVERE [1]	<input type="checkbox"/> NARROW 5-10m [2]	<input type="checkbox"/> RESIDENTIAL, PARK, NEW FIELD [1]	<input type="checkbox"/> MINING / CONSTRUCTION [0]
	<input type="checkbox"/> VERY NARROW < 5m [1]	<input type="checkbox"/> FENCED PASTURE [1]	
	<input type="checkbox"/> NONE [0]	<input type="checkbox"/> OPEN PASTURE, ROWCROP [0]	
Comments			

Indicate predominant land use(s) past 100m riparian.

5) POOL / GLIDE AND RIFFLE / RUN QUALITY

<input type="checkbox"/> > 1m [6]	<input type="checkbox"/> POOL WIDTH > RIFFLE WIDTH [2]	<input type="checkbox"/> TORRENTIAL [-1]	<input checked="" type="checkbox"/> SLOW [1]	Pool / Current Maximum 12
<input type="checkbox"/> 0.7-<1m [4]	<input checked="" type="checkbox"/> POOL WIDTH = RIFFLE WIDTH [1]	<input type="checkbox"/> VERY FAST [1]	<input type="checkbox"/> INTERSTITIAL [-1]	
<input type="checkbox"/> 0.4-<0.7m [2]	<input type="checkbox"/> POOL WIDTH > RIFFLE WIDTH [0]	<input type="checkbox"/> FAST [1]	<input type="checkbox"/> INTERMITTENT [-2]	
<input checked="" type="checkbox"/> 0.2-<0.4m [1]		<input checked="" type="checkbox"/> MODERATE [1]	<input checked="" type="checkbox"/> EDDIES [1]	
<input type="checkbox"/> < 0.2m [0]		Indicate for reach - pools and riffles.		
Comments				

Recreation Potential  
Primary Contact  
Secondary Contact  
(circle one and comment on back)

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species:

<input checked="" type="checkbox"/> BEST AREAS > 10cm [2]	<input type="checkbox"/> MAXIMUM > 50cm [2]	<input type="checkbox"/> STABLE (e.g., Cobble, Boulder) [2]	<input checked="" type="checkbox"/> NONE [2]	Riffle / Run Maximum 8
<input type="checkbox"/> BEST AREAS 5-10cm [1]	<input checked="" type="checkbox"/> MAXIMUM < 50cm [1]	<input type="checkbox"/> MOD. STABLE (e.g., Large Gravel) [1]	<input type="checkbox"/> LOW [1]	
<input type="checkbox"/> BEST AREAS < 5cm [metric=0]		<input type="checkbox"/> UNSTABLE (e.g., Fine Gravel, Sand) [0]	<input type="checkbox"/> MODERATE [0]	
			<input type="checkbox"/> EXTENSIVE [-1]	
Comments				

6) GRADIENT (

ft/mi)	<input type="checkbox"/> VERY LOW - LOW [2-4]	% POOL: <u>30</u>	% GLIDE: <u> </u>	Gradient Maximum 10
mi <sup>2</sup> )	<input type="checkbox"/> MODERATE [6-10]	% RUN: <u>35</u>	% RIFFLE: <u>35</u>	
	<input type="checkbox"/> HIGH - VERY HIGH [10-6]			

S-A1a

**A) SAMPLED REACH**

Check ALL that apply

**METHOD**

- BOAT
- WADE
- L. LINE
- OTHER

**STAGE**

1st sample pass 2nd

- HIGH
- UP
- NORMAL
- LOW
- DRY

**DISTANCE**

- 0.5 Km
- 0.2 Km
- 0.15 Km
- 0.12 Km
- OTHER

**CLARITY**

1st sample pass 2nd

- < 20 cm
- 20-40 cm
- 40-70 cm
- > 70 cm/ CTB
- SECCHI DEPTH

meters

**CANOPY**

1st pass cm

2nd pass cm

- > 85% - OPEN
- 55% - < 85%
- 30% - < 55%
- 10% - < 30%
- < 10% - CLOSED

**C) RECREATION**

AREA DEPTH  
POOL:  > 100R<sup>2</sup>  > 3ft

Comment RE: Reach consistency/ Is reach typical of stream?, Recreation/ Observed - Inferred, Other/ Sampling observations, Concerns, Access directions, etc

Access limited to LOT. Poorly formed riffle-pool complex. Riffles generated by presence of islands and partially submerged cobbles. Shallow pool depths ~30cm. Best riffle depth = 10cm. Width = 27 feet. Distance between riffles = 70 feet. Poorly formed riffle pool complex.

**B) AESTHETICS**

- NUISANCE ALGAE
- INVASIVE MACROPHYTES
- EXCESS TURBIDITY
- DISCOLORATION
- FOAM / SCUM
- OIL SHEEN
- TRASH / LITTER
- NUISANCE ODOR
- SLUDGE DEPOSITS
- CSOs/SSOs/OUTFALLS

**D) MAINTENANCE**

Circle some & COMMENT

- PUBLIC / PRIVATE / BOTH / NA
- ACTIVE / HISTORIC / BOTH / NA
- YOUNG-SUCCESSION-OLD
- SPRAY / SNAG / REMOVED
- MODIFIED / DIPPED OUT / NA
- LEVEED / ONE SIDED
- RELOCATED / CUTOFFS
- MOVING-BEDLOAD-STABLE
- ARMoured / SLUMPS
- ISLANDS / SCOURED
- IMPOUNDED / DESICCATED
- FLOOD CONTROL / DRAINAGE

**E) ISSUES**

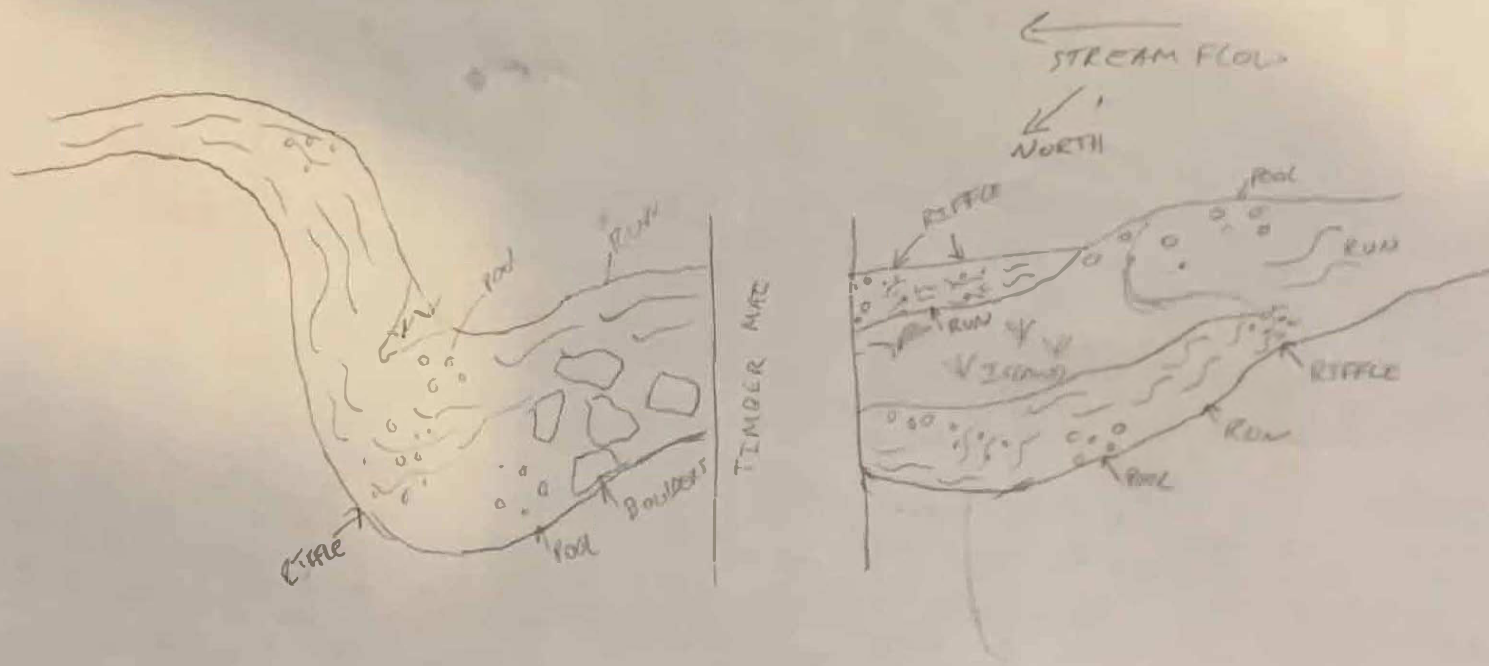
- WWTP / CSO / NPDES / INDUSTRY
- HARDENED / URBAN / DIRT&GRIME
- CONTAMINATED / LANDFILL
- BMPs-CONSTRUCTION-SEDIMENT
- LOGGING / IRRIGATION / COOLING
- BANK / EROSION / SURFACE
- FALSE BANK / MANURE / LAGOON
- WASH H<sub>2</sub>O / TILE / H<sub>2</sub>O TABLE
- ACID / MINE / QUARRY / FLOW
- NATURAL / WETLAND / STAGNANT
- PARK / GOLF / LAWN / HOME
- ATMOSPHERE / DATA PAUCITY

**F) MEASUREMENTS**

- $\bar{x}$  width
- $\bar{x}$  depth
- max. depth
- $\bar{x}$  bankfull width
- bankfull  $\bar{x}$  depth
- W/D ratio
- bankfull max. depth
- floodprone  $x^2$  width
- entrench. ratio

Legacy Tree:

**Stream Drawing:**





**A) SAMPLED REACH**

Check ALL that apply

Comment RE: Reach consistency/ Is reach typical of stream?, Recreation/ Observed - Inferred, Other/ Sampling observations, Concerns, Access directions, etc.

**METHOD**

- BOAT
- WADE
- L. LINE
- OTHER

**STAGE**

1st -sample pass- 2nd

- HIGH
- UP
- NORMAL
- LOW
- DRY

**DISTANCE**

- 0.5 Km
- 0.2 Km
- 0.15 Km
- 0.12 Km
- OTHER

**CLARITY**

1st --sample pass-- 2nd

- < 20 cm
- 20-40 cm
- 40-70 cm
- > 70 cm/ CTB
- SECCHI DEPTH

meters

**CANOPY**

- > 85%- OPEN
- 55%-<85%
- 30%-<55%
- 10%-<30%
- <10%- CLOSED

- 1st \_\_\_\_\_ cm
- 2nd \_\_\_\_\_ cm

**C) RECREATION**

AREA DEPTH  
POOL:  >100ft<sup>2</sup>  >3ft

S-125 PLATY SANDSTONE GRAVEL/COBBLE SUBSTRATE  
 POORLY FORMED RIFFLES. SHALLOW POOLS  
 INFREQUENT RIFFLES. PLAIN BED PRIMARILY  
 STRONGLY INFLUENCED BY ADJACENT VALLEY WALL. BOULDERS CONTRIBUTED FROM VALLEY WALL

**B) AESTHETICS**

- NUISANCE ALGAE
- INVASIVE MACROPHYTES
- EXCESS TURBIDITY
- DISCOLORATION
- FOAM / SCUM
- OIL SHEEN
- TRASH / LITTER
- NUISANCE ODOR
- SLUDGE DEPOSITS
- CSOs/SSOs/OUTFALLS

**D) MAINTENANCE**

Circle some & COMMENT

- PUBLIC / PRIVATE / BOTH / NA
- ACTIVE / HISTORIC / BOTH / NA
- YOUNG-SUCCESSION-OLD
- SPRAY / SNAG / REMOVED
- MODIFIED / DIPPED OUT / NA
- LEVEED / ONE SIDED
- RELOCATED / CUTOFFS
- MOVING-BEDLOAD-STABLE
- ARMoured / SLUMPS
- ISLANDS / SCOURED
- IMPOUNDED / DESICCATED
- FLOOD CONTROL / DRAINAGE

**E) ISSUES**

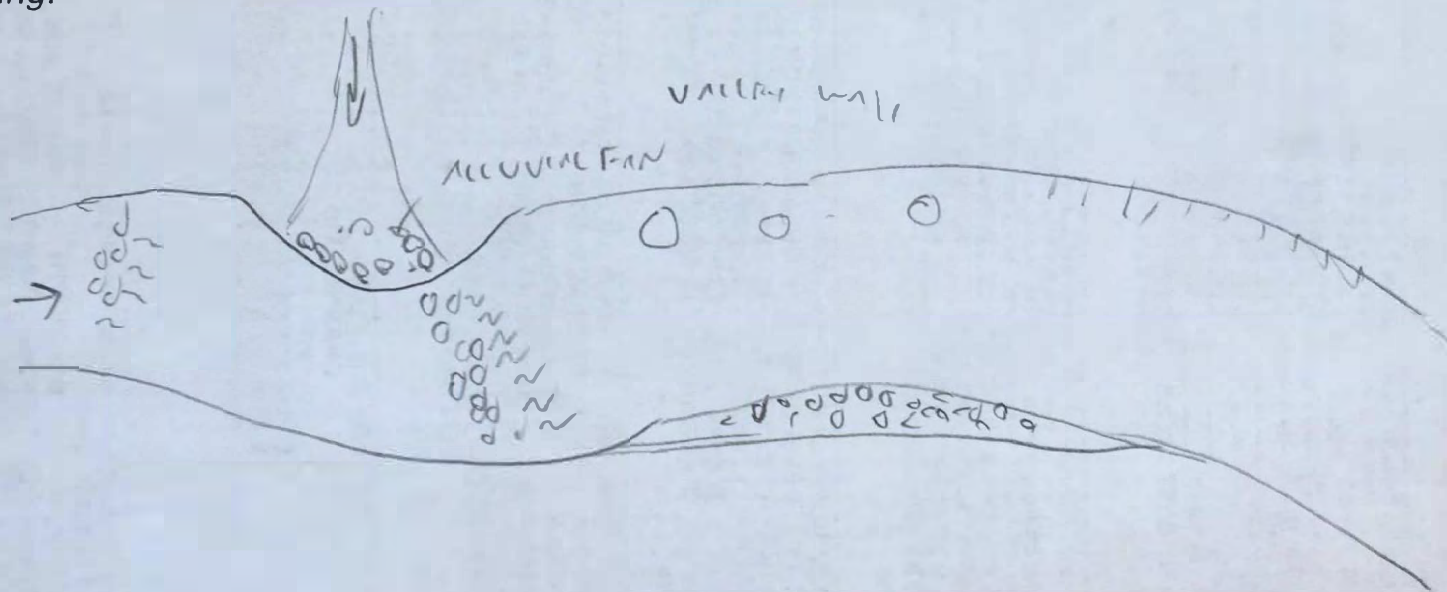
- WWTP / CSO / NPDES / INDUSTRY
- HARDENED / URBAN / DIRT&GRIME
- CONTAMINATED / LANDFILL
- BMPs-CONSTRUCTION-SEDIMENT
- LOGGING / IRRIGATION / COOLING
- BANK / EROSION / SURFACE
- FALSE BANK / MANURE / LAGOON
- WASH H<sub>2</sub>O / TILE / H<sub>2</sub>O TABLE
- ACID / MINE / QUARRY / FLOW
- NATURAL / WETLAND / STAGNANT
- PARK / GOLF / LAWN / HOME
- ATMOSPHERE / DATA PAUCITY

**F) MEASUREMENTS**

- $\bar{x}$  width
- $\bar{x}$  depth
- max. depth
- $\bar{x}$  bankfull width
- bankfull  $\bar{x}$  depth
- WD ratio
- bankfull max. depth
- floodprone  $x^2$  width
- entrench. ratio

Legacy Tree:

**Stream Drawing:**







# Qualitative Habitat Evaluation Index and Use Assessment Field Sheet

QHEI Score:  

Stream & Location: S-362 8:50 RM:   Date: 11/17/21

Scorers Full Name & Affiliation: LK  
River Code:   STORET #:   (NAD 83 - decimal) Lat./Long.: 39.445033, -80.482635 Office verified location

**1] SUBSTRATE** Check ONLY Two substrate TYPE BOXES; estimate % or note every type present. Check ONE (Or 2 & average)

<b>BEST TYPES</b>	<b>POOL RIFFLE</b>	<b>OTHER TYPES</b>	<b>POOL RIFFLE</b>	<b>ORIGIN</b>	<b>QUALITY</b>
<input type="checkbox"/> BLDR/SLABS [10]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> HARDPAN [4]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> LIMESTONE [1]	<input type="checkbox"/> HEAVY [-2]
<input type="checkbox"/> BOULDER [9]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> DETRITUS [3]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> TILLS [1]	<input type="checkbox"/> MODERATE [-1]
<input checked="" type="checkbox"/> COBBLE [8]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> MUCK [2]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> WETLANDS [0]	<input type="checkbox"/> NORMAL [0]
<input type="checkbox"/> GRAVEL [7]	<input type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> SILT [2]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> HARDPAN [0]	<input type="checkbox"/> FREE [1]
<input type="checkbox"/> SAND [6]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> ARTIFICIAL [0]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> SANDSTONE [0]	<input type="checkbox"/> EXTENSIVE [-2]
<input type="checkbox"/> BEDROCK [5]	<input type="checkbox"/> <input type="checkbox"/>			<input type="checkbox"/> RIP/RAP [0]	<input type="checkbox"/> MODERATE [-1]

NUMBER OF BEST TYPES:  4 or more [2] sludge from point-sources)  3 or less [0]

Comments:  

Substrate 17  
Maximum 20

**2] INSTREAM COVER** Indicate presence 0 to 3: 0-Absent; 1-Very small amounts or if more common of marginal quality; 2-Moderate amounts, but not of highest quality or in small amounts of highest quality; 3-Highest quality in moderate or greater amounts (e.g., very large boulders in deep or fast water, large diameter log that is stable, well developed rootwad in deep / fast water, or deep, well-defined, functional pools. Check ONE (Or 2 & average)

<input type="checkbox"/> UNDERCUT BANKS [1]	<input type="checkbox"/> POOLS > 70cm [2]	<input type="checkbox"/> OXBOWS, BACKWATERS [1]	<input type="checkbox"/> EXTENSIVE >75% [11]
<input type="checkbox"/> OVERHANGING VEGETATION [1]	<input type="checkbox"/> ROOTWADS [1]	<input type="checkbox"/> AQUATIC MACROPHYTES [1]	<input type="checkbox"/> MODERATE 25-75% [7]
<input type="checkbox"/> SHALLOWS (IN SLOW WATER) [1]	<input type="checkbox"/> BOULDERS [1]	<input type="checkbox"/> LOGS OR WOODY DEBRIS [1]	<input type="checkbox"/> SPARSE 5-<25% [3]
<input type="checkbox"/> ROOTMATS [1]			<input type="checkbox"/> NEARLY ABSENT <5% [1]

Comments:  

Cover    
Maximum 20

**3] CHANNEL MORPHOLOGY** Check ONE in each category (Or 2 & average)

<b>SINUOSITY</b>	<b>DEVELOPMENT</b>	<b>CHANNELIZATION</b>	<b>STABILITY</b>
<input checked="" type="checkbox"/> HIGH [4]	<input type="checkbox"/> EXCELLENT [7]	<input checked="" type="checkbox"/> NONE [6]	<input type="checkbox"/> HIGH [3]
<input type="checkbox"/> MODERATE [3]	<input type="checkbox"/> GOOD [5]	<input type="checkbox"/> RECOVERED [4]	<input checked="" type="checkbox"/> MODERATE [2]
<input type="checkbox"/> LOW [2]	<input type="checkbox"/> FAIR [3]	<input type="checkbox"/> RECOVERING [3]	<input type="checkbox"/> LOW [1]
<input type="checkbox"/> NONE [1]	<input checked="" type="checkbox"/> POOR [1]	<input type="checkbox"/> RECENT OR NO RECOVERY [1]	

Comments:  

Channel 13  
Maximum 20

**4] BANK EROSION AND RIPARIAN ZONE** Check ONE in each category for EACH BANK (Or 2 per bank & average)

<b>EROSION</b>	<b>RIPARIAN WIDTH</b>	<b>FLOOD PLAIN QUALITY</b>
<input type="checkbox"/> NONE / LITTLE [3]	<input type="checkbox"/> WIDE > 50m [4]	<input type="checkbox"/> FOREST, SWAMP [3]
<input type="checkbox"/> MODERATE [2]	<input type="checkbox"/> MODERATE 10-50m [3]	<input type="checkbox"/> SHRUB OR OLD FIELD [2]
<input type="checkbox"/> HEAVY / SEVERE [1]	<input type="checkbox"/> NARROW 5-10m [2]	<input type="checkbox"/> RESIDENTIAL, PARK, NEW FIELD [1]
	<input type="checkbox"/> VERY NARROW < 5m [1]	<input type="checkbox"/> FENCED PASTURE [1]
	<input type="checkbox"/> NONE [0]	<input type="checkbox"/> OPEN PASTURE, ROWCROP [0]

Comments:  

Indicate predominant land use(s) past 100m riparian. Riparian    
Maximum 10

**5] POOL / GLIDE AND RIFFLE / RUN QUALITY**

<b>MAXIMUM DEPTH</b>	<b>CHANNEL WIDTH</b>	<b>CURRENT VELOCITY</b>	<b>Recreation Potential</b>
Check ONE (ONLY!)	Check ONE (Or 2 & average)	Check ALL that apply	Primary Contact
<input type="checkbox"/> > 1m [6]	<input checked="" type="checkbox"/> POOL WIDTH > RIFFLE WIDTH [2]	<input type="checkbox"/> TORRENTIAL [-1]	Secondary Contact
<input type="checkbox"/> 0.7-<1m [4]	<input type="checkbox"/> POOL WIDTH = RIFFLE WIDTH [1]	<input type="checkbox"/> VERY FAST [1]	(circle one and comment on back)
<input type="checkbox"/> 0.4-<0.7m [2]	<input type="checkbox"/> POOL WIDTH > RIFFLE WIDTH [0]	<input type="checkbox"/> FAST [1]	
<input checked="" type="checkbox"/> 0.2-<0.4m [1]		<input type="checkbox"/> MODERATE [1]	
<input type="checkbox"/> < 0.2m [0]		<input type="checkbox"/> INTERSTITIAL [-1]	
		<input type="checkbox"/> INTERMITTENT [-2]	
		<input type="checkbox"/> EDDIES [1]	

Comments:  

Pool / Current 4  
Maximum 12

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species; Check ONE (Or 2 & average).  NO RIFFLE (metric=0)

<b>RIFFLE DEPTH</b>	<b>RUN DEPTH</b>	<b>RIFFLE / RUN SUBSTRATE</b>	<b>RIFFLE / RUN EMBEDDEDNESS</b>
<input type="checkbox"/> BEST AREAS > 10cm [2]	<input type="checkbox"/> MAXIMUM > 50cm [2]	<input type="checkbox"/> STABLE (e.g., Cobble, Boulder) [2]	<input type="checkbox"/> NONE [2]
<input type="checkbox"/> BEST AREAS 5-10cm [1]	<input checked="" type="checkbox"/> MAXIMUM < 50cm [1]	<input checked="" type="checkbox"/> MOD. STABLE (e.g., Large Gravel) [1]	<input checked="" type="checkbox"/> LOW [1]
<input checked="" type="checkbox"/> BEST AREAS < 5cm [metric=0]		<input type="checkbox"/> UNSTABLE (e.g., Fine Gravel, Sand) [0]	<input type="checkbox"/> MODERATE [0]
			<input type="checkbox"/> EXTENSIVE [-1]

Comments:  

Riffle / Run 3  
Maximum 8

**6] GRADIENT** ( ft/mi)  VERY LOW - LOW [2-4] %POOL: 15 %GLIDE:  

**DRAINAGE AREA** ( mi<sup>2</sup>)  MODERATE [6-10] %RUN: 82 %RIFFLE: 3

HIGH - VERY HIGH [10-6] Gradient    
Maximum 10

**A) SAMPLED REACH**

Check ALL that apply

Comment RE: Reach consistency/ Is reach typical of stream?, Recreation/ Observed - Inferred, Other/ Sampling observations, Concerns, Access directions, etc.

**METHOD**

- BOAT
- WADE
- L. LINE
- OTHER

**STAGE**

- 1st -sample pass- 2nd
- HIGH
  - UP
  - NORMAL
  - LOW
  - DRY

S-JGZ 70% IN ALLUVIAL FLOOD PLAINS, 30% AGAINST VALLEY WALL  
 2 RIFFLES/100m. SHOULD BE ABOUT 6 POOL RIFFLE SEQUENCES FOR  
 CHANNEL WIDTH. VARY SLOW FLOW. LEAF DEBRIS ON QSD.  
 VARY POORLY FORMED POOL-RIFFLE CHANNELS PLAIN QSD?

**DISTANCE**

- 0.5 Km
- 0.2 Km
- 0.15 Km
- 0.12 Km
- OTHER

**CLARITY**

- 1st --sample pass-- 2nd
- < 20 cm
  - 20-<40 cm
  - 40-70 cm
  - > 70 cm/ CTB
  - SECCHI DEPTH

meters

**CANOPY**

- > 85%- OPEN
- 55%-<85%
- 30%-<55%
- 10%-<30%
- <10%-CLOSED

- 1st \_\_\_\_\_ cm  
 2nd \_\_\_\_\_ cm

**C) RECREATION** AREA DEPTH  
 POOL:  >100ft<sup>2</sup>  >3ft

**B) AESTHETICS**

- NUISANCE ALGAE
- INVASIVE MACROPHYTES
- EXCESS TURBIDITY
- DISCOLORATION
- FOAM / SCUM
- OIL SHEEN
- TRASH / LITTER
- NUISANCE ODOR
- SLUDGE DEPOSITS
- CSOs/SSOs/OUTFALLS

**D) MAINTENANCE**

- PUBLIC / PRIVATE / BOTH / NA
- ACTIVE / HISTORIC / BOTH / NA
- YOUNG-SUCCESSION-OLD
- SPRAY / SNAG / REMOVED
- MODIFIED / DIPPED OUT / NA
- LEVEED / ONE SIDED
- RELOCATED / CUTOFFS
- MOVING-BEDLOAD-STABLE
- ARMoured / SLUMPS
- ISLANDS / SCOURED
- IMPOUNDED / DESICCATED
- FLOOD CONTROL / DRAINAGE

Circle some & COMMENT

**E) ISSUES**

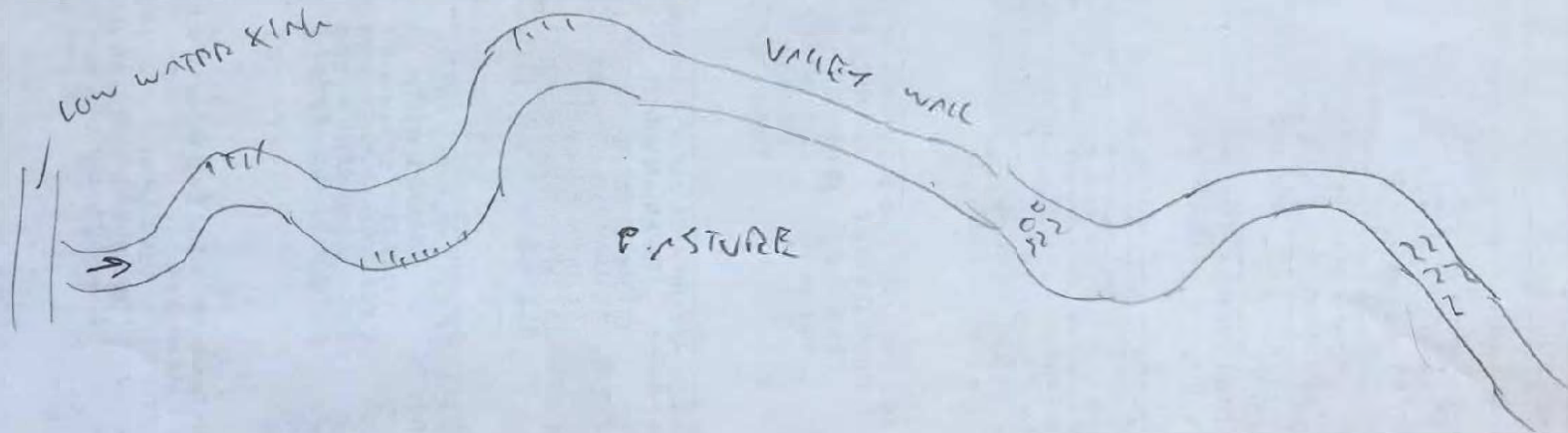
- WWTP / CSO / NPDES / INDUSTRY
- HARDENED / URBAN / DIRT&GRIME
- CONTAMINATED / LANDFILL
- BMPs-CONSTRUCTION-SEDIMENT
- LOGGING / IRRIGATION / COOLING
- BANK / EROSION / SURFACE
- FALSE BANK / MANURE / LAGOON
- WASH H<sub>2</sub>O / TILE / H<sub>2</sub>O TABLE
- ACID / MINE / QUARRY / FLOW
- NATURAL / WETLAND / STAGNANT
- PARK / GOLF / LAWN / HOME
- ATMOSPHERE / DATA PAUCITY

**F) MEASUREMENTS**

- $\bar{x}$  width
- $\bar{x}$  depth
- max. depth
- $\bar{x}$  bankfull width
- bankfull  $\bar{x}$  depth
- WD ratio
- bankfull max. depth
- floodprone  $x^2$  width
- entrench. ratio

Legacy Tree:

**Stream Drawing:**



Stream & Location: S-551

RM:    Date: 11/29/21

Scorers Full Name & Affiliation: LK, MB

River Code:    STORET #:    Lat./ Long.: 39.398116, -80.477174 (NAD 83 - decimal °) Office verified location

1] **SUBSTRATE** Check ONLY Two substrate TYPE BOXES; estimate % or note every type present

<b>BEST TYPES</b>	<b>POOL RIFFLE</b>	<b>OTHER TYPES</b>	<b>POOL RIFFLE</b>	<b>ORIGIN</b>	<b>QUALITY</b>	<b>Substrate</b> <span style="border: 1px solid black; border-radius: 50%; padding: 5px; display: inline-block; text-align: center;">19</span> Maximum 20
<input type="checkbox"/> BLDR /SLABS [10] <input type="checkbox"/> BOULDER [9] <input checked="" type="checkbox"/> COBBLE [8] <input type="checkbox"/> GRAVEL [7] <input checked="" type="checkbox"/> SAND [6] <input type="checkbox"/> BEDROCK [5]	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> HARDPAN [4] <input type="checkbox"/> DETRITUS [3] <input type="checkbox"/> MUCK [2] <input checked="" type="checkbox"/> SILT [2] <input type="checkbox"/> ARTIFICIAL [0]	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> LIMESTONE [1] <input type="checkbox"/> TILLS [1] <input type="checkbox"/> WETLANDS [0] <input type="checkbox"/> HARDPAN [0] <input type="checkbox"/> SANDSTONE [0] <input type="checkbox"/> RIP/RAP [0] <input type="checkbox"/> LACUSTURINE [0] <input type="checkbox"/> SHALE [-1] <input type="checkbox"/> COAL FINES [-2]	<input type="checkbox"/> HEAVY [-2] <input type="checkbox"/> MODERATE [-1] <input type="checkbox"/> NORMAL [0] <input type="checkbox"/> FREE [1] <input type="checkbox"/> EXTENSIVE [-2] <input type="checkbox"/> MODERATE [-1] <input type="checkbox"/> NORMAL [0] <input type="checkbox"/> NONE [1]	

NUMBER OF BEST TYPES:  4 or more [2]  3 or less [0]

Comments:   

2] **INSTREAM COVER** Indicate presence 0 to 3: 0-Absent; 1-Very small amounts or if more common of marginal quality; 2-Moderate amounts, but not of highest quality or in small amounts of highest quality; 3-Highest quality in moderate or greater amounts (e.g., very large boulders in deep or fast water, large diameter log that is stable, well developed rootwad in deep / fast water, or deep, well-defined, functional pools.

<b>UNDERCUT BANKS [1]</b>	<b>POOLS &gt; 70cm [2]</b>	<b>OXBOWS, BACKWATERS [1]</b>	<b>AMOUNT</b>
<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	Check ONE (Or 2 & average)
<b>OVERHANGING VEGETATION [1]</b>	<b>ROOTWADS [1]</b>	<b>AQUATIC MACROPHYTES [1]</b>	<input type="checkbox"/> EXTENSIVE >75% [11]
<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> MODERATE 25-75% [7]
<b>SHALLOWS (IN SLOW WATER) [1]</b>	<b>BOULDERS [1]</b>	<b>LOGS OR WOODY DEBRIS [1]</b>	<input type="checkbox"/> SPARSE 5-<25% [3]
<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> NEARLY ABSENT <5% [1]
<b>ROOTMATS [1]</b>			

Comments:   

**Cover**  
Maximum   20

3] **CHANNEL MORPHOLOGY** Check ONE in each category (Or 2 & average)

<b>SINUOSITY</b>	<b>DEVELOPMENT</b>	<b>CHANNELIZATION</b>	<b>STABILITY</b>	<b>Channel</b> Maximum <span style="border: 1px solid black; border-radius: 50%; padding: 2px 10px;">11</span> 20
<input type="checkbox"/> HIGH [4] <input type="checkbox"/> MODERATE [3] <input type="checkbox"/> LOW [2] <input checked="" type="checkbox"/> NONE [1]	<input type="checkbox"/> EXCELLENT [7] <input type="checkbox"/> GOOD [5] <input checked="" type="checkbox"/> FAIR [3] <input type="checkbox"/> POOR [1]	<input checked="" type="checkbox"/> NONE [6] <input type="checkbox"/> RECOVERED [4] <input type="checkbox"/> RECOVERING [3] <input type="checkbox"/> RECENT OR NO RECOVERY [1]	<input type="checkbox"/> HIGH [3] <input type="checkbox"/> MODERATE [2] <input checked="" type="checkbox"/> LOW [1]	

Comments:   

4] **BANK EROSION AND RIPARIAN ZONE** Check ONE in each category for EACH BANK (Or 2 per bank & average)

<b>EROSION</b>	<b>RIPARIAN WIDTH</b>	<b>FLOOD PLAIN QUALITY</b>	<b>Riparian</b> Maximum <span style="border: 1px solid black; border-radius: 50%; padding: 2px 10px;"> </span> 10
<input type="checkbox"/> NONE / LITTLE [3] <input type="checkbox"/> MODERATE [2] <input type="checkbox"/> HEAVY / SEVERE [1]	<input type="checkbox"/> WIDE > 50m [4] <input type="checkbox"/> MODERATE 10-50m [3] <input type="checkbox"/> NARROW 5-10m [2] <input type="checkbox"/> VERY NARROW < 5m [1] <input type="checkbox"/> NONE [0]	<input type="checkbox"/> FOREST, SWAMP [3] <input type="checkbox"/> SHRUB OR OLD FIELD [2] <input type="checkbox"/> RESIDENTIAL, PARK, NEW FIELD [1] <input type="checkbox"/> FENCED PASTURE [1] <input type="checkbox"/> OPEN PASTURE, ROWCROP [0]	

Comments:   

5] **POOL / GLIDE AND RIFFLE / RUN QUALITY**

<b>MAXIMUM DEPTH</b>	<b>CHANNEL WIDTH</b>	<b>CURRENT VELOCITY</b>	<b>Recreation Potential</b> Primary Contact Secondary Contact (circle one and comment on back)
<input type="checkbox"/> > 1m [6] <input type="checkbox"/> 0.7-<1m [4] <input type="checkbox"/> 0.4-<0.7m [2] <input checked="" type="checkbox"/> 0.2-<0.4m [1] <input type="checkbox"/> < 0.2m [0]	<input checked="" type="checkbox"/> POOL WIDTH > RIFFLE WIDTH [2] <input type="checkbox"/> POOL WIDTH = RIFFLE WIDTH [1] <input type="checkbox"/> POOL WIDTH < RIFFLE WIDTH [0]	<input type="checkbox"/> TORRENTIAL [-1] <input type="checkbox"/> VERY FAST [1] <input type="checkbox"/> FAST [1] <input type="checkbox"/> MODERATE [1]	

Comments: Riffles due to LWD or islands

**Pool / Current**  
Maximum 4 12

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species:  NO RIFFLE [metric=0]

<b>RIFFLE DEPTH</b>	<b>RUN DEPTH</b>	<b>RIFFLE / RUN SUBSTRATE</b>	<b>RIFFLE / RUN EMBEDDEDNESS</b>	<b>Riffle / Run</b> Maximum <span style="border: 1px solid black; border-radius: 50%; padding: 2px 10px;">1</span> 8
<input type="checkbox"/> BEST AREAS > 10cm [2] <input checked="" type="checkbox"/> BEST AREAS 5-10cm [1] <input type="checkbox"/> BEST AREAS < 5cm [metric=0]	<input type="checkbox"/> MAXIMUM > 50cm [2] <input checked="" type="checkbox"/> MAXIMUM < 50cm [1]	<input type="checkbox"/> STABLE (e.g., Cobble, Boulder) [2] <input type="checkbox"/> MOD. STABLE (e.g., Large Gravel) [1] <input checked="" type="checkbox"/> UNSTABLE (e.g., Fine Gravel, Sand) [0]	<input type="checkbox"/> NONE [2] <input type="checkbox"/> LOW [1] <input type="checkbox"/> MODERATE [0] <input checked="" type="checkbox"/> EXTENSIVE [-1]	

Comments: Absence of silt + detritus due to low velocity

6] **GRADIENT** (ft/mi)  VERY LOW - LOW [2-4]  MODERATE [6-10]  HIGH - VERY HIGH [10-6]

**DRAINAGE AREA** (mi<sup>2</sup>)

% POOL: 5 % GLIDE:  

% RUN: 90 % RIFFLE: 5

**Gradient**  
Maximum   10

S-351

Comment RE: Reach consistency/ Is reach typical of stream?, Recreation/ Observed - Inferred, Other/ Sampling observations, Concerns, Access directions, etc.

Reach access limited to LOD. Plane bed, primarily slow velocity run w/ fine silt/clay generated by islands and large woody debris. Abundance of algae + debris. Islands appear long narrow w/ thick grass. Banks are eroded + partially undercut.

Run = 35 cm R run = 0-10 cm Pool = 30-40 cm width = 33 ft

[PLANE BED]

**A) SAMPLED REACH**

Check ALL that apply

**METHOD STAGE**

- BOAT  
 WADE  
 L. LINE  
 OTHER
- HIGH  
 UP  
 NORMAL  
 LOW  
 DRY

**DISTANCE**

- 0.5 Km  
 0.2 Km  
 0.15 Km  
 0.12 Km  
 OTHER

**CLARITY**

- 1st --sample pass-- 2nd
- < 20 cm  
 20-40 cm  
 40-70 cm  
 > 70 cm/ CTB
- SECCHI DEPTH

meters

**CANOPY**

- > 85% - OPEN  
 55% - < 85%  
 30% - < 55%  
 10% - < 30%  
 < 10% - CLOSED

- 1st \_\_\_\_\_ cm  
 2nd \_\_\_\_\_ cm

**C) RECREATION**

AREA DEPTH  
 POOL:  > 100ft<sup>2</sup>  > 3ft

**B) AESTHETICS**

- NUISANCE ALGAE  
 INVASIVE MACROPHYTES  
 EXCESS TURBIDITY  
 DISCOLORATION  
 FOAM / SCUM  
 OIL SHEEN  
 TRASH / LITTER  
 NUISANCE ODOR  
 SLUDGE DEPOSITS  
 CSOs/SSOs/OUTFALLS

**D) MAINTENANCE**

- PUBLIC / PRIVATE / BOTH / NA  
 ACTIVE / HISTORIC / BOTH / NA  
 YOUNG-SUCCESSION-OLD  
 SPRAY / SNAG / REMOVED  
 MODIFIED / DIPPED OUT / NA  
 LEVEED / ONE SIDED  
 RELOCATED / CUTOFFS  
 MOVING-BEDLOAD-STABLE  
 ARMoured / SLUMPS  
 ISLANDS / SCOURED  
 IMPOUNDED / DESICCATED  
 FLOOD CONTROL / DRAINAGE

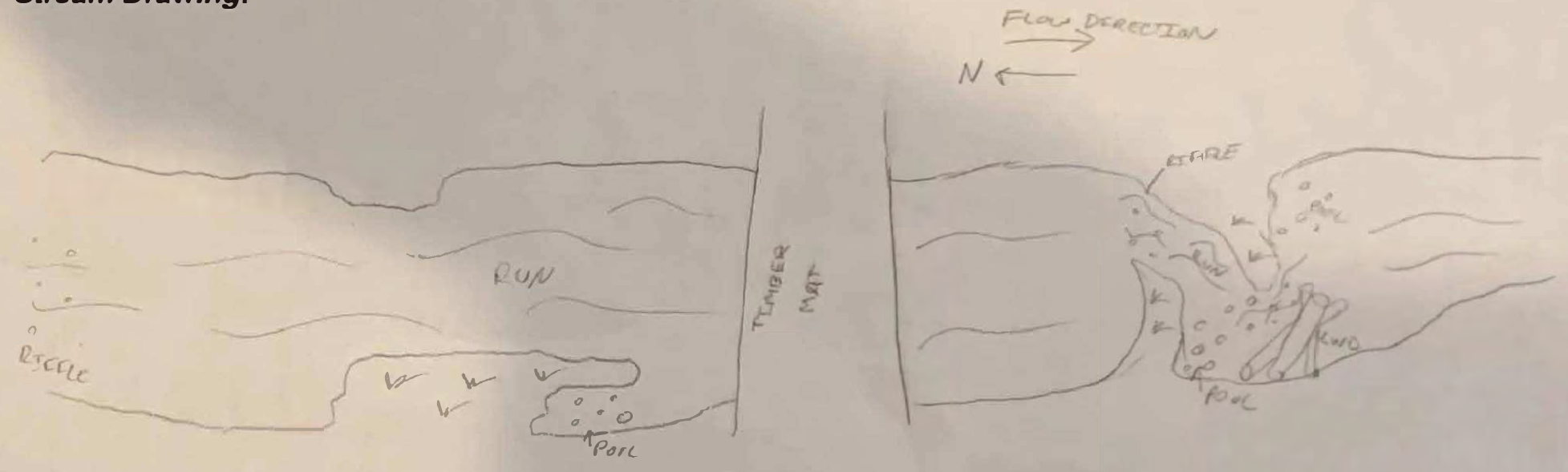
**E) ISSUES**

- Circle some & COMMENT
- WWTP / CSO / NPDES / INDUSTRY  
 HARDENED / URBAN / DIRT & GRIME  
 CONTAMINATED / LANDFILL  
 BMPs-CONSTRUCTION-SEDIMENT  
 LOGGING / IRRIGATION / COOLING  
 BANK / EROSION / SURFACE  
 FALSE BANK / MANURE / LAGOON  
 WASH H<sub>2</sub>O / TILE / H<sub>2</sub>O TABLE  
 ACID / MINE / QUARRY / FLOW  
 NATURAL / WETLAND / STAGNANT  
 PARK / GOLF / LAWN / HOME  
 ATMOSPHERE / DATA PAUCITY

**F) MEASUREMENTS**

- $\bar{x}$  width  
  $\bar{x}$  depth  
 max. depth  
  $\bar{x}$  bankfull width  
 bankfull  $\bar{x}$  depth  
 W/D ratio  
 bankfull max. depth  
 floodprone  $x^2$  width  
 entrench. ratio
- Legacy Tree:

**Stream Drawing:**





# Qualitative Habitat Evaluation Index and Use Assessment Field Sheet

QHEI Score:  

Stream & Location: S-410A 9:30 RM:    Date: 11/17/21

Scorers Full Name & Affiliation: LK

River Code:    STORET #:    (NAD 83 - decimal) Lat./Long.: 39, 370005, -80.484974 Office verified location

1) **SUBSTRATE** Check ONLY Two substrate TYPE BOXES; estimate % or note every type present

Check ONE (Or 2 & average)

<b>BEST TYPES</b>		<b>POOL RIFFLE</b>	<b>OTHER TYPES</b>		<b>POOL RIFFLE</b>	<b>ORIGIN</b>	<b>QUALITY</b>	Substrate <span style="font-size: 2em; font-weight: bold;">11</span> Maximum 20
<input type="checkbox"/> BLDR/SLABS [10]	<input type="checkbox"/> BOULDER [9]	<input type="checkbox"/> POOL	<input checked="" type="checkbox"/> HARDPAN [4]	<input type="checkbox"/> DETRITUS [3]	<input type="checkbox"/> RIFFLE	<input type="checkbox"/> LIMESTONE [1]	<input type="checkbox"/> HEAVY [-2]	
<input type="checkbox"/> COBBLE [8]	<input type="checkbox"/> GRAVEL [7]	<input type="checkbox"/> RIFFLE	<input type="checkbox"/> MUCK [2]	<input type="checkbox"/> SILT [2]	<input type="checkbox"/> RIFFLE	<input type="checkbox"/> TILLS [1]	<input type="checkbox"/> MODERATE [-1]	
<input type="checkbox"/> SAND [6]	<input type="checkbox"/> BEDROCK [5]	<input type="checkbox"/> RIFFLE	<input type="checkbox"/> ARTIFICIAL [0]	<input type="checkbox"/> SILT [2]	<input type="checkbox"/> RIFFLE	<input type="checkbox"/> WETLANDS [0]	<input type="checkbox"/> NORMAL [0]	
NUMBER OF BEST TYPES: <input type="checkbox"/> 4 or more [2] <input type="checkbox"/> 3 or less [0]		(Score natural substrates; ignore sludge from point-sources)		<input type="checkbox"/> ARTIFICIAL [0]	<input type="checkbox"/> RIFFLE	<input type="checkbox"/> SANDSTONE [0]	<input type="checkbox"/> FREE [1]	
Comments				<input type="checkbox"/> RIP/RAP [0]	<input type="checkbox"/> RIFFLE	<input type="checkbox"/> LACUSTURINE [0]	<input type="checkbox"/> EXTENSIVE [-2]	
				<input type="checkbox"/> SHALE [-1]	<input type="checkbox"/> RIFFLE	<input type="checkbox"/> COAL FINES [-2]	<input type="checkbox"/> MODERATE [-1]	
				<input type="checkbox"/> COAL FINES [-2]	<input type="checkbox"/> RIFFLE	<input type="checkbox"/> NONE [1]	<input type="checkbox"/> NEARLY ABSENT [-1]	

2) **INSTREAM COVER** Indicate presence 0 to 3: 0-Absent; 1-Very small amounts or if more common of marginal quality; 2-Moderate amounts, but not of highest quality or in small amounts of highest quality; 3-Highest quality in moderate or greater amounts (e.g., very large boulders in deep or fast water, large diameter log that is stable, well developed rootwad in deep / fast water, or deep, well-defined, functional pools.

<input type="checkbox"/> UNDERCUT BANKS [1]	<input type="checkbox"/> POOLS > 70cm [2]	<input type="checkbox"/> OXBOWS, BACKWATERS [1]	AMOUNT Check ONE (Or 2 & average) <input type="checkbox"/> EXTENSIVE >75% [11] <input type="checkbox"/> MODERATE 25-75% [7] <input type="checkbox"/> SPARSE 5-<25% [3] <input type="checkbox"/> NEARLY ABSENT <5% [1]
<input type="checkbox"/> OVERHANGING VEGETATION [1]	<input type="checkbox"/> ROOTWADS [1]	<input type="checkbox"/> AQUATIC MACROPHYTES [1]	
<input type="checkbox"/> SHALLOWS (IN SLOW WATER) [1]	<input type="checkbox"/> BOULDERS [1]	<input type="checkbox"/> LOGS OR WOODY DEBRIS [1]	
<input type="checkbox"/> ROOTMATS [1]			

Comments Cover Maximum   20

3) **CHANNEL MORPHOLOGY** Check ONE in each category (Or 2 & average)

<b>SINUOSITY</b>	<b>DEVELOPMENT</b>	<b>CHANNELIZATION</b>	<b>STABILITY</b>	Channel Maximum 20 <span style="font-size: 2em; font-weight: bold;">12</span>
<input checked="" type="checkbox"/> HIGH [4]	<input type="checkbox"/> EXCELLENT [7]	<input checked="" type="checkbox"/> NONE [6]	<input type="checkbox"/> HIGH [3]	
<input type="checkbox"/> MODERATE [3]	<input type="checkbox"/> GOOD [5]	<input type="checkbox"/> RECOVERED [4]	<input type="checkbox"/> MODERATE [2]	
<input type="checkbox"/> LOW [2]	<input type="checkbox"/> FAIR [3]	<input type="checkbox"/> RECOVERING [3]	<input checked="" type="checkbox"/> LOW [1]	

Comments Channel Maximum   20

4) **BANK EROSION AND RIPARIAN ZONE** Check ONE in each category for EACH BANK (Or 2 per bank & average)

River right looking downstream		<b>RIPARIAN WIDTH</b>	<b>FLOOD PLAIN QUALITY</b>	Riparian Maximum 10 <span style="font-size: 2em; font-weight: bold;"> </span>
<b>EROSION</b>	<input type="checkbox"/> WIDE > 50m [4]	<input type="checkbox"/> FOREST, SWAMP [3]	<input type="checkbox"/> CONSERVATION TILLAGE [1]	
<input type="checkbox"/> NONE / LITTLE [3]	<input type="checkbox"/> MODERATE 10-50m [3]	<input type="checkbox"/> SHRUB OR OLD FIELD [2]	<input type="checkbox"/> URBAN OR INDUSTRIAL [0]	
<input type="checkbox"/> MODERATE [2]	<input type="checkbox"/> NARROW 5-10m [2]	<input type="checkbox"/> RESIDENTIAL, PARK, NEW FIELD [1]	<input type="checkbox"/> MINING / CONSTRUCTION [0]	

Comments Indicate predominant land use(s) past 100m riparian. Riparian Maximum   10

5) **POOL / GLIDE AND RIFFLE / RUN QUALITY**

<b>MAXIMUM DEPTH</b>	<b>CHANNEL WIDTH</b>	<b>CURRENT VELOCITY</b>	Recreation Potential Primary Contact Secondary Contact (circle one and comment on back) Pool / Current Maximum 12 <span style="font-size: 2em; font-weight: bold;">4</span>
Check ONE (ONLY)	Check ONE (Or 2 & average)	Check ALL that apply	
<input type="checkbox"/> > 1m [6]	<input checked="" type="checkbox"/> POOL WIDTH > RIFFLE WIDTH [2]	<input type="checkbox"/> TORRENTIAL [-1]	
<input type="checkbox"/> 0.7-<1m [4]	<input type="checkbox"/> POOL WIDTH = RIFFLE WIDTH [1]	<input type="checkbox"/> SLOW [1]	

Comments Indicate for reach - pools and riffles. Pool / Current Maximum   12

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species: Check ONE (Or 2 & average)  NO RIFFLE [metric=0]

<b>RIFFLE DEPTH</b>	<b>RUN DEPTH</b>	<b>RIFFLE / RUN SUBSTRATE</b>	<b>RIFFLE / RUN EMBEDDEDNESS</b>	Riffle / Run Maximum 8 <span style="font-size: 2em; font-weight: bold;">1</span>
<input type="checkbox"/> BEST AREAS > 10cm [2]	<input type="checkbox"/> MAXIMUM > 50cm [2]	<input type="checkbox"/> STABLE (e.g., Cobble, Boulder) [2]	<input type="checkbox"/> NONE [2]	
<input type="checkbox"/> BEST AREAS 5-10cm [1]	<input checked="" type="checkbox"/> MAXIMUM < 50cm [1]	<input type="checkbox"/> MOD. STABLE (e.g., Large Gravel) [1]	<input type="checkbox"/> LOW [1]	
<input checked="" type="checkbox"/> BEST AREAS < 5cm [metric=0]		<input checked="" type="checkbox"/> UNSTABLE (e.g., Fine Gravel, Sand) [0]	<input checked="" type="checkbox"/> MODERATE [0]	

Comments Riffle / Run Maximum   8

6) **GRADIENT** (ft/mi)  VERY LOW - LOW [2-4]  MODERATE [6-10]  HIGH - VERY HIGH [10-6]

**DRAINAGE AREA** (mi<sup>2</sup>)  VERY LOW - LOW [2-4]  MODERATE [6-10]  HIGH - VERY HIGH [10-6]

%POOL: 20 %GLIDE:  

%RUN: 65 %RIFFLE: 15

Gradient Maximum   10

**A) SAMPLED REACH**

Check ALL that apply

Comment RE: Reach consistency/Is reach typical of stream?, Recreation/ Observed - Inferred, Other/ Sampling observations, Concerns, Access directions, etc.

ASSIGNED UPS/DRAM OR LOD

**METHOD**

- BOAT
- WADE
- L. LINE
- OTHER

**STAGE**

1st -sample pass- 2nd

- HIGH
- UP
- NORMAL
- LOW
- DRY

**DISTANCE**

- 0.5 Km
- 0.2 Km
- 0.15 Km
- 0.12 Km
- OTHER

meters

**CANOPY**

- > 85%- OPEN
- 55%-<85%
- 30%-<55%
- 10%-<30%
- <10%- CLOSED

**CLARITY**

1st --sample pass-- 2nd

- < 20 cm
- 20-<40 cm
- 40-70 cm
- > 70 cm/ CTB
- SECCHI DEPTH

1st \_\_\_\_\_ cm

2nd \_\_\_\_\_ cm

**C) RECREATION**

AREA DEPTH

POOL:  >100ft<sup>2</sup>  >3ft

S-A IONA HIGH FREQUENCY OF POOL RIPPLE SEQUENCES.  
 POORLY FORMED POOLS. FINE GRADE RIPPLES  
 FORM IS TYPICAL BUT NOT HABITAT.  
 POORLY FORMED RIPPLE-POOL COMPLEX

**B) AESTHETICS**

- NUISANCE ALGAE
- INVASIVE MACROPHYTES
- EXCESS TURBIDITY
- DISCOLORATION
- FOAM / SCUM
- OIL SHEEN
- TRASH / LITTER
- NUISANCE ODOR
- SLUDGE DEPOSITS
- CSOs/SSOs/OUTFALLS

**D) MAINTENANCE**

Circle some & COMMENT

- PUBLIC / PRIVATE / BOTH / NA
- ACTIVE / HISTORIC / BOTH / NA
- YOUNG-SUCCESSION-OLD
- SPRAY / SNAG / REMOVED
- MODIFIED / DIPPED OUT / NA
- LEVEED / ONE SIDED
- RELOCATED / CUTOFFS
- MOVING-BEDLOAD-STABLE
- ARMORED / SLUMPS
- ISLANDS / SCOURED
- IMPOUNDED / DESICCATED
- FLOOD CONTROL / DRAINAGE

**E) ISSUES**

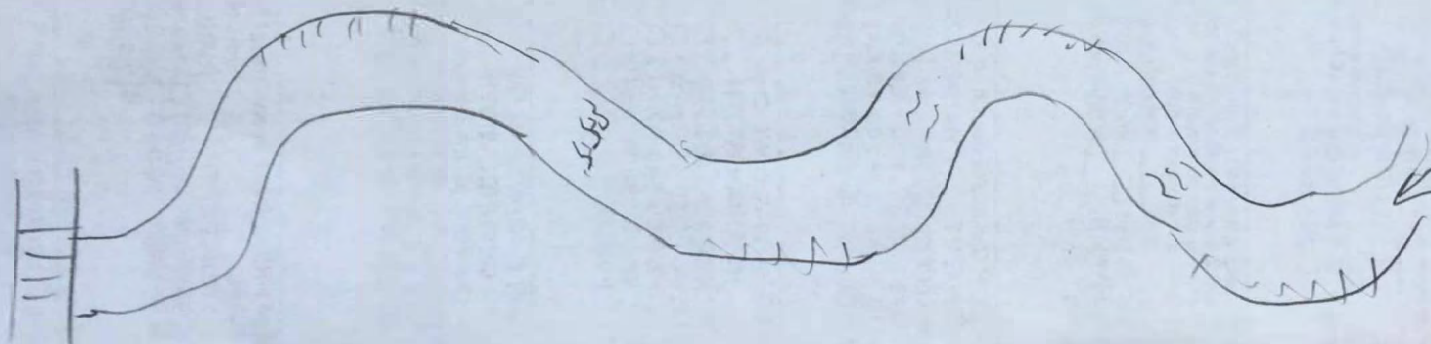
- WWTP / CSO / NPDES / INDUSTRY
- HARDENED / URBAN / DIRT&GRIME
- CONTAMINATED / LANDFILL
- BMPs-CONSTRUCTION-SEDIMENT
- LOGGING / IRRIGATION / COOLING
- BANK / EROSION / SURFACE
- FALSE BANK / MANURE / LAGOON
- WASH H<sub>2</sub>O / TILE / H<sub>2</sub>O TABLE
- ACID / MINE / QUARRY / FLOW
- NATURAL / WETLAND / STAGNANT
- PARK / GOLF / LAWN / HOME
- ATMOSPHERE / DATA PAUCITY

**F) MEASUREMENTS**

- $\bar{x}$  width
- $\bar{x}$  depth
- max. depth
- $\bar{x}$  bankfull width
- bankfull  $\bar{x}$  depth
- WD ratio
- bankfull max. depth
- floodprone x<sup>2</sup> width
- entrench. ratio

Legacy Tree:

**Stream Drawing:**



Stream & Location: S-B3a

RM:    Date: 11/29/06

Scorers Full Name & Affiliation: MB, LB

Office verified location

River Code:   

STORET #:   

Lat./ Long.: 39.358871, -80.493707

1) SUBSTRATE Check ONLY Two substrate TYPE BOXES. estimate % or note every type present

Check ONE (Or 2 & average)

- |                                                |                                                   |                                              |                                                   |
|------------------------------------------------|---------------------------------------------------|----------------------------------------------|---------------------------------------------------|
| <b>BEST TYPES</b>                              | <b>POOL RIFFLE</b>                                | <b>OTHER TYPES</b>                           | <b>POOL RIFFLE</b>                                |
| <input type="checkbox"/> BLDR /SLABS [10]      | <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> HARDPAN [4]         | <input type="checkbox"/> <input type="checkbox"/> |
| <input type="checkbox"/> BOULDER [9]           | <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> DETRITUS [3]        | <input type="checkbox"/> <input type="checkbox"/> |
| <input type="checkbox"/> COBBLE [8]            | <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> MUCK [2]            | <input type="checkbox"/> <input type="checkbox"/> |
| <input checked="" type="checkbox"/> GRAVEL [7] | <input type="checkbox"/> <input type="checkbox"/> | <input checked="" type="checkbox"/> SILT [2] | <input type="checkbox"/> <input type="checkbox"/> |
| <input type="checkbox"/> SAND [6]              | <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> ARTIFICIAL [0]      | <input type="checkbox"/> <input type="checkbox"/> |
| <input type="checkbox"/> BEDROCK [5]           | <input type="checkbox"/> <input type="checkbox"/> |                                              |                                                   |

- ORIGIN**
- LIMESTONE [1]
  - TILLS [1]
  - WETLANDS [0]
  - HARDPAN [0]
  - SANDSTONE [0]
  - RIP/RAP [0]
  - LACUSTURINE [0]
  - SHALE [-1]
  - COAL FINES [-2]

- QUALITY**
- HEAVY [-2]
  - MODERATE [-1]
  - NORMAL [0]
  - FREE [1]
  - EXTENSIVE [-2]
  - MODERATE [-1]
  - NORMAL [0]
  - NONE [1]

Substrate  
18  
Maximum 20

NUMBER OF BEST TYPES:  4 or more [2]  3 or less [0]

Comments

2) INSTREAM COVER Indicate presence 0 to 3: 0-Absent; 1-Very small amounts or if more common of marginal quality; 2-Moderate amounts, but not of highest quality or in small amounts of highest quality; 3-Highest quality in moderate or greater amounts (e.g., very large boulders in deep or fast water, large diameter log that is stable, well developed rootwad in deep / fast water, or deep, well-defined, functional pools.

AMOUNT

Check ONE (Or 2 & average)

- UNDERCUT BANKS [1]
- OVERHANGING VEGETATION [1]
- SHALLOWS (IN SLOW WATER) [1]
- ROOTMATS [1]

- POOLS > 70cm [2]
- ROOTWADS [1]
- BOULDERS [1]

- OXBOWS, BACKWATERS [1]
- AQUATIC MACROPHYTES [1]
- LOGS OR WOODY DEBRIS [1]

- EXTENSIVE >75% [11]
- MODERATE 25-75% [7]
- SPARSE 5-<25% [3]
- NEARLY ABSENT <5% [1]

Cover  
Maximum    
20

Comments

3) CHANNEL MORPHOLOGY Check ONE in each category (Or 2 & average)

- |                                             |                                              |                                                    |                                                  |
|---------------------------------------------|----------------------------------------------|----------------------------------------------------|--------------------------------------------------|
| <b>SINUOSITY</b>                            | <b>DEVELOPMENT</b>                           | <b>CHANNELIZATION</b>                              | <b>STABILITY</b>                                 |
| <input type="checkbox"/> HIGH [4]           | <input type="checkbox"/> EXCELLENT [7]       | <input checked="" type="checkbox"/> NONE [6]       | <input type="checkbox"/> HIGH [3]                |
| <input type="checkbox"/> MODERATE [3]       | <input type="checkbox"/> GOOD [5]            | <input type="checkbox"/> RECOVERED [4]             | <input checked="" type="checkbox"/> MODERATE [2] |
| <input checked="" type="checkbox"/> LOW [2] | <input type="checkbox"/> FAIR [3]            | <input type="checkbox"/> RECOVERING [3]            | <input type="checkbox"/> LOW [1]                 |
| <input type="checkbox"/> NONE [1]           | <input checked="" type="checkbox"/> POOR [1] | <input type="checkbox"/> RECENT OR NO RECOVERY [1] |                                                  |

Channel  
Maximum 11  
20

Comments

4) BANK EROSION AND RIPARIAN ZONE Check ONE in each category for EACH BANK (Or 2 per bank & average)

- |                                             |                                               |                                                           |
|---------------------------------------------|-----------------------------------------------|-----------------------------------------------------------|
| <b>EROSION</b>                              | <b>RIPARIAN WIDTH</b>                         | <b>FLOOD PLAIN QUALITY</b>                                |
| <input type="checkbox"/> NONE / LITTLE [3]  | <input type="checkbox"/> WIDE > 50m [4]       | <input type="checkbox"/> FOREST, SWAMP [3]                |
| <input type="checkbox"/> MODERATE [2]       | <input type="checkbox"/> MODERATE 10-50m [3]  | <input type="checkbox"/> SHRUB OR OLD FIELD [2]           |
| <input type="checkbox"/> HEAVY / SEVERE [1] | <input type="checkbox"/> NARROW 5-10m [2]     | <input type="checkbox"/> RESIDENTIAL, PARK, NEW FIELD [1] |
|                                             | <input type="checkbox"/> VERY NARROW < 5m [1] | <input type="checkbox"/> FENCED PASTURE [1]               |
|                                             | <input type="checkbox"/> NONE [0]             | <input type="checkbox"/> OPEN PASTURE, ROWCROP [0]        |
|                                             |                                               | <input type="checkbox"/> CONSERVATION TILLAGE [1]         |
|                                             |                                               | <input type="checkbox"/> URBAN OR INDUSTRIAL [0]          |
|                                             |                                               | <input type="checkbox"/> MINING / CONSTRUCTION [0]        |

Indicate predominant land use(s) past 100m riparian.

Riparian  
Maximum    
10

Comments

5) POOL / GLIDE AND RIFFLE / RUN QUALITY

- |                                              |                                                        |                                              |
|----------------------------------------------|--------------------------------------------------------|----------------------------------------------|
| <b>MAXIMUM DEPTH</b>                         | <b>CHANNEL WIDTH</b>                                   | <b>CURRENT VELOCITY</b>                      |
| Check ONE (ONLY!)                            | Check ONE (Or 2 & average)                             | Check ALL that apply                         |
| <input checked="" type="checkbox"/> > 1m [6] | <input type="checkbox"/> POOL WIDTH > RIFFLE WIDTH [2] | <input type="checkbox"/> TORRENTIAL [-1]     |
| <input type="checkbox"/> 0.7-<1m [4]         | <input type="checkbox"/> POOL WIDTH = RIFFLE WIDTH [1] | <input checked="" type="checkbox"/> SLOW [1] |
| <input type="checkbox"/> 0.4-<0.7m [2]       | <input type="checkbox"/> POOL WIDTH > RIFFLE WIDTH [0] | <input type="checkbox"/> VERY FAST [1]       |
| <input type="checkbox"/> 0.2-<0.4m [1]       |                                                        | <input type="checkbox"/> FAST [1]            |
| <input type="checkbox"/> < 0.2m [0]          |                                                        | <input type="checkbox"/> MODERATE [1]        |
|                                              |                                                        | <input type="checkbox"/> INTERSTITIAL [-1]   |
|                                              |                                                        | <input type="checkbox"/> INTERMITTENT [-2]   |
|                                              |                                                        | <input type="checkbox"/> EDDIES [1]          |

Indicate for reach - pools and riffles.

Recreation Potential  
Primary Contact  
Secondary Contact  
(circle one and comment on back)

Pool / Current  
Maximum 7  
12

Comments No Riffles

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species:

Check ONE (Or 2 & average).

NO RIFFLE [metric=0]

- |                                                      |                                                        |                                                                            |                                                    |
|------------------------------------------------------|--------------------------------------------------------|----------------------------------------------------------------------------|----------------------------------------------------|
| <b>RIFFLE DEPTH</b>                                  | <b>RUN DEPTH</b>                                       | <b>RIFFLE / RUN SUBSTRATE</b>                                              | <b>RIFFLE / RUN EMBEDDEDNESS</b>                   |
| <input type="checkbox"/> BEST AREAS > 10cm [2]       | <input checked="" type="checkbox"/> MAXIMUM > 50cm [2] | <input type="checkbox"/> STABLE (e.g., Cobble, Boulder) [2]                | <input type="checkbox"/> NONE [2]                  |
| <input type="checkbox"/> BEST AREAS 5-10cm [1]       | <input type="checkbox"/> MAXIMUM < 50cm [1]            | <input type="checkbox"/> MOD. STABLE (e.g., Large Gravel) [1]              | <input type="checkbox"/> LOW [1]                   |
| <input type="checkbox"/> BEST AREAS < 5cm [metric=0] |                                                        | <input checked="" type="checkbox"/> UNSTABLE (e.g., Fine Gravel, Sand) [0] | <input type="checkbox"/> MODERATE [0]              |
|                                                      |                                                        |                                                                            | <input checked="" type="checkbox"/> EXTENSIVE [-1] |

Riffle / Run  
Maximum 1  
8

Comments No Riffles in reach

6) GRADIENT ( ft/mi )  VERY LOW - LOW [2-4]  MODERATE [6-10]  HIGH - VERY HIGH [10-6]

%POOL:   %GLIDE:    
%RUN: 100 %RIFFLE:  

Gradient  
Maximum    
10

S-B3a

Comment RE: Reach consistency/ Is reach typical of stream?, Recreation/ Observed - Inferred, Other/ Sampling observations, Concerns, Access directions, etc.

Stream reach limited to LAD. No ditches present, 100% run, slow velocity very low gradient stream.

Plane bed

**A) SAMPLED REACH**

Check ALL that apply

- METHOD**
- BOAT
  - WADE
  - L. LINE
  - OTHER
- STAGE**
- HIGH
  - UP
  - NORMAL
  - LOW
  - DRY

**DISTANCE**

- 0.5 Km
- 0.2 Km
- 0.15 Km
- 0.12 Km
- OTHER

**CLARITY**

- 1st sample pass 2nd
- < 20 cm
  - 20-<40 cm
  - 40-70cm
  - > 70 cm/ CTB
  - SECCHI DEPTH

meters

**CANOPY**

- 1st \_\_\_\_\_ cm
- 2nd \_\_\_\_\_ cm
- > 85%- OPEN
  - 55%-<85%
  - 30%-<55%
  - 10%-<30%
  - <10%- CLOSED

**CJ RECREATION**

AREA DEPTH  
POOL:  >100ft<sup>2</sup>  >3ft

**B) AESTHETICS**

- NUISANCE ALGAE
- INVASIVE MACROPHYTES
- EXCESS TURBIDITY
- DISCOLORATION
- FOAM / SCUM
- OIL SHEEN
- TRASH / LITTER
- NUISANCE ODOR
- SLUDGE DEPOSITS
- CSOs/SSOs/OUTFALLS

**D) MAINTENANCE**

Circle some & COMMENT

- PUBLIC / PRIVATE / BOTH / NA
- ACTIVE / HISTORIC / BOTH / NA
- YOUNG-SUCCESSION-OLD
- SPRAY / SNAG / REMOVED
- MODIFIED / DIPPED OUT / NA
- LEVEED / ONE SIDED
- RELOCATED / CUTOFFS
- MOVING-BEDLOAD-STABLE
- ARMoured / SLUMPS
- ISLANDS / SCoured
- IMPOUNDED / DESICCATED
- FLOOD CONTROL / DRAINAGE

**E) ISSUES**

- WWTP / CSO / NPDES / INDUSTRY
- HARDENED / URBAN / DIRT&GRIME
- CONTAMINATED / LANDFILL
- BMPs-CONSTRUCTION-SEDIMENT
- LOGGING / IRRIGATION / COOLING
- BANK / EROSION / SURFACE
- FALSE BANK / MANURE / LAGOON
- WASH H<sub>2</sub>O / TILE / H<sub>2</sub>O TABLE
- ACID / MINE / QUARRY / FLOW
- NATURAL / WETLAND / STAGNANT
- PARK / GOLF / LAWN / HOME
- ATMOSPHERE / DATA PAUCITY

**F) MEASUREMENTS**

- $\bar{x}$  width
- $\bar{x}$  depth
- max. depth
- $\bar{x}$  bankfull width
- bankfull  $\bar{x}$  depth
- W/D ratio
- bankfull max. depth
- floodprone  $x^2$  width
- entrench. ratio

Legacy Tree:

**Stream Drawing:**





Stream & Location: S-B6a TM

RM:    Date: 11/29/06

Scorers Full Name & Affiliation: LK/MB

River Code:    STORET #:    Lat./ Long.: 39.317309, -80.527175

Office verified location

1) SUBSTRATE Check ONLY Two substrate TYPE BOXES; estimate % or note every type present

Check ONE (Or 2 & average)

<b>BEST TYPES</b>		<b>POOL RIFFLE</b>	<b>OTHER TYPES</b>		<b>POOL RIFFLE</b>	<b>ORIGIN</b>	<b>QUALITY</b>	18														
<input type="checkbox"/> BLDR /SLABS [10]	<input type="checkbox"/> BOULDER [9]	<input type="checkbox"/> COBBLE [8]	<input type="checkbox"/> GRAVEL [7]	<input type="checkbox"/> SAND [6]	<input checked="" type="checkbox"/> BEDROCK [5]	<input type="checkbox"/> LIMESTONE [1]	<input type="checkbox"/> TILLS [1]		<input type="checkbox"/> WETLANDS [0]	<input type="checkbox"/> HARDPAN [0]	<input type="checkbox"/> SANDSTONE [0]	<input type="checkbox"/> RIP/RAP [0]	<input type="checkbox"/> LACUSTURINE [0]	<input type="checkbox"/> SHALE [-1]	<input type="checkbox"/> COAL FINES [-2]	<input type="checkbox"/> HEAVY [-2]	<input type="checkbox"/> MODERATE [-1]	<input type="checkbox"/> NORMAL [0]	<input type="checkbox"/> FREE [1]	<input type="checkbox"/> EXTENSIVE [-2]	<input type="checkbox"/> MODERATE [-1]	<input type="checkbox"/> NORMAL [0]

NUMBER OF BEST TYPES:  4 or more [2]  3 or less [0]

Comments: Iron Clac in some pools

2) INSTREAM COVER Indicate presence 0 to 3: 0-Absent, 1-Very small amounts or if more common of marginal quality; 2-Moderate amounts, but not of highest quality or in small amounts of highest quality; 3-Highest quality in moderate or greater amounts (e.g., very large boulders in deep or fast water, large diameter log that is stable, well developed rootwad in deep / fast water, or deep, well-defined, functional pools.

AMOUNT

Check ONE (Or 2 & average)

<input type="checkbox"/> UNDERCUT BANKS [1]	<input type="checkbox"/> OVERHANGING VEGETATION [1]	<input type="checkbox"/> SHALLOWS (IN SLOW WATER) [1]	<input type="checkbox"/> ROOTMATS [1]	<input type="checkbox"/> POOLS > 70cm [2]	<input type="checkbox"/> ROOTWADS [1]	<input type="checkbox"/> BOULDERS [1]	<input type="checkbox"/> OXBOWS, BACKWATERS [1]	<input type="checkbox"/> AQUATIC MACROPHYTES [1]	<input type="checkbox"/> LOGS OR WOODY DEBRIS [1]	<input type="checkbox"/> EXTENSIVE >75% [11]	<input type="checkbox"/> MODERATE 25-75% [7]	<input type="checkbox"/> SPARSE 5-<25% [3]	<input type="checkbox"/> NEARLY ABSENT <5% [1]	
---------------------------------------------	-----------------------------------------------------	-------------------------------------------------------	---------------------------------------	-------------------------------------------	---------------------------------------	---------------------------------------	-------------------------------------------------	--------------------------------------------------	---------------------------------------------------	----------------------------------------------	----------------------------------------------	--------------------------------------------	------------------------------------------------	--

Comments:   

3) CHANNEL MORPHOLOGY Check ONE in each category (Or 2 & average)

<b>SINUOSITY</b>	<b>DEVELOPMENT</b>	<b>CHANNELIZATION</b>	<b>STABILITY</b>	13										
<input type="checkbox"/> HIGH [4]	<input type="checkbox"/> MODERATE [3]	<input checked="" type="checkbox"/> LOW [2]	<input type="checkbox"/> NONE [1]		<input type="checkbox"/> EXCELLENT [7]	<input type="checkbox"/> GOOD [5]	<input checked="" type="checkbox"/> FAIR [3]	<input type="checkbox"/> POOR [1]	<input checked="" type="checkbox"/> NONE [6]	<input type="checkbox"/> RECOVERED [4]	<input type="checkbox"/> RECOVERING [3]	<input type="checkbox"/> RECENT OR NO RECOVERY [1]	<input type="checkbox"/> HIGH [3]	<input checked="" type="checkbox"/> MODERATE [2]

Comments:   

4) BANK EROSION AND RIPARIAN ZONE Check ONE in each category for EACH BANK (Or 2 per bank & average)

<b>EROSION</b>	<b>RIPARIAN WIDTH</b>	<b>FLOOD PLAIN QUALITY</b>													
<input type="checkbox"/> NONE / LITTLE [3]	<input type="checkbox"/> MODERATE [2]	<input type="checkbox"/> HEAVY / SEVERE [1]		<input type="checkbox"/> WIDE > 50m [4]	<input type="checkbox"/> MODERATE 10-50m [3]	<input type="checkbox"/> NARROW 5-10m [2]	<input type="checkbox"/> VERY NARROW < 5m [1]	<input type="checkbox"/> NONE [0]	<input type="checkbox"/> FOREST, SWAMP [3]	<input type="checkbox"/> SHRUB OR OLD FIELD [2]	<input type="checkbox"/> RESIDENTIAL, PARK, NEW FIELD [1]	<input type="checkbox"/> FENCED PASTURE [1]	<input type="checkbox"/> OPEN PASTURE, ROWCROP [0]	<input type="checkbox"/> CONSERVATION TILLAGE [1]	<input type="checkbox"/> URBAN OR INDUSTRIAL [0]

Comments:   

5) POOL / GLIDE AND RIFFLE / RUN QUALITY

<b>MAXIMUM DEPTH</b>	<b>CHANNEL WIDTH</b>	<b>CURRENT VELOCITY</b>	5
<input type="checkbox"/> > 1m [6]	<input checked="" type="checkbox"/> POOL WIDTH > RIFFLE WIDTH [2]	<input type="checkbox"/> TORRENTIAL [-1]	

Comments:   

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species:

<b>RIFFLE DEPTH</b>	<b>RUN DEPTH</b>	<b>RIFFLE / RUN SUBSTRATE</b>	<b>RIFFLE / RUN EMBEDDEDNESS</b>	7
<input checked="" type="checkbox"/> BEST AREAS > 10cm [2]	<input type="checkbox"/> MAXIMUM > 50cm [2]	<input checked="" type="checkbox"/> STABLE (e.g., Cobble, Boulder) [2]	<input checked="" type="checkbox"/> NONE [2]	

Comments:   

6) GRADIENT ( ft/mi)  VERY LOW - LOW [2-4]  MODERATE [6-10]  HIGH - VERY HIGH [10-6]

DRAINAGE AREA ( mi<sup>2</sup>)

% POOL: 30 % GLIDE:    % RUN: 30 % RIFFLE: 40

Gradient Maximum 10

**A) SAMPLED REACH**

Check ALL that apply

- METHOD**
- BOAT
  - WADE
  - L. LINE
  - OTHER
- DISTANCE**
- 0.5 Km
  - 0.2 Km
  - 0.15 Km
  - 0.12 Km
  - OTHER

**STAGE**

- 1st -sample pass- 2nd
- HIGH
  - UP
  - NORMAL
  - LOW
  - DRY

**CLARITY**

- 1st -sample pass- 2nd
- < 20 cm
  - 20-<40 cm
  - 40-70 cm
  - > 70 cm/ CTB
  - SECCHI DEPTH

**CANOPY**

- 1st pass \_\_\_\_\_ cm
- 2nd pass \_\_\_\_\_ cm
- > 85%- OPEN
  - 55%-<85%
  - 30%-<55%
  - 10%-<30%
  - <10%- CLOSED

**C) RECREATION**

- AREA DEPTH
- POOL:  >100ft<sup>2</sup>  >3ft

Comment RE: Reach consistency/ Is reach typical of stream?, Recreation/ Observed - Inferred, Other/ Sampling observations, Concerns, Access directions, etc.

S-B6a TM: Reach limited to LOD. Vegetation along banks.

Moderate undercutting. R. Flies formed on cobbles.

Riffle width = 3' Run/Pool width = 15'

Poorly Formed Riffle-Pool Complex

**B) AESTHETICS**

- NUISANCE ALGAE
- INVASIVE MACROPHYTES
- EXCESS TURBIDITY
- DISCOLORATION
- FOAM / SCUM
- OIL SHEEN
- TRASH / LITTER
- NUISANCE ODOR
- SLUDGE DEPOSITS
- CSOs/SSOs/OUTFALLS

**D) MAINTENANCE**

Circle some & COMMENT

- PUBLIC / PRIVATE / BOTH / NA
- ACTIVE / HISTORIC / BOTH / NA
- YOUNG-SUCCESSION-OLD
- SPRAY / SNAG / REMOVED
- MODIFIED / DIPPED OUT / NA
- LEVEED / ONE SIDED
- RELOCATED / CUTOFFS
- MOVING-BEDLOAD-STABLE
- ARMOURED / SLUMPS
- ISLANDS / SCOURED
- IMPOUNDED / DESICCATED
- FLOOD CONTROL / DRAINAGE

**E) ISSUES**

- WWTP / CSO / NPDES / INDUSTRY
- HARDENED / URBAN / DIRT&GRIME
- CONTAMINATED / LANDFILL
- BMPs-CONSTRUCTION-SEDIMENT
- LOGGING / IRRIGATION / COOLING
- BANK / EROSION / SURFACE
- FALSE BANK / MANURE / LAGOON
- WASH H<sub>2</sub>O / TILE / H<sub>2</sub>O TABLE
- ACID / MINE / QUARRY / FLOW
- NATURAL / WETLAND / STAGNANT
- PARK / GOLF / LAWN / HOME
- ATMOSPHERE / DATA PAUCITY

**F) MEASUREMENTS**

- $\bar{x}$  width
- $\bar{x}$  depth
- max. depth
- $\bar{x}$  bankfull width
- bankfull  $\bar{x}$  depth
- W/D ratio
- bankfull max. depth
- floodprone  $x^2$  width
- entrench. ratio

Legacy Tree:

**Stream Drawing:**





# Qualitative Habitat Evaluation Index and Use Assessment Field Sheet

QHEI Score:  

Stream & Location: S-B6A-TM RM:   Date: 12 / 02 / 06

Scorers Full Name & Affiliation: MB

River Code:   STORET #:   Lat./ Long.: 39.317023, -80.526157 Office verified location

**1] SUBSTRATE** Check ONLY Two substrate TYPE BOXES; estimate % or note every type present

<p><b>BEST TYPES</b></p> <input type="checkbox"/> BLDR /SLABS [10] <input type="checkbox"/> BOULDER [9] <input type="checkbox"/> COBBLE [8] <input type="checkbox"/> GRAVEL [7] <input type="checkbox"/> SAND [6] <input type="checkbox"/> BEDROCK [5]	<p><b>POOL RIFFLE</b></p> <p>_____</p>	<p><b>OTHER TYPES</b></p> <input type="checkbox"/> HARDPAN [4] <input type="checkbox"/> DETRITUS [3] <input type="checkbox"/> MUCK [2] <input type="checkbox"/> SILT [2] <input type="checkbox"/> ARTIFICIAL [0]	<p><b>POOL RIFFLE</b></p> <p>_____</p>	<p><b>ORIGIN</b></p> <input type="checkbox"/> LIMESTONE [1] <input type="checkbox"/> TILLS [1] <input type="checkbox"/> WETLANDS [0] <input type="checkbox"/> HARDPAN [0] <input type="checkbox"/> SANDSTONE [0] <input type="checkbox"/> RIP/RAP [0] <input type="checkbox"/> LACUSTURINE [0] <input type="checkbox"/> SHALE [-1] <input type="checkbox"/> COAL FINES [-2]	<p><b>QUALITY</b></p> <input type="checkbox"/> HEAVY [-2] <input type="checkbox"/> MODERATE [-1] <input type="checkbox"/> NORMAL [0] <input type="checkbox"/> FREE [1] <input type="checkbox"/> EXTENSIVE [-2] <input type="checkbox"/> MODERATE [-1] <input type="checkbox"/> NORMAL [0] <input type="checkbox"/> NONE [1]	<p><b>Substrate</b></p> <div style="border: 1px solid black; border-radius: 15px; width: 40px; height: 40px; display: flex; align-items: center; justify-content: center; margin: 10px auto;">18</div> <p>Maximum 20</p>
-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	----------------------------------------	------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	----------------------------------------	-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

Check ONE (Or 2 & average)

NUMBER OF BEST TYPES:  4 or more [2]  3 or less [0]

Comments: \_\_\_\_\_

**2] INSTREAM COVER** Indicate presence 0 to 3: 0-Absent; 1-Very small amounts or if more common of marginal quality; 2-Moderate amounts, but not of highest quality or in small amounts of highest quality; 3-Highest quality in moderate or greater amounts (e.g., very large boulders in deep or fast water, large diameter log that is stable, well developed rootwad in deep / fast water, or deep, well-defined, functional pools.

<p><b>UNDERCUT BANKS [1]</b></p> <p><b>OVERHANGING VEGETATION [1]</b></p> <p><b>SHALLOWS (IN SLOW WATER) [1]</b></p> <p><b>ROOTMATS [1]</b></p>	<p><b>POOLS &gt; 70cm [2]</b></p> <p><b>ROOTWADS [1]</b></p> <p><b>BOULDERS [1]</b></p>	<p><b>OXBOWS, BACKWATERS [1]</b></p> <p><b>AQUATIC MACROPHYTES [1]</b></p> <p><b>LOGS OR WOODY DEBRIS [1]</b></p>	<p><b>AMOUNT</b></p> <p>Check ONE (Or 2 &amp; average)</p> <input type="checkbox"/> EXTENSIVE >75% [1] <input type="checkbox"/> MODERATE 25-75% [7] <input type="checkbox"/> SPARSE 5-<25% [3] <input type="checkbox"/> NEARLY ABSENT <5% [1]	<p><b>Cover</b></p> <div style="border: 1px solid black; border-radius: 15px; width: 40px; height: 40px; display: flex; align-items: center; justify-content: center; margin: 10px auto;"> </div> <p>Maximum 20</p>
-------------------------------------------------------------------------------------------------------------------------------------------------	-----------------------------------------------------------------------------------------	-------------------------------------------------------------------------------------------------------------------	--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

Comments: \_\_\_\_\_

**3] CHANNEL MORPHOLOGY** Check ONE in each category (Or 2 & average)

<p><b>SINUOSITY</b></p> <input type="checkbox"/> HIGH [4] <input type="checkbox"/> MODERATE [3] <input type="checkbox"/> LOW [2] <input type="checkbox"/> NONE [1]	<p><b>DEVELOPMENT</b></p> <input type="checkbox"/> EXCELLENT [7] <input type="checkbox"/> GOOD [5] <input type="checkbox"/> FAIR [3] <input checked="" type="checkbox"/> POOR [1]	<p><b>CHANNELIZATION</b></p> <input checked="" type="checkbox"/> NONE [6] <input type="checkbox"/> RECOVERED [4] <input type="checkbox"/> RECOVERING [3] <input type="checkbox"/> RECENT OR NO RECOVERY [1]	<p><b>STABILITY</b></p> <input type="checkbox"/> HIGH [3] <input checked="" type="checkbox"/> MODERATE [2] <input type="checkbox"/> LOW [1]	<p><b>Channel</b></p> <div style="border: 1px solid black; border-radius: 15px; width: 40px; height: 40px; display: flex; align-items: center; justify-content: center; margin: 10px auto;">11</div> <p>Maximum 20</p>
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Comments: \_\_\_\_\_

**4] BANK EROSION AND RIPARIAN ZONE** Check ONE in each category for EACH BANK (Or 2 per bank & average)

<p><b>EROSION</b></p> <input type="checkbox"/> NONE / LITTLE [3] <input type="checkbox"/> MODERATE [2] <input type="checkbox"/> HEAVY / SEVERE [1]	<p><b>RIPARIAN WIDTH</b></p> <input type="checkbox"/> WIDE > 50m [4] <input type="checkbox"/> MODERATE 10-50m [3] <input type="checkbox"/> NARROW 5-10m [2] <input type="checkbox"/> VERY NARROW < 5m [1] <input type="checkbox"/> NONE [0]	<p><b>FLOOD PLAIN QUALITY</b></p> <input type="checkbox"/> FOREST, SWAMP [3] <input type="checkbox"/> SHRUB OR OLD FIELD [2] <input type="checkbox"/> RESIDENTIAL, PARK, NEW FIELD [1] <input type="checkbox"/> FENCED PASTURE [1] <input type="checkbox"/> OPEN PASTURE, ROWCROP [0]	<p><b>CONSERVATION TILLAGE [1]</b></p> <p><b>URBAN OR INDUSTRIAL [0]</b></p> <p><b>MINING / CONSTRUCTION [0]</b></p>	<p><b>Riparian</b></p> <div style="border: 1px solid black; border-radius: 15px; width: 40px; height: 40px; display: flex; align-items: center; justify-content: center; margin: 10px auto;"> </div> <p>Maximum 10</p>
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Comments: \_\_\_\_\_

**5] POOL / GLIDE AND RIFFLE / RUN QUALITY**

<p><b>MAXIMUM DEPTH</b></p> <p>Check ONE (ONLY)</p> <input type="checkbox"/> > 1m [6] <input type="checkbox"/> 0.7-<1m [4] <input type="checkbox"/> 0.4-<0.7m [2] <input checked="" type="checkbox"/> 0.2-<0.4m [1] <input type="checkbox"/> < 0.2m [0]	<p><b>CHANNEL WIDTH</b></p> <p>Check ONE (Or 2 &amp; average)</p> <input checked="" type="checkbox"/> POOL WIDTH > RIFFLE WIDTH [2] <input type="checkbox"/> POOL WIDTH = RIFFLE WIDTH [1] <input type="checkbox"/> POOL WIDTH < RIFFLE WIDTH [0]	<p><b>CURRENT VELOCITY</b></p> <p>Check ALL that apply</p> <input type="checkbox"/> TORRENTIAL [-1] <input type="checkbox"/> VERY FAST [1] <input type="checkbox"/> FAST [1] <input checked="" type="checkbox"/> MODERATE [1] <input type="checkbox"/> SLOW [1] <input type="checkbox"/> INTERSTITIAL [-1] <input type="checkbox"/> INTERMITTENT [-2] <input type="checkbox"/> EDDIES [1]	<p><b>Recreation Potential</b></p> <p><b>Primary Contact</b></p> <p><b>Secondary Contact</b></p> <p>(circle one and comment on back)</p>	<p><b>Pool / Current</b></p> <div style="border: 1px solid black; border-radius: 15px; width: 40px; height: 40px; display: flex; align-items: center; justify-content: center; margin: 10px auto;">5</div> <p>Maximum 12</p>
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Comments: \_\_\_\_\_

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species:  NO RIFFLE [metric=0]

<p><b>RIFFLE DEPTH</b></p> <input type="checkbox"/> BEST AREAS > 10cm [2] <input checked="" type="checkbox"/> BEST AREAS 5-10cm [1] <input type="checkbox"/> BEST AREAS < 5cm [metric=0]	<p><b>RUN DEPTH</b></p> <input type="checkbox"/> MAXIMUM > 50cm [2] <input checked="" type="checkbox"/> MAXIMUM < 50cm [1]	<p><b>RIFFLE / RUN SUBSTRATE</b></p> <input type="checkbox"/> STABLE (e.g., Cobble, Boulder) [2] <input checked="" type="checkbox"/> MOD. STABLE (e.g., Large Gravel) [1] <input type="checkbox"/> UNSTABLE (e.g., Fine Gravel, Sand) [0]	<p><b>RIFFLE / RUN EMBEDDEDNESS</b></p> <input type="checkbox"/> NONE [2] <input checked="" type="checkbox"/> LOW [1] <input type="checkbox"/> MODERATE [0] <input type="checkbox"/> EXTENSIVE [-1]	<p><b>Riffle / Run</b></p> <div style="border: 1px solid black; border-radius: 15px; width: 40px; height: 40px; display: flex; align-items: center; justify-content: center; margin: 10px auto;">4</div> <p>Maximum 8</p>
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Comments: \_\_\_\_\_

**6] GRADIENT** (ft/mi)  VERY LOW - LOW [2-4]  MODERATE [6-10]  HIGH - VERY HIGH [10-6]

**DRAINAGE AREA** (mi<sup>2</sup>)

%POOL: 55 %GLIDE:   %RUN: 5 %RIFFLE: 40

**Gradient**

Maximum 10

**A) SAMPLED REACH**

Check ALL that apply

- METHOD**
- BOAT
  - WADE
  - L. LINE
  - OTHER
- DISTANCE**
- 0.5 Km
  - 0.2 Km
  - 0.15 Km
  - 0.12 Km
  - OTHER

- STAGE**
- 1st -sample pass- 2nd
  - HIGH
  - UP
  - NORMAL
  - LOW
  - DRY

- CLARITY**
- 1st --sample pass-- 2nd
  - < 20 cm
  - 20-40 cm
  - 40-70 cm
  - > 70 cm/ CTB
  - SECCHI DEPTH

- CANOPY**
- 1st \_\_\_\_\_ cm
  - 2nd \_\_\_\_\_ cm
  - > 85% - OPEN
  - 55% - < 85%
  - 30% - < 55%
  - 10% - < 30%
  - < 10% - CLOSED

- C) RECREATION** AREA DEPTH
- POOL:  > 100ft<sup>2</sup>  > 3ft

Comment RE: Reach consistency/ Is reach typical of stream?, Recreation/ Observed - Inferred, Other/ Sampling observations, Concerns, Access directions, etc.

SB-6A-TM - poorly developed riffles w/ cobble + large gravel substrate. Embeddedness is minimal in riffles, more sand + fine in pool. Access limited to LOD. banks mostly stable w/ some understory. banks vegetated w/ grass + small shrubs

Poorly developed Riffle-pool complex

- B) AESTHETICS**
- NUISANCE ALGAE
  - INVASIVE MACROPHYTES
  - EXCESS TURBIDITY
  - DISCOLORATION
  - FOAM / SCUM
  - OIL SHEEN
  - TRASH / LITTER
  - NUISANCE ODOR
  - SLUDGE DEPOSITS
  - CSOs/SSOs/OUTFALLS

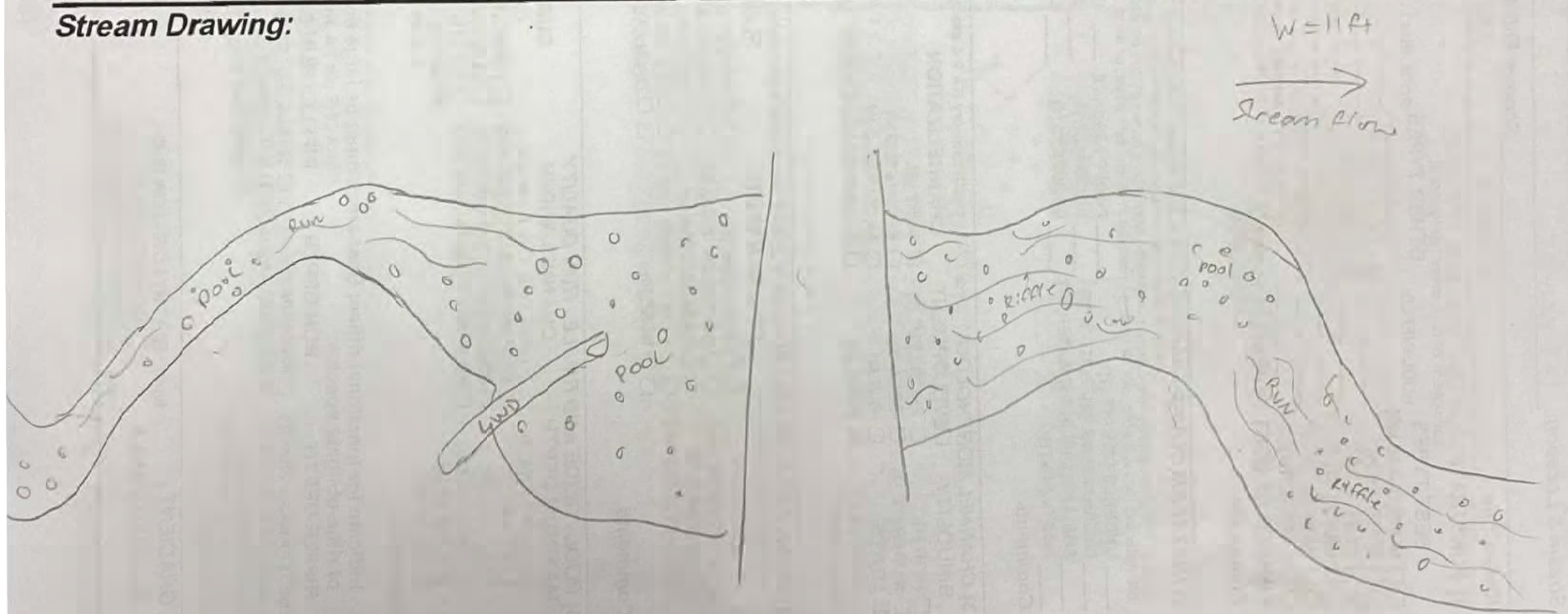
- D) MAINTENANCE**
- PUBLIC / PRIVATE / BOTH / NA
  - ACTIVE / HISTORIC / BOTH / NA
  - YOUNG-SUCCESSION-OLD
  - SPRAY / SNAG / REMOVED
  - MODIFIED / DIPPED OUT / NA
  - LEVEED / ONE SIDED
  - RELOCATED / CUTOFFS
  - MOVING-BEDLOAD-STABLE
  - ARMORED / SLUMPS
  - ISLANDS / SCOURED
  - IMPOUNDED / DESICCATED
  - FLOOD CONTROL / DRAINAGE

Circle some & COMMENT

- E) ISSUES**
- WWTP / CSO / NPDES / INDUSTRY
  - HARDENED / URBAN / DIRT&GRIME
  - CONTAMINATED / LANDFILL
  - BMPs-CONSTRUCTION-SEDIMENT
  - LOGGING / IRRIGATION / COOLING
  - BANK / EROSION / SURFACE
  - FALSE BANK / MANURE / LAGOON
  - WASH H<sub>2</sub>O / TILE / H<sub>2</sub>O TABLE
  - ACID / MINE / QUARRY / FLOW
  - NATURAL / WETLAND / STAGNANT
  - PARK / GOLF / LAWN / HOME
  - ATMOSPHERE / DATA PAUCITY

- F) MEASUREMENTS**
- $\bar{x}$  width
  - $\bar{x}$  depth
  - max. depth
  - $\bar{x}$  bankfull width
  - bankfull  $\bar{x}$  depth
  - W/D ratio
  - bankfull max. depth
  - floodprone  $x^2$  width
  - entrench. ratio
- Legacy Tree:

**Stream Drawing:**



Stream & Location: S-411 10:30 RM:    Date: 11/17/21

Scorers Full Name & Affiliation: LK  
 River Code:    STORET #:    (NAD 83 - decimal) Lat./Long.:    39.200749, -80.55319 Office verified location

**1] SUBSTRATE** Check ONLY Two substrate TYPE BOXES; estimate % or note every type present. Check ONE (Or 2 & average)

<b>BEST TYPES</b>	<b>POOL RIFFLE</b>	<b>OTHER TYPES</b>	<b>POOL RIFFLE</b>	<b>ORIGIN</b>	<b>QUALITY</b>
<input type="checkbox"/> BLDR /SLABS [10]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> HARDPAN [4]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> LIMESTONE [1]	<input type="checkbox"/> HEAVY [-2]
<input type="checkbox"/> BOULDER [9]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> DETRITUS [3]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> TILLS [1]	<input type="checkbox"/> MODERATE [-1]
<input type="checkbox"/> COBBLE [8]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> MUCK [2]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> WETLANDS [0]	<input type="checkbox"/> NORMAL [0]
<input checked="" type="checkbox"/> GRAVEL [7]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> SILT [2]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> HARDPAN [0]	<input type="checkbox"/> FREE [1]
<input checked="" type="checkbox"/> SAND [6]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> ARTIFICIAL [0]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> SANDSTONE [0]	<input type="checkbox"/> EXTENSIVE [-2]
<input type="checkbox"/> BEDROCK [5]	<input type="checkbox"/> <input type="checkbox"/>			<input type="checkbox"/> RIP/RAP [0]	<input type="checkbox"/> MODERATE [-1]

NUMBER OF BEST TYPES:  4 or more [2]  3 or less [0]

Comments:   

Substrate  
16  
 Maximum  
 20

**2] INSTREAM COVER** Indicate presence 0 to 3: 0-Absent; 1-Very small amounts or if more common of marginal quality; 2-Moderate amounts, but not of highest quality or in small amounts of highest quality; 3-Highest quality in moderate or greater amounts (e.g., very large boulders in deep or fast water, large diameter log that is stable, well developed rootwad in deep / fast water, or deep, well-defined, functional pools). Check ONE (Or 2 & average)

<input type="checkbox"/> UNDERCUT BANKS [1]	<input type="checkbox"/> POOLS > 70cm [2]	<input type="checkbox"/> OXBOWS, BACKWATERS [1]	<input type="checkbox"/> EXTENSIVE >75% [11]
<input type="checkbox"/> OVERHANGING VEGETATION [1]	<input type="checkbox"/> ROOTWADS [1]	<input type="checkbox"/> AQUATIC MACROPHYTES [1]	<input type="checkbox"/> MODERATE 25-75% [7]
<input type="checkbox"/> SHALLOWS (IN SLOW WATER) [1]	<input type="checkbox"/> BOULDERS [1]	<input type="checkbox"/> LOGS OR WOODY DEBRIS [1]	<input type="checkbox"/> SPARSE 5-<25% [3]
<input type="checkbox"/> ROOTMATS [1]			<input type="checkbox"/> NEARLY ABSENT <5% [1]

Comments:   

Cover  
    
 Maximum  
 20

**3] CHANNEL MORPHOLOGY** Check ONE in each category (Or 2 & average)

<b>SINUOSITY</b>	<b>DEVELOPMENT</b>	<b>CHANNELIZATION</b>	<b>STABILITY</b>
<input type="checkbox"/> HIGH [4]	<input type="checkbox"/> EXCELLENT [7]	<input checked="" type="checkbox"/> NONE [6]	<input type="checkbox"/> HIGH [3]
<input type="checkbox"/> MODERATE [3]	<input type="checkbox"/> GOOD [5]	<input type="checkbox"/> RECOVERED [4]	<input checked="" type="checkbox"/> MODERATE [2]
<input type="checkbox"/> LOW [2]	<input type="checkbox"/> FAIR [3]	<input type="checkbox"/> RECOVERING [3]	<input type="checkbox"/> LOW [1]
<input checked="" type="checkbox"/> NONE [1]	<input checked="" type="checkbox"/> POOR [1]	<input type="checkbox"/> RECENT OR NO RECOVERY [1]	

Comments:   

Channel  
10  
 Maximum  
 20

**4] BANK EROSION AND RIPARIAN ZONE** Check ONE in each category for EACH BANK (Or 2 per bank & average)

<b>EROSION</b>	<b>RIPARIAN WIDTH</b>	<b>FLOOD PLAIN QUALITY</b>
<input type="checkbox"/> NONE / LITTLE [3]	<input type="checkbox"/> WIDE > 50m [4]	<input type="checkbox"/> FOREST, SWAMP [3]
<input type="checkbox"/> MODERATE [2]	<input type="checkbox"/> MODERATE 10-50m [3]	<input type="checkbox"/> SHRUB OR OLD FIELD [2]
<input type="checkbox"/> HEAVY / SEVERE [1]	<input type="checkbox"/> NARROW 5-10m [2]	<input type="checkbox"/> RESIDENTIAL, PARK, NEW FIELD [1]
	<input type="checkbox"/> VERY NARROW < 5m [1]	<input type="checkbox"/> FENCED PASTURE [1]
	<input type="checkbox"/> NONE [0]	<input type="checkbox"/> OPEN PASTURE, ROWCROP [0]

Comments:   

Indicate predominant land use(s) past 100m riparian.  
 Riparian  
    
 Maximum  
 10

**5] POOL / GLIDE AND RIFFLE / RUN QUALITY**

<b>MAXIMUM DEPTH</b>	<b>CHANNEL WIDTH</b>	<b>CURRENT VELOCITY</b>	<b>Recreation Potential</b>
Check ONE (ONLY!)	Check ONE (Or 2 & average)	Check ALL that apply	Primary Contact
<input type="checkbox"/> > 1m [6]	<input type="checkbox"/> POOL WIDTH > RIFFLE WIDTH [2]	<input type="checkbox"/> TORRENTIAL [-1]	Secondary Contact
<input type="checkbox"/> 0.7-<1m [4]	<input checked="" type="checkbox"/> POOL WIDTH = RIFFLE WIDTH [1]	<input checked="" type="checkbox"/> SLOW [1]	(circle one and comment on back)
<input checked="" type="checkbox"/> 0.4-<0.7m [2]	<input type="checkbox"/> POOL WIDTH > RIFFLE WIDTH [0]	<input type="checkbox"/> VERY FAST [1]	
<input type="checkbox"/> 0.2-<0.4m [1]		<input type="checkbox"/> FAST [1]	
<input type="checkbox"/> < 0.2m [0]		<input type="checkbox"/> MODERATE [1]	

Comments:   

Pool / Current  
4  
 Maximum  
 12

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species: Check ONE (Or 2 & average).  NO RIFFLE [metric=0]

<b>RIFFLE DEPTH</b>	<b>RUN DEPTH</b>	<b>RIFFLE / RUN SUBSTRATE</b>	<b>RIFFLE / RUN EMBEDDEDNESS</b>
<input type="checkbox"/> BEST AREAS > 10cm [2]	<input type="checkbox"/> MAXIMUM > 50cm [2]	<input type="checkbox"/> STABLE (e.g., Cobble, Boulder) [2]	<input type="checkbox"/> NONE [2]
<input type="checkbox"/> BEST AREAS 5-10cm [1]	<input checked="" type="checkbox"/> MAXIMUM < 50cm [1]	<input checked="" type="checkbox"/> MOD. STABLE (e.g., Large Gravel) [1]	<input type="checkbox"/> LOW [1]
<input checked="" type="checkbox"/> BEST AREAS < 5cm [metric=0]		<input type="checkbox"/> UNSTABLE (e.g., Fine Gravel, Sand) [0]	<input checked="" type="checkbox"/> MODERATE [0]
			<input type="checkbox"/> EXTENSIVE [-1]

Comments:   

Riffle / Run  
2  
 Maximum  
 8

**6] GRADIENT** (ft/mi)  VERY LOW - LOW [2-4]  MODERATE [6-10]  HIGH - VERY HIGH [10-6]

DRAINAGE AREA (mi<sup>2</sup>)

% POOL: 15 % GLIDE:     
 % RUN: 80 % RIFFLE: 5

Comments:   

Gradient  
    
 Maximum  
 10

**A) SAMPLED REACH**

Check ALL that apply

**METHOD**

- BOAT
- WADE
- L. LINE
- OTHER

**STAGE**

1st -sample pass- 2nd

- HIGH
- UP
- NORMAL
- LOW
- DRY

**DISTANCE**

- 0.5 Km
- 0.2 Km
- 0.15 Km
- 0.12 Km
- OTHER

**CLARITY**

1st --sample pass-- 2nd

- < 20 cm
- 20-<40 cm
- 40-70 cm
- > 70 cm/ CTB
- SECCHI DEPTH

meters

**CANOPY**

- > 85%- OPEN
- 55%-<85%
- 30%-<55%
- 10%-<30%
- <10%- CLOSED

- 1st \_\_\_\_\_ cm
- 2nd \_\_\_\_\_ cm

**C) RECREATION**

AREA DEPTH

POOL:  >100ft  >3ft

Comment RE: Reach consistency/ Is reach typical of stream?, Recreation/ Observed - Inferred, Other/ Sampling observations, Concerns, Access directions, etc.

S-A II UPPER HALF ALL SLOW FLOWING RUN. LOWER HALF ALL GRAVEL PLANE BED

PLANE BED

**B) AESTHETICS**

- NUISANCE ALGAE
- INVASIVE MACROPHYTES
- EXCESS TURBIDITY
- DISCOLORATION
- FOAM / SCUM
- OIL SHEEN
- TRASH / LITTER
- NUISANCE ODOR
- SLUDGE DEPOSITS
- CSOs/SSOs/OUTFALLS

**D) MAINTENANCE**

- PUBLIC / PRIVATE / BOTH / NA
- ACTIVE / HISTORIC / BOTH / NA
- YOUNG-SUCCESSION-OLD
- SPRAY / SNAG / REMOVED
- MODIFIED / DIPPED OUT / NA
- LEVEED / ONE SIDED
- RELOCATED / CUTOFFS
- MOVING-BEDLOAD-STABLE
- ARMoured / SLUMPS
- ISLANDS / SCoured
- IMPOUNDED / DESICCATED
- FLOOD CONTROL / DRAINAGE

Circle some & COMMENT

**E) ISSUES**

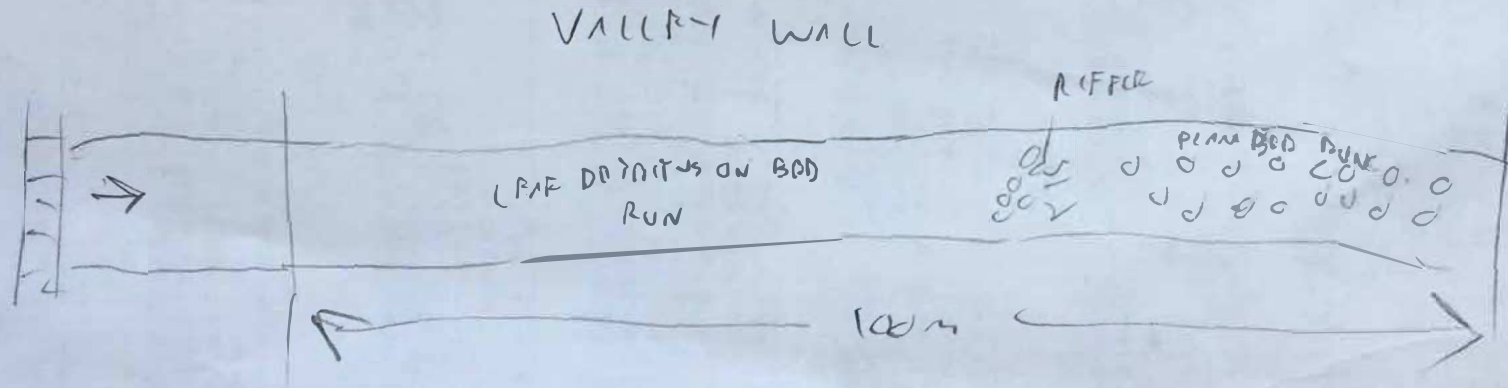
- WWTP / CSO / NPDES / INDUSTRY
- HARDENED / URBAN / DIRT&GRIME
- CONTAMINATED / LANDFILL
- BMPs-CONSTRUCTION-SEDIMENT
- LOGGING / IRRIGATION / COOLING
- BANK / EROSION / SURFACE
- FALSE BANK / MANURE / LAGOON
- WASH H<sub>2</sub>O / TILE / H<sub>2</sub>O TABLE
- ACID / MINE / QUARRY / FLOW
- NATURAL / WETLAND / STAGNANT
- PARK / GOLF / LAWN / HOME
- ATMOSPHERE / DATA PAUCITY

**F) MEASUREMENTS**

- $\bar{x}$  width
- $\bar{x}$  depth
- max. depth
- $\bar{x}$  bankfull width
- bankfull  $\bar{x}$  depth
- W/D ratio
- bankfull max. depth
- floodprone  $x^2$  width
- entrench. ratio

Legacy Tree:

**Stream Drawing:**





# Qualitative Habitat Evaluation Index and Use Assessment Field Sheet

QHEI Score:   

Stream & Location: S-1 J43 11:25 RM:    Date: 11/17/21

Scorers Full Name & Affiliation: LK

River Code:    STORET #:    Lat./Long.: 39.120579, -80.581328 Office verified location

1] SUBSTRATE Check ONLY Two substrate TYPE BOXES; estimate % or note every type present

Check ONE (Or 2 & average)

<b>BEST TYPES</b>	<b>POOL RIFFLE</b>	<b>OTHER TYPES</b>	<b>POOL RIFFLE</b>	<b>ORIGIN</b>	<b>QUALITY</b>	Substrate <b>18</b> Maximum 20
<input type="checkbox"/> BLDG / SLABS [10] <input type="checkbox"/> BOULDER [9] <input type="checkbox"/> COBBLE [8] <input type="checkbox"/> GRAVEL [7] <input checked="" type="checkbox"/> SAND [6] <input type="checkbox"/> BEDROCK [5]	<u>  </u> <u>  </u>	<input type="checkbox"/> HARDPAN [4] <input checked="" type="checkbox"/> DETRITUS [3] <input type="checkbox"/> MUCK [2] <input checked="" type="checkbox"/> SILT [2] <input type="checkbox"/> ARTIFICIAL [0]	<u>  </u> <u>  </u>	<input type="checkbox"/> LIMESTONE [1] <input type="checkbox"/> TILLS [1] <input type="checkbox"/> WETLANDS [0] <input type="checkbox"/> HARDPAN [0] <input type="checkbox"/> SANDSTONE [0] <input type="checkbox"/> RIP/RAP [0] <input type="checkbox"/> LACUSTURINE [0] <input type="checkbox"/> SHALE [-1] <input type="checkbox"/> COAL FINES [-2]	<input type="checkbox"/> HEAVY [-2] <input type="checkbox"/> MODERATE [-1] <input type="checkbox"/> NORMAL [0] <input type="checkbox"/> FREE [1] <input type="checkbox"/> EXTENSIVE [-2] <input type="checkbox"/> MODERATE [-1] <input type="checkbox"/> NORMAL [0] <input type="checkbox"/> NONE [1]	

NUMBER OF BEST TYPES:  4 or more [2]  3 or less [0]

Comments:   

2] INSTREAM COVER Indicate presence 0 to 3: 0-Absent; 1-Very small amounts or if more common of marginal quality; 2-Moderate amounts, but not of highest quality or in small amounts of highest quality; 3-Highest quality in moderate or greater amounts (e.g., very large boulders in deep or fast water, large diameter log that is stable, well developed rootwad in deep / fast water, or deep, well-defined, functional pools.

AMOUNT

Check ONE (Or 2 & average)

<input type="checkbox"/> UNDERCUT BANKS [1] <input type="checkbox"/> OVERHANGING VEGETATION [1] <input type="checkbox"/> SHALLOWS (IN SLOW WATER) [1] <input type="checkbox"/> ROOTMATS [1]	<input type="checkbox"/> POOLS > 70cm [2] <input type="checkbox"/> ROOTWADS [1] <input type="checkbox"/> BOULDERS [1]	<input type="checkbox"/> OXBOWS, BACKWATERS [1] <input type="checkbox"/> AQUATIC MACROPHYTES [1] <input type="checkbox"/> LOGS OR WOODY DEBRIS [1]	<input type="checkbox"/> EXTENSIVE >75% [11] <input type="checkbox"/> MODERATE 25-75% [7] <input type="checkbox"/> SPARSE 5-<25% [3] <input type="checkbox"/> NEARLY ABSENT <5% [1]
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Comments:   

Cover Maximum    20

3] CHANNEL MORPHOLOGY Check ONE in each category (Or 2 & average)

<b>SINUOSITY</b>	<b>DEVELOPMENT</b>	<b>CHANNELIZATION</b>	<b>STABILITY</b>	Channel Maximum 20
<input type="checkbox"/> HIGH [4] <input type="checkbox"/> MODERATE [3] <input checked="" type="checkbox"/> LOW [2] <input type="checkbox"/> NONE [1]	<input type="checkbox"/> EXCELLENT [7] <input type="checkbox"/> GOOD [5] <input checked="" type="checkbox"/> FAIR [3] <input type="checkbox"/> POOR [1]	<input checked="" type="checkbox"/> NONE [6] <input type="checkbox"/> RECOVERED [4] <input type="checkbox"/> RECOVERING [3] <input type="checkbox"/> RECENT OR NO RECOVERY [1]	<input type="checkbox"/> HIGH [3] <input checked="" type="checkbox"/> MODERATE [2] <input type="checkbox"/> LOW [1]	

Comments:   

4] BANK EROSION AND RIPARIAN ZONE Check ONE in each category for EACH BANK (Or 2 per bank & average)

<b>EROSION</b>	<b>RIPARIAN WIDTH</b>	<b>FLOOD PLAIN QUALITY</b>	<b>CONSERVATION TILLAGE</b>
<input type="checkbox"/> NONE / LITTLE [3] <input type="checkbox"/> MODERATE [2] <input type="checkbox"/> HEAVY / SEVERE [1]	<input type="checkbox"/> WIDE > 50m [4] <input type="checkbox"/> MODERATE 10-50m [3] <input type="checkbox"/> NARROW 5-10m [2] <input type="checkbox"/> VERY NARROW < 5m [1] <input type="checkbox"/> NONE [0]	<input type="checkbox"/> FOREST, SWAMP [3] <input type="checkbox"/> SHRUB OR OLD FIELD [2] <input type="checkbox"/> RESIDENTIAL, PARK, NEW FIELD [1] <input type="checkbox"/> FENCED PASTURE [1] <input type="checkbox"/> OPEN PASTURE, ROWCROP [0]	<input type="checkbox"/> URBAN OR INDUSTRIAL [0] <input type="checkbox"/> MINING / CONSTRUCTION [0]

Comments:   

Indicate predominant land use(s) past 100m riparian. Riparian Maximum    10

5] POOL / GLIDE AND RIFFLE / RUN QUALITY

<b>MAXIMUM DEPTH</b> Check ONE (ONLY) <input type="checkbox"/> > 1m [6] <input type="checkbox"/> 0.7-<1m [4] <input checked="" type="checkbox"/> 0.4-<0.7m [2] <input type="checkbox"/> 0.2-<0.4m [1] <input type="checkbox"/> < 0.2m [0]	<b>CHANNEL WIDTH</b> Check ONE (Or 2 & average) <input type="checkbox"/> POOL WIDTH > RIFFLE WIDTH [2] <input checked="" type="checkbox"/> POOL WIDTH = RIFFLE WIDTH [1] <input type="checkbox"/> POOL WIDTH < RIFFLE WIDTH [0]	<b>CURRENT VELOCITY</b> Check ALL that apply <input type="checkbox"/> TORRENTIAL [-1] <input type="checkbox"/> VERY FAST [1] <input type="checkbox"/> FAST [1] <input type="checkbox"/> MODERATE [1]	<input type="checkbox"/> SLOW [1] <input type="checkbox"/> INTERSTITIAL [-1] <input type="checkbox"/> INTERMITTENT [-2] <input type="checkbox"/> EDDIES [1]	Recreation Potential Primary Contact Secondary Contact (circle one and comment on back)
-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	----------------------------------------------------------------------------------------------------------------------------------------------------------------------	--------------------------------------------------------------------------------------------------

Comments:   

Pool / Current Maximum    12

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species:

Check ONE (Or 2 & average).

NO RIFFLE [metric=0]

<b>RIFFLE DEPTH</b>	<b>RUN DEPTH</b>	<b>RIFFLE / RUN SUBSTRATE</b>	<b>RIFFLE / RUN EMBEDDEDNESS</b>	Riffle / Run Maximum 8
<input type="checkbox"/> BEST AREAS > 10cm [2] <input type="checkbox"/> BEST AREAS 5-10cm [1] <input checked="" type="checkbox"/> BEST AREAS < 5cm [metric=0]	<input type="checkbox"/> MAXIMUM > 50cm [2] <input checked="" type="checkbox"/> MAXIMUM < 50cm [1]	<input type="checkbox"/> STABLE (e.g., Cobble, Boulder) [2] <input type="checkbox"/> MOD. STABLE (e.g., Large Gravel) [1] <input checked="" type="checkbox"/> UNSTABLE (e.g., Fine Gravel, Sand) [0]	<input type="checkbox"/> NONE [2] <input checked="" type="checkbox"/> LOW [1] <input type="checkbox"/> MODERATE [0] <input type="checkbox"/> EXTENSIVE [-1]	

Comments:   

6] GRADIENT ( ft/mi)  VERY LOW - LOW [2-4]  
 MODERATE [6-10]  
 HIGH - VERY HIGH [10-6]

DRAINAGE AREA ( mi<sup>2</sup>)

%POOL: 10 %GLIDE:     
%RUN: 80 %RIFFLE: 10

Gradient Maximum    10

**A) SAMPLED REACH**

Check ALL that apply

Comment RE: Reach consistency/ Is reach typical of stream?, Recreation/ Observed - Inferred, Other/ Sampling observations, Concerns, Access directions, etc.

**METHOD STAGE**

- BOAT  
 WADE  
 L. LINE  
 OTHER
- 1st-sample pass-- 2nd  
 HIGH  
 UP  
 NORMAL  
 LOW  
 DRY

S-J43 LEAF DETRITUS ON BED LONG RUN  
 POORLY FORMED POOL-RIPPLE 2 RIPPLES/100m RYPPY TO SDR 5 SDR QUENCH  
 SLOW FLOW

**DISTANCE**

- 0.5 Km  
 0.2 Km  
 0.15 Km  
 0.12 Km  
 OTHER

**CLARITY**

- 1st --sample pass-- 2nd  
 < 20 cm  
 20-40 cm  
 40-70 cm  
 > 70 cm/ CTB  
 SECCHI DEPTH

POORLY FORMED POOL-RIPPLE

**B) AESTHETICS**

- NUISANCE ALGAE  
 INVASIVE MACROPHYTES  
 EXCESS TURBIDITY  
 DISCOLORATION  
 FOAM / SCUM  
 OIL SHEEN  
 TRASH / LITTER  
 NUISANCE ODOR  
 SLUDGE DEPOSITS  
 CSOs/SSOs/OUTFALLS

**D) MAINTENANCE**

- PUBLIC / PRIVATE / BOTH / NA  
 ACTIVE / HISTORIC / BOTH / NA  
 YOUNG-SUCCESSION-OLD  
 SPRAY / SNAG / REMOVED  
 MODIFIED / DIPPED OUT / NA  
 LEVEED / ONE SIDED  
 RELOCATED / CUTOFFS  
 MOVING-BEDLOAD-STABLE  
 ARMoured / SLUMPS  
 ISLANDS / SCoured  
 IMPOUNDED / DESICCATED  
 FLOOD CONTROL / DRAINAGE

Circle some & COMMENT

**E) ISSUES**

- WWTP / CSO / NPDES / INDUSTRY  
 HARDENED / URBAN / DIRT&GRIME  
 CONTAMINATED / LANDFILL  
 BMPs-CONSTRUCTION-SEDIMENT  
 LOGGING / IRRIGATION / COOLING  
 BANK / EROSION / SURFACE  
 FALSE BANK / MANURE / LAGOON  
 WASH H<sub>2</sub>O / TILE / H<sub>2</sub>O TABLE  
 ACID / MINE / QUARRY / FLOW  
 NATURAL / WETLAND / STAGNANT  
 PARK / GOLF / LAWN / HOME  
 ATMOSPHERE / DATA PAUCITY

**F) MEASUREMENTS**

- $\bar{x}$  width  
 $\bar{x}$  depth  
 max. depth  
 $\bar{x}$  bankfull width  
 bankfull  $\bar{x}$  depth  
 W/D ratio  
 bankfull max. depth  
 floodprone  $x^2$  width  
 entrench. ratio

Legacy Tree:

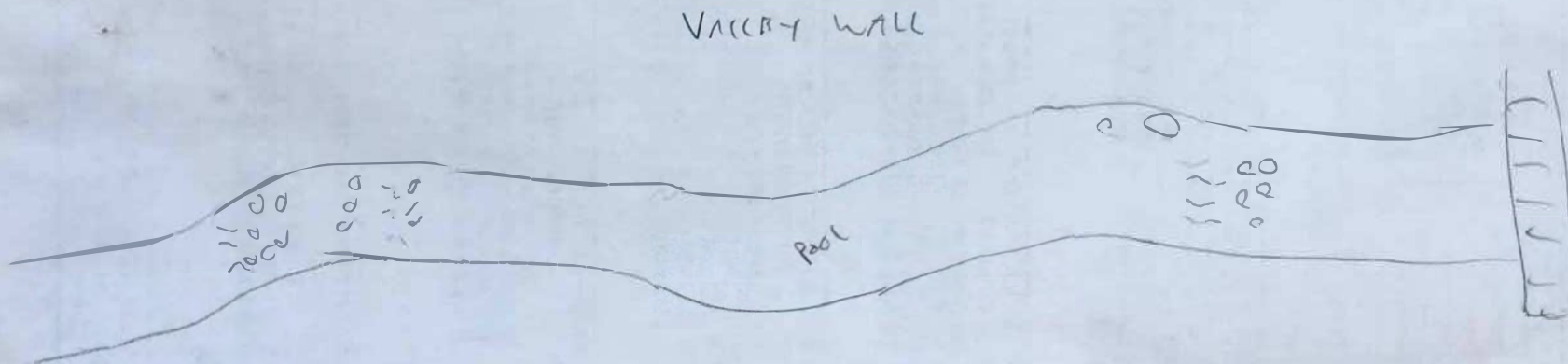
**CANOPY**

- 1st pass \_\_\_\_\_ cm  
 2nd pass \_\_\_\_\_ cm
- > 85%- OPEN  
 55%-<85%  
 30%-<55%  
 10%-<30%  
 <10%- CLOSED

**C) RECREATION**

- AREA DEPTH  
 POOL:  >100ft<sup>2</sup>  >3ft

**Stream Drawing:**





Stream & Location: S-146 12:10 RM:    Date: 11/17/21

Scorers Full Name & Affiliation: LK

River Code:    STORET #:    Lat./Long.: 39.094778, -80.584826 Office verified location

1] SUBSTRATE Check ONLY Two substrate TYPE BOXES; estimate % or note every type present

<b>BEST TYPES</b>		<b>POOL RIFFLE</b>	<b>OTHER TYPES</b>		<b>POOL RIFFLE</b>	<b>ORIGIN</b>	<b>QUALITY</b>	<span style="font-size: 24px;">16</span> <small>Maximum 20</small>
<input type="checkbox"/> BLD R/SLABS [10]	<input type="checkbox"/> BOULDER [9]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> HARDPAN [4]	<input type="checkbox"/> DETRITUS [3]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> LIMESTONE [1]	<input type="checkbox"/> HEAVY [-2]	
<input type="checkbox"/> COBBLE [8]	<input type="checkbox"/> GRAVEL [7]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> MUCK [2]	<input type="checkbox"/> SILT [2]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> TILLS [1]	<input type="checkbox"/> MODERATE [-1]	
<input checked="" type="checkbox"/> SAND [6]	<input type="checkbox"/> BEDROCK [5]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> ARTIFICIAL [0]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> WETLANDS [0]	<input type="checkbox"/> NORMAL [0]	
			<small>(Score natural substrates; ignore sludge from point-sources)</small>			<input type="checkbox"/> HARDPAN [0]	<input type="checkbox"/> FREE [1]	
						<input type="checkbox"/> SANDSTONE [0]	<input type="checkbox"/> EXTENSIVE [-2]	
						<input type="checkbox"/> RIP/RAP [0]	<input type="checkbox"/> MODERATE [-1]	
						<input type="checkbox"/> LACUSTURINE [0]	<input type="checkbox"/> NORMAL [0]	
						<input type="checkbox"/> SHALE [-1]	<input type="checkbox"/> NONE [1]	
						<input type="checkbox"/> COAL FINES [-2]		

Check ONE (Or 2 & average)

NUMBER OF BEST TYPES:  4 or more [2]  3 or less [0]

Comments SILT EMBEDDEDNESS

2] INSTREAM COVER Indicate presence 0 to 3: 0-Absent; 1-Very small amounts or if more common of marginal quality; 2-Moderate amounts, but not of highest quality or in small amounts of highest quality; 3-Highest quality in moderate or greater amounts (e.g., very large boulders in deep or fast water, large diameter log that is stable, well developed rootwad in deep / fast water, or deep, well-defined, functional pools.

<input type="checkbox"/> UNDERCUT BANKS [1]	<input type="checkbox"/> POOLS > 70cm [2]	<input type="checkbox"/> OXBOWS, BACKWATERS [1]	<b>AMOUNT</b>
<input type="checkbox"/> OVERHANGING VEGETATION [1]	<input type="checkbox"/> ROOTWADS [1]	<input type="checkbox"/> AQUATIC MACROPHYTES [1]	Check ONE (Or 2 & average)
<input type="checkbox"/> SHALLOWS (IN SLOW WATER) [1]	<input type="checkbox"/> BOULDERS [1]	<input type="checkbox"/> LOGS OR WOODY DEBRIS [1]	<input type="checkbox"/> EXTENSIVE >75% [11]
<input type="checkbox"/> ROOTMATS [1]			<input type="checkbox"/> MODERATE 25-75% [7]
			<input type="checkbox"/> SPARSE 5-<25% [3]
			<input type="checkbox"/> NEARLY ABSENT <5% [1]

Comments Cover Maximum 20

3] CHANNEL MORPHOLOGY Check ONE in each category (Or 2 & average)

<input checked="" type="checkbox"/> HIGH [4]	<input type="checkbox"/> EXCELLENT [7]	<input checked="" type="checkbox"/> NONE [6]	<input type="checkbox"/> HIGH [3]
<input type="checkbox"/> MODERATE [3]	<input type="checkbox"/> GOOD [5]	<input type="checkbox"/> RECOVERED [4]	<input checked="" type="checkbox"/> MODERATE [2]
<input type="checkbox"/> LOW [2]	<input checked="" type="checkbox"/> FAIR [3]	<input type="checkbox"/> RECOVERING [3]	<input type="checkbox"/> LOW [1]
<input type="checkbox"/> NONE [1]	<input type="checkbox"/> POOR [1]	<input type="checkbox"/> RECENT OR NO RECOVERY [1]	

Comments Channel Maximum 20

4] BANK EROSION AND RIPARIAN ZONE Check ONE in each category for EACH BANK (Or 2 per bank & average)

<b>EROSION</b>		<b>RIPARIAN WIDTH</b>		<b>FLOOD PLAIN QUALITY</b>		
<input type="checkbox"/> NONE / LITTLE [3]	<input type="checkbox"/> MODERATE [2]	<input type="checkbox"/> WIDE > 50m [4]	<input type="checkbox"/> MODERATE 10-50m [3]	<input type="checkbox"/> FOREST, SWAMP [3]	<input type="checkbox"/> SHRUB OR OLD FIELD [2]	<input type="checkbox"/> CONSERVATION TILLAGE [1]
<input type="checkbox"/> MODERATE [2]	<input type="checkbox"/> HEAVY / SEVERE [1]	<input type="checkbox"/> NARROW 5-10m [2]	<input type="checkbox"/> VERY NARROW < 5m [1]	<input type="checkbox"/> RESIDENTIAL, PARK, NEW FIELD [1]	<input type="checkbox"/> FENCED PASTURE [1]	<input type="checkbox"/> URBAN OR INDUSTRIAL [0]
<input type="checkbox"/> MODERATE [2]	<input type="checkbox"/> HEAVY / SEVERE [1]	<input type="checkbox"/> NONE [0]		<input type="checkbox"/> OPEN PASTURE, ROWCROP [0]		<input type="checkbox"/> MINING / CONSTRUCTION [0]

Comments Indicate predominant land use(s) past 100m riparian. Riparian Maximum 10

5] POOL / GLIDE AND RIFFLE / RUN QUALITY

<b>MAXIMUM DEPTH</b>	<b>CHANNEL WIDTH</b>	<b>CURRENT VELOCITY</b>	<b>Recreation Potential</b> Primary Contact Secondary Contact <small>(circle one and comment on back)</small>
Check ONE (ONLY!)	Check ONE (Or 2 & average)	Check ALL that apply	
<input type="checkbox"/> > 1m [6]	<input checked="" type="checkbox"/> POOL WIDTH > RIFFLE WIDTH [2]	<input type="checkbox"/> TORRENTIAL [-1]	<span style="font-size: 24px;">5</span> <small>Maximum 12</small>
<input type="checkbox"/> 0.7-<1m [4]	<input type="checkbox"/> POOL WIDTH = RIFFLE WIDTH [1]	<input type="checkbox"/> VERY FAST [1]	
<input checked="" type="checkbox"/> 0.4-<0.7m [2]	<input type="checkbox"/> POOL WIDTH > RIFFLE WIDTH [0]	<input type="checkbox"/> FAST [1]	
<input type="checkbox"/> 0.2-<0.4m [1]		<input type="checkbox"/> MODERATE [1]	
<input type="checkbox"/> < 0.2m [0]		<input type="checkbox"/> INTERSTITIAL [-1]	
		<input type="checkbox"/> INTERMITTENT [-2]	
		<input type="checkbox"/> EDDIES [1]	

Comments Indicate for reach - pools and riffles.

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species: Check ONE (Or 2 & average).  NO RIFFLE [metric=0]

<b>RIFFLE DEPTH</b>	<b>RUN DEPTH</b>	<b>RIFFLE / RUN SUBSTRATE</b>	<b>RIFFLE / RUN EMBEDDEDNESS</b>
<input type="checkbox"/> BEST AREAS > 10cm [2]	<input type="checkbox"/> MAXIMUM > 50cm [2]	<input type="checkbox"/> STABLE (e.g., Cobble, Boulder) [2]	<input type="checkbox"/> NONE [2]
<input type="checkbox"/> BEST AREAS 5-10cm [1]	<input checked="" type="checkbox"/> MAXIMUM < 50cm [1]	<input type="checkbox"/> MOD. STABLE (e.g., Large Gravel) [1]	<input checked="" type="checkbox"/> LOW [1]
<input checked="" type="checkbox"/> BEST AREAS < 5cm [metric=0]		<input checked="" type="checkbox"/> UNSTABLE (e.g., Fine Gravel, Sand) [0]	<input type="checkbox"/> MODERATE [0]
			<input type="checkbox"/> EXTENSIVE [-1]

Comments Riffle / Run Maximum 8

6] GRADIENT ( ft/mi)  VERY LOW - LOW [2-4]  MODERATE [6-10]  HIGH - VERY HIGH [10-6] %POOL: 20 %GLIDE:    %RUN: 60 %RIFFLE: 20

**A) SAMPLED REACH**

Check ALL that apply

Comment RE: Reach consistency/ Is reach typical of stream?, Recreation/ Observed - Inferred, Other/ Sampling observations, Concerns, Access directions, etc.

**METHOD**

- BOAT
- WADE
- L. LINE
- OTHER

**STAGE**

1st -sample pass- 2nd

- HIGH
- UP
- NORMAL
- LOW
- DRY

**DISTANCE**

- 0.5 Km
- 0.2 Km
- 0.15 Km
- 0.12 Km
- OTHER

meters

**CANOPY**

- > 85% - OPEN
- 55% - < 85%
- 30% - < 55%
- 10% - < 30%
- < 10% - CLOSED

**CLARITY**

1st --sample pass-- 2nd

- < 20 cm
- 20 - < 40 cm
- 40 - 70 cm
- > 70 cm / CTB
- SECCHI DEPTH

1st \_\_\_\_\_ cm

2nd \_\_\_\_\_ cm

**C) RECREATION**

AREA DEPTH

POOL:  > 100ft<sup>2</sup>  > 3ft

**B) AESTHETICS**

- NUISANCE ALGAE
- INVASIVE MACROPHYTES
- EXCESS TURBIDITY
- DISCOLORATION
- FOAM / SCUM
- OIL SHEEN
- TRASH / LITTER
- NUISANCE ODOR
- SLUDGE DEPOSITS
- CSOs/SSOs/OUTFALLS

**D) MAINTENANCE**

- PUBLIC / PRIVATE / BOTH / NA
- ACTIVE / HISTORIC / BOTH / NA
- YOUNG-SUCCESSION-OLD
- SPRAY / SNAG / REMOVED
- MODIFIED / DIPPED OUT / NA
- LEVEED / ONE SIDED
- RELOCATED / CUTOFFS
- MOVING-BEDLOAD-STABLE
- ARMoured / SLUMPS
- ISLANDS / SCOURED
- IMPOUNDED / DESICCATED
- FLOOD CONTROL / DRAINAGE

Circle some & COMMENT

**E) ISSUES**

- WWTP / CSO / NPDES / INDUSTRY
- HARDENED / URBAN / DIRT&GRIME
- CONTAMINATED / LANDFILL
- BMPs-CONSTRUCTION-SEDIMENT
- LOGGING / IRRIGATION / COOLING
- BANK / EROSION / SURFACE
- FALSE BANK / MANURE / LAGOON
- WASH H<sub>2</sub>O / TILE / H<sub>2</sub>O TABLE
- ACID / MINE / QUARRY / FLOW
- NATURAL / WETLAND / STAGNANT
- PARK / GOLF / LAWN / HOME
- ATMOSPHERE / DATA PAUCITY

**F) MEASUREMENTS**

- $\bar{x}$  width
- $\bar{x}$  depth
- max. depth
- $\bar{x}$  bankful width
- bankful  $\bar{x}$  depth
- WD ratio
- bankful | max. depth
- floodprone  $x^2$  width
- entrench. ratio

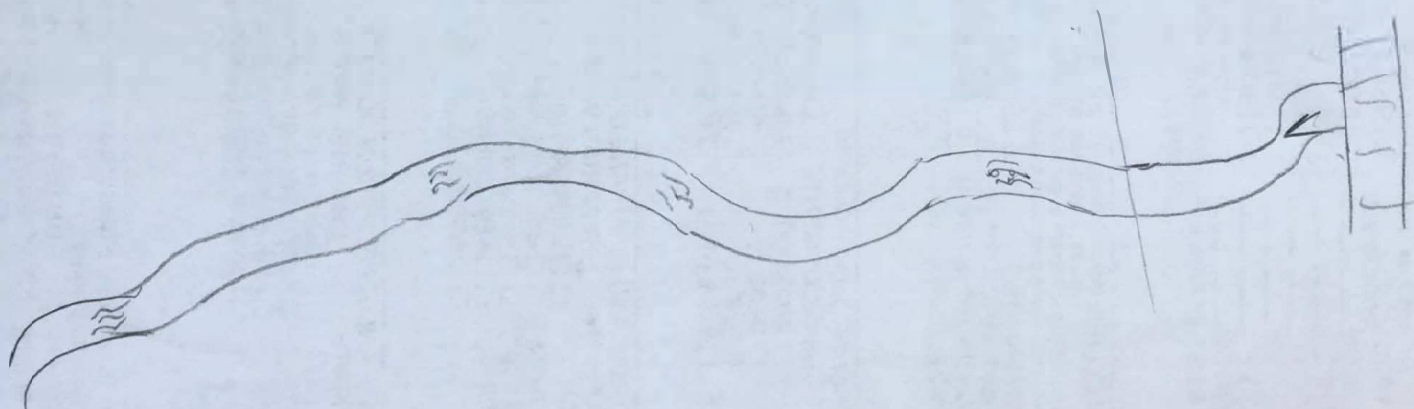
Legacy Tree:

S-346 Poorly Formed Pool - RIFFLE. LEAF DETRITUS ON BAR OF RUNS

5 RIFFLES, GOOD P-R SEQUENCE FREQUENCY

RIFFLE - Pool COMPLEX

**Stream Drawing:**



Stream & Location: S-K43 13-00 RM:    Date: 1/17/21

Scorers Full Name & Affiliation: LK

River Code:    STORET #:    Lat./Long.: 39,002111, -80.595843 Office verified location

1] SUBSTRATE Check ONLY Two substrate TYPE BOXES; estimate % or note every type present

Check ONE (Or 2 & average)

<b>BEST TYPES</b>		<b>POOL RIFFLE</b>	<b>OTHER TYPES</b>		<b>POOL RIFFLE</b>	<b>ORIGIN</b>	<b>QUALITY</b>	16																			
<input type="checkbox"/> BLDR /SLABS [10]	<input type="checkbox"/> BOULDER [9]	<input type="checkbox"/> COBBLE [8]	<input checked="" type="checkbox"/> GRAVEL [7]	<input checked="" type="checkbox"/> SAND [6]	<input type="checkbox"/> BEDROCK [5]	<input type="checkbox"/> HARDPAN [4]	<input checked="" type="checkbox"/> DETRITUS [3]		<input type="checkbox"/> MUCK [2]	<input type="checkbox"/> SILT [2]	<input type="checkbox"/> ARTIFICIAL [0]	<input type="checkbox"/> LIMESTONE [1]	<input type="checkbox"/> TILLS [1]	<input type="checkbox"/> WETLANDS [0]	<input type="checkbox"/> HARDPAN [0]	<input type="checkbox"/> SANDSTONE [0]	<input type="checkbox"/> RIP/RAP [0]	<input type="checkbox"/> LACUSTURINE [0]	<input type="checkbox"/> SHALE [-1]	<input type="checkbox"/> COAL FINES [-2]	<input type="checkbox"/> HEAVY [-2]	<input type="checkbox"/> MODERATE [-1]	<input type="checkbox"/> NORMAL [0]	<input type="checkbox"/> FREE [1]	<input type="checkbox"/> EXTENSIVE [-2]	<input type="checkbox"/> MODERATE [-1]	<input type="checkbox"/> NORMAL [0]

NUMBER OF BEST TYPES:  4 or more [2]  3 or less [0]

Comments

2] INSTREAM COVER Indicate presence 0 to 3. 0-Absent; 1-Very small amounts or if more common of marginal quality; 2-Moderate amounts, but not of highest quality or in small amounts of highest quality; 3-Highest quality in moderate or greater amounts (e.g., very large boulders in deep or fast water, large diameter log that is stable, well developed rootwad in deep / fast water, or deep, well-defined, functional pools.

AMOUNT Check ONE (Or 2 & average)

<input type="checkbox"/> UNDERCUT BANKS [1]	<input type="checkbox"/> POOLS > 70cm [2]	<input type="checkbox"/> OXBOWS, BACKWATERS [1]	<input type="checkbox"/> EXTENSIVE >75% [11]
<input type="checkbox"/> OVERHANGING VEGETATION [1]	<input type="checkbox"/> ROOTWADS [1]	<input type="checkbox"/> AQUATIC MACROPHYTES [1]	<input type="checkbox"/> MODERATE 25-75% [7]
<input type="checkbox"/> SHALLOWS (IN SLOW WATER) [1]	<input type="checkbox"/> BOULDERS [1]	<input type="checkbox"/> LOGS OR WOODY DEBRIS [1]	<input type="checkbox"/> SPARSE 5-<25% [3]
<input type="checkbox"/> ROOTMATS [1]			<input type="checkbox"/> NEARLY ABSENT <5% [1]

Comments

Cover Maximum 20   

3] CHANNEL MORPHOLOGY Check ONE in each category (Or 2 & average)

<b>SINUOSITY</b>	<b>DEVELOPMENT</b>	<b>CHANNELIZATION</b>	<b>STABILITY</b>	15
<input checked="" type="checkbox"/> HIGH [4]	<input type="checkbox"/> EXCELLENT [7]	<input checked="" type="checkbox"/> NONE [6]	<input type="checkbox"/> HIGH [3]	
<input type="checkbox"/> MODERATE [3]	<input type="checkbox"/> GOOD [5]	<input type="checkbox"/> RECOVERED [4]	<input checked="" type="checkbox"/> MODERATE [2]	
<input type="checkbox"/> LOW [2]	<input checked="" type="checkbox"/> FAIR [3]	<input type="checkbox"/> RECOVERING [3]	<input type="checkbox"/> LOW [1]	
<input type="checkbox"/> NONE [1]	<input type="checkbox"/> POOR [1]	<input type="checkbox"/> RECENT OR NO RECOVERY [1]		

Comments

Channel Maximum 20

4] BANK EROSION AND RIPARIAN ZONE Check ONE in each category for EACH BANK (Or 2 per bank & average)

<b>EROSION</b>		<b>RIPARIAN WIDTH</b>		<b>FLOOD PLAIN QUALITY</b>		10									
<input type="checkbox"/> NONE / LITTLE [3]	<input type="checkbox"/> MODERATE [2]	<input type="checkbox"/> HEAVY / SEVERE [1]	<input type="checkbox"/> WIDE > 50m [4]	<input type="checkbox"/> MODERATE 10-50m [3]	<input type="checkbox"/> NARROW 5-10m [2]		<input type="checkbox"/> VERY NARROW < 5m [1]	<input type="checkbox"/> NONE [0]	<input type="checkbox"/> FOREST, SWAMP [3]	<input type="checkbox"/> SHRUB OR OLD FIELD [2]	<input type="checkbox"/> RESIDENTIAL, PARK, NEW FIELD [1]	<input type="checkbox"/> FENCED PASTURE [1]	<input type="checkbox"/> OPEN PASTURE, ROWCROP [0]	<input type="checkbox"/> CONSERVATION TILLAGE [1]	<input type="checkbox"/> URBAN OR INDUSTRIAL [0]

Comments

Riparian Maximum 10

5] POOL / GLIDE AND RIFFLE / RUN QUALITY

<b>MAXIMUM DEPTH</b>	<b>CHANNEL WIDTH</b>	<b>CURRENT VELOCITY</b>	7
Check ONE (ONLY!)	Check ONE (Or 2 & average)	Check ALL that apply	
<input type="checkbox"/> > 1m [6]	<input checked="" type="checkbox"/> POOL WIDTH > RIFFLE WIDTH [2]	<input type="checkbox"/> TORRENTIAL [-1]	7
<input checked="" type="checkbox"/> 0.7-<1m [4]	<input type="checkbox"/> POOL WIDTH = RIFFLE WIDTH [1]	<input type="checkbox"/> VERY FAST [1]	
<input type="checkbox"/> 0.4-<0.7m [2]	<input type="checkbox"/> POOL WIDTH > RIFFLE WIDTH [0]	<input type="checkbox"/> FAST [1]	7
<input type="checkbox"/> 0.2-<0.4m [1]		<input type="checkbox"/> MODERATE [1]	
<input type="checkbox"/> < 0.2m [0]		<input type="checkbox"/> SLOW [1]	7
		<input type="checkbox"/> INTERSTITIAL [-1]	
		<input type="checkbox"/> INTERMITTENT [-2]	7
		<input type="checkbox"/> EDDIES [1]	

Comments

Pool / Current Maximum 12

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species:

Check ONE (Or 2 & average).

NO RIFFLE [metric=0]

<b>RIFFLE DEPTH</b>	<b>RUN DEPTH</b>	<b>RIFFLE / RUN SUBSTRATE</b>	<b>RIFFLE / RUN EMBEDDEDNESS</b>	2
<input type="checkbox"/> BEST AREAS > 10cm [2]	<input type="checkbox"/> MAXIMUM > 50cm [2]	<input type="checkbox"/> STABLE (e.g., Cobble, Boulder) [2]	<input type="checkbox"/> NONE [2]	
<input type="checkbox"/> BEST AREAS 5-10cm [1]	<input checked="" type="checkbox"/> MAXIMUM < 50cm [1]	<input type="checkbox"/> MOD. STABLE (e.g., Large Gravel) [1]	<input type="checkbox"/> LOW [1]	
<input checked="" type="checkbox"/> BEST AREAS < 5cm [metric=0]		<input type="checkbox"/> UNSTABLE (e.g., Fine Gravel, Sand) [0]	<input type="checkbox"/> MODERATE [0]	
			<input type="checkbox"/> EXTENSIVE [-1]	

Comments

Riffle / Run Maximum 8

6] GRADIENT ( ft/mi)  VERY LOW - LOW [2-4]  MODERATE [6-10]  HIGH - VERY HIGH [10-6]

DRAINAGE AREA ( mi<sup>2</sup>)

%POOL: 30 %GLIDE:   

%RUN: 05 %RIFFLE: 5

Gradient Maximum 10

**A) SAMPLED REACH**

Check ALL that apply

**METHOD**

- BOAT
- WADE
- L. LINE
- OTHER

**DISTANCE**

- 0.5 Km
- 0.2 Km
- 0.15 Km
- 0.12 Km
- OTHER

meters

**CANOPY**

- > 85% - OPEN
- 55% - <85%
- 30% - <55%
- 10% - <30%
- <10% - CLOSED

**STAGE**

1st - sample pass - 2nd

- HIGH
- UP
- NORMAL
- LOW
- DRY

**CLARITY**

1st - sample pass - 2nd

- < 20 cm
- 20 - <40 cm
- 40 - 70 cm
- > 70 cm / CTB
- SECCHI DEPTH

- 1st pass \_\_\_\_\_ cm
- 2nd pass \_\_\_\_\_ cm

**C) RECREATION**

AREA DEPTH  
POOL:  >100ft<sup>2</sup>  >3ft

Comment RE: Reach consistency/ Is reach typical of stream?, Recreation/ Observed - Inferred, Other/ Sampling observations, Concerns, Access directions, etc.

S-K43 SLOW FLOW. DDDP POOLS. HEAVY LEAF DETRITUS ON BDD  
 POORLY FORMED POOL-RIFFLES. 3 RIFFLES, 2x PLOT 6 TO 7 FT OVER 100 M  
 Flow Slow TO STAGNANT.  
 PLWR-BDD

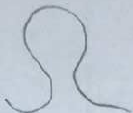
**B) AESTHETICS**

- NUISANCE ALGAE
- INVASIVE MACROPHYTES
- EXCESS TURBIDITY
- DISCOLORATION
- FOAM / SCUM
- OIL SHEEN
- TRASH / LITTER
- NUISANCE ODOR
- SLUDGE DEPOSITS
- CSOs/SSOs/OUTFALLS

**D) MAINTENANCE**

Circle some & COMMENT

- PUBLIC / PRIVATE / BOTH / NA
- ACTIVE / HISTORIC / BOTH / NA
- YOUNG-SUCCESSION-OLD
- SPRAY / SNAG / REMOVED
- MODIFIED / DIPPED OUT / NA
- LEVEED / ONE SIDED
- RELOCATED / CUTOFFS
- MOVING-BEDLOAD-STABLE
- ARMoured / SLUMPS
- ISLANDS / SCoured
- IMPOUNDED / DESICCATED
- FLOOD CONTROL / DRAINAGE



**E) ISSUES**

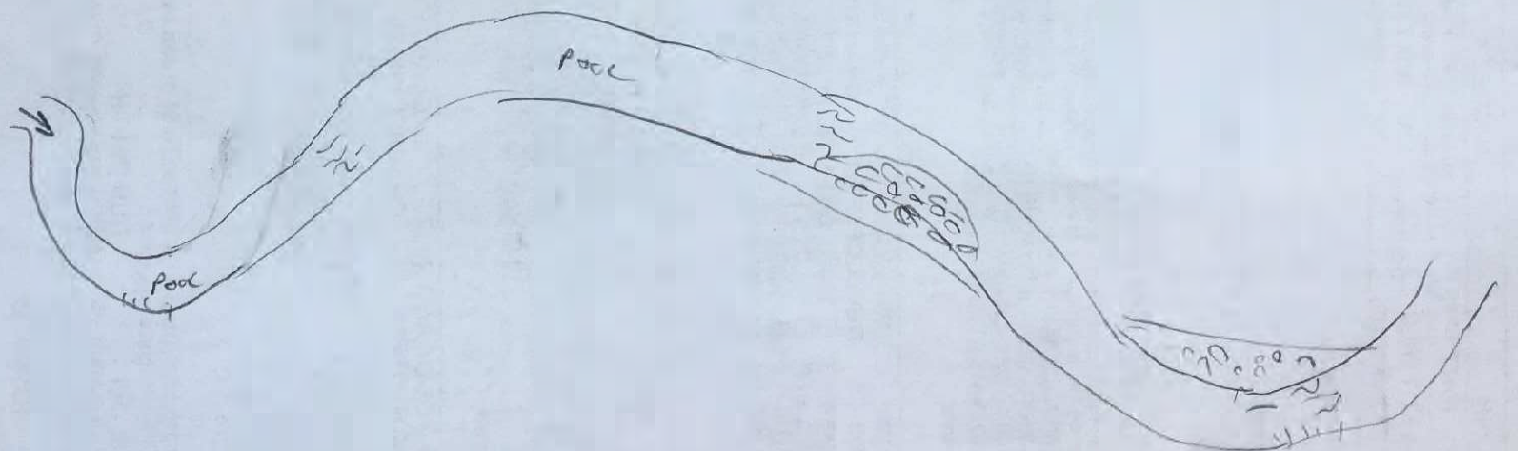
- WWTP / CSO / NPDES / INDUSTRY
- HARDENED / URBAN / DIRT&GRIME
- CONTAMINATED / LANDFILL
- BMPs-CONSTRUCTION-SEDIMENT
- LOGGING / IRRIGATION / COOLING
- BANK / EROSION / SURFACE
- FALSE BANK / MANURE / LAGOON
- WASH H<sub>2</sub>O / TILE / H<sub>2</sub>O TABLE
- ACID / MINE / QUARRY / FLOW
- NATURAL / WETLAND / STAGNANT
- PARK / GOLF / LAWN / HOME
- ATMOSPHERE / DATA PAUCITY

**F) MEASUREMENTS**

- $\bar{x}$  width
- $\bar{x}$  depth
- max. depth
- $\bar{x}$  bankfull width
- bankfull  $\bar{x}$  depth
- W/D ratio
- bankfull max. depth
- floodprone  $x^2$  width
- entrench. ratio

Legacy Tree:

**Stream Drawing:**



Stream & Location: S-K43-TM

RM:    Date: 12 / 02 / 21

Scorers Full Name & Affiliation: MB

River Code:   

STORET #:   

Lat./ Long.: 39.002045 / -80.596098  
(NAD 83 - decimal)

Office verified location

**1) SUBSTRATE** Check ONLY Two substrate TYPE BOXES; estimate % or note every type present

Check ONE (Or 2 & average)

- |                                                |                    |                                                  |                    |
|------------------------------------------------|--------------------|--------------------------------------------------|--------------------|
| <b>BEST TYPES</b>                              | <b>POOL RIFFLE</b> | <b>OTHER TYPES</b>                               | <b>POOL RIFFLE</b> |
| <input type="checkbox"/> BLDR / SLABS [10]     | <u>  </u>          | <input type="checkbox"/> HARDPAN [4]             | <u>  </u>          |
| <input type="checkbox"/> BOULDER [9]           | <u>  </u>          | <input checked="" type="checkbox"/> DETRITUS [3] | <u>  </u>          |
| <input checked="" type="checkbox"/> COBBLE [8] | <u>  </u>          | <input type="checkbox"/> MUCK [2]                | <u>  </u>          |
| <input checked="" type="checkbox"/> GRAVEL [7] | <u>  </u>          | <input checked="" type="checkbox"/> SILT [2]     | <u>  </u>          |
| <input type="checkbox"/> SAND [6]              | <u>  </u>          | <input type="checkbox"/> ARTIFICIAL [0]          | <u>  </u>          |
| <input type="checkbox"/> BEDROCK [5]           | <u>  </u>          |                                                  |                    |

- ORIGIN**
- LIMESTONE [1]
  - TILLS [1]
  - WETLANDS [0]
  - HARDPAN [0]
  - SANDSTONE [0]
  - RIP/RAP [0]
  - LACUSTURINE [0]
  - SHALE [-1]
  - COAL FINES [-2]

- QUALITY**
- HEAVY [-2]
  - MODERATE [-1]
  - NORMAL [0]
  - FREE [1]
  - EXTENSIVE [-2]
  - MODERATE [-1]
  - NORMAL [0]
  - NONE [1]

Substrate  
20  
Maximum 20

NUMBER OF BEST TYPES:  4 or more [2]  3 or less [0]

Comments

**2) INSTREAM COVER** Indicate presence 0 to 3: 0-Absent; 1-Very small amounts or if more common of marginal quality; 2-Moderate amounts, but not of highest quality or in small amounts of highest quality; 3-Highest quality in moderate or greater amounts (e.g., very large boulders in deep or fast water, large diameter log that is stable, well developed rootwad in deep / fast water, or deep, well-defined, functional pools.

Check ONE (Or 2 & average)

- |                                        |                            |                                    |
|----------------------------------------|----------------------------|------------------------------------|
| <u>  </u> UNDERCUT BANKS [1]           | <u>  </u> POOLS > 70cm [2] | <u>  </u> OXBOWS, BACKWATERS [1]   |
| <u>  </u> OVERHANGING VEGETATION [1]   | <u>  </u> ROOTWADS [1]     | <u>  </u> AQUATIC MACROPHYTES [1]  |
| <u>  </u> SHALLOWS (IN SLOW WATER) [1] | <u>  </u> BOULDERS [1]     | <u>  </u> LOGS OR WOODY DEBRIS [1] |
| <u>  </u> ROOTMATS [1]                 |                            |                                    |

- AMOUNT**
- EXTENSIVE >75% [11]
  - MODERATE 25-75% [7]
  - SPARSE 5-<25% [3]
  - NEARLY ABSENT <5% [1]

Cover  
   
Maximum 20

Comments

**3) CHANNEL MORPHOLOGY** Check ONE in each category (Or 2 & average)

- |                                                  |                                              |                                                               |                                             |
|--------------------------------------------------|----------------------------------------------|---------------------------------------------------------------|---------------------------------------------|
| <b>SINUOSITY</b>                                 | <b>DEVELOPMENT</b>                           | <b>CHANNELIZATION</b>                                         | <b>STABILITY</b>                            |
| <input type="checkbox"/> HIGH [4]                | <input type="checkbox"/> EXCELLENT [7]       | <input type="checkbox"/> NONE [6]                             | <input type="checkbox"/> HIGH [3]           |
| <input checked="" type="checkbox"/> MODERATE [3] | <input checked="" type="checkbox"/> GOOD [5] | <input type="checkbox"/> RECOVERED [4]                        | <input type="checkbox"/> MODERATE [2]       |
| <input type="checkbox"/> LOW [2]                 | <input type="checkbox"/> FAIR [3]            | <input type="checkbox"/> RECOVERING [3]                       | <input checked="" type="checkbox"/> LOW [1] |
| <input type="checkbox"/> NONE [1]                | <input type="checkbox"/> POOR [1]            | <input checked="" type="checkbox"/> RECENT OR NO RECOVERY [1] |                                             |

Channel  
10  
Maximum 20

Comments

*Culvert under Access rd bridge*

**4) BANK EROSION AND RIPARIAN ZONE** Check ONE in each category for EACH BANK (Or 2 per bank & average)

River right looking downstream

- |                                             |                                               |                                                           |                                                    |
|---------------------------------------------|-----------------------------------------------|-----------------------------------------------------------|----------------------------------------------------|
| <b>EROSION</b>                              | <b>RIPARIAN WIDTH</b>                         | <b>FLOOD PLAIN QUALITY</b>                                | <b>CONSERVATION TILLAGE</b>                        |
| <input type="checkbox"/> NONE / LITTLE [3]  | <input type="checkbox"/> WIDE > 50m [4]       | <input type="checkbox"/> FOREST, SWAMP [3]                | <input type="checkbox"/> URBAN OR INDUSTRIAL [0]   |
| <input type="checkbox"/> MODERATE [2]       | <input type="checkbox"/> MODERATE 10-50m [3]  | <input type="checkbox"/> SHRUB OR OLD FIELD [2]           | <input type="checkbox"/> MINING / CONSTRUCTION [0] |
| <input type="checkbox"/> HEAVY / SEVERE [1] | <input type="checkbox"/> NARROW 5-10m [2]     | <input type="checkbox"/> RESIDENTIAL, PARK, NEW FIELD [1] |                                                    |
|                                             | <input type="checkbox"/> VERY NARROW < 5m [1] | <input type="checkbox"/> FENCED PASTURE [1]               |                                                    |
|                                             | <input type="checkbox"/> NONE [0]             | <input type="checkbox"/> OPEN PASTURE, ROWCROP [0]        |                                                    |

Indicate predominant land use(s) past 100m riparian.  
Riparian  
Maximum 10

Comments

**5) POOL / GLIDE AND RIFFLE / RUN QUALITY**

**MAXIMUM DEPTH**

Check ONE (ONLY!)

- > 1m [6]
- 0.7-<1m [4]
- 0.4-<0.7m [2]
- 0.2-<0.4m [1]
- < 0.2m [0]

**CHANNEL WIDTH**

Check ONE (Or 2 & average)

- POOL WIDTH > RIFFLE WIDTH [2]
- POOL WIDTH = RIFFLE WIDTH [1]
- POOL WIDTH < RIFFLE WIDTH [0]

**CURRENT VELOCITY**

Check ALL that apply

- TORRENTIAL [-1]
- SLOW [1]
- VERY FAST [1]
- FAST [1]
- MODERATE [1]
- INTERSTITIAL [-1]
- INTERMITTENT [-2]
- EDDIES [1]

Indicate for reach - pools and riffles.

**Recreation Potential**

**Primary Contact**

**Secondary Contact**

(circle one and comment on back)

Pool / Current  
2  
Maximum 12

Comments

*Water mostly stagnant except for through culvert*

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species:

Check ONE (Or 2 & average).

NO RIFFLE [metric=0]

- |                                                                 |                                                        |                                                                          |                                             |
|-----------------------------------------------------------------|--------------------------------------------------------|--------------------------------------------------------------------------|---------------------------------------------|
| <b>RIFFLE DEPTH</b>                                             | <b>RUN DEPTH</b>                                       | <b>RIFFLE / RUN SUBSTRATE</b>                                            | <b>RIFFLE / RUN EMBEDDEDNESS</b>            |
| <input type="checkbox"/> BEST AREAS > 10cm [2]                  | <input type="checkbox"/> MAXIMUM > 50cm [2]            | <input type="checkbox"/> STABLE (e.g., Cobble, Boulder) [2]              | <input type="checkbox"/> NONE [2]           |
| <input type="checkbox"/> BEST AREAS 5-10cm [1]                  | <input checked="" type="checkbox"/> MAXIMUM < 50cm [1] | <input checked="" type="checkbox"/> MOD. STABLE (e.g., Large Gravel) [1] | <input checked="" type="checkbox"/> LOW [1] |
| <input checked="" type="checkbox"/> BEST AREAS < 5cm [metric=0] |                                                        | <input type="checkbox"/> UNSTABLE (e.g., Fine Gravel, Sand) [0]          | <input type="checkbox"/> MODERATE [0]       |
|                                                                 |                                                        |                                                                          | <input type="checkbox"/> EXTENSIVE [-1]     |

Riffle / Run  
3  
Maximum 8

Comments

- 6) GRADIENT** ( ft/mi)  VERY LOW - LOW [2-4]  MODERATE [6-10]  HIGH - VERY HIGH [10-6]
- DRAINAGE AREA** ( mi<sup>2</sup>)

% POOL: 75 % GLIDE:    
% RUN: 5 % RIFFLE: 10

Gradient  
   
Maximum 10

**A) SAMPLED REACH**

Check ALL that apply

Comment RE: Reach consistency/ Is reach typical of stream?, Recreation/ Observed - Inferred, Other/ Sampling observations, Concerns, Access directions, etc.

S-1243-TM Mostly slow moving, channelized into a culvert beneath access rd. Mostly pools ~ 1 ft deep. Substrate exposed in riffles (cobbles + gravel). banks are undercut + moderately unstable.

- METHOD**
- BOAT
  - WADE
  - L. LINE
  - OTHER
- STAGE**
- HIGH
  - UP
  - NORMAL
  - LOW
  - DRY
- DISTANCE**
- 0.5 Km
  - 0.2 Km
  - 0.15 Km
  - 0.12 Km
  - OTHER

- CLARITY**
- 1st --sample pass-- 2nd
- < 20 cm
  - 20-40 cm
  - 40-70 cm
  - > 70 cm/ CTB
  - SECCHI DEPTH

- CANOPY**
- 1st pass \_\_\_\_\_ cm
- 2nd pass \_\_\_\_\_ cm
- > 85%- OPEN
  - 55%-<85%
  - 30%-<55%
  - 10%-<30%
  - <10%- CLOSED

- C) RECREATION**
- AREA DEPTH
- POOL:  >100ft<sup>2</sup>  >3ft

- B) AESTHETICS**
- NUISANCE ALGAE
  - INVASIVE MACROPHYTES
  - EXCESS TURBIDITY
  - DISCOLORATION
  - FOAM / SCUM
  - OIL SHEEN
  - TRASH / LITTER
  - NUISANCE ODOR
  - SLUDGE DEPOSITS
  - CSOs/SSOs/OUTFALLS

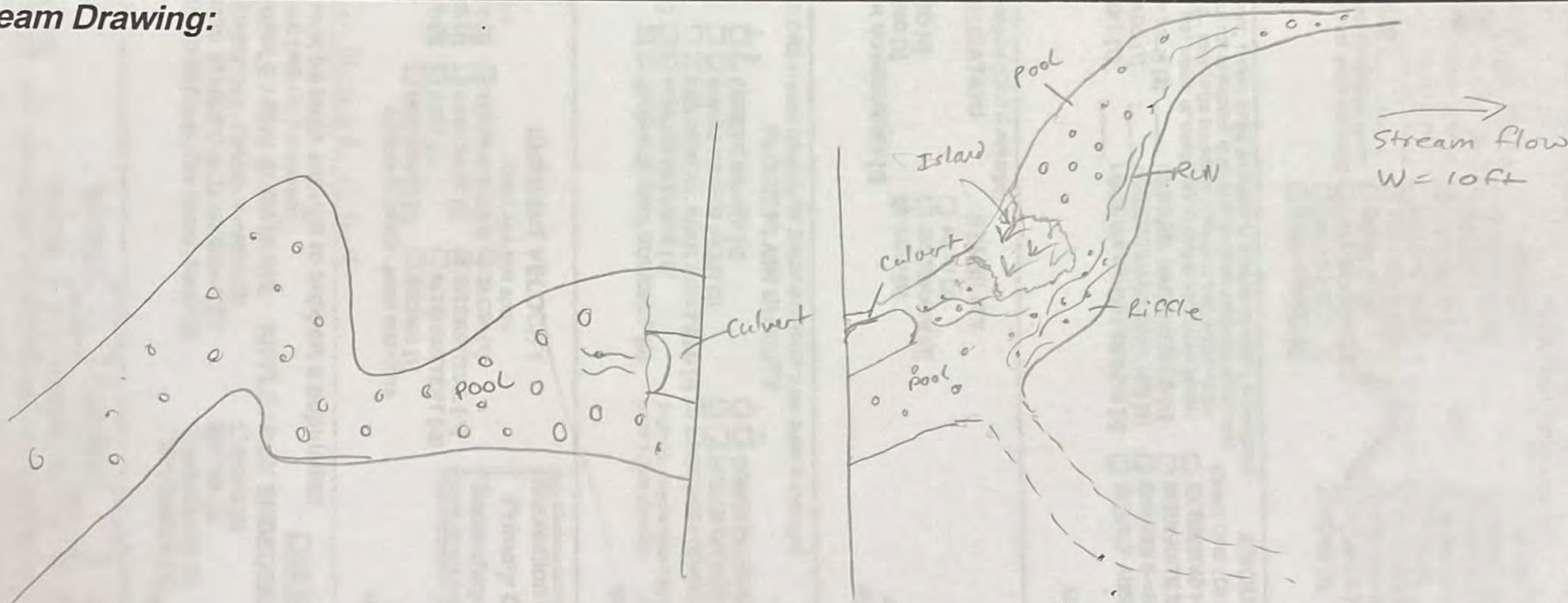
- D) MAINTENANCE**
- CIRCLE SOME & COMMENT
- PUBLIC / PRIVATE / BOTH / NA
  - ACTIVE / HISTORIC / BOTH / NA
  - YOUNG-SUCCESSION-OLD
  - SPRAY / SNAG / REMOVED
  - MODIFIED / DIPPED OUT / NA
  - LEVEED / ONE SIDED
  - RELOCATED / CUTOFFS
  - MOVING-BEDLOAD-STABLE
  - ARMOURED / SLUMPS
  - ISLANDS / SCOURED
  - IMPOUNDED / DESICCATED
  - FLOOD CONTROL / DRAINAGE

- E) ISSUES**
- WWTP / CSO / NPDES / INDUSTRY
  - HARDENED / URBAN / DIRT&GRIME
  - CONTAMINATED / LANDFILL
  - BMPs-CONSTRUCTION-SEDIMENT
  - LOGGING / IRRIGATION / COOLING
  - BANK / EROSION / SURFACE
  - FALSE BANK / MANURE / LAGOON
  - WASH H<sub>2</sub>O / TILE / H<sub>2</sub>O TABLE
  - ACID / MINE / QUARRY / FLOW
  - NATURAL / WETLAND / STAGNANT
  - PARK / GOLF / LAWN / HOME
  - ATMOSPHERE / DATA PAUCITY

- F) MEASUREMENTS**
- $\bar{x}$  width
  - $\bar{x}$  depth
  - max. depth
  - $\bar{x}$  bankfull width
  - bankfull  $\bar{x}$  depth
  - W/D ratio
  - bankfull max. depth
  - floodprone  $x^2$  width
  - entrench. ratio
  - Legacy Tree:

Plane bed

**Stream Drawing:**



Stream & Location: S-H100

RM:   Date: 11/29/06

Scorers Full Name & Affiliation: LKIMB

River Code:   STORET #:   Lat./ Long.: 38.933171 / -80.584562 Office verified location

1] SUBSTRATE Check ONLY Two substrate TYPE BOXES, estimate % or note every type present

Check ONE (Or 2 & average)

<b>BEST TYPES</b>	<b>POOL RIFFLE</b>	<b>OTHER TYPES</b>	<b>POOL RIFFLE</b>	<b>ORIGIN</b>	<b>QUALITY</b>	15
<input type="checkbox"/> BLDR /SLABS [10]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> HARDPAN [4]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> LIMESTONE [1]	<input type="checkbox"/> HEAVY [-2]	
<input type="checkbox"/> BOULDER [9]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> DETRITUS [3]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> TILLS [1]	<input type="checkbox"/> MODERATE [-1]	20
<input type="checkbox"/> COBBLE [8]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> MUCK [2]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> WETLANDS [0]	<input type="checkbox"/> NORMAL [0]	
<input checked="" type="checkbox"/> GRAVEL [7]	<input type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> SILT [2]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> HARDPAN [0]	<input type="checkbox"/> FREE [1]	
<input type="checkbox"/> SAND [6]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> ARTIFICIAL [0]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> SANDSTONE [0]	<input type="checkbox"/> EXTENSIVE [-2]	
<input type="checkbox"/> BEDROCK [5]	<input type="checkbox"/> <input type="checkbox"/>	(Score natural substrates; ignore sludge from point-sources)		<input type="checkbox"/> RIP/RAP [0]	<input type="checkbox"/> MODERATE [-1]	
NUMBER OF BEST TYPES: <input type="checkbox"/> 4 or more [2]	<input type="checkbox"/> 3 or less [0]			<input type="checkbox"/> LACUSTURINE [0]	<input type="checkbox"/> NORMAL [0]	
Comments				<input type="checkbox"/> SHALE [-1]	<input type="checkbox"/> NONE [1]	
				<input type="checkbox"/> COAL FINES [-2]		

2] INSTREAM COVER Indicate presence 0 to 3. 0-Absent, 1-Very small amounts or if more common of marginal quality; 2-Moderate amounts, but not of highest quality or in small amounts of highest quality; 3-Highest quality in moderate or greater amounts (e.g., very large boulders in deep or fast water, large diameter log that is stable, well developed rootwad in deep / fast water, or deep, well-defined, functional pools.

AMOUNT

Check ONE (Or 2 & average)

<input type="checkbox"/> UNDERCUT BANKS [1]	<input type="checkbox"/> POOLS > 70cm [2]	<input type="checkbox"/> OXBOWS, BACKWATERS [1]	<input type="checkbox"/> EXTENSIVE >75% [11]
<input type="checkbox"/> OVERHANGING VEGETATION [1]	<input type="checkbox"/> ROOTWADS [1]	<input type="checkbox"/> AQUATIC MACROPHYTES [1]	<input type="checkbox"/> MODERATE 25-75% [7]
<input type="checkbox"/> SHALLOWS (IN SLOW WATER) [1]	<input type="checkbox"/> BOULDERS [1]	<input type="checkbox"/> LOGS OR WOODY DEBRIS [1]	<input type="checkbox"/> SPARSE 5-<25% [3]
<input type="checkbox"/> ROOTMATS [1]			<input type="checkbox"/> NEARLY ABSENT <5% [1]
Comments			20

3] CHANNEL MORPHOLOGY Check ONE in each category (Or 2 & average)

<b>SINUOSITY</b>	<b>DEVELOPMENT</b>	<b>CHANNELIZATION</b>	<b>STABILITY</b>	4
<input type="checkbox"/> HIGH [4]	<input type="checkbox"/> EXCELLENT [7]	<input type="checkbox"/> NONE [6]	<input type="checkbox"/> HIGH [3]	
<input type="checkbox"/> MODERATE [3]	<input type="checkbox"/> GOOD [5]	<input type="checkbox"/> RECOVERED [4]	<input type="checkbox"/> MODERATE [2]	
<input type="checkbox"/> LOW [2]	<input type="checkbox"/> FAIR [3]	<input type="checkbox"/> RECOVERING [3]	<input checked="" type="checkbox"/> LOW [1]	
<input checked="" type="checkbox"/> NONE [1]	<input checked="" type="checkbox"/> POOR [1]	<input checked="" type="checkbox"/> RECENT OR NO RECOVERY [1]		
Comments				20

4] BANK EROSION AND RIPARIAN ZONE Check ONE in each category for EACH BANK (Or 2 per bank & average)

River right looking downstream		<b>RIPARIAN WIDTH</b>	<b>FLOOD PLAIN QUALITY</b>
<b>EROSION</b>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
<input type="checkbox"/> NONE / LITTLE [3]	<input type="checkbox"/> WIDE > 50m [4]	<input type="checkbox"/> FOREST, SWAMP [3]	<input type="checkbox"/> CONSERVATION TILLAGE [1]
<input type="checkbox"/> MODERATE [2]	<input type="checkbox"/> MODERATE 10-50m [3]	<input type="checkbox"/> SHRUB OR OLD FIELD [2]	<input type="checkbox"/> URBAN OR INDUSTRIAL [0]
<input type="checkbox"/> HEAVY / SEVERE [1]	<input type="checkbox"/> NARROW 5-10m [2]	<input type="checkbox"/> RESIDENTIAL, PARK, NEW FIELD [1]	<input type="checkbox"/> MINING / CONSTRUCTION [0]
	<input type="checkbox"/> VERY NARROW < 5m [1]	<input type="checkbox"/> FENCED PASTURE [1]	
	<input type="checkbox"/> NONE [0]	<input type="checkbox"/> OPEN PASTURE, ROWCROP [0]	Indicate predominant land use(s) past 100m riparian.
Comments			10

5] POOL / GLIDE AND RIFFLE / RUN QUALITY

<b>MAXIMUM DEPTH</b>	<b>CHANNEL WIDTH</b>	<b>CURRENT VELOCITY</b>	<b>Recreation Potential</b> Primary Contact Secondary Contact <small>(circle one and comment on back)</small>
Check ONE (ONLY!)	Check ONE (Or 2 & average)	Check ALL that apply	
<input type="checkbox"/> > 1m [6]	<input type="checkbox"/> POOL WIDTH > RIFFLE WIDTH [2]	<input type="checkbox"/> TORRENTIAL [-1]	1
<input type="checkbox"/> 0.7-<1m [4]	<input type="checkbox"/> POOL WIDTH = RIFFLE WIDTH [1]	<input checked="" type="checkbox"/> SLOW [1]	
<input type="checkbox"/> 0.4-<0.7m [2]	<input checked="" type="checkbox"/> POOL WIDTH > RIFFLE WIDTH [0]	<input type="checkbox"/> VERY FAST [1]	
<input type="checkbox"/> 0.2-<0.4m [1]		<input type="checkbox"/> FAST [1]	
<input checked="" type="checkbox"/> < 0.2m [0]		<input type="checkbox"/> MODERATE [1]	
Comments			12

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species:

Check ONE (Or 2 & average).

NO RIFFLE [metric=0]

<b>RIFFLE DEPTH</b>	<b>RUN DEPTH</b>	<b>RIFFLE / RUN SUBSTRATE</b>	<b>RIFFLE / RUN EMBEDDEDNESS</b>	0
<input type="checkbox"/> BEST AREAS > 10cm [2]	<input type="checkbox"/> MAXIMUM > 50cm [2]	<input type="checkbox"/> STABLE (e.g., Cobble, Boulder) [2]	<input type="checkbox"/> NONE [2]	
<input type="checkbox"/> BEST AREAS 5-10cm [1]	<input checked="" type="checkbox"/> MAXIMUM < 50cm [1]	<input type="checkbox"/> MOD. STABLE (e.g., Large Gravel) [1]	<input type="checkbox"/> LOW [1]	
<input checked="" type="checkbox"/> BEST AREAS < 5cm [metric=0]		<input checked="" type="checkbox"/> UNSTABLE (e.g., Fine Gravel, Sand) [0]	<input type="checkbox"/> MODERATE [0]	
Comments			<input checked="" type="checkbox"/> EXTENSIVE [-1]	8

6] GRADIENT (

DRAINAGE AREA

ft/mi)  VERY LOW - LOW [2-4]  
 MODERATE [6-10]  
mi<sup>2</sup>)  HIGH - VERY HIGH [10-6]

% POOL: 10 % GLIDE:  

% RUN: 70 % RIFFLE: 20

Gradient Maximum 10

**AJ SAMPLED REACH**

Check ALL that apply

**METHOD**

- BOAT
- WADE
- L. LINE
- OTHER

**STAGE**

1st -sample pass- 2nd

- HIGH
- UP
- NORMAL
- LOW
- DRY

**DISTANCE**

- 0.5 Km
- 0.2 Km
- 0.15 Km
- 0.12 Km
- OTHER

**CLARITY**

1st --sample pass-- 2nd

- < 20 cm
- 20-<40 cm
- 40-70 cm
- > 70 cm/ CTB
- SECCHI DEPTH

**CANOPY**

- > 85%- OPEN
- 55%-<85%
- 30%-<55%
- 10%-<30%
- <10%- CLOSED

1st \_\_\_\_\_ cm  
pass  
2nd \_\_\_\_\_ cm

**CJ RECREATION**

AREA DEPTH

POOL:  >100ft<sup>2</sup>  >3ft

**BJ AESTHETICS**

- NUISANCE ALGAE
- INVASIVE MACROPHYTES
- EXCESS TURBIDITY
- DISCOLORATION
- FOAM / SCUM
- OIL SHEEN
- TRASH / LITTER
- NUISANCE ODOR
- SLUDGE DEPOSITS
- CSOs/SSOs/OUTFALLS

**DJ MAINTENANCE**

Circle some & COMMENT

- PUBLIC / PRIVATE / BOTH / NA
- ACTIVE / HISTORIC / BOTH / NA
- YOUNG-SUCCESSION-OLD
- SPRAY / SNAG / REMOVED
- MODIFIED / DIPPED OUT / NA
- LEVEED / ONE SIDED
- RELOCATED / CUTOFFS
- MOVING-BEDLOAD-STABLE
- ARMoured / SLUMPS
- ISLANDS / SCOURED
- IMPOUNDED / DESICCATED
- FLOOD CONTROL / DRAINAGE

**EJ ISSUES**

- WWTP / CSO / NPDES / INDUSTRY
- HARDENED / URBAN / DIRT&GRIME
- CONTAMINATED / LANDFILL
- BMPs-CONSTRUCTION-SEDIMENT
- LOGGING / IRRIGATION / COOLING
- BANK / EROSION / SURFACE
- FALSE BANK / MANURE / LAGOON
- WASH H<sub>2</sub>O / TILE / H<sub>2</sub>O TABLE
- ACID / MINE / QUARRY / FLOW
- NATURAL / WETLAND / STAGNANT
- PARK / GOLF / LAWN / HOME
- ATMOSPHERE / DATA PAUCITY

**FJ MEASUREMENTS**

- $\bar{x}$  width
- $\bar{x}$  depth
- max. depth
- $\bar{x}$  bankfull width
- bankfull  $\bar{x}$  depth
- W/D ratio
- bankfull max. depth
- floodprone x<sup>2</sup> width
- entrench. ratio

Legacy Tree:

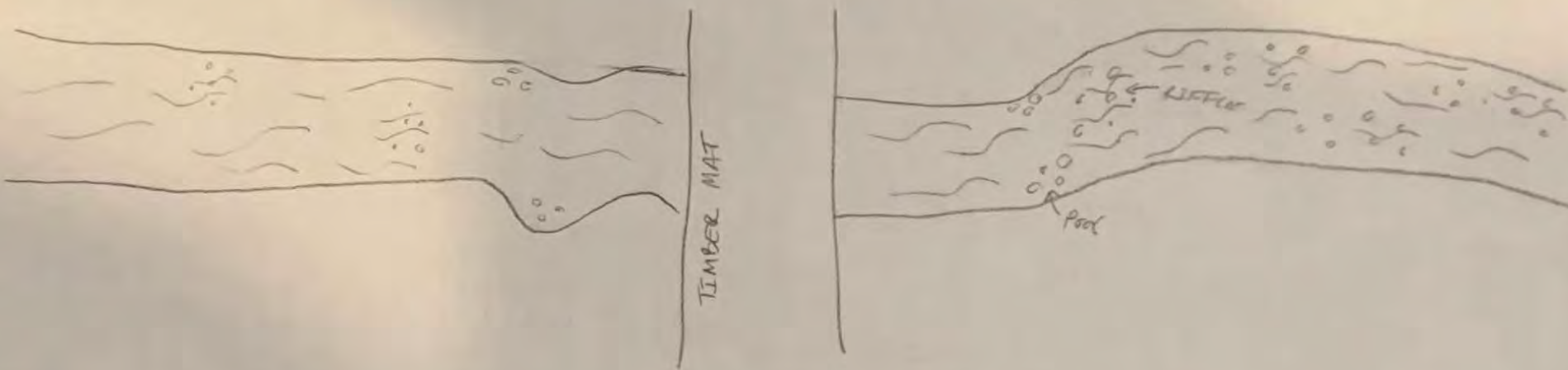
Comment RE: Reach consistency/ Is reach typical of stream?, Recreation/ Observed - Inferred, Other/ Sampling observations, Concerns, Access directions, etc.

S-H160: Reach limited to LOD. Entire stream recently channelized with rounded banks, and sediment filled bottoms. Width = ~15.0' Water depth = ~10cm very low gradient

PLANE BED

**Stream Drawing:**

← Stream flow





Stream & Location: S-L51 15:00 RM: --- Date: 11/17/21

Scorers Full Name & Affiliation: LK

River Code: - STORET #: --- Lat./Long.: 38.839355, -80.519693 (NAD 83 - decimal) Office verified location

**1] SUBSTRATE** Check ONLY Two substrate TYPE BOXES; estimate % or note every type present

<b>BEST TYPES</b>	<b>POOL RIFFLE</b>	<b>OTHER TYPES</b>	<b>POOL RIFFLE</b>	<b>ORIGIN</b>	<b>QUALITY</b>
<input type="checkbox"/> BLDR/SLABS [10]	<input type="checkbox"/>	<input type="checkbox"/> HARDPAN [4]	<input type="checkbox"/>	<input type="checkbox"/> LIMESTONE [1]	<input type="checkbox"/> HEAVY [-2]
<input type="checkbox"/> BOULDER [9]	<input type="checkbox"/>	<input checked="" type="checkbox"/> DETRITUS [3]	<input type="checkbox"/>	<input type="checkbox"/> TILLS [1]	<input type="checkbox"/> MODERATE [-1]
<input type="checkbox"/> COBBLE [8]	<input type="checkbox"/>	<input type="checkbox"/> MUCK [2]	<input type="checkbox"/>	<input type="checkbox"/> WETLANDS [0]	<input type="checkbox"/> NORMAL [0]
<input checked="" type="checkbox"/> GRAVEL [7]	<input type="checkbox"/>	<input type="checkbox"/> SILT [2]	<input type="checkbox"/>	<input type="checkbox"/> HARDPAN [0]	<input type="checkbox"/> FREE [1]
<input type="checkbox"/> SAND [6]	<input type="checkbox"/>	<input type="checkbox"/> ARTIFICIAL [0]	<input type="checkbox"/>	<input type="checkbox"/> SANDSTONE [0]	<input type="checkbox"/> EXTENSIVE [-2]
<input checked="" type="checkbox"/> BEDROCK [5]	<input type="checkbox"/>	<small>(Score natural substrates; ignore)</small>		<input type="checkbox"/> RIP/RAP [0]	<input type="checkbox"/> MODERATE [-1]
<b>NUMBER OF BEST TYPES:</b> <input type="checkbox"/> 4 or more [2] sludge from point-sources				<input type="checkbox"/> LACUSTURINE [0]	<input type="checkbox"/> NORMAL [0]
<input type="checkbox"/> 3 or less [0]				<input type="checkbox"/> SHALE [-1]	<input type="checkbox"/> NONE [1]
Comments				<input type="checkbox"/> COAL FINES [-2]	

Substrate  
15  
Maximum  
20

**2] INSTREAM COVER** Indicate presence 0 to 3: 0-Absent; 1-Very small amounts or if more common of marginal quality; 2-Moderate amounts, but not of highest quality or in small amounts of highest quality; 3-Highest quality in moderate or greater amounts (e.g., very large boulders in deep or fast water, large diameter log that is stable, well developed rootwad in deep / fast water, or deep, well-defined, functional pools.

<b>UNDERCUT BANKS [1]</b>	<b>POOLS &gt; 70cm [2]</b>	<b>OXBOWS, BACKWATERS [1]</b>
<b>OVERHANGING VEGETATION [1]</b>	<b>ROOTWADS [1]</b>	<b>AQUATIC MACROPHYTES [1]</b>
<b>SHALLOWS (IN SLOW WATER) [1]</b>	<b>BOULDERS [1]</b>	<b>LOGS OR WOODY DEBRIS [1]</b>
<b>ROOTMATS [1]</b>		

Check ONE (Or 2 & average)

EXTENSIVE >75% [11]

MODERATE 25-75% [7]

SPARSE 5-<25% [3]

NEARLY ABSENT <5% [1]

Comments

Cover  
Maximum  
20  
  

**3] CHANNEL MORPHOLOGY** Check ONE in each category (Or 2 & average)

<b>SINUOSITY</b>	<b>DEVELOPMENT</b>	<b>CHANNELIZATION</b>	<b>STABILITY</b>
<input type="checkbox"/> HIGH [4]	<input type="checkbox"/> EXCELLENT [7]	<input checked="" type="checkbox"/> NONE [6]	<input checked="" type="checkbox"/> HIGH [3]
<input checked="" type="checkbox"/> MODERATE [3]	<input type="checkbox"/> GOOD [5]	<input type="checkbox"/> RECOVERED [4]	<input type="checkbox"/> MODERATE [2]
<input type="checkbox"/> LOW [2]	<input checked="" type="checkbox"/> FAIR [3]	<input type="checkbox"/> RECOVERING [3]	<input type="checkbox"/> LOW [1]
<input type="checkbox"/> NONE [1]	<input type="checkbox"/> POOR [1]	<input type="checkbox"/> RECENT OR NO RECOVERY [1]	

Comments

Channel  
Maximum  
20  
15

**4] BANK EROSION AND RIPARIAN ZONE** Check ONE in each category for EACH BANK (Or 2 per bank & average)

<b>EROSION</b>	<b>RIPARIAN WIDTH</b>
<input type="checkbox"/> NONE / LITTLE [3]	<input type="checkbox"/> WIDE > 50m [4]
<input type="checkbox"/> MODERATE [2]	<input type="checkbox"/> MODERATE 10-50m [3]
<input type="checkbox"/> HEAVY / SEVERE [1]	<input type="checkbox"/> NARROW 5-10m [2]
	<input type="checkbox"/> VERY NARROW < 5m [1]
	<input type="checkbox"/> NONE [0]

<b>FLOOD PLAIN QUALITY</b>	<b>CONSERVATION TILLAGE [1]</b>
<input type="checkbox"/> FOREST, SWAMP [3]	<input type="checkbox"/> URBAN OR INDUSTRIAL [0]
<input type="checkbox"/> SHRUB OR OLD FIELD [2]	<input type="checkbox"/> MINING / CONSTRUCTION [0]
<input type="checkbox"/> RESIDENTIAL, PARK, NEW FIELD [1]	
<input type="checkbox"/> FENCED PASTURE [1]	
<input type="checkbox"/> OPEN PASTURE, ROWCROP [0]	

Indicate predominant land use(s) past 100m riparian.

Comments

Riparian  
Maximum  
10  
  

**5] POOL / GLIDE AND RIFFLE / RUN QUALITY**

<b>MAXIMUM DEPTH</b> Check ONE (ONLY)	<b>CHANNEL WIDTH</b> Check ONE (Or 2 & average)	<b>CURRENT VELOCITY</b> Check ALL that apply
<input type="checkbox"/> > 1m [6]	<input type="checkbox"/> POOL WIDTH > RIFFLE WIDTH [2]	<input type="checkbox"/> TORRENTIAL [-1]
<input type="checkbox"/> 0.7-<1m [4]	<input checked="" type="checkbox"/> POOL WIDTH = RIFFLE WIDTH [1]	<input type="checkbox"/> SLOW [1]
<input type="checkbox"/> 0.4-<0.7m [2]	<input type="checkbox"/> POOL WIDTH > RIFFLE WIDTH [0]	<input type="checkbox"/> VERY FAST [1]
<input checked="" type="checkbox"/> 0.2-<0.4m [1]		<input type="checkbox"/> FAST [1]
<input type="checkbox"/> < 0.2m [0]		<input checked="" type="checkbox"/> MODERATE [1]
		<input type="checkbox"/> INTERSTITIAL [-1]
		<input type="checkbox"/> INTERMITTENT [-2]
		<input type="checkbox"/> EDDIES [1]

Indicate for reach - pools and riffles.

**Recreation Potential**  
Primary Contact  
Secondary Contact  
(circle one and comment on bank)

Pool / Current  
Maximum  
12  
3

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species:

<b>RIFFLE DEPTH</b>	<b>RUN DEPTH</b>	<b>RIFFLE / RUN SUBSTRATE</b>	<b>RIFFLE / RUN EMBEDDEDNESS</b>
<input type="checkbox"/> BEST AREAS > 10cm [2]	<input type="checkbox"/> MAXIMUM > 50cm [2]	<input checked="" type="checkbox"/> STABLE (e.g., Cobble, Boulder) [2]	<input type="checkbox"/> NONE [2]
<input type="checkbox"/> BEST AREAS 5-10cm [1]	<input checked="" type="checkbox"/> MAXIMUM < 50cm [1]	<input type="checkbox"/> MOD. STABLE (e.g., Large Gravel) [1]	<input checked="" type="checkbox"/> LOW [1]
<input checked="" type="checkbox"/> BEST AREAS < 5cm [metric=0]		<input type="checkbox"/> UNSTABLE (e.g., Fine Gravel, Sand) [0]	<input type="checkbox"/> MODERATE [0]
			<input type="checkbox"/> EXTENSIVE [-1]

Check ONE (Or 2 & average).  NO RIFFLE [metric=0]

Comments

Riffle / Run  
Maximum  
8  
4

**6] GRADIENT** ( ft/mi)  VERY LOW - LOW [2-4]      %POOL: 30      %GLIDE:   

**DRAINAGE AREA** ( mi<sup>2</sup>)  MODERATE [6-10]      %RUN: 40      %RIFFLE: 30

HIGH - VERY HIGH [10-6]      Gradient Maximum 10

**A) SAMPLED REACH**

Check ALL that apply

Comment RE: Reach consistency/ Is reach typical of stream?, Recreation/ Observed - Inferred, Other/ Sampling observations, Concerns, Access directions, etc.

S-LS1

**METHOD**

- BOAT
- WADE
- L. LINE
- OTHER

**STAGE**

1st -sample pass- 2nd

- HIGH
- UP
- NORMAL
- LOW
- DRY

**DISTANCE**

- 0.5 Km
- 0.2 Km
- 0.15 Km
- 0.12 Km
- OTHER

**CLARITY**

1st -sample pass- 2nd

- < 20 cm
- 20-40 cm
- 40-70 cm
- > 70 cm/ CTB
- SECCHI DEPTH

meters

**CANOPY**

- > 85% - OPEN
- 55%-<85%
- 30%-<55%
- 10%-<30%
- <10% - CLOSED

- 1st \_\_\_\_\_ cm
- 2nd \_\_\_\_\_ cm

**C) RECREATION**

AREA DEPTH

POOL:  >100ft<sup>2</sup>  >3ft

**B) AESTHETICS**

- NUISANCE ALGAE
- INVASIVE MACROPHYTES
- EXCESS TURBIDITY
- DISCOLORATION
- FOAM / SCUM
- OIL SHEEN
- TRASH / LITTER
- NUISANCE ODOR
- SLUDGE DEPOSITS
- CSCs/SSOs/OUTFALLS

**D) MAINTENANCE**

- PUBLIC / PRIVATE / BOTH / NA
- ACTIVE / HISTORIC / BOTH / NA
- YOUNG-SUCCESSION-OLD
- SPRAY / SNAG / REMOVED
- MODIFIED / DIPPED OUT / NA
- LEVEED / ONE SIDED
- RELOCATED / CUTOFFS
- MOVING-BEDLOAD-STABLE
- ARMoured / SLUMPS
- ISLANDS / SCoured
- IMPOUNDED / DESICCATED
- FLOOD CONTROL / DRAINAGE

Circle some & COMMENT

**E) ISSUES**

- WWTP / CSO / NPDES / INDUSTRY
- HARDENED / URBAN / DIRT&GRIME
- CONTAMINATED / LANDFILL
- BMPs-CONSTRUCTION-SEDIMENT
- LOGGING / IRRIGATION / COOLING
- BANK / EROSION / SURFACE
- FALSE BANK / MANURE / LAGOON
- WASH H<sub>2</sub>O / TILE / H<sub>2</sub>O TABLE
- ACID / MINE / QUARRY / FLOW
- NATURAL / WETLAND / STAGNANT
- PARK / GOLF / LAWN / HOME
- ATMOSPHERE / DATA PAUCITY

**F) MEASUREMENTS**

- $\bar{x}$  width
- $\bar{x}$  depth
- max. depth
- $\bar{x}$  bankfull width
- bankfull  $\bar{x}$  depth
- W/D ratio
- bankfull max. depth
- floodprone x<sup>2</sup> width
- entrench. ratio

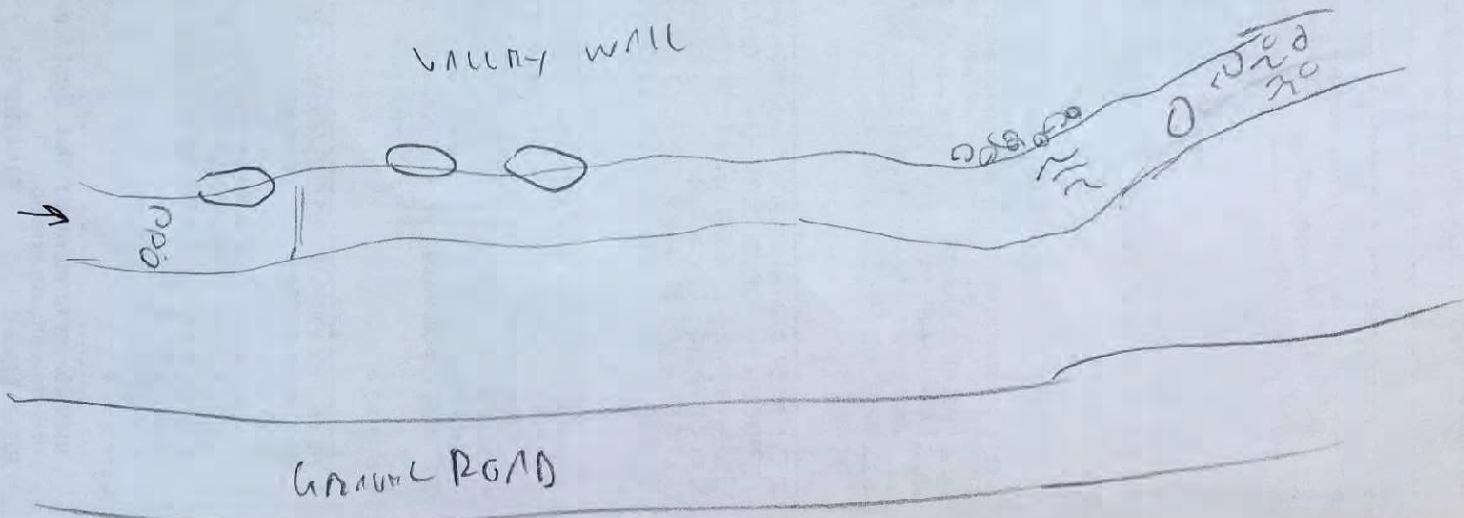
Legacy Tree:

BED ROCK containing STEP POOL OVER UPPER HALF. GRAVEL/COBBLE PLAINS BED OVER LOWER HALF

HEAVY LEAF DEPOSITS ON BED.

STEP-POOL

**Stream Drawing:**



Stream & Location: S-668

RM:   Date: 11/21/06

Scorers Full Name & Affiliation: LK/MB

River Code:   STORET #:   Lat./ Long.: 38.824034, -80.524988

Office verified location

1] SUBSTRATE Check ONLY Two substrate TYPE BOXES, estimate % or note every type present

Check ONE (Or 2 & average)

<b>BEST TYPES</b>		<b>POOL RIFFLE</b>		<b>OTHER TYPES</b>		<b>POOL RIFFLE</b>		<b>ORIGIN</b>		<b>QUALITY</b>		Substrate <span style="font-size: 24px;">20</span> Maximum 20
<input type="checkbox"/> BLDR /SLABS [10]	<input type="checkbox"/> POOL RIFFLE	<input type="checkbox"/> HARDPAN [4]	<input type="checkbox"/> POOL RIFFLE	<input type="checkbox"/> DETRITUS [3]	<input type="checkbox"/> LIMESTONE [1]	<input type="checkbox"/> SILT	<input type="checkbox"/> HEAVY [-2]	<input type="checkbox"/> TILLS [1]	<input type="checkbox"/> MODERATE [-1]	<input type="checkbox"/> NORMAL [0]		
<input type="checkbox"/> BOULDER [9]	<input type="checkbox"/> COBBLE [8]	<input type="checkbox"/> MUCK [2]	<input type="checkbox"/> SANDSTONE [0]	<input type="checkbox"/> SILT [2]	<input type="checkbox"/> WETLANDS [0]	<input type="checkbox"/> BEDDEDNESS	<input type="checkbox"/> FREE [1]	<input type="checkbox"/> HARDPAN [0]	<input type="checkbox"/> MODERATE [-1]	<input type="checkbox"/> NORMAL [0]		
<input type="checkbox"/> GRAVEL [7]	<input type="checkbox"/> SAND [6]	<input type="checkbox"/> ARTIFICIAL [0]	<input type="checkbox"/> RIP/RAP [0]	<input type="checkbox"/> ARTIFICIAL [0]	<input type="checkbox"/> SANDSTONE [0]	<input type="checkbox"/> LACUSTURINE [0]	<input type="checkbox"/> EXTENSIVE [-2]	<input type="checkbox"/> SANDSTONE [0]	<input type="checkbox"/> MODERATE [-1]	<input type="checkbox"/> SPARSE [0]		
<input type="checkbox"/> BEDROCK [5]			<input type="checkbox"/> SHALE [-1]		<input type="checkbox"/> LACUSTURINE [0]	<input type="checkbox"/> COAL FINES [-2]	<input type="checkbox"/> NONE [1]	<input type="checkbox"/> RIP/RAP [0]				

NUMBER OF BEST TYPES:  4 or more [2]  3 or less [0] (Score natural substrates; ignore sludge from point-sources)

Comments:  

2] INSTREAM COVER Indicate presence 0 to 3: 0-Absent; 1-Very small amounts or if more common of marginal quality; 2-Moderate amounts, but not of highest quality or in small amounts of highest quality; 3-Highest quality in moderate or greater amounts (e.g., very large boulders in deep or fast water, large diameter log that is stable, well developed rootwad in deep / fast water, or deep, well-defined, functional pools.

AMOUNT Check ONE (Or 2 & average)

<input type="checkbox"/> UNDERCUT BANKS [1]	<input type="checkbox"/> POOLS > 70cm [2]	<input type="checkbox"/> OXBOWS, BACKWATERS [1]	<input type="checkbox"/> EXTENSIVE >75% [11]
<input type="checkbox"/> OVERHANGING VEGETATION [1]	<input type="checkbox"/> ROOTWADS [1]	<input type="checkbox"/> AQUATIC MACROPHYTES [1]	<input type="checkbox"/> MODERATE 25-75% [7]
<input type="checkbox"/> SHALLOWS (IN SLOW WATER) [1]	<input type="checkbox"/> BOULDERS [1]	<input type="checkbox"/> LOGS OR WOODY DEBRIS [1]	<input type="checkbox"/> SPARSE 5-<25% [3]
<input type="checkbox"/> ROOTMATS [1]			<input type="checkbox"/> NEARLY ABSENT <5% [1]

Comments:  

Cover Maximum   20

3] CHANNEL MORPHOLOGY Check ONE in each category (Or 2 & average)

<b>SINUOSITY</b>	<b>DEVELOPMENT</b>	<b>CHANNELIZATION</b>	<b>STABILITY</b>	Channel Maximum <span style="font-size: 24px;">14</span> 20
<input type="checkbox"/> HIGH [4]	<input type="checkbox"/> EXCELLENT [7]	<input type="checkbox"/> NONE [6]	<input type="checkbox"/> HIGH [3]	
<input type="checkbox"/> MODERATE [3]	<input type="checkbox"/> GOOD [5]	<input type="checkbox"/> RECOVERED [4]	<input type="checkbox"/> MODERATE [2]	
<input type="checkbox"/> LOW [2]	<input type="checkbox"/> FAIR [3]	<input type="checkbox"/> RECOVERING [3]	<input type="checkbox"/> LOW [1]	

Comments: Moderate sinuosity, fast down

4] BANK EROSION AND RIPARIAN ZONE Check ONE in each category for EACH BANK (Or 2 per bank & average)

<b>EROSION</b>		<b>RIPARIAN WIDTH</b>		<b>FLOOD PLAIN QUALITY</b>		Riparian Maximum <span style="font-size: 24px;"> </span> 10
<input type="checkbox"/> NONE / LITTLE [3]	<input type="checkbox"/> MODERATE [2]	<input type="checkbox"/> WIDE > 50m [4]	<input type="checkbox"/> MODERATE 10-50m [3]	<input type="checkbox"/> FOREST, SWAMP [3]	<input type="checkbox"/> SHRUB OR OLD FIELD [2]	
<input type="checkbox"/> HEAVY / SEVERE [1]	<input type="checkbox"/> MODERATE [2]	<input type="checkbox"/> NARROW 5-10m [2]	<input type="checkbox"/> VERY NARROW < 5m [1]	<input type="checkbox"/> RESIDENTIAL, PARK, NEW FIELD [1]	<input type="checkbox"/> FENCED PASTURE [1]	
	<input type="checkbox"/> NONE [0]	<input type="checkbox"/> NONE [0]		<input type="checkbox"/> OPEN PASTURE, ROWCROP [0]	<input type="checkbox"/> CONSERVATION TILLAGE [1]	

Comments:  

Indicate predominant land use(s) past 100m riparian.

5] POOL / GLIDE AND RIFFLE / RUN QUALITY

<b>MAXIMUM DEPTH</b>	<b>CHANNEL WIDTH</b>	<b>CURRENT VELOCITY</b>	Recreation Potential Primary Contact Secondary Contact (circle one and comment on back)
Check ONE (ONLY)	Check ONE (Or 2 & average)	Check ALL that apply	
<input checked="" type="checkbox"/> > 1m [6]	<input type="checkbox"/> POOL WIDTH > RIFFLE WIDTH [2]	<input type="checkbox"/> TORRENTIAL [-1] <input checked="" type="checkbox"/> SLOW [1]	
<input type="checkbox"/> 0.7-<1m [4]	<input type="checkbox"/> POOL WIDTH = RIFFLE WIDTH [1]	<input type="checkbox"/> VERY FAST [1] <input type="checkbox"/> INTERSTITIAL [-1]	

Comments:  

Pool / Current Maximum 7 12

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species:

Check ONE (Or 2 & average).

NO RIFFLE [metric=0]

<b>RIFFLE DEPTH</b>	<b>RUN DEPTH</b>	<b>RIFFLE / RUN SUBSTRATE</b>	<b>RIFFLE / RUN EMBEDDEDNESS</b>	Riffle / Run Maximum <span style="font-size: 24px;">5</span> 8
<input type="checkbox"/> BEST AREAS > 10cm [2]	<input checked="" type="checkbox"/> MAXIMUM > 50cm [2]	<input type="checkbox"/> STABLE (e.g., Cobble, Boulder) [2]	<input type="checkbox"/> NONE [2]	
<input checked="" type="checkbox"/> BEST AREAS 5-10cm [1]	<input type="checkbox"/> MAXIMUM < 50cm [1]	<input checked="" type="checkbox"/> MOD. STABLE (e.g., Large Gravel) [1]	<input checked="" type="checkbox"/> LOW [1]	
<input type="checkbox"/> BEST AREAS < 5cm [metric=0]		<input type="checkbox"/> UNSTABLE (e.g., Fine Gravel, Sand) [0]	<input type="checkbox"/> MODERATE [0]	

Comments:  

6] GRADIENT ( ft/mi)  VERY LOW - LOW [2-4] % POOL: 50 % GLIDE:  

DRAINAGE AREA ( mi<sup>2</sup>)  MODERATE [6-10] % RUN: 45 % RIFFLE: 5 Gradient Maximum   10

**AJ SAMPLED REACH**

Check ALL that apply

**METHOD**      **STAGE**

- BOAT      1st -sample pass- 2nd  
 WADE       HIGH        
 L. LINE       UP        
 OTHER       NORMAL        
 DRY       LOW        
 DRY       DRY

**DISTANCE**

- 0.5 Km  
 0.2 Km  
 0.15 Km  
 0.12 Km  
 OTHER

**CLARITY**

- 1st --sample pass-- 2nd  
 < 20 cm        
 20-<40 cm        
 40-70 cm        
 > 70 cm/ CTB        
 SECCHI DEPTH

**CANOPY**

- 1st \_\_\_\_\_ cm  
 2nd \_\_\_\_\_ cm  
 > 85%- OPEN  
 55%-<85%  
 30%-<55%  
 10%-<30%  
 <10%- CLOSED

**CJ RECREATION**

- AREA DEPTH  
 POOL:  >100ft<sup>2</sup>  >3ft

**BJ AESTHETICS**

- NUISANCE ALGAE  
 INVASIVE MACROPHYTES  
 EXCESS TURBIDITY  
 DISCOLORATION  
 FOAM / SCUM  
 OIL SHEEN  
 TRASH / LITTER  
 NUISANCE ODOR  
 SLUDGE DEPOSITS  
 CSOs/SSOs/OUTFALLS

**DJ MAINTENANCE**

- PUBLIC / PRIVATE / BOTH / NA  
 ACTIVE / HISTORIC / BOTH / NA  
 YOUNG-SUCCESSION-OLD  
 SPRAY / SNAG / REMOVED  
 MODIFIED / DIPPED OUT / NA  
 LEVEED / ONE SIDED  
 RELOCATED / CUTOFFS  
 MOVING-BEDLOAD-STABLE  
 ARMoured / SLUMPS  
 ISLANDS / SCoured  
 IMPOUNDED / DESICCATED  
 FLOOD CONTROL / DRAINAGE

Circle some & COMMENT

**EJ ISSUES**

- WWTP / CSO / NPDES / INDUSTRY  
 HARDENED / URBAN / DIRT&GRIME  
 CONTAMINATED / LANDFILL  
 BMPs-CONSTRUCTION-SEDIMENT  
 LOGGING / IRRIGATION / COOLING  
 BANK / EROSION / SURFACE  
 FALSE BANK / MANURE / LAGOON  
 WASH H<sub>2</sub>O / TILE / H<sub>2</sub>O TABLE  
 ACID / MINE / QUARRY / FLOW  
 NATURAL / WETLAND / STAGNANT  
 PARK / GOLF / LAWN / HOME  
 ATMOSPHERE / DATA PAUCITY

**FJ MEASUREMENTS**

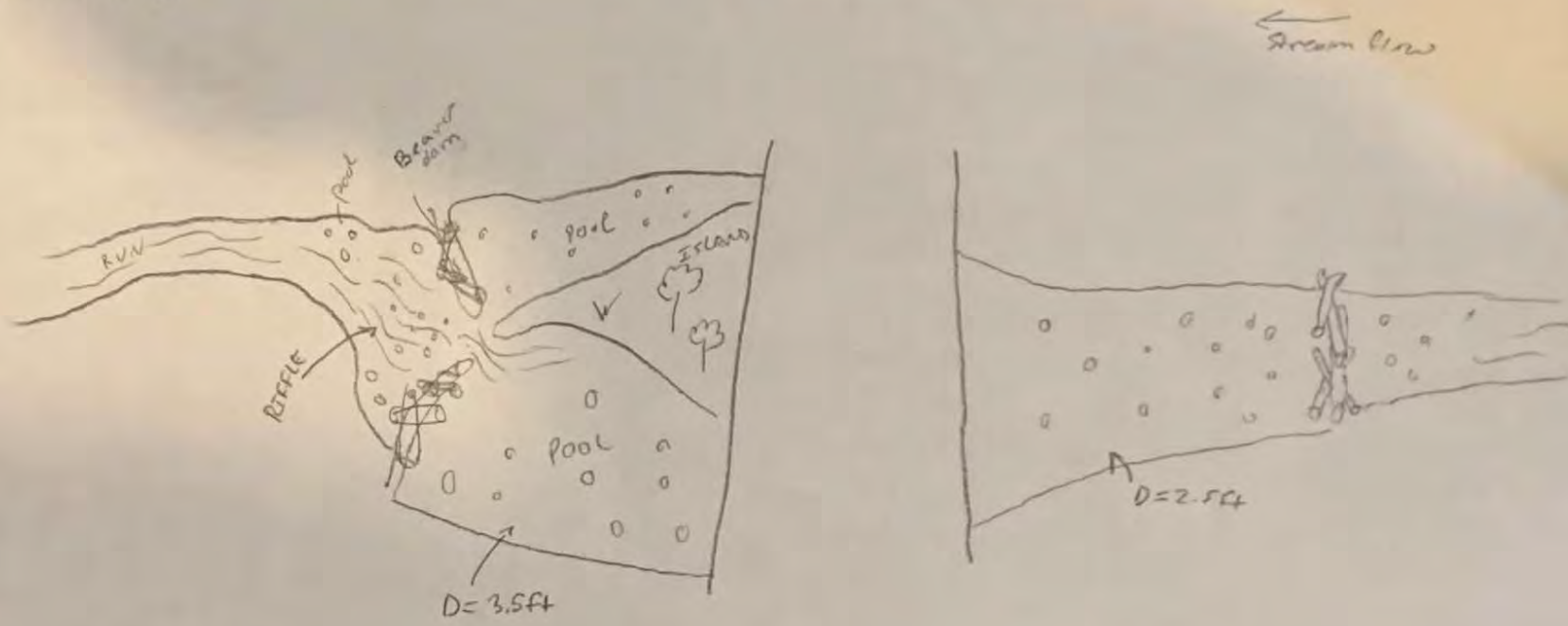
- $\bar{x}$  width  
 $\bar{x}$  depth  
 max. depth  
 $\bar{x}$  bankfull width  
 bankfull  $\bar{x}$  depth  
 W/D ratio  
 bankfull max. depth  
 floodprone  $x^2$  width  
 entrench. ratio

Legacy Tree:

Comment RE: Reach consistency/ Is reach typical of stream?, Recreation/ Observed - Inferred, Other/ Sampling observations, Concerns, Access directions, etc.  
 Reach access limited to LOD. mostly pool due to dam. past dam, various c.f.cle - pool complex.  
 Pre-dam plane bed.

Plane bed

**Stream Drawing:**



Stream & Location: S-LL2

RM: CK/MB Date: 01/29/06

Scorers Full Name & Affiliation: CK/MB

Office verified location

River Code: - - - STORET #:    Lat./ Long.: 38.823595, -80.525342

1) **SUBSTRATE** Check ONLY Two substrate TYPE BOXES, estimate % or note every type present

<b>BEST TYPES</b>	<b>POOL RIFFLE</b>	<b>OTHER TYPES</b>	<b>POOL RIFFLE</b>	<b>ORIGIN</b>	<b>QUALITY</b>	Substrate <span style="border: 1px solid black; border-radius: 50%; padding: 5px 15px;">18</span> Maximum 20
<input type="checkbox"/> BLDR / SLABS [10]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> HARDPAN [4]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> LIMESTONE [1]	<input type="checkbox"/> HEAVY [-2]	
<input type="checkbox"/> BOULDER [9]	<input type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> DETRITUS [3]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> TILLS [1]	<input type="checkbox"/> MODERATE [-1]	
<input checked="" type="checkbox"/> COBBLE [8]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> MUCK [2]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> WETLANDS [0]	<input type="checkbox"/> NORMAL [0]	
<input checked="" type="checkbox"/> GRAVEL [7]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> SILT [2]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> HARDPAN [0]	<input type="checkbox"/> FREE [1]	
<input type="checkbox"/> SAND [6]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> ARTIFICIAL [0]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> SANDSTONE [0]	<input type="checkbox"/> EXTENSIVE [-2]	
<input type="checkbox"/> BEDROCK [5]	<input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> RIP/RAP [0]	<input type="checkbox"/> MODERATE [-1]	

NUMBER OF BEST TYPES:  4 or more [2]  3 or less [0]

Comments:   

2) **INSTREAM COVER** Indicate presence 0 to 3: 0-Absent; 1-Very small amounts or if more common of marginal quality; 2-Moderate amounts, but not of highest quality or in small amounts of highest quality; 3-Highest quality in moderate or greater amounts (e.g., very large boulders in deep or fast water, large diameter log that is stable, well developed rootwad in deep / fast water, or deep, well-defined, functional pools.

<input type="checkbox"/> UNDERCUT BANKS [1]	<input type="checkbox"/> POOLS > 70cm [2]	<input type="checkbox"/> OXBOWS, BACKWATERS [1]	AMOUNT Check ONE (Or 2 & average) <input type="checkbox"/> EXTENSIVE >75% [11] <input type="checkbox"/> MODERATE 25-75% [7] <input type="checkbox"/> SPARSE 5-<25% [3] <input type="checkbox"/> NEARLY ABSENT <5% [1]
<input type="checkbox"/> OVERHANGING VEGETATION [1]	<input type="checkbox"/> ROOTWADS [1]	<input type="checkbox"/> AQUATIC MACROPHYTES [1]	
<input type="checkbox"/> SHALLOWS (IN SLOW WATER) [1]	<input type="checkbox"/> BOULDERS [1]	<input type="checkbox"/> LOGS OR WOODY DEBRIS [1]	
<input type="checkbox"/> ROOTMATS [1]			Cover Maximum <span style="border: 1px solid black; border-radius: 50%; padding: 5px 15px;">  </span> 20

Comments:   

3) **CHANNEL MORPHOLOGY** Check ONE in each category (Or 2 & average)

<b>SINUOSITY</b>	<b>DEVELOPMENT</b>	<b>CHANNELIZATION</b>	<b>STABILITY</b>	Channel Maximum <span style="border: 1px solid black; border-radius: 50%; padding: 5px 15px;">13</span> 20
<input type="checkbox"/> HIGH [4]	<input type="checkbox"/> EXCELLENT [7]	<input checked="" type="checkbox"/> NONE [6]	<input checked="" type="checkbox"/> HIGH [3]	
<input type="checkbox"/> MODERATE [3]	<input type="checkbox"/> GOOD [5]	<input type="checkbox"/> RECOVERED [4]	<input type="checkbox"/> MODERATE [2]	
<input type="checkbox"/> LOW [2]	<input checked="" type="checkbox"/> FAIR [3]	<input type="checkbox"/> RECOVERING [3]	<input type="checkbox"/> LOW [1]	
<input checked="" type="checkbox"/> NONE [1]	<input type="checkbox"/> POOR [1]	<input type="checkbox"/> RECENT OR NO RECOVERY [1]		

Comments:   

4) **BANK EROSION AND RIPARIAN ZONE** Check ONE in each category for EACH BANK (Or 2 per bank & average)

<b>EROSION</b>	<b>RIPARIAN WIDTH</b>	<b>FLOOD PLAIN QUALITY</b>	Indicate predominant land use(s) past 100m riparian. Riparian Maximum <span style="border: 1px solid black; border-radius: 50%; padding: 5px 15px;">  </span> 10
<input type="checkbox"/> NONE / LITTLE [3]	<input type="checkbox"/> WIDE > 50m [4]	<input type="checkbox"/> FOREST, SWAMP [3]	
<input type="checkbox"/> MODERATE [2]	<input type="checkbox"/> MODERATE 10-50m [3]	<input type="checkbox"/> SHRUB OR OLD FIELD [2]	<input type="checkbox"/> CONSERVATION TILLAGE [1]
<input type="checkbox"/> HEAVY / SEVERE [1]	<input type="checkbox"/> NARROW 5-10m [2]	<input type="checkbox"/> RESIDENTIAL, PARK, NEW FIELD [1]	<input type="checkbox"/> URBAN OR INDUSTRIAL [0]
	<input type="checkbox"/> VERY NARROW < 5m [1]	<input type="checkbox"/> FENCED PASTURE [1]	<input type="checkbox"/> MINING / CONSTRUCTION [0]
	<input type="checkbox"/> NONE [0]	<input type="checkbox"/> OPEN PASTURE, ROWCROP [0]	

Comments:   

5) **POOL / GLIDE AND RIFFLE / RUN QUALITY**

<b>MAXIMUM DEPTH</b>	<b>CHANNEL WIDTH</b>	<b>CURRENT VELOCITY</b>	Recreation Potential Primary Contact Secondary Contact (circle one and comment on back)
Check ONE (ONLY!)	Check ONE (Or 2 & average)	Check ALL that apply	
<input type="checkbox"/> > 1m [6]	<input checked="" type="checkbox"/> POOL WIDTH > RIFFLE WIDTH [2]	<input type="checkbox"/> TORRENTIAL [-1]	Pool / Current Maximum <span style="border: 1px solid black; border-radius: 50%; padding: 5px 15px;">6</span> 12
<input type="checkbox"/> 0.7-<1m [4]	<input type="checkbox"/> POOL WIDTH = RIFFLE WIDTH [1]	<input type="checkbox"/> VERY FAST [1]	
<input checked="" type="checkbox"/> 0.4-<0.7m [2]	<input type="checkbox"/> POOL WIDTH > RIFFLE WIDTH [0]	<input type="checkbox"/> FAST [1]	
<input type="checkbox"/> 0.2-<0.4m [1]		<input checked="" type="checkbox"/> MODERATE [1]	
<input type="checkbox"/> < 0.2m [0]		<input type="checkbox"/> INTERSTITIAL [-1]	
		<input type="checkbox"/> INTERMITTENT [-2]	
		<input type="checkbox"/> EDDIES [1]	

Indicate for reach - pools and riffles.

Comments:   

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species:  NO RIFFLE [metric=0]

<b>RIFFLE DEPTH</b>	<b>RUN DEPTH</b>	<b>RIFFLE / RUN SUBSTRATE</b>	<b>RIFFLE / RUN EMBEDDEDNESS</b>	Riffle / Run Maximum <span style="border: 1px solid black; border-radius: 50%; padding: 5px 15px;">4</span> 8
<input type="checkbox"/> BEST AREAS > 10cm [2]	<input checked="" type="checkbox"/> MAXIMUM > 50cm [2]	<input type="checkbox"/> STABLE (e.g., Cobble, Boulder) [2]	<input type="checkbox"/> NONE [2]	
<input type="checkbox"/> BEST AREAS 5-10cm [1]	<input type="checkbox"/> MAXIMUM < 50cm [1]	<input checked="" type="checkbox"/> MOD. STABLE (e.g., Large Gravel) [1]	<input checked="" type="checkbox"/> LOW [1]	
<input checked="" type="checkbox"/> BEST AREAS < 5cm [metric=0]		<input type="checkbox"/> UNSTABLE (e.g., Fine Gravel, Sand) [0]	<input type="checkbox"/> MODERATE [0]	
			<input type="checkbox"/> EXTENSIVE [-1]	

Comments:   

6) **GRADIENT** (ft/mi)  VERY LOW - LOW [2-4] % POOL: 50 % GLIDE:   

**DRAINAGE AREA** (mi<sup>2</sup>)  MODERATE [6-10] % RUN: 40 % RIFFLE: 10

HIGH - VERY HIGH [10-6] Gradient  
Maximum  
    
10

**AJ SAMPLED REACH**

Check ALL that apply

**METHOD**

- BOAT
- WADE
- L. LINE
- OTHER

**STAGE**

1st -sample pass-- 2nd

- HIGH
- UP
- NORMAL
- LOW
- DRY

**DISTANCE**

- 0.5 Km
- 0.2 Km
- 0.15 Km
- 0.12 Km
- OTHER

meters

**CLARITY**

1st --sample pass-- 2nd

- < 20 cm
- 20-40 cm
- 40-70 cm
- > 70 cm/ CTB
- SECCHI DEPTH

**CANOPY**

1st \_\_\_\_\_ cm

2nd \_\_\_\_\_ cm

- > 85%- OPEN
- 55%-<85%
- 30%-<55%
- 10%-<30%
- <10%- CLOSED

**CJ RECREATION**

AREA DEPTH

POOL:  >100ft<sup>2</sup>  >3ft

Comment RE: Reach consistency/ Is reach typical of stream?, Recreation/ Observed - Inferred, Other/ Sampling observations, Concerns, Access directions, etc.

S-LLI: Reach limited to L.O. Upstream riffles followed by pools  
 Pools depth = 1.8 feet. Riffles are cobble and gravel. Left bank up stream  
 governed by mountain slope.

Poorly-Formed riffle-pool

**BJA AESTHETICS**

- NUISANCE ALGAE
- INVASIVE MACROPHYTES
- EXCESS TURBIDITY
- DISCOLORATION
- FOAM / SCUM
- OIL SHEEN
- TRASH / LITTER
- NUISANCE ODOR
- SLUDGE DEPOSITS
- CSOs/SSOs/OUTFALLS

**DJ MAINTENANCE**

Circle some & COMMENT

- PUBLIC / PRIVATE / BOTH / NA
- ACTIVE / HISTORIC / BOTH / NA
- YOUNG-SUCCESSION-OLD
- SPRAY / SNAG / REMOVED
- MODIFIED / DIPPED OUT / NA
- LEVEED / ONE SIDED
- RELOCATED / CUTOFFS
- MOVING-BEDLOAD-STABLE
- ARMOURED / SLUMPS
- ISLANDS / SCOURED
- IMPOUNDED / DESICCATED
- FLOOD CONTROL / DRAINAGE

**EJ ISSUES**

- WWTP / CSO / NPDES / INDUSTRY
- HARDENED / URBAN / DIRT&GRIME
- CONTAMINATED / LANDFILL
- BMPs-CONSTRUCTION-SEDIMENT
- LOGGING / IRRIGATION / COOLING
- BANK / EROSION / SURFACE
- FALSE BANK / MANURE / LAGOON
- WASH H<sub>2</sub>O / TILE / H<sub>2</sub>O TABLE
- ACID / MINE / QUARRY / FLOW
- NATURAL / WETLAND / STAGNANT
- PARK / GOLF / LAWN / HOME
- ATMOSPHERE / DATA PAUCITY

**FJ MEASUREMENTS**

- $\bar{x}$  width
- $\bar{x}$  depth
- max. depth
- $\bar{x}$  bankfull width
- bankfull  $\bar{x}$  depth
- W/D ratio
- bankfull max. depth
- floodprone  $x^2$  width
- entrench. ratio

Legacy Tree:

**Stream Drawing:**



Mountain Slope



# Qualitative Habitat Evaluation Index and Use Assessment Field Sheet

QHEI Score:   

Stream & Location: 5-132

RM:    Date: 7/10/21

Scorers Full Name & Affiliation: LK

River Code:    STORET #:    Lat./ Long.: 38.751499, -80.514919 Office verified location

**1] SUBSTRATE** Check **ONLY Two** substrate **TYPE BOXES**, estimate % or note every type present

<b>BEST TYPES</b>	<b>POOL RIFFLE</b>	<b>OTHER TYPES</b>	<b>POOL RIFFLE</b>	<b>ORIGIN</b>	<b>QUALITY</b>
<input type="checkbox"/> BLDR /SLABS [10]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> HARDPAN [4]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> LIMESTONE [1]	<input type="checkbox"/> HEAVY [-2]
<input type="checkbox"/> BOULDER [9]	<input type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> DETRITUS [3]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> TILLS [1]	<input type="checkbox"/> MODERATE [-1]
<input checked="" type="checkbox"/> COBBLE [8]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> MUCK [2]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> WETLANDS [0]	<input type="checkbox"/> NORMAL [0]
<input type="checkbox"/> GRAVEL [7]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> SILT [2]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> HARDPAN [0]	<input type="checkbox"/> FREE [1]
<input checked="" type="checkbox"/> SAND [6]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> ARTIFICIAL [0]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> SANDSTONE [0]	<input type="checkbox"/> EXTENSIVE [-2]
<input type="checkbox"/> BEDROCK [5]	<input type="checkbox"/> <input type="checkbox"/>			<input type="checkbox"/> RIP/RAP [0]	<input type="checkbox"/> MODERATE [-1]

NUMBER OF BEST TYPES:  4 or more [2]  3 or less [0]

Comments:   

Check ONE (Or 2 & average)

SILT  EMBEDDEDNESS

SHALE [-1]  COAL FINES [-2]

Substrate 17 Maximum 20

**2] INSTREAM COVER** Indicate presence 0 to 3: 0-Absent, 1-Very small amounts or if more common of marginal quality; 2-Moderate amounts, but not of highest quality or in small amounts of highest quality; 3-Highest quality in moderate or greater amounts (e.g., very large boulders in deep or fast water, large diameter log that is stable, well developed rootwad in deep / fast water, or deep, well-defined, functional pools.

<input type="checkbox"/> UNDERCUT BANKS [1]	<input type="checkbox"/> POOLS > 70cm [2]	<input type="checkbox"/> OXBOWS, BACKWATERS [1]	<b>AMOUNT</b>
<input type="checkbox"/> OVERHANGING VEGETATION [1]	<input type="checkbox"/> ROOTWADS [1]	<input type="checkbox"/> AQUATIC MACROPHYTES [1]	Check ONE (Or 2 & average)
<input type="checkbox"/> SHALLOWS (IN SLOW WATER) [1]	<input type="checkbox"/> BOULDERS [1]	<input type="checkbox"/> LOGS OR WOODY DEBRIS [1]	<input type="checkbox"/> EXTENSIVE >75% [11]
<input type="checkbox"/> ROOTMATS [1]			<input type="checkbox"/> MODERATE 25-75% [7]
			<input type="checkbox"/> SPARSE 5-<25% [3]
			<input type="checkbox"/> NEARLY ABSENT <5% [1]

Comments:   

Cover    Maximum 20

**3] CHANNEL MORPHOLOGY** Check ONE in each category (Or 2 & average)

<b>SINUOSITY</b>	<b>DEVELOPMENT</b>	<b>CHANNELIZATION</b>	<b>STABILITY</b>
<input type="checkbox"/> HIGH [4]	<input type="checkbox"/> EXCELLENT [7]	<input type="checkbox"/> NONE [6]	<input type="checkbox"/> HIGH [3]
<input type="checkbox"/> MODERATE [3]	<input checked="" type="checkbox"/> GOOD [5]	<input checked="" type="checkbox"/> RECOVERED [4]	<input type="checkbox"/> MODERATE [2]
<input checked="" type="checkbox"/> LOW [2]	<input type="checkbox"/> FAIR [3]	<input type="checkbox"/> RECOVERING [3]	<input type="checkbox"/> LOW [1]
<input type="checkbox"/> NONE [1]	<input type="checkbox"/> POOR [1]	<input type="checkbox"/> RECENT OR NO RECOVERY [1]	

Comments:   

Channel 11 Maximum 20

**4] BANK EROSION AND RIPARIAN ZONE** Check ONE in each category for EACH BANK (Or 2 per bank & average)

River right looking downstream

<b>EROSION</b>	<b>RIPARIAN WIDTH</b>	<b>FLOOD PLAIN QUALITY</b>
<input type="checkbox"/> NONE / LITTLE [3]	<input type="checkbox"/> WIDE > 50m [4]	<input type="checkbox"/> FOREST, SWAMP [3]
<input type="checkbox"/> MODERATE [2]	<input type="checkbox"/> MODERATE 10-50m [3]	<input type="checkbox"/> SHRUB OR OLD FIELD [2]
<input type="checkbox"/> HEAVY / SEVERE [1]	<input type="checkbox"/> NARROW 5-10m [2]	<input type="checkbox"/> RESIDENTIAL, PARK, NEW FIELD [1]
	<input type="checkbox"/> VERY NARROW < 5m [1]	<input type="checkbox"/> FENCED PASTURE [1]
	<input type="checkbox"/> NONE [0]	<input type="checkbox"/> OPEN PASTURE, ROWCROP [0]

Indicate predominant land use(s) past 100m riparian.

Conservation Tillage [1] Urban or Industrial [0] Mining / Construction [0]

Comments:   

Riparian    Maximum 10

**5] POOL / GLIDE AND RIFFLE / RUN QUALITY**

<b>MAXIMUM DEPTH</b>	<b>CHANNEL WIDTH</b>	<b>CURRENT VELOCITY</b>	<b>Recreation Potential</b>
Check ONE (ONLY)	Check ONE (Or 2 & average)	Check ALL that apply	<b>Primary Contact</b>
<input checked="" type="checkbox"/> > 1m [6]	<input checked="" type="checkbox"/> POOL WIDTH > RIFFLE WIDTH [2]	<input type="checkbox"/> TORRENTIAL [-1]	<b>Secondary Contact</b>
<input type="checkbox"/> 0.7-<1m [4]	<input type="checkbox"/> POOL WIDTH = RIFFLE WIDTH [1]	<input type="checkbox"/> VERY FAST [1]	(circle one and comment on back)
<input type="checkbox"/> 0.4-<0.7m [2]	<input type="checkbox"/> POOL WIDTH > RIFFLE WIDTH [0]	<input checked="" type="checkbox"/> FAST [1]	
<input type="checkbox"/> 0.2-<0.4m [1]		<input type="checkbox"/> INTERSTITIAL [-1]	
<input type="checkbox"/> < 0.2m [0]		<input type="checkbox"/> INTERMITTENT [-2]	
		<input checked="" type="checkbox"/> MODERATE [1]	
		<input type="checkbox"/> EDDIES [1]	

Indicate for reach - pools and riffles.

Comments: river bridge pool > 1m

Pool / Current 11 Maximum 12

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species:

<b>RIFFLE DEPTH</b>	<b>RUN DEPTH</b>	<b>RIFFLE / RUN SUBSTRATE</b>	<b>RIFFLE / RUN EMBEDDEDNESS</b>
<input checked="" type="checkbox"/> BEST AREAS > 10cm [2]	<input checked="" type="checkbox"/> MAXIMUM > 50cm [2]	<input checked="" type="checkbox"/> STABLE (e.g., Cobble, Boulder) [2]	<input type="checkbox"/> NONE [2]
<input type="checkbox"/> BEST AREAS 5-10cm [1]	<input type="checkbox"/> MAXIMUM < 50cm [1]	<input type="checkbox"/> MOD. STABLE (e.g., Large Gravel) [1]	<input type="checkbox"/> LOW [1]
<input type="checkbox"/> BEST AREAS < 5cm [metric=0]		<input type="checkbox"/> UNSTABLE (e.g., Fine Gravel, Sand) [0]	<input type="checkbox"/> MODERATE [0]
			<input type="checkbox"/> EXTENSIVE [-1]

Comments:   

Riffle / Run 6 Maximum 8

**6] GRADIENT** (ft/mi)  VERY LOW - LOW [2-4]  MODERATE [6-10]  HIGH - VERY HIGH [10-6]

**DRAINAGE AREA** (mi<sup>2</sup>)

% POOL: 10 % GLIDE:    % RUN: 70 % RIFFLE: 20

Gradient    Maximum 10

**AJ SAMPLED REACH**

Check ALL that apply

**METHOD**

- BOAT  
 WADE  
 L. LINE  
 OTHER

1st -sample pass- 2nd

- STAGE**  
 HIGH  
 UP  
 NORMAL  
 LOW  
 DRY

**DISTANCE**

- 0.5 Km  
 0.2 Km  
 0.15 Km  
 0.12 Km  
 OTHER

**CLARITY**

1st -sample pass- 2nd

- < 20 cm  
 20-40 cm  
 40-70 cm  
 > 70 cm/ CTB  
 SECCHI DEPTH

meters

**CANOPY**

- > 85%- OPEN  
 55%-<85%  
 30%-<55%  
 10%-<30%  
 <10%- CLOSED

- 1st \_\_\_\_\_ cm  
 2nd \_\_\_\_\_ cm

**CJ RECREATION**

AREA DEPTH

POOL:  >100ft<sup>2</sup>  >3ft

**BJ AESTHETICS**

- NUISANCE ALGAE  
 INVASIVE MACROPHYTES  
 EXCESS TURBIDITY  
 DISCOLORATION  
 FOAM / SCUM  
 OIL SHEEN  
 TRASH / LITTER  
 NUISANCE ODOR  
 SLUDGE DEPOSITS  
 CSOs/SSOs/OUTFALLS

**DJ MAINTENANCE**

Circle some & COMMENT

- PUBLIC / PRIVATE / BOTH / NA  
 ACTIVE / HISTORIC / BOTH / NA  
 YOUNG-SUCCESSION-OLD  
 SPRAY / SNAG / REMOVED  
 MODIFIED / DIPPED OUT / NA  
 LEVEED / ONE SIDED  
 RELOCATED / CUTOFFS  
 MOVING-BEDLOAD-STABLE  
 ARMoured / SLUMPS  
 ISLANDS / SCURED  
 IMPOUNDED / DESICCATED  
 FLOOD CONTROL / DRAINAGE

**EJ ISSUES**

- WWTP / CSO / NPDES / INDUSTRY  
 HARDENED / URBAN / DIRT&GRIME  
 CONTAMINATED / LANDFILL  
 BMPs-CONSTRUCTION-SEDIMENT  
 LOGGING / IRRIGATION / COOLING  
 BANK / EROSION / SURFACE  
 FALSE BANK / MANURE / LAGOON  
 WASH H<sub>2</sub>O / TILE / H<sub>2</sub>O TABLE  
 ACID / MINE / QUARRY / FLOW  
 NATURAL / WETLAND / STAGNANT  
 PARK / GOLF / LAWN / HOME  
 ATMOSPHERE / DATA PAUCITY

**FJ MEASUREMENTS**

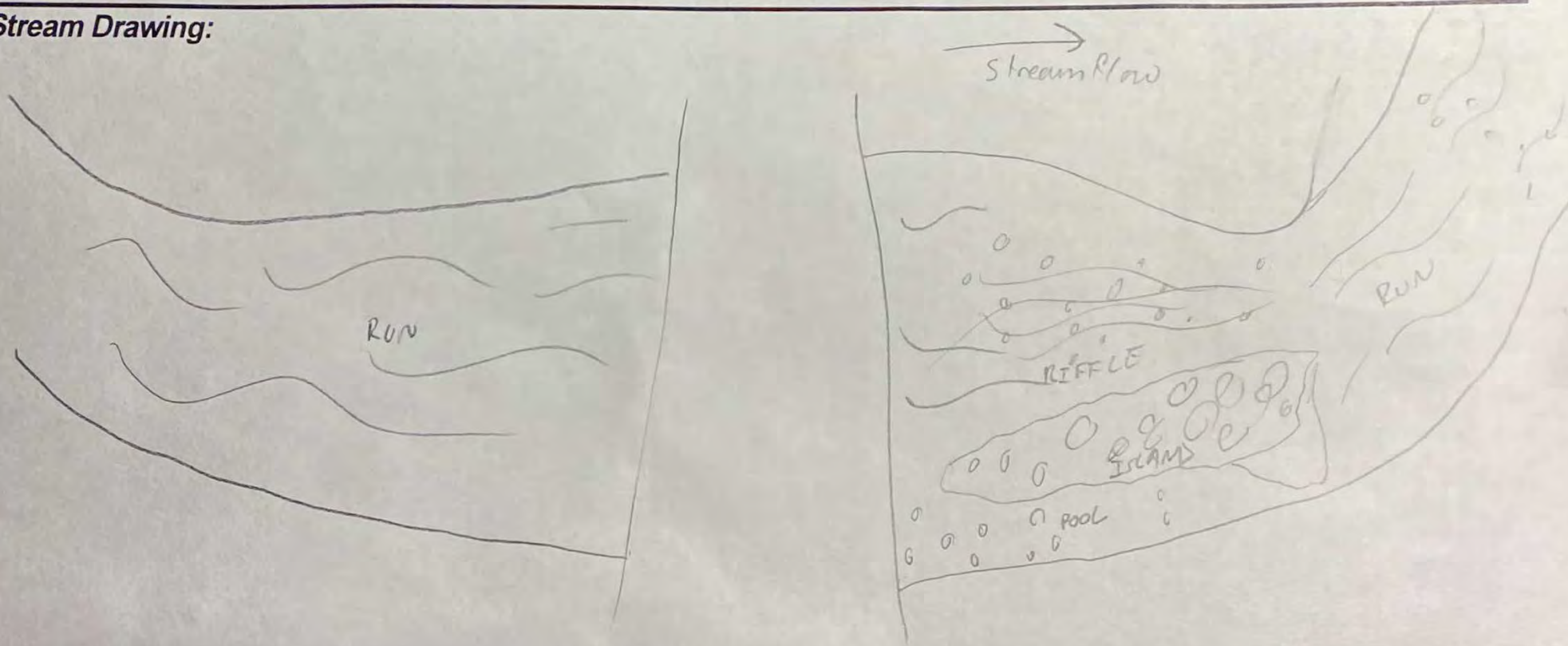
- $\bar{x}$  width  
 $\bar{x}$  depth  
 max. depth  
 $\bar{x}$  bankfull width  
 bankfull  $\bar{x}$  depth  
 W/D ratio  
 bankfull max. depth  
 floodprone  $x^2$  width  
 entrench. ratio

Legacy Tree:

Comment RE: Reach consistency/ Is reach typical of stream?, Recreation/ Observed - Inferred, Other/ Sampling observations, Concerns, Access directions, etc.

Reach limited to 100. Stable Banks, cobble/sand, Vegetated Banks.  
 Plane Bed

**Stream Drawing:**





Stream & Location: S-A100

RM:   Date: 12/01/06 Z1

Scorers Full Name & Affiliation: LJ/MB

River Code: - - - STORET #:   Lat./ Long.: 38.676643, -80.477940 (NAD 83 decimal <sup>4</sup>) Origin verified location

**1] SUBSTRATE** Check **ONLY** Two substrate **TYPE BOXES**; estimate % or note every type present

<b>BEST TYPES</b>	<b>POOL RIFFLE</b>	<b>OTHER TYPES</b>	<b>POOL RIFFLE</b>	<b>ORIGIN</b>	<b>QUALITY</b>
<input checked="" type="checkbox"/> BLDR / SLABS [10]	<u> </u>	<input type="checkbox"/> HARDPAN [4]	<u> </u>	<input type="checkbox"/> LIMESTONE [1]	<input type="checkbox"/> HEAVY [-2]
<input type="checkbox"/> BOULDER [9]	<u> </u>	<input type="checkbox"/> DETRITUS [3]	<u> </u>	<input type="checkbox"/> TILLS [1]	<input type="checkbox"/> MODERATE [-1]
<input checked="" type="checkbox"/> COBBLE [8]	<u> </u>	<input type="checkbox"/> MUCK [2]	<u> </u>	<input type="checkbox"/> WETLANDS [0]	<input type="checkbox"/> NORMAL [0]
<input type="checkbox"/> GRAVEL [7]	<u> </u>	<input type="checkbox"/> SILT [2]	<u> </u>	<input type="checkbox"/> HARDPAN [0]	<input type="checkbox"/> FREE [1]
<input type="checkbox"/> SAND [6]	<u> </u>	<input type="checkbox"/> ARTIFICIAL [0]	<u> </u>	<input type="checkbox"/> SANDSTONE [0]	<input type="checkbox"/> EXTENSIVE [-2]
<input type="checkbox"/> BEDROCK [5]	<u> </u>			<input type="checkbox"/> RIP/RAP [0]	<input type="checkbox"/> MODERATE [-1]
(Score natural substrates; ignore sludge from point-sources)				<input type="checkbox"/> LACUSTURINE [0]	<input type="checkbox"/> NORMAL [0]
<b>NUMBER OF BEST TYPES:</b> <input type="checkbox"/> 4 or more [2] <input type="checkbox"/> 3 or less [0]				<input type="checkbox"/> SHALE [-1]	<input type="checkbox"/> NONE [1]
<b>Comments</b>				<input type="checkbox"/> COAL FINES [-2]	

SILT   EMBEDDEDNESS   18 Substrate Maximum 20

**2] INSTREAM COVER** Indicate presence 0 to 3: 0-Absent; 1-Very small amounts or if more common of marginal quality; 2-Moderate amounts, but not of highest quality or in small amounts of highest quality; 3-Highest quality in moderate or greater amounts (e.g., very large boulders in deep or fast water, large diameter log that is stable, well developed rootwad in deep / fast water, or deep, well-defined, functional pools.

<b>UNDERCUT BANKS [1]</b>	<b>POOLS &gt; 70cm [2]</b>	<b>OXBOWS, BACKWATERS [1]</b>	<b>AMOUNT</b>
<input type="checkbox"/> OVERHANGING VEGETATION [1]	<input type="checkbox"/> ROOTWADS [1]	<input type="checkbox"/> AQUATIC MACROPHYTES [1]	<input type="checkbox"/> EXTENSIVE >75% [11]
<input type="checkbox"/> SHALLOWS (IN SLOW WATER) [1]	<input type="checkbox"/> BOULDERS [1]	<input type="checkbox"/> LOGS OR WOODY DEBRIS [1]	<input type="checkbox"/> MODERATE 25-75% [7]
<input type="checkbox"/> ROOTMATS [1]			<input type="checkbox"/> SPARSE 5-<25% [3]
			<input type="checkbox"/> NEARLY ABSENT <5% [1]

**Comments** Channel Maximum 20  

**3] CHANNEL MORPHOLOGY** Check ONE in each category (Or 2 & average)

<b>SINUOSITY</b>	<b>DEVELOPMENT</b>	<b>CHANNELIZATION</b>	<b>STABILITY</b>
<input type="checkbox"/> HIGH [4]	<input checked="" type="checkbox"/> EXCELLENT [7]	<input checked="" type="checkbox"/> NONE [6]	<input checked="" type="checkbox"/> HIGH [3]
<input type="checkbox"/> MODERATE [3]	<input type="checkbox"/> GOOD [5]	<input type="checkbox"/> RECOVERED [4]	<input type="checkbox"/> MODERATE [2]
<input type="checkbox"/> LOW [2]	<input type="checkbox"/> FAIR [3]	<input type="checkbox"/> RECOVERING [3]	<input type="checkbox"/> LOW [1]
<input checked="" type="checkbox"/> NONE [1]	<input type="checkbox"/> POOR [1]	<input type="checkbox"/> RECENT OR NO RECOVERY [1]	

**Comments** Channel Maximum 20 17

**4] BANK EROSION AND RIPARIAN ZONE** Check ONE in each category for EACH BANK (Or 2 per bank & average)

<b>EROSION</b>	<b>RIPARIAN WIDTH</b>	<b>FLOOD PLAIN QUALITY</b>
<input type="checkbox"/> NONE / LITTLE [3]	<input type="checkbox"/> WIDE > 50m [4]	<input type="checkbox"/> FOREST, SWAMP [3]
<input type="checkbox"/> MODERATE [2]	<input type="checkbox"/> MODERATE 10-50m [3]	<input type="checkbox"/> SHRUB OR OLD FIELD [2]
<input type="checkbox"/> HEAVY / SEVERE [1]	<input type="checkbox"/> NARROW 5-10m [2]	<input type="checkbox"/> RESIDENTIAL, PARK, NEW FIELD [1]
	<input type="checkbox"/> VERY NARROW < 5m [1]	<input type="checkbox"/> FENCED PASTURE [1]
	<input type="checkbox"/> NONE [0]	<input type="checkbox"/> OPEN PASTURE, ROWCROP [0]
		<input type="checkbox"/> CONSERVATION TILLAGE [1]
		<input type="checkbox"/> URBAN OR INDUSTRIAL [0]
		<input type="checkbox"/> MINING / CONSTRUCTION [0]

**Comments** Riparian Maximum 10  

**5] POOL / GLIDE AND RIFFLE / RUN QUALITY**

<b>MAXIMUM DEPTH</b>	<b>CHANNEL WIDTH</b>	<b>CURRENT VELOCITY</b>	<b>Recreation Potential</b>
Check ONE (ONLY)	Check ONE (Or 2 & average)	Check ALL that apply	<b>Primary Contact</b>
<input checked="" type="checkbox"/> > 1m [6]	<input checked="" type="checkbox"/> POOL WIDTH > RIFFLE WIDTH [2]	<input type="checkbox"/> TORRENTIAL [-1]	<b>Secondary Contact</b>
<input type="checkbox"/> 0.7-<1m [4]	<input type="checkbox"/> POOL WIDTH = RIFFLE WIDTH [1]	<input type="checkbox"/> VERY FAST [1]	(circle one and comment on back)
<input type="checkbox"/> 0.4-<0.7m [2]	<input type="checkbox"/> POOL WIDTH > RIFFLE WIDTH [0]	<input type="checkbox"/> INTERSTITIAL [-1]	
<input type="checkbox"/> 0.2-<0.4m [1]		<input type="checkbox"/> INTERMITTENT [-2]	
<input type="checkbox"/> < 0.2m [0]		<input checked="" type="checkbox"/> MODERATE [1]	
		<input checked="" type="checkbox"/> EDDIES [1]	

**Comments** Pool / Current Maximum 12 12

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species;  NO RIFFLE [metric=0]

<b>RIFFLE DEPTH</b>	<b>RUN DEPTH</b>	<b>RIFFLE / RUN SUBSTRATE</b>	<b>RIFFLE / RUN EMBEDDEDNESS</b>
<input checked="" type="checkbox"/> BEST AREAS > 10cm [2]	<input checked="" type="checkbox"/> MAXIMUM > 50cm [2]	<input checked="" type="checkbox"/> STABLE (e.g., Cobble, Boulder) [2]	<input checked="" type="checkbox"/> NONE [2]
<input type="checkbox"/> BEST AREAS 5-10cm [1]	<input type="checkbox"/> MAXIMUM < 50cm [1]	<input type="checkbox"/> MOD. STABLE (e.g., Large Gravel) [1]	<input type="checkbox"/> LOW [1]
<input type="checkbox"/> BEST AREAS < 5cm [metric=0]		<input type="checkbox"/> UNSTABLE (e.g., Fine Gravel, Sand) [0]	<input type="checkbox"/> MODERATE [0]
			<input type="checkbox"/> EXTENSIVE [-1]

**Comments** Riffle / Run Maximum 8 8

**6] GRADIENT** (ft/mi)  VERY LOW - LOW [2-4]  MODERATE [6-10]  HIGH - VERY HIGH [10-6]

**DRAINAGE AREA** (mi<sup>2</sup>)  VERY LOW - LOW [2-4]  MODERATE [6-10]  HIGH - VERY HIGH [10-6]

%POOL: 30 %GLIDE:   %RUN: 30 %RIFFLE: 40

**Comments** Gradient Maximum 10

**A) SAMPLED REACH**

Check ALL that apply

**METHOD**

- 
- BOAT
- 
- 
- WADE
- 
- 
- L. LINE
- 
- 
- OTHER

**STAGE**

1st -sample pass- 2nd

- 
- HIGH
- 
- 
- UP
- 
- 
- NORMAL
- 
- 
- LOW
- 
- 
- DRY

**DISTANCE**

- 
- 0.5 Km
- 
- 
- 0.2 Km
- 
- 
- 0.15 Km
- 
- 
- 0.12 Km
- 
- 
- OTHER

**CLARITY**

1st -sample pass- 2nd

- 
- < 20 cm
- 
- 
- 20-40 cm
- 
- 
- 40-70 cm
- 
- 
- > 70 cm/ CTB
- 
- 
- SECCHI DEPTH

meters

**CANOPY**

1st \_\_\_\_\_ cm

2nd \_\_\_\_\_ cm

- 
- > 85%- OPEN
- 
- 
- 55%-<85%
- 
- 
- 30%-<55%
- 
- 
- 10%-<30%
- 
- 
- <10%- CLOSED

**C) RECREATION**

AREA DEPTH

POOL:  >100ft<sup>2</sup>  >3ft

Comment RE: Reach consistency/ Is reach typical of stream?, Recreation/ Observed - Inferred, Other/ Sampling observations, Concerns, Access directions, etc.

S-A 100

Reach limited by (L.D.) Substrate mainly stable - cobbles, pool depth > 1m  
 Riffle depth > 10 cm, run depth > 70 cm, Banks appear stable, mostly bar  
 cover on immediate banks

Riffle Pool complex

**B) AESTHETICS**

- 
- NUISANCE ALGAE
- 
- 
- INVASIVE MACROPHYTES
- 
- 
- EXCESS TURBIDITY
- 
- 
- DISCOLORATION
- 
- 
- FOAM / SCUM
- 
- 
- OIL SHEEN
- 
- 
- TRASH / LITTER
- 
- 
- NUISANCE ODOR
- 
- 
- SLUDGE DEPOSITS
- 
- 
- CSOs/SSOs/OUTFALLS

**D) MAINTENANCE**

Circle some &amp; COMMENT

- 
- PUBLIC / PRIVATE / BOTH / NA
- 
- 
- ACTIVE / HISTORIC / BOTH / NA
- 
- 
- YOUNG-SUCCESSION-OLD
- 
- 
- SPRAY / SNAG / REMOVED
- 
- 
- MODIFIED / DIPPED OUT / NA
- 
- 
- LEVEED / ONE SIDED
- 
- 
- RELOCATED / CUTOFFS
- 
- 
- MOVING-BEDLOAD-STABLE
- 
- 
- ARMoured / SLUMPS
- 
- 
- ISLANDS / SCoured
- 
- 
- IMPOUNDED / DESICCATED
- 
- 
- FLOOD CONTROL / DRAINAGE

**E) ISSUES**

- 
- WWTP / CSO / NPDES / INDUSTRY
- 
- 
- HARDENED / URBAN / DIRT&GRIME
- 
- 
- CONTAMINATED / LANDFILL
- 
- 
- BMPs-CONSTRUCTION-SEDIMENT
- 
- 
- LOGGING / IRRIGATION / COOLING
- 
- 
- BANK / EROSION / SURFACE
- 
- 
- FALSE BANK / MANURE / LAGOON
- 
- 
- WASH H
- <sub>2</sub>
- O / TILE / H
- <sub>2</sub>
- O TABLE
- 
- 
- ACID / MINE / QUARRY / FLOW
- 
- 
- NATURAL / WETLAND / STAGNANT
- 
- 
- PARK / GOLF / LAWN / HOME
- 
- 
- ATMOSPHERE / DATA PAUCITY

**F) MEASUREMENTS**

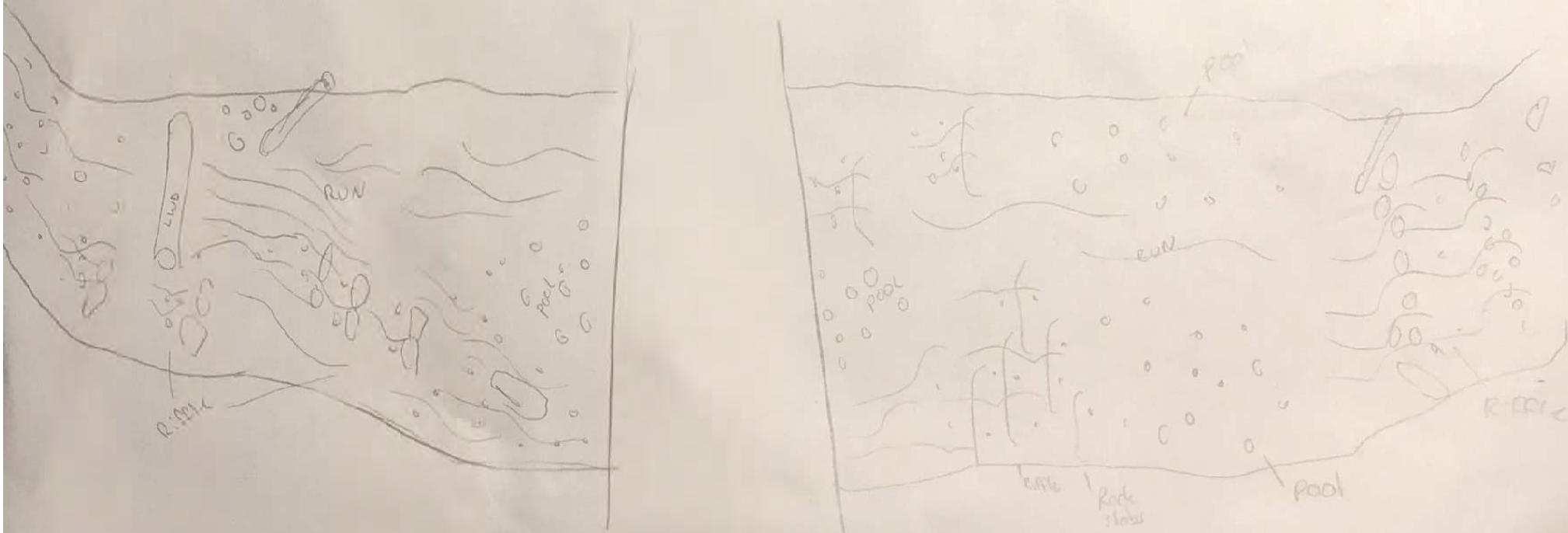
- 
- $\bar{x}$
- width
- 
- 
- $\bar{x}$
- depth
- 
- 
- max. depth
- 
- 
- $\bar{x}$
- bankfull width
- 
- 
- bankfull
- $\bar{x}$
- depth
- 
- 
- W/D ratio
- 
- 
- bankfull max. depth
- 
- 
- floodprone
- $x^2$
- width
- 
- 
- entrench. ratio

Legacy Tree:

**Stream Drawing:**

W = 69 ft

← stream flow



Stream & Location: S-B34 16:35 RM:    Date: 11/17/21

Scorers Full Name & Affiliation: LK

River Code:    STORET #:    Lat./Long.: 38.493956, -80.560990 Office verified location

**1] SUBSTRATE** Check ONLY Two substrate TYPE BOXES: estimate % or note every type present

<p><b>BEST TYPES</b></p> <input type="checkbox"/> BLDR / SLABS [10] <input type="checkbox"/> BOULDER [9] <input checked="" type="checkbox"/> COBBLE [8] <input checked="" type="checkbox"/> GRAVEL [7] <input type="checkbox"/> SAND [6] <input type="checkbox"/> BEDROCK [5]	<p><b>POOL RIFFLE</b></p> <p>_____</p>	<p><b>OTHER TYPES</b></p> <input type="checkbox"/> HARDPAN [4] <input type="checkbox"/> DETRITUS [3] <input type="checkbox"/> MUCK [2] <input type="checkbox"/> SILT [2] <input type="checkbox"/> ARTIFICIAL [0]	<p><b>POOL RIFFLE</b></p> <p>_____</p>	<p><b>ORIGIN</b></p> <input type="checkbox"/> LIMESTONE [1] <input type="checkbox"/> TILLS [1] <input type="checkbox"/> WETLANDS [0] <input type="checkbox"/> HARDPAN [0] <input type="checkbox"/> SANDSTONE [0] <input type="checkbox"/> RIP/RAP [0] <input type="checkbox"/> LACUSTURINE [0] <input type="checkbox"/> SHALE [-1] <input type="checkbox"/> COAL FINES [-2]	<p><b>QUALITY</b></p> <input type="checkbox"/> HEAVY [-2] <input type="checkbox"/> MODERATE [-1] <input type="checkbox"/> NORMAL [0] <input type="checkbox"/> FREE [1] <input type="checkbox"/> EXTENSIVE [-2] <input type="checkbox"/> MODERATE [-1] <input type="checkbox"/> NORMAL [0] <input type="checkbox"/> NONE [1]	<p><b>Substrate</b></p> <div style="border: 1px solid black; border-radius: 15px; padding: 5px; text-align: center; width: 40px; margin: 0 auto;">18</div> <p>Maximum 20</p>
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NUMBER OF BEST TYPES:  4 or more [2]  3 or less [0]

Comments \_\_\_\_\_

**2] INSTREAM COVER** Indicate presence 0 to 3: 0-Absent; 1-Very small amounts or if more common of marginal quality; 2-Moderate amounts, but not of highest quality or in small amounts of highest quality; 3-Highest quality in moderate or greater amounts (e.g., very large boulders in deep or fast water, large diameter log that is stable, well developed rootwad in deep / fast water, or deep, well-defined, functional pools.

<input type="checkbox"/> UNDERCUT BANKS [1] <input type="checkbox"/> OVERHANGING VEGETATION [1] <input type="checkbox"/> SHALLOWS (IN SLOW WATER) [1] <input type="checkbox"/> ROOTMATS [1]	<input type="checkbox"/> POOLS > 70cm [2] <input type="checkbox"/> ROOTWADS [1] <input type="checkbox"/> BOULDERS [1]	<input type="checkbox"/> OXBOWS, BACKWATERS [1] <input type="checkbox"/> AQUATIC MACROPHYTES [1] <input type="checkbox"/> LOGS OR WOODY DEBRIS [1]	<p><b>AMOUNT</b></p> <p>Check ONE (Or 2 &amp; average)</p> <input type="checkbox"/> EXTENSIVE >75% [11] <input type="checkbox"/> MODERATE 25-75% [7] <input type="checkbox"/> SPARSE 5-<25% [3] <input type="checkbox"/> NEARLY ABSENT <5% [1]	<p><b>Cover</b></p> <div style="border: 1px solid black; border-radius: 15px; padding: 5px; text-align: center; width: 40px; margin: 0 auto;"> </div> <p>Maximum 20</p>
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Comments \_\_\_\_\_

**3] CHANNEL MORPHOLOGY** Check ONE in each category (Or 2 & average)

<p><b>SINUOSITY</b></p> <input type="checkbox"/> HIGH [4] <input type="checkbox"/> MODERATE [3] <input type="checkbox"/> LOW [2] <input checked="" type="checkbox"/> NONE [1]	<p><b>DEVELOPMENT</b></p> <input type="checkbox"/> EXCELLENT [7] <input type="checkbox"/> GOOD [5] <input checked="" type="checkbox"/> FAIR [3] <input type="checkbox"/> POOR [1]	<p><b>CHANNELIZATION</b></p> <input checked="" type="checkbox"/> NONE [6] <input type="checkbox"/> RECOVERED [4] <input type="checkbox"/> RECOVERING [3] <input type="checkbox"/> RECENT OR NO RECOVERY [1]	<p><b>STABILITY</b></p> <input checked="" type="checkbox"/> HIGH [3] <input type="checkbox"/> MODERATE [2] <input type="checkbox"/> LOW [1]	<p><b>Channel</b></p> <div style="border: 1px solid black; border-radius: 15px; padding: 5px; text-align: center; width: 40px; margin: 0 auto;">13</div> <p>Maximum 20</p>
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Comments \_\_\_\_\_

**4] BANK EROSION AND RIPARIAN ZONE** Check ONE in each category for EACH BANK (Or 2 per bank & average)

<p><b>EROSION</b></p> <input type="checkbox"/> NONE / LITTLE [3] <input type="checkbox"/> MODERATE [2] <input type="checkbox"/> HEAVY / SEVERE [1]	<p><b>RIPARIAN WIDTH</b></p> <input type="checkbox"/> WIDE > 50m [4] <input type="checkbox"/> MODERATE 10-50m [3] <input type="checkbox"/> NARROW 5-10m [2] <input type="checkbox"/> VERY NARROW < 5m [1] <input type="checkbox"/> NONE [0]	<p><b>FLOOD PLAIN QUALITY</b></p> <input type="checkbox"/> FOREST, SWAMP [3] <input type="checkbox"/> SHRUB OR OLD FIELD [2] <input type="checkbox"/> RESIDENTIAL, PARK, NEW FIELD [1] <input type="checkbox"/> FENCED PASTURE [1] <input type="checkbox"/> OPEN PASTURE, ROWCROP [0]	<p><b>CONSERVATION TILLAGE [1]</b></p> <input type="checkbox"/> URBAN OR INDUSTRIAL [0] <input type="checkbox"/> MINING / CONSTRUCTION [0]	<p><b>Riparian</b></p> <div style="border: 1px solid black; border-radius: 15px; padding: 5px; text-align: center; width: 40px; margin: 0 auto;"> </div> <p>Maximum 10</p>
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Comments \_\_\_\_\_

**5] POOL / GLIDE AND RIFFLE / RUN QUALITY**

<p><b>MAXIMUM DEPTH</b></p> <p>Check ONE (ONLY)</p> <input type="checkbox"/> > 1m [6] <input type="checkbox"/> 0.7-<1m [4] <input checked="" type="checkbox"/> 0.4-<0.7m [2] <input type="checkbox"/> 0.2-<0.4m [1] <input type="checkbox"/> < 0.2m [0]	<p><b>CHANNEL WIDTH</b></p> <p>Check ONE (Or 2 &amp; average)</p> <input checked="" type="checkbox"/> POOL WIDTH > RIFFLE WIDTH [2] <input type="checkbox"/> POOL WIDTH = RIFFLE WIDTH [1] <input type="checkbox"/> POOL WIDTH < RIFFLE WIDTH [0]	<p><b>CURRENT VELOCITY</b></p> <p>Check ALL that apply</p> <input type="checkbox"/> TORRENTIAL [-1] <input checked="" type="checkbox"/> VERY FAST [1] <input type="checkbox"/> FAST [1] <input type="checkbox"/> MODERATE [1]	<p><b>Recreation Potential</b></p> <p>Primary Contact Secondary Contact <small>(circle one and comment on back)</small></p>	<p><b>Pool / Current</b></p> <div style="border: 1px solid black; border-radius: 15px; padding: 5px; text-align: center; width: 40px; margin: 0 auto;">5</div> <p>Maximum 12</p>
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Comments \_\_\_\_\_

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species:

<p><b>RIFFLE DEPTH</b></p> <input checked="" type="checkbox"/> BEST AREAS > 10cm [2] <input type="checkbox"/> BEST AREAS 5-10cm [1] <input type="checkbox"/> BEST AREAS < 5cm [metric=0]	<p><b>RUN DEPTH</b></p> <input type="checkbox"/> MAXIMUM > 50cm [2] <input checked="" type="checkbox"/> MAXIMUM < 50cm [1]	<p><b>RIFFLE / RUN SUBSTRATE</b></p> <input checked="" type="checkbox"/> STABLE (e.g., Cobble, Boulder) [2] <input type="checkbox"/> MOD. STABLE (e.g., Large Gravel) [1] <input type="checkbox"/> UNSTABLE (e.g., Fine Gravel, Sand) [0]	<p><b>RIFFLE / RUN EMBEDDEDNESS</b></p> <input type="checkbox"/> NONE [2] <input checked="" type="checkbox"/> LOW [1] <input type="checkbox"/> MODERATE [0] <input type="checkbox"/> EXTENSIVE [-1]	<p><b>Riffle / Run</b></p> <div style="border: 1px solid black; border-radius: 15px; padding: 5px; text-align: center; width: 40px; margin: 0 auto;">6</div> <p>Maximum 8</p>
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Comments \_\_\_\_\_

**6] GRADIENT** ( ft/mi)  VERY LOW - LOW [2-4]  MODERATE [6-10]  HIGH - VERY HIGH [10-6]

**DRAINAGE AREA** ( mi<sup>2</sup>)

%POOL: 15 %GLIDE:    %RUN: 35 %RIFFLE: 50

**Gradient** Maximum 10

**A) SAMPLED REACH**

Check ALL that apply

Comment RE: Reach consistency/ Is reach typical of stream?, Recreation/ Observed - Inferred, Other/ Sampling observations, Concerns, Access directions, etc.

**METHOD**

- BOAT
- WADE
- L. LINE
- OTHER

**STAGE**

- 1st. sample pass- 2nd
- HIGH
  - UP
  - NORMAL
  - LOW
  - DRY

S-B34 COBBLE BOLDER BEDDRO STAG-Pool / PLAIN BED

**DISTANCE**

- 0.5 Km
- 0.2 Km
- 0.15 Km
- 0.12 Km
- OTHER

**CLARITY**

- 1st. sample pass- 2nd
- < 20 cm
  - 20-40 cm
  - 40-70 cm
  - > 70 cm/ CTB
  - SECCHI DEPTH

meters

**CANOPY**

- > 85%- OPEN
- 55%-<85%
- 30%-<55%
- 10%-<30%
- <10%- CLOSED

- 1st. pass \_\_\_\_\_ cm
- 2nd. pass \_\_\_\_\_ cm

**B) AESTHETICS**

- NUISANCE ALGAE
- INVASIVE MACROPHYTES
- EXCESS TURBIDITY
- DISCOLORATION
- FOAM / SCUM
- OIL SHEEN
- TRASH / LITTER
- NUISANCE ODOR
- SLUDGE DEPOSITS
- CSOs/SSOs/OUTFALLS

**D) MAINTENANCE**

- PUBLIC / PRIVATE / BOTH / NA
- ACTIVE / HISTORIC / BOTH / NA
- YOUNG-SUCCESSION-OLD
- SPRAY / SNAG / REMOVED
- MODIFIED / DIPPED OUT / NA
- LEVEED / ONE SIDED
- RELOCATED / CUTOFFS
- MOVING-BEDLOAD-STABLE
- ARMoured / SLUMPS
- ISLANDS / SCOURED
- IMPOUNDED / DESICCATED
- FLOOD CONTROL / DRAINAGE

Circle some & COMMENT

**E) ISSUES**

- WWTP / CSO / NPDES / INDUSTRY
- HARDENED / URBAN / DIRT&GRIME
- CONTAMINATED / LANDFILL
- BMPs-CONSTRUCTION-SEDIMENT
- LOGGING / IRRIGATION / COOLING
- BANK / EROSION / SURFACE
- FALSE BANK / MANURE / LAGOON
- WASH H<sub>2</sub>O / TILE / H<sub>2</sub>O TABLE
- ACID / MINE / QUARRY / FLOW
- NATURAL / WETLAND / STAGNANT
- PARK / GOLF / LAWN / HOME
- ATMOSPHERE / DATA PAUCITY

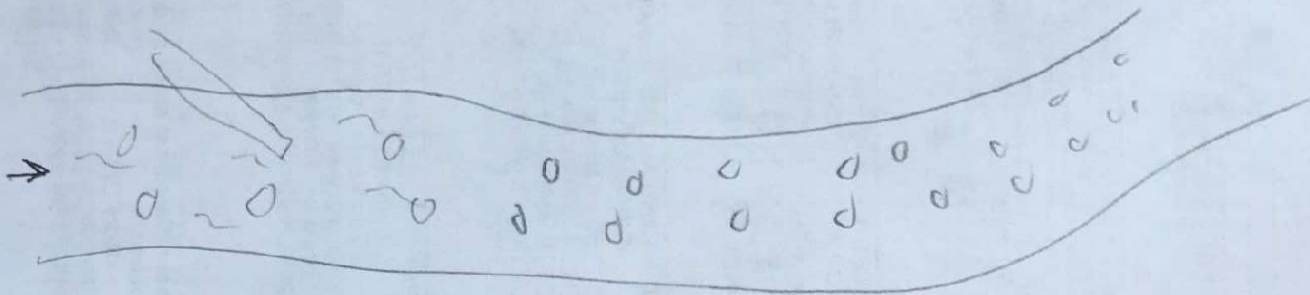
**F) MEASUREMENTS**

- $\bar{x}$  width
- $\bar{x}$  depth
- max. depth
- $\bar{x}$  bankfull width
- bankfull  $\bar{x}$  depth
- W/D ratio
- bankfull max. depth
- floodprone  $x^2$  width
- entrench. ratio

Legacy Tree:

- C) RECREATION** AREA DEPTH
- POOL:  >100ft<sup>2</sup>  >3ft

**Stream Drawing:**



Stream & Location: S-ES8 17:10 RM:    Date: 11/17/21

Scorers Full Name & Affiliation: LK

River Code:    STORET #:    Lat./ Long.: 38.443669, -80.551989 Office verified location

**1] SUBSTRATE** Check ONLY Two substrate TYPE BOXES; estimate % or note every type present

Check ONE (Or 2 & average)

<p><b>BEST TYPES</b></p> <input type="checkbox"/> BLDG / SLABS [10] <input type="checkbox"/> BOULDER [9] <input type="checkbox"/> COBBLE [8] <input type="checkbox"/> GRAVEL [7] <input checked="" type="checkbox"/> SAND [6] <input type="checkbox"/> BEDROCK [5]	<p><b>POOL RIFFLE</b></p> <p>_____</p>	<p><b>OTHER TYPES</b></p> <input type="checkbox"/> HARDPAN [4] <input type="checkbox"/> DETRITUS [3] <input type="checkbox"/> MUCK [2] <input checked="" type="checkbox"/> SILT [2] <input type="checkbox"/> ARTIFICIAL [0]	<p><b>POOL RIFFLE</b></p> <p>_____</p>	<p><b>ORIGIN</b></p> <input type="checkbox"/> LIMESTONE [1] <input type="checkbox"/> TILLS [1] <input type="checkbox"/> WETLANDS [0] <input type="checkbox"/> HARDPAN [0] <input type="checkbox"/> SANDSTONE [0] <input type="checkbox"/> RIP/RAP [0] <input type="checkbox"/> LACUSTURINE [0] <input type="checkbox"/> SHALE [-1] <input type="checkbox"/> COAL FINES [-2]	<p><b>QUALITY</b></p> <input type="checkbox"/> HEAVY [-2] <input type="checkbox"/> MODERATE [-1] <input type="checkbox"/> NORMAL [0] <input type="checkbox"/> FREE [1] <input type="checkbox"/> EXTENSIVE [-2] <input type="checkbox"/> MODERATE [-1] <input type="checkbox"/> NORMAL [0] <input type="checkbox"/> NONE [1]	<p>SILT</p> <p>EMBEDDEDNESS</p>	<p>Substrate</p> <div style="border: 2px solid black; border-radius: 15px; width: 40px; height: 40px; display: flex; align-items: center; justify-content: center; margin: 0 auto;">18</div> <p>Maximum 20</p>
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NUMBER OF BEST TYPES:  4 or more [2]  3 or less [0]

Comments \_\_\_\_\_

**2] INSTREAM COVER** Indicate presence 0 to 3: 0-Absent; 1-Very small amounts or if more common of marginal quality; 2-Moderate amounts, but not of highest quality or in small amounts of highest quality; 3-Highest quality in moderate or greater amounts (e.g., very large boulders in deep or fast water, large diameter log that is stable, well developed rootwad in deep / fast water, or deep, well-defined, functional pools.)

**AMOUNT**

Check ONE (Or 2 & average)

<p><input type="checkbox"/> UNDERCUT BANKS [1]  <input type="checkbox"/> OVERHANGING VEGETATION [1]  <input type="checkbox"/> SHALLOWS (IN SLOW WATER) [1]  <input type="checkbox"/> ROOTMATS [1]</p>	<p><input type="checkbox"/> POOLS &gt; 70cm [2]  <input type="checkbox"/> ROOTWADS [1]  <input type="checkbox"/> BOULDERS [1]</p>	<p><input type="checkbox"/> OXBOWS, BACKWATERS [1]  <input type="checkbox"/> AQUATIC MACROPHYTES [1]  <input type="checkbox"/> LOGS OR WOODY DEBRIS [1]</p>	<p>Check ONE (Or 2 &amp; average)</p> <input type="checkbox"/> EXTENSIVE >75% [11] <input type="checkbox"/> MODERATE 25-75% [7] <input type="checkbox"/> SPARSE 5-<25% [3] <input type="checkbox"/> NEARLY ABSENT <5% [1]	<p>Cover</p> <div style="border: 2px solid black; border-radius: 15px; width: 40px; height: 40px; display: flex; align-items: center; justify-content: center; margin: 0 auto;">  </div> <p>Maximum 20</p>
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Comments \_\_\_\_\_

**3] CHANNEL MORPHOLOGY** Check ONE in each category (Or 2 & average)

<p><b>SINUOSITY</b></p> <input checked="" type="checkbox"/> HIGH [4] <input type="checkbox"/> MODERATE [3] <input type="checkbox"/> LOW [2] <input type="checkbox"/> NONE [1]	<p><b>DEVELOPMENT</b></p> <input type="checkbox"/> EXCELLENT [7] <input type="checkbox"/> GOOD [5] <input type="checkbox"/> FAIR [3] <input checked="" type="checkbox"/> POOR [1]	<p><b>CHANNELIZATION</b></p> <input checked="" type="checkbox"/> NONE [6] <input type="checkbox"/> RECOVERED [4] <input type="checkbox"/> RECOVERING [3] <input type="checkbox"/> RECENT OR NO RECOVERY [1]	<p><b>STABILITY</b></p> <input type="checkbox"/> HIGH [3] <input checked="" type="checkbox"/> MODERATE [2] <input type="checkbox"/> LOW [1]	<p>Channel</p> <div style="border: 2px solid black; border-radius: 15px; width: 40px; height: 40px; display: flex; align-items: center; justify-content: center; margin: 0 auto;">13</div> <p>Maximum 20</p>
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Comments \_\_\_\_\_

**4] BANK EROSION AND RIPARIAN ZONE** Check ONE in each category for EACH BANK (Or 2 per bank & average)

<p><b>EROSION</b></p> <input type="checkbox"/> NONE / LITTLE [3] <input type="checkbox"/> MODERATE [2] <input type="checkbox"/> HEAVY / SEVERE [1]	<p><b>RIPARIAN WIDTH</b></p> <input type="checkbox"/> WIDE > 50m [4] <input type="checkbox"/> MODERATE 10-50m [3] <input type="checkbox"/> NARROW 5-10m [2] <input type="checkbox"/> VERY NARROW < 5m [1] <input type="checkbox"/> NONE [0]	<p><b>FLOOD PLAIN QUALITY</b></p> <input type="checkbox"/> FOREST, SWAMP [3] <input type="checkbox"/> SHRUB OR OLD FIELD [2] <input type="checkbox"/> RESIDENTIAL, PARK, NEW FIELD [1] <input type="checkbox"/> FENCED PASTURE [1] <input type="checkbox"/> OPEN PASTURE, ROWCROP [0]	<p><b>CONSERVATION TILLAGE [1]</b>  <input type="checkbox"/> URBAN OR INDUSTRIAL [0]  <input type="checkbox"/> MINING / CONSTRUCTION [0]</p> <p>Indicate predominant land use(s) past 100m riparian.</p>	<p>Riparian</p> <div style="border: 2px solid black; border-radius: 15px; width: 40px; height: 40px; display: flex; align-items: center; justify-content: center; margin: 0 auto;">  </div> <p>Maximum 10</p>
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Comments \_\_\_\_\_

**5] POOL / GLIDE AND RIFFLE / RUN QUALITY**

<p><b>MAXIMUM DEPTH</b></p> <p>Check ONE (ONLY!)</p> <input type="checkbox"/> > 1m [6] <input type="checkbox"/> 0.7-<1m [4] <input type="checkbox"/> 0.4-<0.7m [2] <input checked="" type="checkbox"/> 0.2-<0.4m [1] <input type="checkbox"/> < 0.2m [0]	<p><b>CHANNEL WIDTH</b></p> <p>Check ONE (Or 2 &amp; average)</p> <input type="checkbox"/> POOL WIDTH > RIFFLE WIDTH [2] <input checked="" type="checkbox"/> POOL WIDTH = RIFFLE WIDTH [1] <input type="checkbox"/> POOL WIDTH < RIFFLE WIDTH [0]	<p><b>CURRENT VELOCITY</b></p> <p>Check ALL that apply</p> <input type="checkbox"/> TORRENTIAL [-1] <input type="checkbox"/> VERY FAST [1] <input type="checkbox"/> FAST [1] <input type="checkbox"/> MODERATE [1]	<p><input checked="" type="checkbox"/> SLOW [1]  <input type="checkbox"/> INTERSTITIAL [-1]  <input type="checkbox"/> INTERMITTENT [-2]  <input type="checkbox"/> EDDIES [1]</p> <p>Indicate for reach - pools and riffles.</p>	<p><b>Recreation Potential</b></p> <p>Primary Contact                  Secondary Contact                  (circle one and comment on back)</p> <p>Pool / Current</p> <div style="border: 2px solid black; border-radius: 15px; width: 40px; height: 40px; display: flex; align-items: center; justify-content: center; margin: 0 auto;">3</div> <p>Maximum 12</p>
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Comments \_\_\_\_\_

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species:

Check ONE (Or 2 & average).

NO RIFFLE [metric=0]

<p><b>RIFFLE DEPTH</b></p> <input type="checkbox"/> BEST AREAS > 10cm [2] <input type="checkbox"/> BEST AREAS 5-10cm [1] <input checked="" type="checkbox"/> BEST AREAS < 5cm [metric=0]	<p><b>RUN DEPTH</b></p> <input type="checkbox"/> MAXIMUM > 50cm [2] <input checked="" type="checkbox"/> MAXIMUM < 50cm [1]	<p><b>RIFFLE / RUN SUBSTRATE</b></p> <input type="checkbox"/> STABLE (e.g., Cobble, Boulder) [2] <input type="checkbox"/> MOD. STABLE (e.g., Large Gravel) [1] <input checked="" type="checkbox"/> UNSTABLE (e.g., Fine Gravel, Sand) [0]	<p><b>RIFFLE / RUN EMBEDDEDNESS</b></p> <input type="checkbox"/> NONE [2] <input type="checkbox"/> LOW [1] <input checked="" type="checkbox"/> MODERATE [0] <input type="checkbox"/> EXTENSIVE [-1]	<p>Riffle / Run</p> <div style="border: 2px solid black; border-radius: 15px; width: 40px; height: 40px; display: flex; align-items: center; justify-content: center; margin: 0 auto;">1</div> <p>Maximum 8</p>
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Comments \_\_\_\_\_

**6] GRADIENT** (ft/mi)  VERY LOW - LOW [2-4]  MODERATE [6-10]  HIGH - VERY HIGH [10-6]

**DRAINAGE AREA** (mi<sup>2</sup>)

%POOL: 5 %GLIDE:     
 %RUN: 94 %RIFFLE: 1

Gradient

Maximum 10

**A) SAMPLED REACH**

Check ALL that apply

**METHOD**

- BOAT
- WADE
- L. LINE
- OTHER

**DISTANCE**

- 0.5 Km
- 0.2 Km
- 0.15 Km
- 0.12 Km
- OTHER

meters

**CANOPY**

- > 85% - OPEN
- 55% - <85%
- 30% - <55%
- 10% - <30%
- <10% - CLOSED

**STAGE**

1st - sample pass - 2nd

- HIGH
- UP
- NORMAL
- LOW
- DRY

**CLARITY**

1st -- sample pass -- 2nd

- < 20 cm
- 20 - <40 cm
- 40 - 70 cm
- > 70 cm / CTB
- SECCHI DEPTH

1st pass \_\_\_\_\_ cm

2nd pass \_\_\_\_\_ cm

**CJ RECREATION**

AREA DEPTH

POOL:  >100ft<sup>2</sup>  >3ft

Comment RE: Reach consistency/ Is reach typical of stream?, Recreation/ Observed - Inferred, Other/ Sampling observations, Concerns, Access directions, etc.

S-ESS

WOODY DEBRIS PORCH RIFFLES, LOW VEGETATION

FEW RIFFLES

POOR QUALITY POOL-RIFFLE, EMBEDDED RUNS

PLANT BED

**BJ AESTHETICS**

- NUISANCE ALGAE
- INVASIVE MACROPHYTES
- EXCESS TURBIDITY
- DISCOLORATION
- FOAM / SCUM
- OIL SHEEN
- TRASH / LITTER
- NUISANCE ODOR
- SLUDGE DEPOSITS
- CSOs/SSOs/OUTFALLS

**DJ MAINTENANCE**

- PUBLIC / PRIVATE / BOTH / NA
- ACTIVE / HISTORIC / BOTH / NA
- YOUNG-SUCCESSION-OLD
- SPRAY / SNAG / REMOVED
- MODIFIED / DIPPED OUT / NA
- LEVEED / ONE SIDED
- RELOCATED / CUTOFFS
- MOVING-BEDLOAD-STABLE
- ARMORED / SLUMPS
- ISLANDS / SCOURED
- IMPOUNDED / DESICCATED
- FLOOD CONTROL / DRAINAGE

Circle some & COMMENT

**EJ ISSUES**

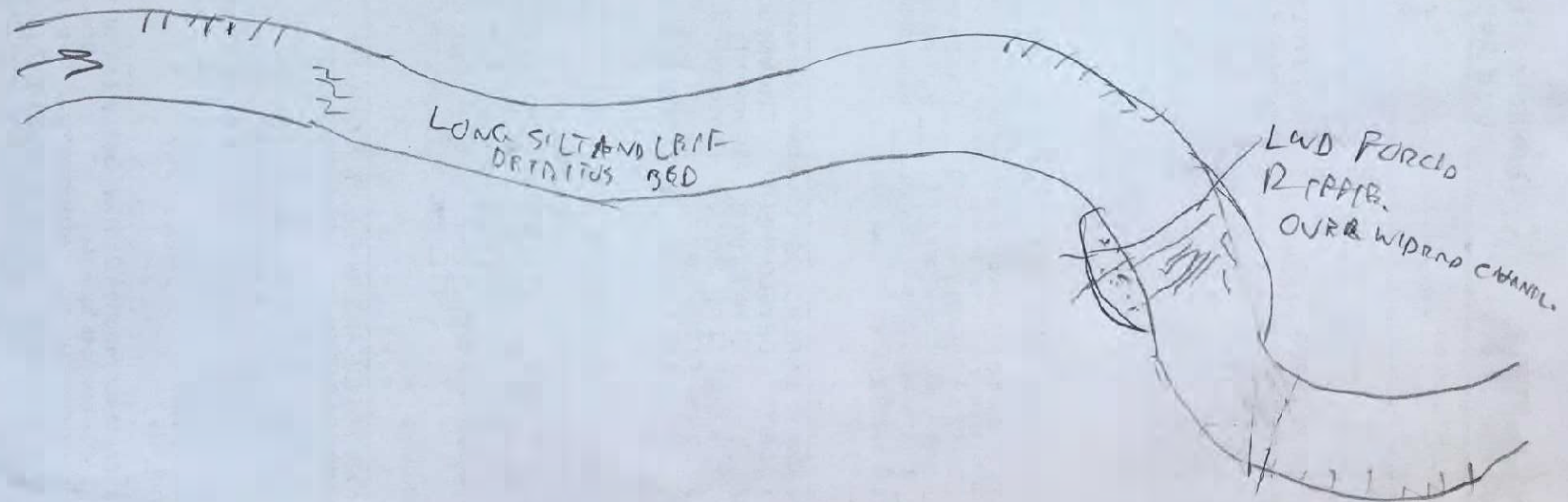
- WWTP / CSO / NPDES / INDUSTRY
- HARDENED / URBAN / DIRT&GRIME
- CONTAMINATED / LANDFILL
- BMPs-CONSTRUCTION-SEDIMENT
- LOGGING / IRRIGATION / COOLING
- BANK / EROSION / SURFACE
- FALSE BANK / MANURE / LAGOON
- WASH H<sub>2</sub>O / TILE / H<sub>2</sub>O TABLE
- ACID / MINE / QUARRY / FLOW
- NATURAL / WETLAND / STAGNANT
- PARK / GOLF / LAWN / HOME
- ATMOSPHERE / DATA PAUCITY

**FJ MEASUREMENTS**

- $\bar{x}$  width
- $\bar{x}$  depth
- max. depth
- $\bar{x}$  bankfull width
- bankfull  $\bar{x}$  depth
- W/D ratio
- bankfull max. depth
- floodprone  $x^2$  width
- entrench. ratio

Legacy Tree:

**Stream Drawing:**





# Qualitative Habitat Evaluation Index and Use Assessment Field Sheet

**QHEI Score:**   

Stream & Location: S-J37

RM:    Date: 2/01/06

Scorers Full Name & Affiliation: LK MB

River Code:    STORET #:    Lat./ Long.:    38.331763, -80.670342 Office verified location

**1] SUBSTRATE** Check **ONLY** Two substrate **TYPE BOXES**; estimate % or note every type present

Check ONE (Or 2 & average)

<b>BEST TYPES</b>	<b>POOL RIFFLE</b>	<b>OTHER TYPES</b>	<b>POOL RIFFLE</b>	<b>ORIGIN</b>	<b>QUALITY</b>
<input type="checkbox"/> BLDR /SLABS [10]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> HARDPAN [4]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> LIMESTONE [1]	<input type="checkbox"/> HEAVY [-2]
<input type="checkbox"/> BOULDER [9]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> DETRITUS [3]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> TILLS [1]	<input type="checkbox"/> MODERATE [-1]
<input type="checkbox"/> COBBLE [8]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> MUCK [2]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> WETLANDS [0]	<input type="checkbox"/> NORMAL [0]
<input type="checkbox"/> GRAVEL [7]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> SILT [2]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> HARDPAN [0]	<input type="checkbox"/> FREE [1]
<input type="checkbox"/> SAND [6]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> ARTIFICIAL [0]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> SANDSTONE [0]	<input type="checkbox"/> EXTENSIVE [-2]
<input type="checkbox"/> BEDROCK [5]	<input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> RIP/RAP [0]	<input type="checkbox"/> MODERATE [-1]
NUMBER OF BEST TYPES: <input type="checkbox"/> 4 or more [2] <input type="checkbox"/> 3 or less [0]				<input type="checkbox"/> LACUSTURINE [0]	<input type="checkbox"/> NORMAL [0]
Comments: <u>Some fine sand gravels surrounding boulders.</u>				<input type="checkbox"/> SHALE [-1]	<input type="checkbox"/> NONE [1]
				<input type="checkbox"/> COAL FINES [-2]	

Substrate  
18  
Maximum 20

**2] INSTREAM COVER** Indicate presence 0 to 3: 0-Absent; 1-Very small amounts or if more common of marginal quality; 2-Moderate amounts, but not of highest quality or in small amounts of highest quality; 3-Highest quality in moderate or greater amounts (e.g., very large boulders in deep or fast water, large diameter log that is stable, well developed rootwad in deep / fast water, or deep, well-defined, functional pools.

**AMOUNT**

Check ONE (Or 2 & average)

<input type="checkbox"/> UNDERCUT BANKS [1]	<input type="checkbox"/> POOLS > 70cm [2]	<input type="checkbox"/> OXBOWS, BACKWATERS [1]	<input type="checkbox"/> EXTENSIVE >75% [11]
<input type="checkbox"/> OVERHANGING VEGETATION [1]	<input type="checkbox"/> ROOTWADS [1]	<input type="checkbox"/> AQUATIC MACROPHYTES [1]	<input type="checkbox"/> MODERATE 25-75% [7]
<input type="checkbox"/> SHALLOWS (IN SLOW WATER) [1]	<input type="checkbox"/> BOULDERS [1]	<input type="checkbox"/> LOGS OR WOODY DEBRIS [1]	<input type="checkbox"/> SPARSE 5-<25% [3]
<input type="checkbox"/> ROOTMATS [1]			<input type="checkbox"/> NEARLY ABSENT <5% [1]

Cover  
Maximum 20

**3] CHANNEL MORPHOLOGY** Check ONE in each category (Or 2 & average)

<b>SINUOSITY</b>	<b>DEVELOPMENT</b>	<b>CHANNELIZATION</b>	<b>STABILITY</b>
<input type="checkbox"/> HIGH [4]	<input checked="" type="checkbox"/> EXCELLENT [7]	<input checked="" type="checkbox"/> NONE [6]	<input checked="" type="checkbox"/> HIGH [3]
<input type="checkbox"/> MODERATE [3]	<input type="checkbox"/> GOOD [5]	<input type="checkbox"/> RECOVERED [4]	<input type="checkbox"/> MODERATE [2]
<input type="checkbox"/> LOW [2]	<input type="checkbox"/> FAIR [3]	<input type="checkbox"/> RECOVERING [3]	<input type="checkbox"/> LOW [1]
<input checked="" type="checkbox"/> NONE [1]	<input type="checkbox"/> POOR [1]	<input type="checkbox"/> RECENT OR NO RECOVERY [1]	

Channel  
Maximum 20

**4] BANK EROSION AND RIPARIAN ZONE** Check ONE in each category for EACH BANK (Or 2 per bank & average)

River right looking downstream

<b>EROSION</b>	<b>RIPARIAN WIDTH</b>	<b>FLOOD PLAIN QUALITY</b>	<b>CONSERVATION TILLAGE</b>
<input type="checkbox"/> NONE / LITTLE [3]	<input type="checkbox"/> WIDE > 50m [4]	<input type="checkbox"/> FOREST, SWAMP [3]	<input type="checkbox"/> URBAN OR INDUSTRIAL [0]
<input type="checkbox"/> MODERATE [2]	<input type="checkbox"/> MODERATE 10-50m [3]	<input type="checkbox"/> SHRUB OR OLD FIELD [2]	<input type="checkbox"/> MINING / CONSTRUCTION [0]
<input type="checkbox"/> HEAVY / SEVERE [1]	<input type="checkbox"/> NARROW 5-10m [2]	<input type="checkbox"/> RESIDENTIAL, PARK, NEW FIELD [1]	
	<input type="checkbox"/> VERY NARROW < 5m [1]	<input type="checkbox"/> FENCED PASTURE [1]	
	<input type="checkbox"/> NONE [0]	<input type="checkbox"/> OPEN PASTURE, ROWCROP [0]	

Indicate predominant land use(s) past 100m riparian.  
Riparian  
Maximum 10

**5] POOL / GLIDE AND RIFFLE / RUN QUALITY**

**MAXIMUM DEPTH**

**CHANNEL WIDTH**

**CURRENT VELOCITY**

Check ONE (ONLY)

Check ONE (Or 2 & average)

Check ALL that apply

<input checked="" type="checkbox"/> > 1m [6]	<input checked="" type="checkbox"/> POOL WIDTH > RIFFLE WIDTH [2]	<input type="checkbox"/> TORRENTIAL [-1]	<input checked="" type="checkbox"/> SLOW [1]
<input type="checkbox"/> 0.7-<1m [4]	<input type="checkbox"/> POOL WIDTH = RIFFLE WIDTH [1]	<input type="checkbox"/> VERY FAST [1]	<input type="checkbox"/> INTERSTITIAL [-1]
<input type="checkbox"/> 0.4-<0.7m [2]	<input type="checkbox"/> POOL WIDTH > RIFFLE WIDTH [0]	<input checked="" type="checkbox"/> FAST [1]	<input type="checkbox"/> INTERMITTENT [-2]
<input type="checkbox"/> 0.2-<0.4m [1]		<input checked="" type="checkbox"/> MODERATE [1]	<input checked="" type="checkbox"/> EDDIES [1]
<input type="checkbox"/> < 0.2m [0]			

**Recreation Potential**  
Primary Contact  
Secondary Contact  
(circle one and comment on back)

Pool / Current  
Maximum 12

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species:

Check ONE (Or 2 & average)

NO RIFFLE [metric=0]

<b>RIFFLE DEPTH</b>	<b>RUN DEPTH</b>	<b>RIFFLE / RUN SUBSTRATE</b>	<b>RIFFLE / RUN EMBEDDEDNESS</b>
<input checked="" type="checkbox"/> BEST AREAS > 10cm [2]	<input checked="" type="checkbox"/> MAXIMUM > 50cm [2]	<input checked="" type="checkbox"/> STABLE (e.g., Cobble, Boulder) [2]	<input checked="" type="checkbox"/> NONE [2]
<input type="checkbox"/> BEST AREAS 5-10cm [1]	<input type="checkbox"/> MAXIMUM < 50cm [1]	<input type="checkbox"/> MOD. STABLE (e.g., Large Gravel) [1]	<input type="checkbox"/> LOW [1]
<input type="checkbox"/> BEST AREAS < 5cm [metric=0]		<input type="checkbox"/> UNSTABLE (e.g., Fine Gravel, Sand) [0]	<input type="checkbox"/> MODERATE [0]

Riffle / Run  
Maximum 8

**6] GRADIENT** ( ft/mi)  VERY LOW - LOW [2-4]  MODERATE [6-10]  HIGH - VERY HIGH [10-6]

**DRAINAGE AREA** ( m<sup>2</sup>)

% POOL: 45 % GLIDE:   

% RUN: 10 % RIFFLE: 45

Gradient  
Maximum 10

**A) SAMPLED REACH**

Check ALL that apply

- METHOD**
- BOAT
  - WADE
  - L. LINE
  - OTHER
- STAGE**
- 1st -sample pass- 2nd
  - HIGH
  - UP
  - NORMAL
  - LOW
  - DRY

- DISTANCE**
- 0.5 Km
  - 0.2 Km
  - 0.15 Km
  - 0.12 Km
  - OTHER
- CLARITY**
- 1st --sample pass-- 2nd
  - < 20 cm
  - 20-<40 cm
  - 40-70 cm
  - > 70 cm/ CTB
  - SECCHI DEPTH

- CANOPY**
- 1st \_\_\_\_\_ cm
  - 2nd \_\_\_\_\_ cm
  - > 85%- OPEN
  - 55%-<85%
  - 30%-<55%
  - 10%-<30%
  - <10%- CLOSED

- CJ RECREATION**
- AREA DEPTH  
 POOL:  >100ft<sup>2</sup>  >3ft

Comment RE: Reach consistency/ Is reach typical of stream? Recreation/ Observed - Inferred, Other/ Sampling observations, Concerns, Access directions, etc.

S-J32: Reach limited to 60m Width =  $\approx 50$  feet. Riffles are primarily boulders and flats

large cobbles, Deep Pools > 100cm. Banks are protected with boulders and have high stability. Little to no embeddedness

Riffle - Pool Complex

- BJ AESTHETICS**
- NUISANCE ALGAE
  - INVASIVE MACROPHYTES
  - EXCESS TURBIDITY
  - DISCOLORATION
  - FOAM / SCUM
  - OIL SHEEN
  - TRASH / LITTER
  - NUISANCE ODOR
  - SLUDGE DEPOSITS
  - CSOs/SSOs/OUTFALLS

- DJ MAINTENANCE** Circle some & COMMENT
- PUBLIC / PRIVATE / BOTH / NA
  - ACTIVE / HISTORIC / BOTH / NA
  - YOUNG-SUCCESSION-OLD
  - SPRAY / SNAG / REMOVED
  - MODIFIED / DIPPED OUT / NA
  - LEVEED / ONE SIDED
  - RELOCATED / CUTOFFS
  - MOVING-BEDLOAD-STABLE
  - ARMOURED / SLUMPS
  - ISLANDS / SCOURED
  - IMPOUNDED / DESICCATED
  - FLOOD CONTROL / DRAINAGE

- EJ ISSUES**
- WWTP / CSO / NPDES / INDUSTRY
  - HARDENED / URBAN / DIRT & GRIME
  - CONTAMINATED / LANDFILL
  - BMPs-CONSTRUCTION-SEDIMENT
  - LOGGING / IRRIGATION / COOLING
  - BANK / EROSION / SURFACE
  - FALSE BANK / MANURE / LAGOON
  - WASH H<sub>2</sub>O / TILE / H<sub>2</sub>O TABLE
  - ACID / MINE / QUARRY / FLOW
  - NATURAL / WETLAND / STAGNANT
  - PARK / GOLF / LAWN / HOME
  - ATMOSPHERE / DATA PAUCITY

- FJ MEASUREMENTS**
- $\bar{x}$  width
  - $\bar{x}$  depth
  - max. depth
  - $\bar{x}$  bankfull width
  - bankfull  $\bar{x}$  depth
  - W/D ratio
  - bankfull max. depth
  - floodprone  $x^2$  width
  - entrench. ratio
  - Legacy Tree:

**Stream Drawing:**





Stream & Location: 5-I36 Honey Creek RM: \_\_\_\_\_ Date: 12/07/21

River Code: \_\_\_\_\_ STORET #: \_\_\_\_\_ Lat./Long.: \_\_\_\_\_ (NAD 83 - decimal °) 37.178889, -80.729790 Office verified location

1] **SUBSTRATE** Check ONLY TWO substrate TYPE BOXES; estimate % or note every type present

<b>BEST TYPES</b>		<b>OTHER TYPES</b>		<b>ORIGIN</b>		<b>QUALITY</b>	
<input type="checkbox"/> BLDR /SLABS [10]	<input type="checkbox"/> POOL RIFFLE	<input type="checkbox"/> HARDPAN [4]	<input type="checkbox"/> POOL RIFFLE	<input type="checkbox"/> LIMESTONE [1]	<input type="checkbox"/> SILT	<input type="checkbox"/> HEAVY [-2]	Substrate <b>17</b> Maximum 20
<input checked="" type="checkbox"/> BOULDER [9]	<u>50</u> <u>50</u>	<input type="checkbox"/> DETRITUS [3]	_____	<input type="checkbox"/> TILLS [1]	<input type="checkbox"/> WETLANDS [0]	<input type="checkbox"/> MODERATE [-1]	
<input type="checkbox"/> COBBLE [8]	<u>50</u> <u>50</u>	<input type="checkbox"/> MUCK [2]	_____	<input type="checkbox"/> HARDPAN [0]	<input type="checkbox"/> SANDSTONE [0]	<input type="checkbox"/> NORMAL [0]	
<input type="checkbox"/> GRAVEL [7]	_____	<input type="checkbox"/> SILT [2]	_____	<input type="checkbox"/> RIP/RAP [0]	<input type="checkbox"/> LACUSTURINE [0]	<input type="checkbox"/> FREE [1]	
<input type="checkbox"/> SAND [6]	_____	<input type="checkbox"/> ARTIFICIAL [0]	_____	<input type="checkbox"/> SHALE [-1]	<input type="checkbox"/> COAL FINES [-2]	<input type="checkbox"/> EXTENSIVE [-2]	
<input type="checkbox"/> BEDROCK [5]	_____	(Score natural substrates; ignore sludge from point-sources)		<input type="checkbox"/> SANDSTONE [0]	<input type="checkbox"/> RIP/RAP [0]	<input type="checkbox"/> MODERATE [-1]	
<input type="checkbox"/> BEDROCK [5]	_____			<input type="checkbox"/> LACUSTURINE [0]	<input type="checkbox"/> SHALE [-1]	<input type="checkbox"/> NORMAL [0]	

NUMBER OF BEST TYPES:  4 or more [2]  3 or less [0]

Comments \_\_\_\_\_

2] **INSTREAM COVER** Indicate presence 0 to 3: 0-Absent; 1-Very small amounts or if more common of marginal quality; 2-Moderate amounts, but not of highest quality or in small amounts of highest quality; 3-Highest quality in moderate or greater amounts (e.g., very large boulders in deep or fast water, large diameter log that is stable, well developed rootwad in deep / fast water, or deep, well-defined, functional pools.

<u>0</u> UNDERCUT BANKS [1]	<u>2</u> POOLS > 70cm [2]	<u>0</u> OXBOWS, BACKWATERS [1]	<input type="checkbox"/> EXTENSIVE >75% [11]
<u>0</u> OVERHANGING VEGETATION [1]	<u>0</u> ROOTWADS [1]	<u>1</u> AQUATIC MACROPHYTES [1]	<input checked="" type="checkbox"/> MODERATE 25-75% [7]
<u>1</u> SHALLOWS (IN SLOW WATER) [1]	<u>2</u> BOULDERS [1]	<u>0</u> LOGS OR WOODY DEBRIS [1]	<input type="checkbox"/> SPARSE 5-<25% [3]
<u>0</u> ROOTMATS [1]			<input type="checkbox"/> NEARLY ABSENT <5% [1]

Amount: **14** (Maximum 20)

Comments \_\_\_\_\_

3] **CHANNEL MORPHOLOGY** Check ONE in each category (Or 2 & average)

<input type="checkbox"/> HIGH [4]	<input checked="" type="checkbox"/> EXCELLENT [7]	<input checked="" type="checkbox"/> NONE [6]	<input checked="" type="checkbox"/> HIGH [3]
<input type="checkbox"/> MODERATE [3]	<input type="checkbox"/> GOOD [5]	<input type="checkbox"/> RECOVERED [4]	<input type="checkbox"/> MODERATE [2]
<input type="checkbox"/> LOW [2]	<input type="checkbox"/> FAIR [3]	<input type="checkbox"/> RECOVERING [3]	<input type="checkbox"/> LOW [1]
<input checked="" type="checkbox"/> NONE [1]	<input type="checkbox"/> POOR [1]	<input type="checkbox"/> RECENT OR NO RECOVERY [1]	

Channel Maximum 20: **17**

Comments \_\_\_\_\_

4] **BANK EROSION AND RIPARIAN ZONE** Check ONE in each category for EACH BANK (Or 2 per bank & average)

<input checked="" type="checkbox"/> NONE / LITTLE [3]	<input type="checkbox"/> WIDE > 50m [4]	<input type="checkbox"/> FOREST, SWAMP [3]	<input type="checkbox"/> CONSERVATION TILLAGE [1]
<input type="checkbox"/> MODERATE [2]	<input checked="" type="checkbox"/> MODERATE 10-50m [3]	<input checked="" type="checkbox"/> SHRUB OR OLD FIELD [2]	<input type="checkbox"/> URBAN OR INDUSTRIAL [0]
<input type="checkbox"/> HEAVY / SEVERE [1]	<input type="checkbox"/> NARROW 5-10m [2]	<input type="checkbox"/> RESIDENTIAL, PARK, NEW FIELD [1]	<input type="checkbox"/> MINING / CONSTRUCTION [0]
	<input type="checkbox"/> VERY NARROW < 5m [1]	<input type="checkbox"/> FENCED PASTURE [1]	
	<input type="checkbox"/> NONE [0]	<input type="checkbox"/> OPEN PASTURE, ROWCROP [0]	

Indicate predominant land use(s) past 100m riparian. Riparian Maximum 10: **8**

Comments \_\_\_\_\_

5] **POOL / GLIDE AND RIFFLE / RUN QUALITY**

<input checked="" type="checkbox"/> > 1m [6]	<input type="checkbox"/> POOL WIDTH > RIFFLE WIDTH [2]	<input type="checkbox"/> TORRENTIAL [-1]	<input type="checkbox"/> SLOW [1]
<input type="checkbox"/> 0.7-<1m [4]	<input checked="" type="checkbox"/> POOL WIDTH = RIFFLE WIDTH [1]	<input type="checkbox"/> VERY FAST [1]	<input type="checkbox"/> INTERSTITIAL [-1]
<input type="checkbox"/> 0.4-<0.7m [2]	<input type="checkbox"/> POOL WIDTH < RIFFLE WIDTH [0]	<input type="checkbox"/> FAST [1]	<input type="checkbox"/> INTERMITTENT [-2]
<input type="checkbox"/> 0.2-<0.4m [1]		<input checked="" type="checkbox"/> MODERATE [1]	<input type="checkbox"/> EDDIES [1]
<input type="checkbox"/> < 0.2m [0]		Indicate for reach - pools and riffles.	

Recreation Potential: **8** (Maximum 12)

Comments \_\_\_\_\_

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species: Check ONE (Or 2 & average).  NO RIFFLE [metric=0]

<input checked="" type="checkbox"/> BEST AREAS > 10cm [2]	<input checked="" type="checkbox"/> MAXIMUM > 50cm [2]	<input checked="" type="checkbox"/> STABLE (e.g., Cobble, Boulder) [2]	<input type="checkbox"/> NONE [2]
<input type="checkbox"/> BEST AREAS 5-10cm [1]	<input type="checkbox"/> MAXIMUM < 50cm [1]	<input checked="" type="checkbox"/> MOD. STABLE (e.g., Large Gravel) [1]	<input checked="" type="checkbox"/> LOW [1]
<input type="checkbox"/> BEST AREAS < 5cm [metric=0]		<input type="checkbox"/> UNSTABLE (e.g., Fine Gravel, Sand) [0]	<input type="checkbox"/> MODERATE [0]
			<input type="checkbox"/> EXTENSIVE [-1]

Riffle / Run Maximum 8: **6.5**

Comments \_\_\_\_\_

6] **GRADIENT / DRAINAGE AREA**

(ft/mi) <input type="checkbox"/> VERY LOW - LOW [2-4]	%POOL: <b>65</b>	%GLIDE: <b>5</b>	Gradient Maximum 10: <b>8</b>
(mi <sup>2</sup> ) <input checked="" type="checkbox"/> MODERATE [6-10]	%RUN: <b>5</b>	%RIFFLE: <b>25</b>	
<input type="checkbox"/> HIGH - VERY HIGH [10-6]			

Comments \_\_\_\_\_

**A) SAMPLED REACH**

Check ALL that apply

- METHOD**
- BOAT
  - WADE
  - L. LINE
  - OTHER
- DISTANCE**
- 0.5 Km
  - 0.2 Km
  - 0.15 Km
  - 0.12 Km
  - OTHER
- STAGE**
- 1st--sample pass-- 2nd
  - HIGH
  - UP
  - NORMAL
  - LOW
  - DRY

Comment RE: Reach consistency/ Is reach typical of steam?, Recreation/ Observed - Inferred, Other/ Sampling observations, Concerns, Access directions, etc.

Reach access limited to LOD. Reach is Boulder/Cobble dominant. Deep, well-formed pools. Good riffle habitat, Cobble dominant w/ well-developed stocking. Left & Right banks are stable w/ well-developed vegetation; No undercut banks

- CLARITY**
- 1st --sample pass-- 2nd
  - < 20 cm
  - 20-<40 cm
  - 40-70 cm
  - > 70 cm/ CTB
  - SECCHI DEPTH
- meters

- CANOPY**
- 1st pass \_\_\_\_\_ cm
  - 2nd pass \_\_\_\_\_ cm
  - > 85%- OPEN
  - 55%-<85%
  - 30%-<55%
  - 10%-<30%
  - <10%- CLOSED

- B) AESTHETICS**
- NUISANCE ALGAE
  - INVASIVE MACROPHYTES
  - EXCESS TURBIDITY
  - DISCOLORATION
  - FOAM / SCUM
  - OIL SHEEN
  - TRASH / LITTER
  - NUISANCE ODOR
  - SLUDGE DEPOSITS
  - CSOs/SSOs/OUTFALLS

- D) MAINTENANCE**
- PUBLIC / PRIVATE / BOTH / NA
  - ACTIVE / HISTORIC / BOTH / NA
  - YOUNG-SUCCESSION-OLD
  - SPRAY / SNAG / REMOVED
  - MODIFIED / DIPPED OUT / NA
  - LEVEED / ONE SIDED
  - RELOCATED / CUTOFFS
  - MOVING-BEDLOAD-STABLE
  - ARMoured / SLUMPS
  - ISLANDS / SCoured
  - IMPOUNDED / DESICCATED
  - FLOOD CONTROL / DRAINAGE

Circle some & COMMENT

- E) ISSUES**
- WWTP / CSO / NPDES / INDUSTRY
  - HARDENED / URBAN / DIRT&GRIME
  - CONTAMINATED / LANDFILL
  - BMPs-CONSTRUCTION-SEDIMENT
  - LOGGING / IRRIGATION / COOLING
  - BANK / EROSION / SURFACE
  - FALSE BANK / MANURE / LAGOON
  - WASH H<sub>2</sub>O / TILE / H<sub>2</sub>O TABLE
  - ACID / MINE / QUARRY / FLOW
  - NATURAL / WETLAND / STAGNANT
  - PARK / GOLF / LAWN / HOME
  - ATMOSPHERE / DATA PAUCITY

- F) MEASUREMENTS**
- $\bar{x}$  width
  - $\bar{x}$  depth
  - max. depth
  - $\bar{x}$  bankfull width
  - bankfull  $\bar{x}$  depth
  - W/D ratio
  - bankfull max. depth
  - floodprone  $x^2$  width
  - entrench. ratio
- Legacy Tree:

- C) RECREATION**
- AREA  >100ft<sup>2</sup>  >3ft
  - DEPTH  >100ft<sup>2</sup>  >3ft

**Stream Drawing:**



Stream & Location: S-031

RM:   Date: 11/30/06 Z1

Scorers Full Name & Affiliation: Lk, MB

River Code:   STORET #:   Lat./ Long.:   37.554163, -80.710853 Office verified location

1) SUBSTRATE Check ONLY Two substrate TYPE BOXES; estimate % or note every type present

<b>BEST TYPES</b>		<b>POOL RIFFLE</b>	<b>OTHER TYPES</b>		<b>POOL RIFFLE</b>	<b>ORIGIN</b>	<b>QUALITY</b>	13																		
<input type="checkbox"/> Bldr/Slabs [10]	<input type="checkbox"/> Boulder [9]	<input type="checkbox"/> Cobble [8]	<input type="checkbox"/> Gravel [7]	<input type="checkbox"/> Sand [6]	<input type="checkbox"/> Bedrock [5]	<input type="checkbox"/> Hardpan [4]	<input type="checkbox"/> Detritus [3]		<input type="checkbox"/> Muck [2]	<input type="checkbox"/> Artificial [0]	<input type="checkbox"/> Limestone [1]	<input type="checkbox"/> Tills [1]	<input type="checkbox"/> Wetlands [0]	<input type="checkbox"/> Hardpan [0]	<input type="checkbox"/> Sandstone [0]	<input type="checkbox"/> Rip/Rap [0]	<input type="checkbox"/> Lacustrine [0]	<input type="checkbox"/> Shale [-1]	<input type="checkbox"/> Coal Fines [-2]	<input type="checkbox"/> Heavy [-2]	<input type="checkbox"/> Moderate [-1]	<input type="checkbox"/> Normal [0]	<input type="checkbox"/> Free [1]	<input type="checkbox"/> Extensive [-2]	<input type="checkbox"/> Moderate [-1]	<input type="checkbox"/> Normal [0]

NUMBER OF BEST TYPES:  4 or more [2]  3 or less [0]

Comments:  

2) INSTREAM COVER Indicate presence 0 to 3: 0-Absent; 1-Very small amounts or if more common of marginal quality; 2-Moderate amounts, but not of highest quality or in small amounts of highest quality; 3-Highest quality in moderate or greater amounts (e.g., very large boulders in deep or fast water, large diameter log that is stable, well developed rootwad in deep / fast water, or deep, well-defined, functional pools)

<input type="checkbox"/> Undercut Banks [1]	<input type="checkbox"/> Overhanging Vegetation [1]	<input type="checkbox"/> Shallows (in slow water) [1]	<input type="checkbox"/> Rootmats [1]	<input type="checkbox"/> Pools > 70cm [2]	<input type="checkbox"/> Rootwads [1]	<input type="checkbox"/> Boulders [1]	<input type="checkbox"/> Oxbows, Backwaters [1]	<input type="checkbox"/> Aquatic Macrophytes [1]	<input type="checkbox"/> Logs or Woody Debris [1]
---------------------------------------------	-----------------------------------------------------	-------------------------------------------------------	---------------------------------------	-------------------------------------------	---------------------------------------	---------------------------------------	-------------------------------------------------	--------------------------------------------------	---------------------------------------------------

AMOUNT Check ONE (Or 2 & average)

EXTENSIVE >75% [11]  MODERATE 25-75% [7]  SPARSE 5-<25% [3]  NEARLY ABSENT <5% [1]

Channel Maximum 20

Comments:  

3) CHANNEL MORPHOLOGY Check ONE in each category (Or 2 & average)

<b>SINUOSITY</b>	<b>DEVELOPMENT</b>	<b>CHANNELIZATION</b>	<b>STABILITY</b>
<input type="checkbox"/> High [4] <input type="checkbox"/> Moderate [3] <input type="checkbox"/> Low [2] <input checked="" type="checkbox"/> None [1]	<input type="checkbox"/> Excellent [7] <input checked="" type="checkbox"/> Good [5] <input type="checkbox"/> Fair [3] <input type="checkbox"/> Poor [1]	<input checked="" type="checkbox"/> None [6] <input type="checkbox"/> Recovered [4] <input type="checkbox"/> Recovering [3] <input type="checkbox"/> Recent or no recovery [1]	<input checked="" type="checkbox"/> High [3] <input type="checkbox"/> Moderate [2] <input type="checkbox"/> Low [1]

Channel Maximum 20

Comments:  

4) BANK EROSION AND RIPARIAN ZONE Check ONE in each category for EACH BANK (Or 2 per bank & average)

<b>EROSION</b>	<b>RIPARIAN WIDTH</b>	<b>FLOOD PLAIN QUALITY</b>	<b>CONSERVATION TILLAGE</b>
<input type="checkbox"/> None/Little [3] <input type="checkbox"/> Moderate [2] <input type="checkbox"/> Heavy/Severe [1]	<input type="checkbox"/> Wide > 50m [4] <input type="checkbox"/> Moderate 10-50m [3] <input type="checkbox"/> Narrow 5-10m [2] <input type="checkbox"/> Very narrow < 5m [1] <input type="checkbox"/> None [0]	<input type="checkbox"/> Forest, Swamp [3] <input type="checkbox"/> Shrub or Old Field [2] <input type="checkbox"/> Residential, Park, New Field [1] <input type="checkbox"/> Fenced Pasture [1] <input type="checkbox"/> Open Pasture, Rowcrop [0]	<input type="checkbox"/> Conservation Tillage [1] <input type="checkbox"/> Urban or Industrial [0] <input type="checkbox"/> Mining / Construction [0]

Riparian Maximum 10

Comments:  

5) POOL / GLIDE AND RIFFLE / RUN QUALITY

<b>MAXIMUM DEPTH</b>	<b>CHANNEL WIDTH</b>	<b>CURRENT VELOCITY</b>	<b>Recreation Potential</b> Primary Contact Secondary Contact <small>(circle one and comment on back)</small>
Check ONE (ONLY!)	Check ONE (Or 2 & average)	Check ALL that apply	
<input type="checkbox"/> > 1m [6] <input type="checkbox"/> 0.7-<1m [4] <input type="checkbox"/> 0.4-<0.7m [2] <input checked="" type="checkbox"/> 0.2-<0.4m [1] <input type="checkbox"/> < 0.2m [0]	<input type="checkbox"/> Pool width > riffle width [2] <input checked="" type="checkbox"/> Pool width = riffle width [1] <input type="checkbox"/> Pool width < riffle width [0]	<input type="checkbox"/> Torrential [-1] <input type="checkbox"/> Very Fast [1] <input type="checkbox"/> Fast [1] <input checked="" type="checkbox"/> Moderate [1] <input type="checkbox"/> Slow [1] <input type="checkbox"/> Interstitial [-1] <input type="checkbox"/> Intermittent [-2] <input type="checkbox"/> Eddies [1]	

Pool / Current Maximum 12

Comments:  

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species: Check ONE (Or 2 & average).

<b>RIFFLE DEPTH</b>	<b>RUN DEPTH</b>	<b>RIFFLE / RUN SUBSTRATE</b>	<b>RIFFLE / RUN EMBEDDEDNESS</b>
<input checked="" type="checkbox"/> Best areas > 10cm [2] <input type="checkbox"/> Best areas 5-10cm [1] <input type="checkbox"/> Best areas < 5cm [metric=0]	<input checked="" type="checkbox"/> Maximum > 50cm [2] <input type="checkbox"/> Maximum < 50cm [1]	<input type="checkbox"/> Stable (e.g., Cobble, Boulder) [2] <input checked="" type="checkbox"/> Mod. Stable (e.g., Large Gravel) [1] <input type="checkbox"/> Unstable (e.g., Fine Gravel, Sand) [0]	<input type="checkbox"/> None [2] <input type="checkbox"/> Low [1] <input checked="" type="checkbox"/> Moderate [0] <input type="checkbox"/> Extensive [-1]

Riffle / Run Maximum 8

Comments:  

6) GRADIENT (ft/mi)  VERY LOW - LOW [2-4]  MODERATE [6-10]  HIGH - VERY HIGH [10-6]

DRAINAGE AREA (mi<sup>2</sup>)

% POOL: 5 % GLIDE:   % RUN: 75 % RIFFLE: 20

Gradient Maximum 10

Comments:

**AJ SAMPLED REACH**

Check ALL that apply

**METHOD**

- BOAT  
 WADE  
 L. LINE  
 OTHER

**STAGE**

1st -sample pass- 2nd

- HIGH   
 UP   
 NORMAL   
 LOW   
 DRY

**DISTANCE**

- 0.5 Km  
 0.2 Km  
 0.15 Km  
 0.12 Km  
 OTHER

**CLARITY**

1st --sample pass-- 2nd

- < 20 cm   
 20-<40 cm   
 40-70 cm   
 > 70 cm/ CTB   
 SECCHI DEPTH

meters

**CANOPY**

1st \_\_\_\_\_ cm

2nd \_\_\_\_\_ cm

- > 85%- OPEN  
 55%-<85%  
 30%-<55%  
 10%-<30%  
 <10%- CLOSED

**CJ RECREATION**

AREA DEPTH

POOL:  >100ft<sup>2</sup>  >3ft

Comment RE: Reach consistency/ Is reach typical of stream?, Recreation/ Observed - Inferred, Other/ Sampling observations, Concerns, Access directions, etc.

S-D31. Reach limited to LOD, moderately embedded gravel + rubble substrate.

Trees + mountainside on left bank, road on right bank, moderately vegetated banks.

Plane bed

**DJ MAINTENANCE**

Circle some &amp; COMMENT

- PUBLIC / PRIVATE / BOTH / NA  
 ACTIVE / HISTORIC / BOTH / NA  
 YOUNG-SUCCESSION-OLD  
 SPRAY / SNAG / REMOVED  
 MODIFIED / DIPPED OUT / NA  
 LEVEED / ONE SIDED  
 RELOCATED / CUTOFFS  
 MOVING-BEDLOAD-STABLE  
 ARMoured / SLUMPS  
 ISLANDS / SCOURED  
 IMPOUNDED / DESICCATED  
 FLOOD CONTROL / DRAINAGE

**BJ AESTHETICS**

- NUISANCE ALGAE  
 INVASIVE MACROPHYTES  
 EXCESS TURBIDITY  
 DISCOLORATION  
 FOAM / SCUM  
 OIL SHEEN  
 TRASH / LITTER  
 NUISANCE ODOR  
 SLUDGE DEPOSITS  
 CSOs/SSOs/OUTFALLS

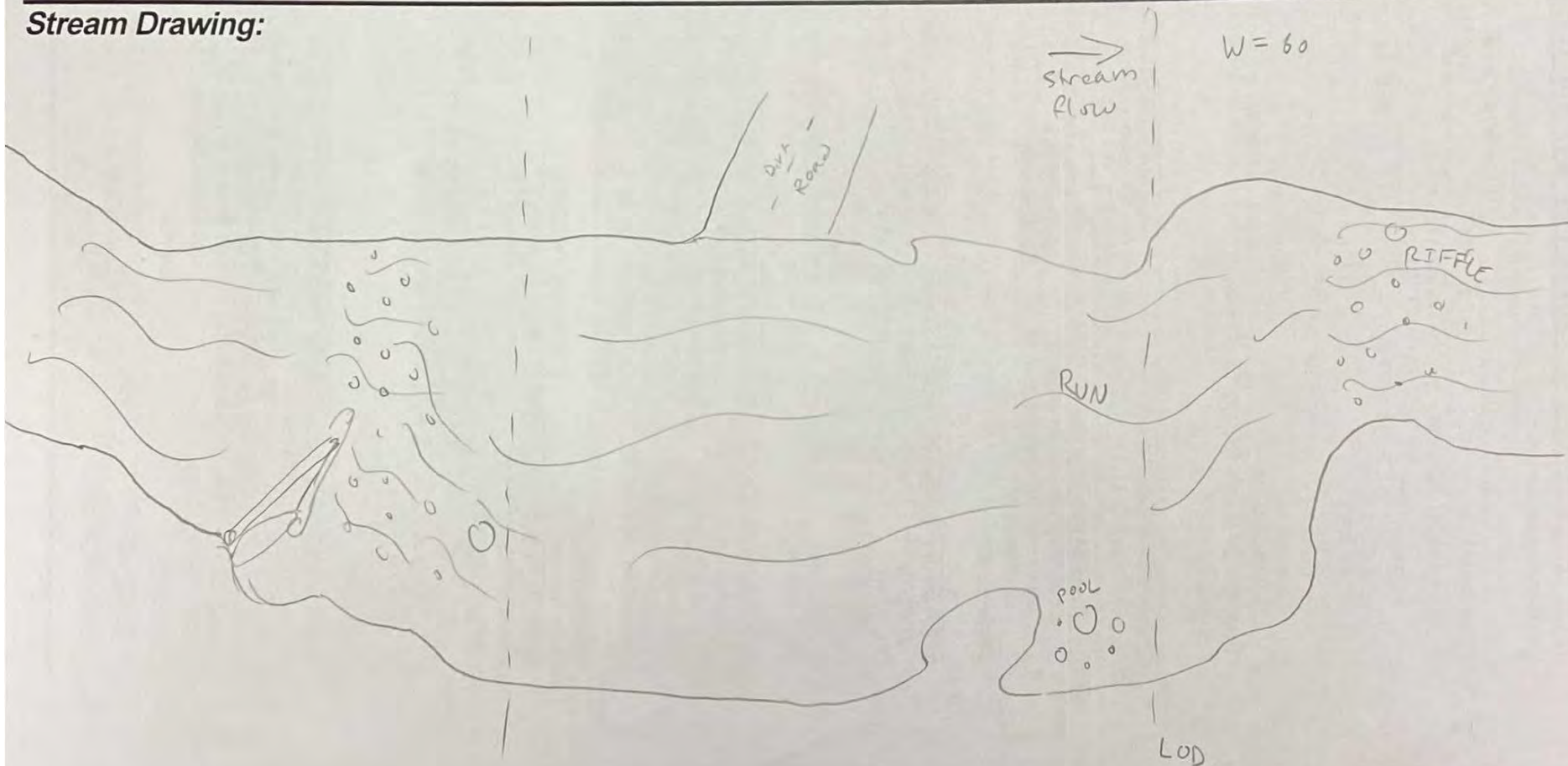
**EJ ISSUES**

- WWTP / CSO / NPDES / INDUSTRY  
 HARDENED / URBAN / DIRT&GRIME  
 CONTAMINATED / LANDFILL  
 BMPs-CONSTRUCTION-SEDIMENT  
 LOGGING / IRRIGATION / COOLING  
 BANK / EROSION / SURFACE  
 FALSE BANK / MANURE / LAGOON  
 WASH H<sub>2</sub>O / TILE / H<sub>2</sub>O TABLE  
 ACID / MINE / QUARRY / FLOW  
 NATURAL / WETLAND / STAGNANT  
 PARK / GOLF / LAWN / HOME  
 ATMOSPHERE / DATA PAUCITY

**FJ MEASUREMENTS**

- $\bar{x}$  width  
 $\bar{x}$  depth  
 max. depth  
 $\bar{x}$  bankfull width  
 bankfull  $\bar{x}$  depth  
 W/D ratio  
 bankfull max. depth  
 floodprone  $x^2$  width  
 entrench. ratio

Legacy Tree:

**Stream Drawing:**

Stream & Location: S-CC1RM:    Date: 12 / 04 / 21Scorers Full Name & Affiliation: LKRiver Code:   STORET #:   Lat./ Long.:     
(NAD 83 - decimal °)

36.894043, -79.445744

Office verified location **1) SUBSTRATE** Check **ONLY** Two substrate **TYPE BOXES**; estimate % or note every type presentCheck **ONE** (Or 2 & average)

- |                                                |                    |                                                  |                    |
|------------------------------------------------|--------------------|--------------------------------------------------|--------------------|
| <b>BEST TYPES</b>                              | <b>POOL RIFFLE</b> | <b>OTHER TYPES</b>                               | <b>POOL RIFFLE</b> |
| <input type="checkbox"/> BLDR /SLABS [10]      | <u>  </u>          | <input type="checkbox"/> HARDPAN [4]             | <u>  </u>          |
| <input type="checkbox"/> BOULDER [9]           | <u>  </u>          | <input checked="" type="checkbox"/> DETRITUS [3] | <u>  </u>          |
| <input type="checkbox"/> COBBLE [8]            | <u>  </u>          | <input type="checkbox"/> MUCK [2]                | <u>  </u>          |
| <input checked="" type="checkbox"/> GRAVEL [7] | <u>  </u>          | <input type="checkbox"/> SILT [2]                | <u>  </u>          |
| <input checked="" type="checkbox"/> SAND [6]   | <u>  </u>          | <input type="checkbox"/> ARTIFICIAL [0]          | <u>  </u>          |
| <input type="checkbox"/> BEDROCK [5]           | <u>  </u>          |                                                  |                    |

- ORIGIN**
- 
- 
- LIMESTONE [1]
- 
- 
- TILLS [1]
- 
- 
- WETLANDS [0]
- 
- 
- HARDPAN [0]
- 
- 
- SANDSTONE [0]
- 
- 
- RIP/RAP [0]
- 
- 
- LACUSTURINE [0]
- 
- 
- SHALE [-1]
- 
- 
- COAL FINES [-2]

- QUALITY**
- 
- 
- HEAVY [-2]
- 
- 
- MODERATE [-1]
- 
- 
- NORMAL [0]
- 
- 
- FREE [1]
- 
- 
- EXTENSIVE [-2]
- 
- 
- MODERATE [-1]
- 
- 
- NORMAL [0]
- 
- 
- NONE [1]

SILT  
EMBEDDEDNESSSubstrate  
16  
Maximum  
20NUMBER OF BEST TYPES:  4 or more [2]  3 or less [0]

Comments

**2) INSTREAM COVER** Indicate presence 0 to 3: 0-Absent; 1-Very small amounts or if more common of marginal quality; 2-Moderate amounts, but not of highest quality or in small amounts of highest quality; 3-Highest quality in moderate or greater amounts (e.g., very large boulders in deep or fast water, large diameter log that is stable, well developed rootwad in deep / fast water, or deep, well-defined, functional pools.**AMOUNT**Check **ONE** (Or 2 & average)

- |                                        |                            |                                    |
|----------------------------------------|----------------------------|------------------------------------|
| <u>  </u> UNDERCUT BANKS [1]           | <u>  </u> POOLS > 70cm [2] | <u>  </u> OXBOWS, BACKWATERS [1]   |
| <u>  </u> OVERHANGING VEGETATION [1]   | <u>  </u> ROOTWADS [1]     | <u>  </u> AQUATIC MACROPHYTES [1]  |
| <u>  </u> SHALLOWS (IN SLOW WATER) [1] | <u>  </u> BOULDERS [1]     | <u>  </u> LOGS OR WOODY DEBRIS [1] |
| <u>  </u> ROOTMATS [1]                 |                            |                                    |

- 
- EXTENSIVE >75% [11]
- 
- 
- MODERATE 25-75% [7]
- 
- 
- SPARSE 5-<25% [3]
- 
- 
- NEARLY ABSENT <5% [1]

Cover  
Maximum  
20  

Comments

**3) CHANNEL MORPHOLOGY** Check **ONE** in each category (Or 2 & average)

- |                                                  |                                              |                                                    |                                                  |
|--------------------------------------------------|----------------------------------------------|----------------------------------------------------|--------------------------------------------------|
| <b>SINUOSITY</b>                                 | <b>DEVELOPMENT</b>                           | <b>CHANNELIZATION</b>                              | <b>STABILITY</b>                                 |
| <input type="checkbox"/> HIGH [4]                | <input type="checkbox"/> EXCELLENT [7]       | <input checked="" type="checkbox"/> NONE [6]       | <input type="checkbox"/> HIGH [3]                |
| <input checked="" type="checkbox"/> MODERATE [3] | <input checked="" type="checkbox"/> GOOD [5] | <input type="checkbox"/> RECOVERED [4]             | <input checked="" type="checkbox"/> MODERATE [2] |
| <input type="checkbox"/> LOW [2]                 | <input type="checkbox"/> FAIR [3]            | <input type="checkbox"/> RECOVERING [3]            | <input type="checkbox"/> LOW [1]                 |
| <input type="checkbox"/> NONE [1]                | <input type="checkbox"/> POOR [1]            | <input type="checkbox"/> RECENT OR NO RECOVERY [1] |                                                  |

Channel  
Maximum  
20 16

Comments

**4) BANK EROSION AND RIPARIAN ZONE** Check **ONE** in each category for **EACH BANK** (Or 2 per bank & average)

- |                                             |                                               |                                                           |                                                    |
|---------------------------------------------|-----------------------------------------------|-----------------------------------------------------------|----------------------------------------------------|
| <b>EROSION</b>                              | <b> RIPARIAN WIDTH</b>                        | <b> FLOOD PLAIN QUALITY</b>                               | <b> CONSERVATION TILLAGE [1]</b>                   |
| <input type="checkbox"/> NONE / LITTLE [3]  | <input type="checkbox"/> WIDE > 50m [4]       | <input type="checkbox"/> FOREST, SWAMP [3]                | <input type="checkbox"/> URBAN OR INDUSTRIAL [0]   |
| <input type="checkbox"/> MODERATE [2]       | <input type="checkbox"/> MODERATE 10-50m [3]  | <input type="checkbox"/> SHRUB OR OLD FIELD [2]           | <input type="checkbox"/> MINING / CONSTRUCTION [0] |
| <input type="checkbox"/> HEAVY / SEVERE [1] | <input type="checkbox"/> NARROW 5-10m [2]     | <input type="checkbox"/> RESIDENTIAL, PARK, NEW FIELD [1] |                                                    |
|                                             | <input type="checkbox"/> VERY NARROW < 5m [1] | <input type="checkbox"/> FENCED PASTURE [1]               |                                                    |
|                                             | <input type="checkbox"/> NONE [0]             | <input type="checkbox"/> OPEN PASTURE, ROWCROP [0]        |                                                    |

Indicate predominant land use(s) past 100m riparian.

Riparian  
Maximum  
10  

Comments

**5) POOL / GLIDE AND RIFFLE / RUN QUALITY****MAXIMUM DEPTH****CHANNEL WIDTH****CURRENT VELOCITY****Recreation Potential****Primary Contact****Secondary Contact**

(circle one and comment on back)

Check **ONE** (ONLY)Check **ONE** (Or 2 & average)Check **ALL** that apply

- |                                                   |                                                                   |
|---------------------------------------------------|-------------------------------------------------------------------|
| <input type="checkbox"/> > 1m [6]                 | <input checked="" type="checkbox"/> POOL WIDTH > RIFFLE WIDTH [2] |
| <input type="checkbox"/> 0.7-<1m [4]              | <input type="checkbox"/> POOL WIDTH = RIFFLE WIDTH [1]            |
| <input type="checkbox"/> 0.4-<0.7m [2]            | <input type="checkbox"/> POOL WIDTH > RIFFLE WIDTH [0]            |
| <input checked="" type="checkbox"/> 0.2-<0.4m [1] |                                                                   |
| <input type="checkbox"/> < 0.2m [0]               |                                                                   |

- 
- TORRENTIAL [-1]
- 
- SLOW [1]
- 
- 
- VERY FAST [1]
- 
- INTERSTITIAL [-1]
- 
- 
- FAST [1]
- 
- INTERMITTENT [-2]
- 
- 
- MODERATE [1]
- 
- EDDIES [1]

Indicate for reach - pools and riffles.

Pool /  
Current  
Maximum  
12 5

Comments

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species:

 NO RIFFLE [metric=0]Check **ONE** (Or 2 & average).

- |                                                           |                                                        |                                                                            |                                             |
|-----------------------------------------------------------|--------------------------------------------------------|----------------------------------------------------------------------------|---------------------------------------------|
| <b>RIFFLE DEPTH</b>                                       | <b>RUN DEPTH</b>                                       | <b>RIFFLE / RUN SUBSTRATE</b>                                              | <b>RIFFLE / RUN EMBEDDEDNESS</b>            |
| <input type="checkbox"/> BEST AREAS > 10cm [2]            | <input checked="" type="checkbox"/> MAXIMUM > 50cm [2] | <input type="checkbox"/> STABLE (e.g., Cobble, Boulder) [2]                | <input type="checkbox"/> NONE [2]           |
| <input checked="" type="checkbox"/> BEST AREAS 5-10cm [1] | <input type="checkbox"/> MAXIMUM < 50cm [1]            | <input checked="" type="checkbox"/> MOD. STABLE (e.g., Large Gravel) [1]   | <input checked="" type="checkbox"/> LOW [1] |
| <input type="checkbox"/> BEST AREAS < 5cm [metric=0]      |                                                        | <input checked="" type="checkbox"/> UNSTABLE (e.g., Fine Gravel, Sand) [0] | <input type="checkbox"/> MODERATE [0]       |
|                                                           |                                                        |                                                                            | <input type="checkbox"/> EXTENSIVE [-1]     |

Riffle /  
Run  
Maximum  
8 5

Comments

**6) GRADIENT**

ft/mi)

 VERY LOW - LOW [2-4]% POOL: 65% GLIDE:  

Gradient

DRAINAGE AREA

mi<sup>2</sup>) MODERATE [6-10]% RUN: 10% RIFFLE: 25

Maximum

 HIGH - VERY HIGH [10-6]

06/16/06

### AJ SAMPLED REACH

Check ALL that apply

- METHOD**
- BOAT  
 WADE  
 L LINE  
 OTHER
- DISTANCE**
- 0.5 Km  
 0.2 Km  
 0.15 Km  
 0.12 Km  
 OTHER

- STAGE**
- 1st -sample pass- 2nd
- HIGH  
 UP  
 NORMAL  
 LOW  
 DRY

- CLARITY**
- 1st -sample pass- 2nd
- < 20 cm  
 20-40 cm  
 40-70 cm  
 > 70 cm/ CTB  
 SECCHI DEPTH

- CANOPY**
- 1st pass \_\_\_\_\_ cm  
 2nd pass \_\_\_\_\_ cm
- > 85%- OPEN  
 55%-<85%  
 30%-<55%  
 10%-<30%  
 <10%- CLOSED

- CJ RECREATION**
- AREA DEPTH  
 POOL:  >100ft<sup>2</sup>  >3ft

Comment RE: Reach consistency/ Is reach typical of stream?, Recreation/ Observed - Inferred, Other/ Sampling observations, Concerns, Access directions, etc.

S-CCI: Reach limited by LOD. Primary pool ~ 1 ft deep, riffles where stream steps down in elevation, minimal run. Cut banks are less stable than point bars, but some undercutting. Some trees appear to be unstable due to bank erosion. Mostly coarse sand + small gravel in channel, more cobbles in riffles. Banks are moderately to heavily vegetated w/ grass, shrubs, + trees.

Step pool

### BJ AESTHETICS

- NUISANCE ALGAE  
 INVASIVE MACROPHYTES  
 EXCESS TURBIDITY  
 DISCOLORATION  
 FOAM / SCUM  
 OIL SHEEN  
 TRASH / LITTER  
 NUISANCE ODOR  
 SLUDGE DEPOSITS  
 CSOs/SSOs/OUTFALLS

### DJ MAINTENANCE

- PUBLIC / PRIVATE / BOTH / NA  
 ACTIVE / HISTORIC / BOTH / NA  
 YOUNG-SUCCESSION-OLD  
 SPRAY / SNAG / REMOVED  
 MODIFIED / DIPPED OUT / NA  
 LEVEED / ONE SIDED  
 RELOCATED / CUTOFFS  
 MOVING-BEDLOAD-STABLE  
 ARMoured / SLUMPS  
 ISLANDS / SCoured  
 IMPOUNDED / DESICCATED  
 FLOOD CONTROL / DRAINAGE

Circle some & COMMENT

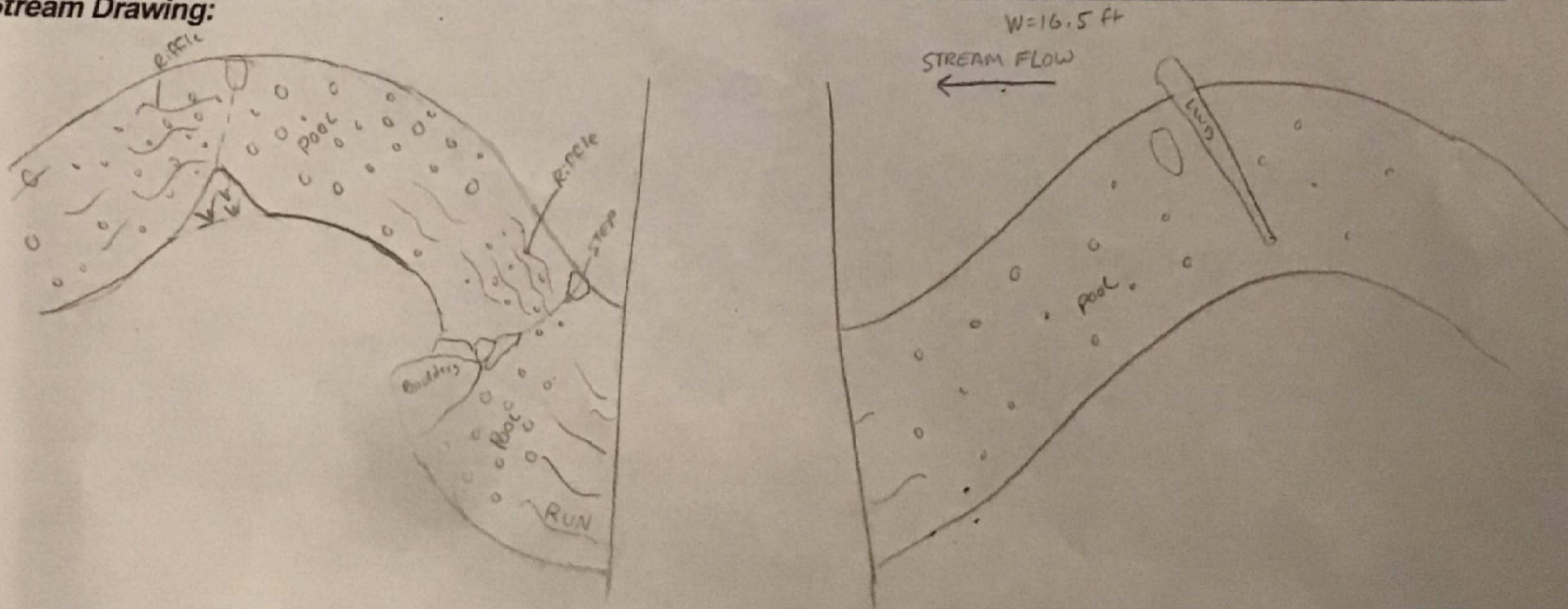
### EJ ISSUES

- WWTP / CSO / NPDES / INDUSTRY  
 HARDENED / URBAN / DIRT&GRIME  
 CONTAMINATED / LANDFILL  
 BMPs-CONSTRUCTION-SEDIMENT  
 LOGGING / IRRIGATION / COOLING  
 BANK / EROSION / SURFACE  
 FALSE BANK / MANURE / LAGOON  
 WASH H<sub>2</sub>O / TILE / H<sub>2</sub>O TABLE  
 ACID / MINE / QUARRY / FLOW  
 NATURAL / WETLAND / STAGNANT  
 PARK / GOLF / LAWN / HOME  
 ATMOSPHERE / DATA PAUCITY

### FJ MEASUREMENTS

- $\bar{x}$  width  
 $\bar{x}$  depth  
 max. depth  
 $\bar{x}$  bankfull width  
 bankfull  $\bar{x}$  depth  
 W/D ratio  
 bankfull max. depth  
 floodprone  $x^2$  width  
 entrench. ratio  
 Legacy Tree:

### Stream Drawing:



Stream & Location: S-09

RM:    Date: 11/30/06

Scorers Full Name & Affiliation: LR/MB

River Code:    STORET #:    Lat./ Long.: 36.959361, -79.586437 Office verified location

**1] SUBSTRATE** Check **ONLY** Two substrate **TYPE** BOXES; estimate % or note every type present

<p><b>BEST TYPES</b></p> <input type="checkbox"/> BLDG / SLABS [10] <input type="checkbox"/> BOULDER [9] <input checked="" type="checkbox"/> COBBLE [8] <input type="checkbox"/> GRAVEL [7] <input checked="" type="checkbox"/> SAND [6] <input type="checkbox"/> BEDROCK [5]	<p><b>POOL RIFFLE</b></p> <p>_____</p>	<p><b>OTHER TYPES</b></p> <input type="checkbox"/> HARDPAN [4] <input type="checkbox"/> DETRITUS [3] <input checked="" type="checkbox"/> MUCK [2] <input checked="" type="checkbox"/> SILT [2] <input type="checkbox"/> ARTIFICIAL [0]	<p><b>POOL RIFFLE</b></p> <p>_____</p>	<p><b>ORIGIN</b></p> <input type="checkbox"/> LIMESTONE [1] <input type="checkbox"/> TILLS [1] <input type="checkbox"/> WETLANDS [0] <input type="checkbox"/> HARDPAN [0] <input type="checkbox"/> SANDSTONE [0] <input type="checkbox"/> RIP/RAP [0] <input type="checkbox"/> LACUSTURINE [0] <input type="checkbox"/> SHALE [-1] <input type="checkbox"/> COAL FINES [-2]	<p><b>QUALITY</b></p> <input type="checkbox"/> HEAVY [-2] <input type="checkbox"/> MODERATE [-1] <input type="checkbox"/> NORMAL [0] <input type="checkbox"/> FREE [1] <input type="checkbox"/> EXTENSIVE [-2] <input type="checkbox"/> MODERATE [-1] <input type="checkbox"/> NORMAL [0] <input type="checkbox"/> NONE [1]	<p><b>Substrate</b></p> <div style="border: 1px solid black; border-radius: 50%; width: 40px; height: 40px; display: flex; align-items: center; justify-content: center; margin: 10px auto;">18</div> <p>Maximum 20</p>
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NUMBER OF BEST TYPES:  4 or more [2]  3 or less [0]

*Comments*

**2] INSTREAM COVER** Indicate presence 0 to 3: 0-Absent; 1-Very small amounts or if more common of marginal quality; 2-Moderate amounts, but not of highest quality or in small amounts of highest quality; 3-Highest quality in moderate or greater amounts (e.g., very large boulders in deep or fast water, large diameter log that is stable, well developed rootwad in deep / fast water, or deep, well-defined, functional pools.

<p>_____ UNDERCUT BANKS [1]          _____ OVERHANGING VEGETATION [1]          _____ SHALLOWS (IN SLOW WATER) [1]          _____ ROOTMATS [1]</p>	<p>_____ POOLS &gt; 70cm [2]          _____ ROOTWADS [1]          _____ BOULDERS [1]</p>	<p>_____ OXBOWS, BACKWATERS [1]          _____ AQUATIC MACROPHYTES [1]          _____ LOGS OR WOODY DEBRIS [1]</p>	<p><b>AMOUNT</b></p> <input type="checkbox"/> EXTENSIVE >75% [11] <input type="checkbox"/> MODERATE 25-75% [7] <input type="checkbox"/> SPARSE 5-<25% [3] <input type="checkbox"/> NEARLY ABSENT <5% [1]
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**Cover** Maximum 20   

*Comments*

**3] CHANNEL MORPHOLOGY** Check ONE in each category (Or 2 & average)

<p><b>SINUOSITY</b></p> <input type="checkbox"/> HIGH [4] <input type="checkbox"/> MODERATE [3] <input type="checkbox"/> LOW [2] <input checked="" type="checkbox"/> NONE [1]	<p><b>DEVELOPMENT</b></p> <input type="checkbox"/> EXCELLENT [7] <input type="checkbox"/> GOOD [5] <input checked="" type="checkbox"/> FAIR [3] <input type="checkbox"/> POOR [1]	<p><b>CHANNELIZATION</b></p> <input checked="" type="checkbox"/> NONE [6] <input type="checkbox"/> RECOVERED [4] <input type="checkbox"/> RECOVERING [3] <input type="checkbox"/> RECENT OR NO RECOVERY [1]	<p><b>STABILITY</b></p> <input checked="" type="checkbox"/> HIGH [3] <input type="checkbox"/> MODERATE [2] <input type="checkbox"/> LOW [1]
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**Channel** Maximum 20 13

*Comments*

**4] BANK EROSION AND RIPARIAN ZONE** Check ONE in each category for EACH BANK (Or 2 per bank & average)

<p><b>EROSION</b></p> <input type="checkbox"/> NONE / LITTLE [3] <input type="checkbox"/> MODERATE [2] <input type="checkbox"/> HEAVY / SEVERE [1]	<p><b>RIPARIAN WIDTH</b></p> <input type="checkbox"/> WIDE > 50m [4] <input type="checkbox"/> MODERATE 10-50m [3] <input type="checkbox"/> NARROW 5-10m [2] <input type="checkbox"/> VERY NARROW < 5m [1] <input type="checkbox"/> NONE [0]	<p><b>FLOOD PLAIN QUALITY</b></p> <input type="checkbox"/> FOREST, SWAMP [3] <input type="checkbox"/> SHRUB OR OLD FIELD [2] <input type="checkbox"/> RESIDENTIAL, PARK, NEW FIELD [1] <input type="checkbox"/> FENCED PASTURE [1] <input type="checkbox"/> OPEN PASTURE, ROWCROP [0]	<p><b>CONSERVATION TILLAGE</b> [1]  <b>URBAN OR INDUSTRIAL</b> [0]  <b>MINING / CONSTRUCTION</b> [0]</p>
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**Riparian** Maximum 10   

*Comments*

**5] POOL / GLIDE AND RIFFLE / RUN QUALITY**

<p><b>MAXIMUM DEPTH</b> Check ONE (ONLY!)</p> <input type="checkbox"/> > 1m [6] <input type="checkbox"/> 0.7-<1m [4] <input type="checkbox"/> 0.4-<0.7m [2] <input checked="" type="checkbox"/> 0.2-<0.4m [1] <input type="checkbox"/> < 0.2m [0]	<p><b>CHANNEL WIDTH</b> Check ONE (Or 2 &amp; average)</p> <input checked="" type="checkbox"/> POOL WIDTH > RIFFLE WIDTH [2] <input type="checkbox"/> POOL WIDTH = RIFFLE WIDTH [1] <input type="checkbox"/> POOL WIDTH < RIFFLE WIDTH [0]	<p><b>CURRENT VELOCITY</b> Check ALL that apply</p> <input type="checkbox"/> TORRENTIAL [-1] <input checked="" type="checkbox"/> SLOW [1] <input type="checkbox"/> VERY FAST [1] <input type="checkbox"/> INTERSTITIAL [-1] <input type="checkbox"/> FAST [1] <input type="checkbox"/> INTERMITTENT [-2] <input type="checkbox"/> MODERATE [1] <input type="checkbox"/> EDDIES [1]	<p><b>Recreation Potential</b></p> <p><b>Primary Contact</b></p> <p><b>Secondary Contact</b> (circle one and comment on back)</p>
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**Pool / Current** Maximum 12 4

*Comments*

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species: Check ONE (Or 2 & average).  NO RIFFLE [metric=0]

<p><b>RIFFLE DEPTH</b></p> <input type="checkbox"/> BEST AREAS > 10cm [2] <input checked="" type="checkbox"/> BEST AREAS 5-10cm [1] <input type="checkbox"/> BEST AREAS < 5cm [metric=0]	<p><b>RUN DEPTH</b></p> <input type="checkbox"/> MAXIMUM > 50cm [2] <input checked="" type="checkbox"/> MAXIMUM < 50cm [1]	<p><b>RIFFLE / RUN SUBSTRATE</b></p> <input type="checkbox"/> STABLE (e.g., Cobble, Boulder) [2] <input type="checkbox"/> MOD. STABLE (e.g., Large Gravel) [1] <input checked="" type="checkbox"/> UNSTABLE (e.g., Fine Gravel, Sand) [0]	<p><b>RIFFLE / RUN EMBEDDEDNESS</b></p> <input type="checkbox"/> NONE [2] <input type="checkbox"/> LOW [1] <input type="checkbox"/> MODERATE [0] <input checked="" type="checkbox"/> EXTENSIVE [-1]
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**Riffle / Run** Maximum 8 1

*Comments*

**6] GRADIENT** (ft/mi)  VERY LOW - LOW [2-4]  MODERATE [6-10]  HIGH - VERY HIGH [10-6]

**DRAINAGE AREA** (mi<sup>2</sup>)

% POOL: 40 % GLIDE:   

% RUN: 20 % RIFFLE: 40

**Gradient** Maximum 10   

*Comments*

**A) SAMPLED REACH**  
Check ALL that apply

Comment RE: Reach consistency/ Is reach typical of stream?, Recreation/ Observed - Inferred, Other/ Sampling observations, Concerns, Access directions, etc.

S-G9: Reach limited to LOD. Upstream riffles step down.  
Very sedimented stream. High sand and silt content throughout

- METHOD**
- BOAT
  - WADE
  - L. LINE
  - OTHER
- DISTANCE**
- 0.5 Km
  - 0.2 Km
  - 0.15 Km
  - 0.12 Km
  - OTHER
- meters

- STAGE**
- HIGH
  - UP
  - NORMAL
  - LOW
  - DRY
- 1st -sample pass- 2nd

- CLARITY**
- < 20 cm
  - 20-<40 cm
  - 40-70 cm
  - > 70 cm/ CTB
  - SECCHI DEPTH
- 1st pass \_\_\_\_\_ cm  
2nd pass \_\_\_\_\_ cm

- CANOPY**
- > 85%- OPEN
  - 55%-<85%
  - 30%-<55%
  - 10%-<30%
  - <10%- CLOSED

- B) AESTHETICS**
- NUISANCE ALGAE
  - INVASIVE MACROPHYTES
  - EXCESS TURBIDITY
  - DISCOLORATION
  - FOAM / SCUM
  - OIL SHEEN
  - TRASH / LITTER
  - NUISANCE ODOR
  - SLUDGE DEPOSITS
  - CSOs/SSOs/OUTFALLS

- C) RECREATION**
- AREA DEPTH  
POOL:  >100R<sup>2</sup>  >3ft

- D) MAINTENANCE** Circle some & COMMENT
- PUBLIC / PRIVATE / BOTH / NA
  - ACTIVE / HISTORIC / BOTH / NA
  - YOUNG-SUCCESSION-OLD
  - SPRAY / SNAG / REMOVED
  - MODIFIED / DIPPED OUT / NA
  - LEVEED / ONE SIDED
  - RELOCATED / CUTOFFS
  - MOVING-BEDLOAD-STABLE
  - ARMoured / SLUMPS
  - ISLANDS / SCOURED
  - IMPOUNDED / DESICCATED
  - FLOOD CONTROL / DRAINAGE

- E) ISSUES**
- WWTP / CSO / NPDES / INDUSTRY
  - HARDENED / URBAN / DIRT&GRIME
  - CONTAMINATED / LANDFILL
  - BMPs-CONSTRUCTION-SEDIMENT
  - LOGGING / IRRIGATION / COOLING
  - BANK / EROSION / SURFACE
  - FALSE BANK / MANURE / LAGOON
  - WASH H<sub>2</sub>O / TILE / H<sub>2</sub>O TABLE
  - ACID / MINE / QUARRY / FLOW
  - NATURAL / WETLAND / STAGNANT
  - PARK / GOLF / LAWN / HOME
  - ATMOSPHERE / DATA PAUCITY

- F) MEASUREMENTS**
- $\bar{x}$  width
  - $\bar{x}$  depth
  - max. depth
  - $\bar{x}$  bankfull width
  - bankfull  $\bar{x}$  depth
  - W/D ratio
  - bankfull max. depth
  - floodprone  $x^2$  width
  - entrench. ratio
- Legacy Tree:

Step pool

**Stream Drawing:**







# Qualitative Habitat Evaluation Index and Use Assessment Field Sheet

QHEI Score:  

Stream & Location: S-D3 R.M.:   Date: 11/19/21

Scorers Full Name & Affiliation: LK/MB

River Code:   STORET #:   Lat./Long.: 36.965631, -79.605542 Office verified location

1] SUBSTRATE Check ONLY Two substrate TYPE BOXES, estimate % or note every type present

<b>BEST TYPES</b>		<b>OTHER TYPES</b>		<b>ORIGIN</b>		<b>QUALITY</b>	
<input type="checkbox"/> BLDR /SLABS [10]	<input type="checkbox"/> POOL RIFFLE	<input type="checkbox"/> HARDPAN [4]	<input type="checkbox"/> POOL RIFFLE	<input type="checkbox"/> LIMESTONE [1]	<input type="checkbox"/> SILT	<input type="checkbox"/> HEAVY [-2]	Substrate <b>18</b> Maximum 20
<input type="checkbox"/> BOULDER [9]	<input type="checkbox"/> <u> </u>	<input checked="" type="checkbox"/> DETRITUS [3]	<input type="checkbox"/> <u> </u>	<input type="checkbox"/> TILLS [1]	<input type="checkbox"/> WETLANDS [0]	<input type="checkbox"/> MODERATE [-1]	
<input checked="" type="checkbox"/> COBBLE [8]	<input type="checkbox"/> <u> </u>	<input type="checkbox"/> MUCK [2]	<input type="checkbox"/> <u> </u>	<input type="checkbox"/> HARDPAN [0]	<input type="checkbox"/> SANDSTONE [0]	<input type="checkbox"/> NORMAL [0]	
<input checked="" type="checkbox"/> GRAVEL [7]	<input type="checkbox"/> <u> </u>	<input type="checkbox"/> SILT [2]	<input type="checkbox"/> <u> </u>	<input type="checkbox"/> RIP/RAP [0]	<input type="checkbox"/> SANDSTONE [0]	<input type="checkbox"/> FREE [1]	
<input type="checkbox"/> SAND [6]	<input type="checkbox"/> <u> </u>	<input type="checkbox"/> ARTIFICIAL [0]	<input type="checkbox"/> <u> </u>	<input type="checkbox"/> LACUSTURINE [0]	<input type="checkbox"/> SHALE [-1]	<input type="checkbox"/> EXTENSIVE [-2]	
<input type="checkbox"/> BEDROCK [5]	<input type="checkbox"/> <u> </u>	(Score natural substrates; ignore sludge from point-sources)		<input type="checkbox"/> COAL FINES [-2]	<input type="checkbox"/> NONE [1]	<input type="checkbox"/> MODERATE [-1]	

NUMBER OF BEST TYPES:  4 or more [2]  3 or less [0]

Comments:  

2] INSTREAM COVER Indicate presence 0 to 3: 0-Absent; 1-Very small amounts or if more common of marginal quality; 2-Moderate amounts, but not of highest quality or in small amounts of highest quality; 3-Highest quality in moderate or greater amounts (e.g., very large boulders in deep or fast water, large diameter log that is stable, well developed rootwad in deep / fast water, or deep, well-defined, functional pools.

<input type="checkbox"/> UNDERCUT BANKS [1]	<input type="checkbox"/> POOLS > 70cm [2]	<input type="checkbox"/> OXBOWS, BACKWATERS [1]	<input type="checkbox"/> EXTENSIVE >75% [11]
<input type="checkbox"/> OVERHANGING VEGETATION [1]	<input type="checkbox"/> ROOTWADS [1]	<input type="checkbox"/> AQUATIC MACROPHYTES [1]	<input type="checkbox"/> MODERATE 25-75% [7]
<input type="checkbox"/> SHALLOWS (IN SLOW WATER) [1]	<input type="checkbox"/> BOULDERS [1]	<input type="checkbox"/> LOGS OR WOODY DEBRIS [1]	<input type="checkbox"/> SPARSE 5-<25% [3]
<input type="checkbox"/> ROOTMATS [1]	<input type="checkbox"/> <u> </u>	<input type="checkbox"/> <u> </u>	<input type="checkbox"/> NEARLY ABSENT <5% [1]

Check ONE (Or 2 & average)

Comments:  

Cover Maximum   20

3] CHANNEL MORPHOLOGY Check ONE in each category (Or 2 & average)

<b>SINUOSITY</b>	<b>DEVELOPMENT</b>	<b>CHANNELIZATION</b>	<b>STABILITY</b>
<input type="checkbox"/> HIGH [4]	<input type="checkbox"/> EXCELLENT [7]	<input checked="" type="checkbox"/> NONE [6]	<input checked="" type="checkbox"/> HIGH [3]
<input type="checkbox"/> MODERATE [3]	<input type="checkbox"/> GOOD [5]	<input type="checkbox"/> RECOVERED [4]	<input type="checkbox"/> MODERATE [2]
<input checked="" type="checkbox"/> LOW [2]	<input checked="" type="checkbox"/> FAIR [3]	<input type="checkbox"/> RECOVERING [3]	<input type="checkbox"/> LOW [1]
<input type="checkbox"/> NONE [1]	<input type="checkbox"/> POOR [1]	<input type="checkbox"/> RECENT OR NO RECOVERY [1]	

Comments:  

Channel Maximum   20

4] BANK EROSION AND RIPARIAN ZONE Check ONE in each category for EACH BANK (Or 2 per bank & average)

<b>EROSION</b>	<b>RIPARIAN WIDTH</b>	<b>FLOOD PLAIN QUALITY</b>
<input type="checkbox"/> NONE / LITTLE [3]	<input type="checkbox"/> WIDE > 50m [4]	<input type="checkbox"/> FOREST, SWAMP [3]
<input type="checkbox"/> MODERATE [2]	<input type="checkbox"/> MODERATE 10-50m [3]	<input type="checkbox"/> SHRUB OR OLD FIELD [2]
<input type="checkbox"/> HEAVY / SEVERE [1]	<input type="checkbox"/> NARROW 5-10m [2]	<input type="checkbox"/> RESIDENTIAL, PARK, NEW FIELD [1]
	<input type="checkbox"/> VERY NARROW < 5m [1]	<input type="checkbox"/> FENCED PASTURE [1]
	<input type="checkbox"/> NONE [0]	<input type="checkbox"/> OPEN PASTURE, ROWCROP [0]
		<input type="checkbox"/> CONSERVATION TILLAGE [1]
		<input type="checkbox"/> URBAN OR INDUSTRIAL [0]
		<input type="checkbox"/> MINING / CONSTRUCTION [0]

Indicate predominant land use(s) past 100m riparian.

Comments:  

Riparian Maximum   10

5] POOL / GLIDE AND RIFFLE / RUN QUALITY

<b>MAXIMUM DEPTH</b>	<b>CHANNEL WIDTH</b>	<b>CURRENT VELOCITY</b>	<b>Recreation Potential</b> Primary Contact Secondary Contact (circle one and comment on back)
Check ONE (ONLY)	Check ONE (Or 2 & average)	Check ALL that apply	
<input type="checkbox"/> >1m [6]	<input checked="" type="checkbox"/> POOL WIDTH > RIFFLE WIDTH [2]	<input type="checkbox"/> TORRENTIAL [-1]	Pool / Current Maximum <b>8</b> 12
<input checked="" type="checkbox"/> 0.7-<1m [4]	<input type="checkbox"/> POOL WIDTH = RIFFLE WIDTH [1]	<input checked="" type="checkbox"/> SLOW [1]	
<input type="checkbox"/> 0.4-<0.7m [2]	<input type="checkbox"/> POOL WIDTH > RIFFLE WIDTH [0]	<input type="checkbox"/> INTERSTITIAL [-1]	
<input type="checkbox"/> 0.2-<0.4m [1]		<input type="checkbox"/> INTERMITTENT [-2]	
<input type="checkbox"/> < 0.2m [0]		<input checked="" type="checkbox"/> MODERATE [1]	

Indicate for reach - pools and riffles.

Comments:  

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species: Check ONE (Or 2 & average).

<b>RIFFLE DEPTH</b>	<b>RUN DEPTH</b>	<b>RIFFLE / RUN SUBSTRATE</b>	<b>RIFFLE / RUN EMBEDDEDNESS</b>
<input type="checkbox"/> BEST AREAS > 10cm [2]	<input checked="" type="checkbox"/> MAXIMUM > 50cm [2]	<input type="checkbox"/> STABLE (e.g., Cobble, Boulder) [2]	<input type="checkbox"/> NONE [2]
<input type="checkbox"/> BEST AREAS 5-10cm [1]	<input type="checkbox"/> MAXIMUM < 50cm [1]	<input checked="" type="checkbox"/> MOD. STABLE (e.g., Large Gravel) [1]	<input checked="" type="checkbox"/> LOW [1]
<input checked="" type="checkbox"/> BEST AREAS < 5cm [metric=0]		<input type="checkbox"/> UNSTABLE (e.g., Fine Gravel, Sand) [0]	<input type="checkbox"/> MODERATE [0]
			<input type="checkbox"/> EXTENSIVE [-1]

Comments:  

Riffle / Run Maximum   4

6] GRADIENT ( DRAINAGE AREA ( ft/mi ) ( mi<sup>2</sup> ) )

<input type="checkbox"/> VERY LOW - LOW [2-4]	%POOL: <span style="border: 1px solid black; border-radius: 50%; padding: 2px 10px;">45</span>	%GLIDE: <span style="border: 1px solid black; border-radius: 50%; padding: 2px 10px;"> </span>	Gradient Maximum <b>10</b>
<input type="checkbox"/> MODERATE [6-10]	%RUN: <span style="border: 1px solid black; border-radius: 50%; padding: 2px 10px;">50</span>	%RIFFLE: <span style="border: 1px solid black; border-radius: 50%; padding: 2px 10px;">5</span>	
<input type="checkbox"/> HIGH - VERY HIGH [10-6]			

**A] SAMPLED REACH**

Check ALL that apply

**METHOD**

- BOAT
- WADE
- L. LINE
- OTHER

**DISTANCE**

- 0.5 Km
- 0.2 Km
- 0.15 Km
- 0.12 Km
- OTHER

meters

**CANOPY**

- > 85% - OPEN
- 55% - <85%
- 30% - <55%
- 10% - <30%
- <10% - CLOSED

**STAGE**

- 1st -sample pass- 2nd
- HIGH
  - UP
  - NORMAL
  - LOW
  - DRY

**CLARITY**

- 1st --sample pass-- 2nd
- < 20 cm
  - 20 - <40 cm
  - 40-70 cm
  - > 70 cm/ CTB
  - SECCHI DEPTH

- 1st \_\_\_\_\_ cm
- pass
- 2nd \_\_\_\_\_ cm

**C] RECREATION**

- AREA DEPTH
- POOL:  >100ft<sup>2</sup>  >3ft

Comment RE: Reach consistency/ Is reach typical of stream?, Recreation/ Observed - Inferred, Other/ Sampling observations, Concerns, Access directions, etc.

S-D3: Reach limited to LOP due to access. 1 rittle down stream of  
 LOD caused by LWD. Mostly pool 2.5ft' deep and run.  
 Not much run bedload  
 - Not a rittle pool complex "Plane-Bed"

**B] AESTHETICS**

- NUISANCE ALGAE
- INVASIVE MACROPHYTES
- EXCESS TURBIDITY
- DISCOLORATION
- FOAM / SCUM
- OIL SHEEN
- TRASH / LITTER
- NUISANCE ODOR
- SLUDGE DEPOSITS
- CSOs/SSOs/OUTFALLS

**D] MAINTENANCE**

- Circle some & COMMENT
- PUBLIC / PRIVATE / BOTH / NA
  - ACTIVE / HISTORIC / BOTH / NA
  - YOUNG-SUCCESSION-OLD
  - SPRAY / SNAG / REMOVED
  - MODIFIED / DIPPED OUT / NA
  - LEVEED / ONE SIDED
  - RELOCATED / CUTOFFS
  - MOVING-BEDLOAD-STABLE
  - ARMOURED / SLUMPS
  - ISLANDS / SCOURED
  - IMPOUNDED / DESICCATED
  - FLOOD CONTROL / DRAINAGE

**E] ISSUES**

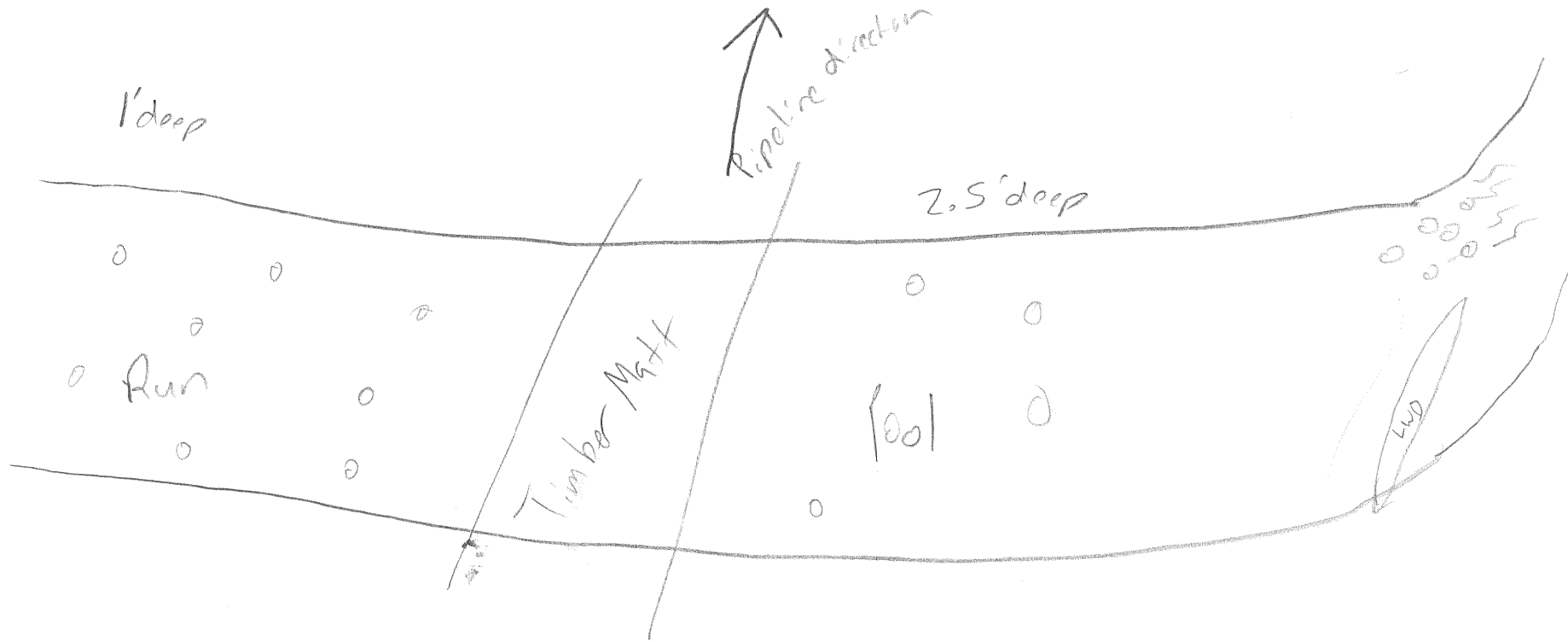
- WWTP / CSO / NPDES / INDUSTRY
- HARDENED / URBAN / DIRT&GRIME
- CONTAMINATED / LANDFILL
- BMPs-CONSTRUCTION-SEDIMENT
- LOGGING / IRRIGATION / COOLING
- BANK / EROSION / SURFACE
- FALSE BANK / MANURE / LAGOON
- WASH H<sub>2</sub>O / TILE / H<sub>2</sub>O TABLE
- ACID / MINE / QUARRY / FLOW
- NATURAL / WETLAND / STAGNANT
- PARK / GOLF / LAWN / HOME
- ATMOSPHERE / DATA PAUCITY

**F] MEASUREMENTS**

- $\bar{x}$  width
- $\bar{x}$  depth
- max. depth
- $\bar{x}$  bankfull width
- bankfull  $\bar{x}$  depth
- W/D ratio
- bankfull max. depth
- floodprone  $x^2$  width
- entrench. ratio

Legacy Tree:

**Stream Drawing:**



Stream & Location: S-E17

RM:    Date: 11/06/21

Scorers Full Name & Affiliation: LH MR

River Code:    STORET #:    Lat./ Long.: 37.000529, -79.74276 (NAD 83 - decimal) Office verified location

1] SUBSTRATE Check ONLY Two substrate TYPE BOXES; estimate % or note every type present

BEST TYPES		OTHER TYPES		ORIGIN		QUALITY		Substrate <span style="border: 1px solid black; border-radius: 50%; padding: 10px;">18</span> Maximum 20
<input checked="" type="checkbox"/> BLDR / SLABS [10]	<input type="checkbox"/> POOL RIFFLE	<input type="checkbox"/> HARDPAN [4]	<input type="checkbox"/> POOL RIFFLE	<input type="checkbox"/> LIMESTONE [1]	<input type="checkbox"/> SILT	<input type="checkbox"/> HEAVY [-2]	<input type="checkbox"/> MODERATE [-1]	
<input type="checkbox"/> BOULDER [9]	<input type="checkbox"/> <u>  </u>	<input checked="" type="checkbox"/> DETRITUS [3]	<input type="checkbox"/> <u>  </u>	<input type="checkbox"/> TILLS [1]	<input type="checkbox"/> WETLANDS [0]	<input type="checkbox"/> NORMAL [0]	<input type="checkbox"/> FREE [1]	
<input checked="" type="checkbox"/> COBBLE [8]	<input type="checkbox"/> <u>  </u>	<input type="checkbox"/> MUCK [2]	<input type="checkbox"/> <u>  </u>	<input type="checkbox"/> HARDPAN [0]	<input type="checkbox"/> SANDSTONE [0]	<input type="checkbox"/> EXTENSIVE [-2]	<input type="checkbox"/> MODERATE [-1]	
<input type="checkbox"/> GRAVEL [7]	<input type="checkbox"/> <u>  </u>	<input checked="" type="checkbox"/> SILT [2]	<input type="checkbox"/> <u>  </u>	<input type="checkbox"/> RIP/RAP [0]	<input type="checkbox"/> LACUSTURINE [0]	<input type="checkbox"/> NORMAL [0]	<input type="checkbox"/> NONE [1]	
<input type="checkbox"/> SAND [6]	<input type="checkbox"/> <u>  </u>	<input type="checkbox"/> ARTIFICIAL [0]	<input type="checkbox"/> <u>  </u>	<input type="checkbox"/> SHALE [-1]	<input type="checkbox"/> COAL FINES [-2]	<input type="checkbox"/> <u>  </u>	<input type="checkbox"/> <u>  </u>	
<input checked="" type="checkbox"/> BEDROCK [5]	<input type="checkbox"/> <u>  </u>	(Score natural substrates; ignore sludge from point-sources)				<input type="checkbox"/> <u>  </u>	<input type="checkbox"/> <u>  </u>	<input type="checkbox"/> <u>  </u>

NUMBER OF BEST TYPES:  4 or more [2]  3 or less [0]

2] INSTREAM COVER Indicate presence 0 to 3: 0-Absent; 1-Very small amounts or if more common of marginal quality; 2-Moderate amounts, but not of highest quality or in small amounts of highest quality; 3-Highest quality in moderate or greater amounts (e.g., very large boulders in deep or fast water, large diameter log that is stable, well developed rootwad in deep / fast water, or deep, well-defined, functional pools.

<input type="checkbox"/> UNDERCUT BANKS [1]	<input type="checkbox"/> POOLS > 70cm [2]	<input type="checkbox"/> OXBOWS, BACKWATERS [1]	AMOUNT Check ONE (Or 2 & average)
<input type="checkbox"/> OVERHANGING VEGETATION [1]	<input type="checkbox"/> ROOTWADS [1]	<input type="checkbox"/> AQUATIC MACROPHYTES [1]	
<input type="checkbox"/> SHALLOWS (IN SLOW WATER) [1]	<input type="checkbox"/> BOULDERS [1]	<input type="checkbox"/> LOGS OR WOODY DEBRIS [1]	<input type="checkbox"/> EXTENSIVE >75% [11]
<input type="checkbox"/> ROOTMATS [1]	<input type="checkbox"/> <u>  </u>	<input type="checkbox"/> <u>  </u>	<input type="checkbox"/> MODERATE 25-75% [7]
Comments: <u>Bedrock riffle steps.</u>			<input type="checkbox"/> SPARSE 5-<25% [3]
			<input type="checkbox"/> NEARLY ABSENT <5% [1]

Cover Maximum   

3] CHANNEL MORPHOLOGY Check ONE in each category (Or 2 & average)

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY	Channel Maximum <span style="border: 1px solid black; border-radius: 50%; padding: 5px;">9</span>
<input type="checkbox"/> HIGH [4]	<input type="checkbox"/> EXCELLENT [7]	<input checked="" type="checkbox"/> NONE [6]	<input type="checkbox"/> HIGH [3]	
<input type="checkbox"/> MODERATE [3]	<input type="checkbox"/> GOOD [5]	<input type="checkbox"/> RECOVERED [4]	<input checked="" type="checkbox"/> MODERATE [2]	
<input type="checkbox"/> LOW [2]	<input type="checkbox"/> FAIR [3]	<input type="checkbox"/> RECOVERING [3]	<input type="checkbox"/> LOW [1]	
<input checked="" type="checkbox"/> NONE [1]	<input type="checkbox"/> POOR [1]	<input type="checkbox"/> RECENT OR NO RECOVERY [1]		

Comments:   

4] BANK EROSION AND RIPARIAN ZONE Check ONE in each category for EACH BANK (Or 2 per bank & average)

EROSION		RIPARIAN WIDTH		FLOOD PLAIN QUALITY		Riparian Maximum <span style="border: 1px solid black; border-radius: 50%; padding: 5px;">  </span>	
<input type="checkbox"/> NONE / LITTLE [3]	<input type="checkbox"/> MODERATE [2]	<input type="checkbox"/> WIDE > 50m [4]	<input type="checkbox"/> MODERATE 10-50m [3]	<input type="checkbox"/> FOREST, SWAMP [3]	<input type="checkbox"/> SHRUB OR OLD FIELD [2]		<input type="checkbox"/> CONSERVATION TILLAGE [1]
<input type="checkbox"/> MODERATE [2]	<input type="checkbox"/> HEAVY / SEVERE [1]	<input type="checkbox"/> NARROW 5-10m [2]	<input type="checkbox"/> VERY NARROW < 5m [1]	<input type="checkbox"/> RESIDENTIAL, PARK, NEW FIELD [1]	<input type="checkbox"/> FENCED PASTURE [1]		<input type="checkbox"/> URBAN OR INDUSTRIAL [0]
<input type="checkbox"/> MODERATE [2]	<input type="checkbox"/> HEAVY / SEVERE [1]	<input type="checkbox"/> NONE [0]	<input type="checkbox"/> NONE [0]	<input type="checkbox"/> OPEN PASTURE, ROWCROP [0]	<input type="checkbox"/> MINING / CONSTRUCTION [0]		

Comments:   

5] POOL / GLIDE AND RIFFLE / RUN QUALITY

MAXIMUM DEPTH Check ONE (ONLY!)	CHANNEL WIDTH Check ONE (Or 2 & average)	CURRENT VELOCITY Check ALL that apply	Recreation Potential Primary Contact Secondary Contact (circle one and comment on back)
<input type="checkbox"/> > 1m [6]	<input checked="" type="checkbox"/> POOL WIDTH > RIFFLE WIDTH [2]	<input type="checkbox"/> TORRENTIAL [-1]	
<input type="checkbox"/> 0.7-<1m [4]	<input type="checkbox"/> POOL WIDTH = RIFFLE WIDTH [1]	<input checked="" type="checkbox"/> SLOW [1]	Pool / Current Maximum <span style="border: 1px solid black; border-radius: 50%; padding: 5px;">7</span>
<input checked="" type="checkbox"/> 0.4-<0.7m [2]	<input type="checkbox"/> POOL WIDTH > RIFFLE WIDTH [0]	<input type="checkbox"/> VERY FAST [1]	
<input type="checkbox"/> 0.2-<0.4m [1]		<input type="checkbox"/> INTERSTITIAL [-1]	
<input type="checkbox"/> < 0.2m [0]		<input checked="" type="checkbox"/> MODERATE [1]	

Comments:   

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species: Check ONE (Or 2 & average).  NO RIFFLE [metric=0]

RIFFLE DEPTH	RUN DEPTH	RIFFLE / RUN SUBSTRATE	RIFFLE / RUN EMBEDDEDNESS	Riffle / Run Maximum <span style="border: 1px solid black; border-radius: 50%; padding: 5px;">7</span>
<input checked="" type="checkbox"/> BEST AREAS > 10cm [2]	<input type="checkbox"/> MAXIMUM > 50cm [2]	<input checked="" type="checkbox"/> STABLE (e.g., Cobble, Boulder) [2]	<input checked="" type="checkbox"/> NONE [2]	
<input type="checkbox"/> BEST AREAS 5-10cm [1]	<input checked="" type="checkbox"/> MAXIMUM < 50cm [1]	<input type="checkbox"/> MOD. STABLE (e.g., Large Gravel) [1]	<input type="checkbox"/> LOW [1]	
<input type="checkbox"/> BEST AREAS < 5cm [metric=0]		<input type="checkbox"/> UNSTABLE (e.g., Fine Gravel, Sand) [0]	<input type="checkbox"/> MODERATE [0]	

Comments:   

6] GRADIENT ( DRAINAGE AREA ( ft/mi) ( mi<sup>2</sup>)

<input type="checkbox"/> VERY LOW - LOW [2-4]	% POOL: <span style="border: 1px solid black; border-radius: 50%; padding: 5px;">60</span>	% GLIDE: <span style="border: 1px solid black; border-radius: 50%; padding: 5px;">  </span>	Gradient Maximum <span style="border: 1px solid black; border-radius: 50%; padding: 5px;">  </span>
<input type="checkbox"/> MODERATE [6-10]	% RUN: <span style="border: 1px solid black; border-radius: 50%; padding: 5px;">5</span>	% RIFFLE: <span style="border: 1px solid black; border-radius: 50%; padding: 5px;">35</span>	
<input type="checkbox"/> HIGH - VERY HIGH [10-6]			

**A) SAMPLED REACH**

Check ALL that apply

- METHOD**
- BOAT
  - WADE
  - L. LINE
  - OTHER
- STAGE**
- HIGH
  - UP
  - NORMAL
  - LOW
  - DRY
- DISTANCE**
- 0.5 Km
  - 0.2 Km
  - 0.15 Km
  - 0.12 Km
  - OTHER

- CLARITY**
- 1st --sample pass-- 2nd
- < 20 cm
  - 20-<40 cm
  - 40-70 cm
  - > 70 cm/ CTB
  - SECCHI DEPTH
- 1st \_\_\_\_\_ cm
- pass
- 2nd \_\_\_\_\_ cm
- meters

- CANOPY**
- > 85%- OPEN
  - 55%-<85%
  - 30%-<55%
  - 10%-<30%
  - <10%- CLOSED

Comment RE: Reach consistency/ Is reach typical of stream?, Recreation/ Observed - Inferred, Other/ Sampling observations, Concerns, Access directions, etc.

S-EIT Reach limited to LOD This is a classic step-pool

Down stream steps caused by bedrock up stream steps are cobbles

Step-Pool

- BJ AESTHETICS**
- NUISANCE ALGAE
  - INVASIVE MACROPHYTES
  - EXCESS TURBIDITY
  - DISCOLORATION
  - FOAM / SCUM
  - OIL SHEEN
  - TRASH / LITTER
  - NUISANCE ODOR
  - SLUDGE DEPOSITS
  - CSOs/SSOs/OUTFALLS

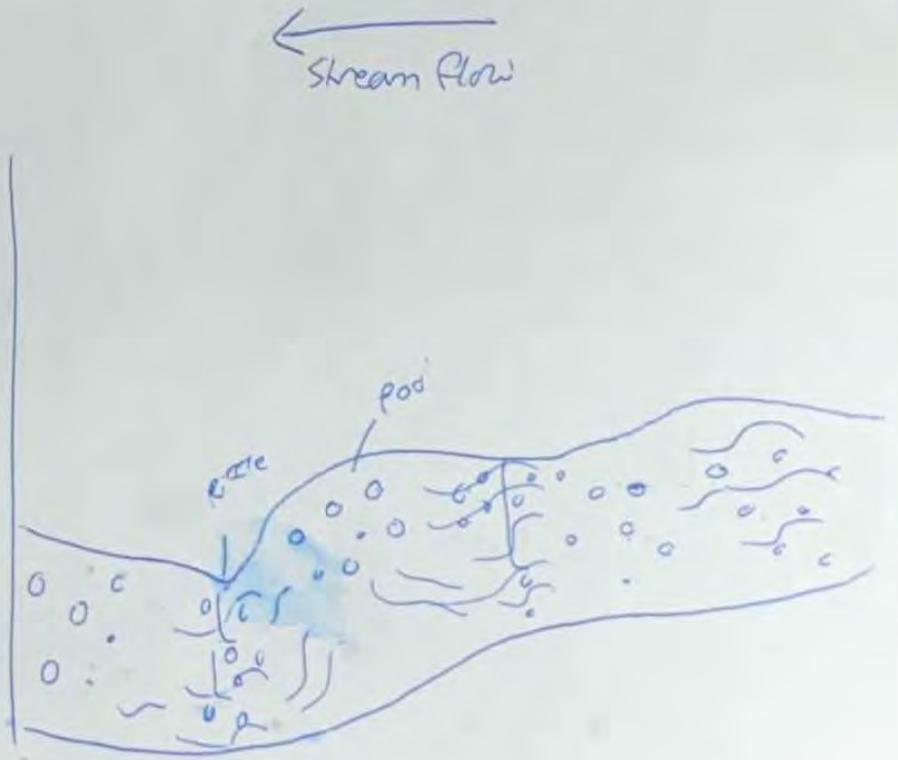
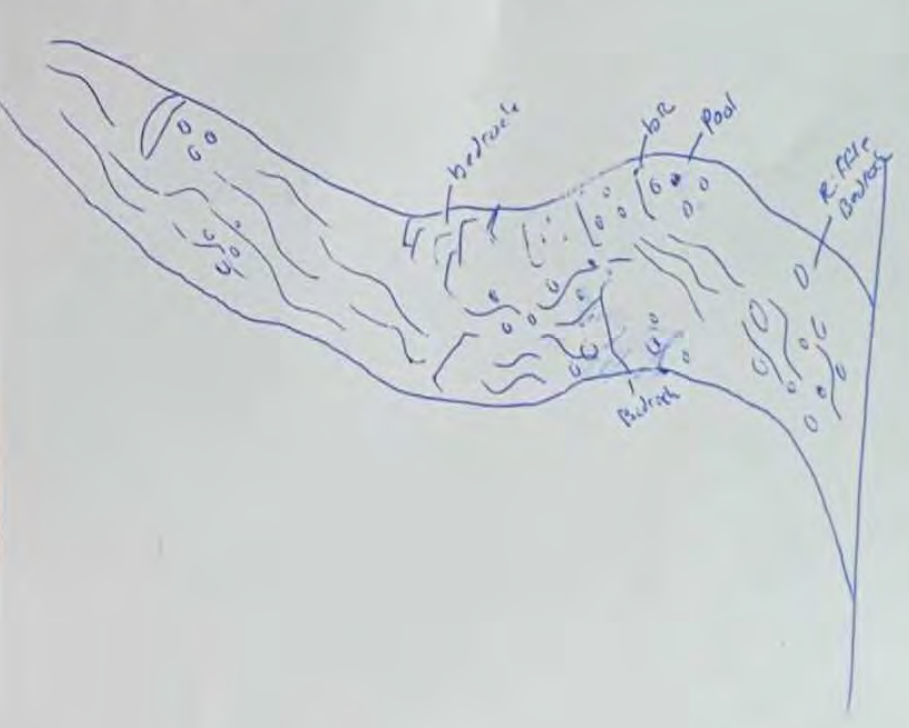
- DJ MAINTENANCE** Circle some & COMMENT
- PUBLIC / PRIVATE / BOTH / NA
  - ACTIVE / HISTORIC / BOTH / NA
  - YOUNG-SUCCESSION-OLD
  - SPRAY / SNAG / REMOVED
  - MODIFIED / DIPPED OUT / NA
  - LEVEED / ONE SIDED
  - RELOCATED / CUTOFFS
  - MOVING-BEDLOAD-STABLE
  - ARMoured / SLUMPS
  - ISLANDS / SCoured
  - IMPOUNDED / DESICCATED
  - FLOOD CONTROL / DRAINAGE

- EJ ISSUES**
- WWTP / CSO / NPDES / INDUSTRY
  - HARDENED / URBAN / DIRT&GRIME
  - CONTAMINATED / LANDFILL
  - BMPs-CONSTRUCTION-SEDIMENT
  - LOGGING / IRRIGATION / COOLING
  - BANK / EROSION / SURFACE
  - FALSE BANK / MANURE / LAGOON
  - WASH H<sub>2</sub>O / TILE / H<sub>2</sub>O TABLE
  - ACID / MINE / QUARRY / FLOW
  - NATURAL / WETLAND / STAGNANT
  - PARK / GOLF / LAWN / HOME
  - ATMOSPHERE / DATA PAUCITY

- FJ MEASUREMENTS**
- $\bar{x}$  width
  - $\bar{x}$  depth
  - max. depth
  - $\bar{x}$  bankfull width
  - bankfull  $\bar{x}$  depth
  - W/D ratio
  - bankfull max. depth
  - floodprone x<sup>2</sup> width
  - entrench. ratio
- Legacy Tree:

- CJ RECREATION** AREA DEPTH
- POOL:  >100ft<sup>2</sup>  >3ft

**Stream Drawing:**



Stream & Location: S = G20 RM:    Date: 11/19/21

Scorers Full Name & Affiliation: LK

River Code:    STORET #:    Lat./Long.: 37.017364, -79.760000 Office verified location

1] **SUBSTRATE** Check ONLY Two substrate TYPE BOXES; estimate % or note every type present

<b>BEST TYPES</b>	<b>POOL RIFFLE</b>	<b>OTHER TYPES</b>	<b>POOL RIFFLE</b>	<b>ORIGIN</b>	<b>QUALITY</b>
<input checked="" type="checkbox"/> BLDR /SLABS [10]	<u>  </u>	<input type="checkbox"/> HARDPAN [4]	<u>  </u>	<input type="checkbox"/> LIMESTONE [1]	<input type="checkbox"/> HEAVY [-2]
<input type="checkbox"/> BOULDER [9]	<u>  </u>	<input type="checkbox"/> DETRITUS [3]	<u>  </u>	<input type="checkbox"/> TILLS [1]	<input type="checkbox"/> MODERATE [-1]
<input checked="" type="checkbox"/> COBBLE [8]	<u>  </u>	<input type="checkbox"/> MUCK [2]	<u>  </u>	<input type="checkbox"/> WETLANDS [0]	<input type="checkbox"/> NORMAL [0]
<input type="checkbox"/> GRAVEL [7]	<u>  </u>	<input type="checkbox"/> SILT [2]	<u>  </u>	<input type="checkbox"/> HARDPAN [0]	<input type="checkbox"/> FREE [1]
<input type="checkbox"/> SAND [6]	<u>  </u>	<input type="checkbox"/> ARTIFICIAL [0]	<u>  </u>	<input type="checkbox"/> SANDSTONE [0]	<input type="checkbox"/> EXTENSIVE [-2]
<input type="checkbox"/> BEDROCK [5]	<u>  </u>			<input type="checkbox"/> RIP/RAP [0]	<input type="checkbox"/> MODERATE [-1]
<b>NUMBER OF BEST TYPES:</b> <input type="checkbox"/> 4 or more [2] <input type="checkbox"/> 3 or less [0]				<input type="checkbox"/> LACUSTURINE [0]	<input type="checkbox"/> NORMAL [0]
<i>Comments</i>				<input type="checkbox"/> SHALE [-1]	<input type="checkbox"/> NONE [1]
				<input type="checkbox"/> COAL FINES [-2]	

Substrate 18  
Maximum 20

2] **INSTREAM COVER** Indicate presence 0 to 3: 0-Absent; 1-Very small amounts or if more common of marginal quality; 2-Moderate amounts, but not of highest quality or in small amounts of highest quality; 3-Highest quality in moderate or greater amounts (e.g., very large boulders in deep or fast water, large diameter log that is stable, well developed rootwad in deep / fast water, or deep, well-defined, functional pools.

<input type="checkbox"/> UNDERCUT BANKS [1]	<input type="checkbox"/> POOLS > 70cm [2]	<input type="checkbox"/> OXBOWS, BACKWATERS [1]	<b>AMOUNT</b>
<input type="checkbox"/> OVERHANGING VEGETATION [1]	<input type="checkbox"/> ROOTWADS [1]	<input type="checkbox"/> AQUATIC MACROPHYTES [1]	<input type="checkbox"/> EXTENSIVE >75% [11]
<input type="checkbox"/> SHALLOWS (IN SLOW WATER) [1]	<input type="checkbox"/> BOULDERS [1]	<input type="checkbox"/> LOGS OR WOODY DEBRIS [1]	<input type="checkbox"/> MODERATE 25-75% [7]
<input type="checkbox"/> ROOTMATS [1]			<input type="checkbox"/> SPARSE 5-<25% [3]
			<input type="checkbox"/> NEARLY ABSENT <5% [1]

*Comments*

Cover    
Maximum 20

3] **CHANNEL MORPHOLOGY** Check ONE in each category (Or 2 & average)

<b>SINUOSITY</b>	<b>DEVELOPMENT</b>	<b>CHANNELIZATION</b>	<b>STABILITY</b>
<input type="checkbox"/> HIGH [4]	<input type="checkbox"/> EXCELLENT [7]	<input checked="" type="checkbox"/> NONE [6]	<input type="checkbox"/> HIGH [3]
<input type="checkbox"/> MODERATE [3]	<input checked="" type="checkbox"/> GOOD [5]	<input type="checkbox"/> RECOVERED [4]	<input checked="" type="checkbox"/> MODERATE [2]
<input checked="" type="checkbox"/> LOW [2]	<input type="checkbox"/> FAIR [3]	<input type="checkbox"/> RECOVERING [3]	<input type="checkbox"/> LOW [1]
<input type="checkbox"/> NONE [1]	<input type="checkbox"/> POOR [1]	<input type="checkbox"/> RECENT OR NO RECOVERY [1]	

*Comments*

Channel 15  
Maximum 20

4] **BANK EROSION AND RIPARIAN ZONE** Check ONE in each category for EACH BANK (Or 2 per bank & average)

<b>EROSION</b>	<b>RIPARIAN WIDTH</b>	<b>FLOOD PLAIN QUALITY</b>
<input type="checkbox"/> NONE / LITTLE [3]	<input type="checkbox"/> WIDE > 50m [4]	<input type="checkbox"/> FOREST, SWAMP [3]
<input type="checkbox"/> MODERATE [2]	<input type="checkbox"/> MODERATE 10-50m [3]	<input type="checkbox"/> SHRUB OR OLD FIELD [2]
<input type="checkbox"/> HEAVY / SEVERE [1]	<input type="checkbox"/> NARROW 5-10m [2]	<input type="checkbox"/> RESIDENTIAL, PARK, NEW FIELD [1]
	<input type="checkbox"/> VERY NARROW < 5m [1]	<input type="checkbox"/> FENCED PASTURE [1]
	<input type="checkbox"/> NONE [0]	<input type="checkbox"/> OPEN PASTURE, ROWCROP [0]
		<input type="checkbox"/> CONSERVATION TILLAGE [1]
		<input type="checkbox"/> URBAN OR INDUSTRIAL [0]
		<input type="checkbox"/> MINING / CONSTRUCTION [0]

*Comments*

Indicate predominant land use(s) past 100m riparian.    
Riparian Maximum 10

5] **POOL / GLIDE AND RIFFLE / RUN QUALITY**

<b>MAXIMUM DEPTH</b>	<b>CHANNEL WIDTH</b>	<b>CURRENT VELOCITY</b>	<b>Recreation Potential</b> Primary Contact Secondary Contact <small>(circle one and comment on back)</small>
Check ONE (ONLY!) <input type="checkbox"/> > 1m [6] <input type="checkbox"/> 0.7-<1m [4] <input checked="" type="checkbox"/> 0.4-<0.7m [2] <input type="checkbox"/> 0.2-<0.4m [1] <input type="checkbox"/> < 0.2m [0]	Check ONE (Or 2 & average) <input checked="" type="checkbox"/> POOL WIDTH > RIFFLE WIDTH [2] <input type="checkbox"/> POOL WIDTH = RIFFLE WIDTH [1] <input type="checkbox"/> POOL WIDTH > RIFFLE WIDTH [0]	Check ALL that apply <input type="checkbox"/> TORRENTIAL [-1] <input checked="" type="checkbox"/> SLOW [1] <input type="checkbox"/> VERY FAST [1] <input type="checkbox"/> INTERSTITIAL [-1] <input checked="" type="checkbox"/> FAST [1] <input type="checkbox"/> INTERMITTENT [-2] <input checked="" type="checkbox"/> MODERATE [1] <input type="checkbox"/> EDDIES [1]	
<i>Comments</i>			
Indicate for reach - pools and riffles.			

Pool / Current 7  
Maximum 12

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species:  NO RIFFLE [metric=0]

<b>RIFFLE DEPTH</b>	<b>RUN DEPTH</b>	<b>RIFFLE / RUN SUBSTRATE</b>	<b>RIFFLE / RUN EMBEDDEDNESS</b>
<input checked="" type="checkbox"/> BEST AREAS > 10cm [2] <input type="checkbox"/> BEST AREAS 5-10cm [1] <input type="checkbox"/> BEST AREAS < 5cm [metric=0]	<input type="checkbox"/> MAXIMUM > 50cm [2] <input checked="" type="checkbox"/> MAXIMUM < 50cm [1]	<input checked="" type="checkbox"/> STABLE (e.g., Cobble, Boulder) [2] <input type="checkbox"/> MOD. STABLE (e.g., Large Gravel) [1] <input type="checkbox"/> UNSTABLE (e.g., Fine Gravel, Sand) [0]	<input checked="" type="checkbox"/> NONE [2] <input type="checkbox"/> LOW [1] <input type="checkbox"/> MODERATE [0] <input type="checkbox"/> EXTENSIVE [-1]

*Comments*

Riffle / Run 7  
Maximum 8

6] **GRADIENT** (ft/mi)  VERY LOW - LOW [2-4]  MODERATE [6-10]  HIGH - VERY HIGH [10-6]

**DRAINAGE AREA** (mi<sup>2</sup>)

%POOL: 40 %GLIDE: 10

%RUN:   %RIFFLE: 50

Gradient    
Maximum 10

**A) SAMPLED REACH**

Check ALL that apply

**METHOD**

- BOAT
- WADE
- L. LINE
- OTHER

**STAGE**

- 1st -sample pass- 2nd
- HIGH
  - UP
  - NORMAL
  - LOW
  - DRY

**DISTANCE**

- 0.5 Km
- 0.2 Km
- 0.15 Km
- 0.12 Km
- OTHER

**CLARITY**

- 1st --sample pass-- 2nd
- < 20 cm
  - 20-<40 cm
  - 40-70 cm
  - > 70 cm/ CTB
  - SECCHI DEPTH

**CANOPY**

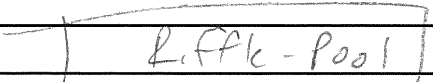
- 1st \_\_\_\_\_ cm
- 2nd \_\_\_\_\_ cm
- > 85%- OPEN
  - 55%-<85%
  - 30%-<55%
  - 10%-<30%
  - <10%- CLOSED

**C) RECREATION**

AREA DEPTH  
 POOL:  >100ft?  >3ft

Comment RE: Reach consistency/Is reach typical of stream?, Recreation/ Observed - Inferred, Other/ Sampling observations, Concerns, Access directions, etc.

S-G 20: Reach extends to limits of LOP. Upstream is a  
 bedrock step-pool riffle system. Down stream appears to be  
 mostly riffle with cobbles. Down stream is a riffle-pool  
 complex



**B) AESTHETICS**

- NUISANCE ALGAE
- INVASIVE MACROPHYTES
- EXCESS TURBIDITY
- DISCOLORATION
- FOAM / SCUM
- OIL SHEEN
- TRASH / LITTER
- NUISANCE ODOR
- SLUDGE DEPOSITS
- CSOs/SSOs/OUTFALLS

**D) MAINTENANCE**

Circle some & COMMENT

- PUBLIC / PRIVATE / BOTH / NA
- ACTIVE / HISTORIC / BOTH / NA
- YOUNG-SUCCESSION-OLD
- SPRAY / SNAG / REMOVED
- MODIFIED / DIPPED OUT / NA
- LEVEED / ONE SIDED
- RELOCATED / CUTOFFS
- MOVING-BEDLOAD-STABLE
- ARMOURED / SLUMPS
- ISLANDS / SCOURED
- IMPOUNDED / DESICCATED
- FLOOD CONTROL / DRAINAGE

**E) ISSUES**

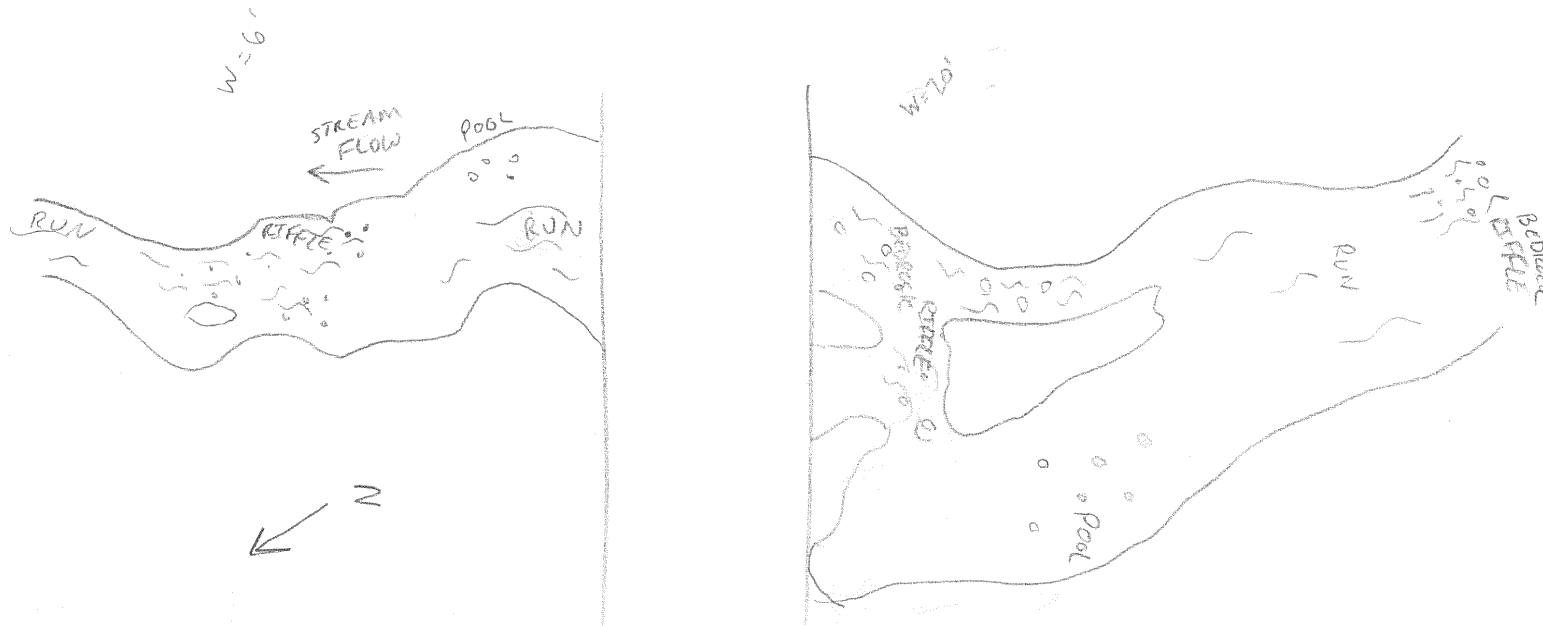
- WWTP / CSO / NPDES / INDUSTRY
- HARDENED / URBAN / DIRT&GRIME
- CONTAMINATED / LANDFILL
- BMPs-CONSTRUCTION-SEDIMENT
- LOGGING / IRRIGATION / COOLING
- BANK / EROSION / SURFACE
- FALSE BANK / MANURE / LAGOON
- WASH H<sub>2</sub>O / TILE / H<sub>2</sub>O TABLE
- ACID / MINE / QUARRY / FLOW
- NATURAL / WETLAND / STAGNANT
- PARK / GOLF / LAWN / HOME
- ATMOSPHERE / DATA PAUCITY

**F) MEASUREMENTS**

- $\bar{x}$  width
- $\bar{x}$  depth
- max. depth
- $\bar{x}$  bankfull width
- bankfull  $\bar{x}$  depth
- W/D ratio
- bankfull max. depth
- floodprone  $x^2$  width
- entrench. ratio

Legacy Tree:

**Stream Drawing:**



Stream & Location: S-T12

RM:    Date: 11 / 30 / 06 Z1

Scorers Full Name & Affiliation: LK

River Code:   

STORET #:   

Lat./ Long.:   

37.049219, -79.908513

Office verified location

**1) SUBSTRATE** Check **ONLY** Two substrate **TYPE BOXES**; estimate % or note every type present

Check ONE (Or 2 & average)

- |                                                 |                                                   |                                                  |                                                   |
|-------------------------------------------------|---------------------------------------------------|--------------------------------------------------|---------------------------------------------------|
| <b>BEST TYPES</b>                               | <b>POOL RIFFLE</b>                                | <b>OTHER TYPES</b>                               | <b>POOL RIFFLE</b>                                |
| <input type="checkbox"/> BLDR / SLABS [10]      | <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> HARDPAN [4]             | <input type="checkbox"/> <input type="checkbox"/> |
| <input type="checkbox"/> BOULDER [9]            | <input type="checkbox"/> <input type="checkbox"/> | <input checked="" type="checkbox"/> DETRITUS [3] | <input type="checkbox"/> <input type="checkbox"/> |
| <input type="checkbox"/> COBBLE [8]             | <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> MUCK [2]                | <input type="checkbox"/> <input type="checkbox"/> |
| <input type="checkbox"/> GRAVEL [7]             | <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> SILT [2]                | <input type="checkbox"/> <input type="checkbox"/> |
| <input type="checkbox"/> SAND [6]               | <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> ARTIFICIAL [0]          | <input type="checkbox"/> <input type="checkbox"/> |
| <input checked="" type="checkbox"/> BEDROCK [5] | <input type="checkbox"/> <input type="checkbox"/> |                                                  |                                                   |

- ORIGIN**
- LIMESTONE [1]
  - TILLS [1]
  - WETLANDS [0]
  - HARDPAN [0]
  - SANDSTONE [0]
  - RIP/RAP [0]
  - LACUSTURINE [0]
  - SHALE [-1]
  - COAL FINES [-2]

- QUALITY**
- HEAVY [-2]
  - MODERATE [-1]
  - NORMAL [0]
  - FREE [1]
  - EXTENSIVE [-2]
  - MODERATE [-1]
  - NORMAL [0]
  - NONE [1]

NUMBER OF BEST TYPES:  4 or more [2]  3 or less [0]

Comments   

SILT  
EMBEDDEDNESS

Substrate  
18  
Maximum  
20

**2) INSTREAM COVER** Indicate presence 0 to 3: 0-Absent; 1-Very small amounts or if more common of marginal quality; 2-Moderate amounts, but not of highest quality or in small amounts of highest quality; 3-Highest quality in moderate or greater amounts (e.g., very large boulders in deep or fast water, large diameter log that is stable, well developed rootwad in deep / fast water, or deep, well-defined, functional pools.

**AMOUNT**

Check ONE (Or 2 & average)

- |                                                       |                                           |                                                   |
|-------------------------------------------------------|-------------------------------------------|---------------------------------------------------|
| <input type="checkbox"/> UNDERCUT BANKS [1]           | <input type="checkbox"/> POOLS > 70cm [2] | <input type="checkbox"/> OXBOWS, BACKWATERS [1]   |
| <input type="checkbox"/> OVERHANGING VEGETATION [1]   | <input type="checkbox"/> ROOTWADS [1]     | <input type="checkbox"/> AQUATIC MACROPHYTES [1]  |
| <input type="checkbox"/> SHALLOWS (IN SLOW WATER) [1] | <input type="checkbox"/> BOULDERS [1]     | <input type="checkbox"/> LOGS OR WOODY DEBRIS [1] |
| <input type="checkbox"/> ROOTMATS [1]                 |                                           |                                                   |

- EXTENSIVE >75% [11]
- MODERATE 25-75% [7]
- SPARSE 5-<25% [3]
- NEARLY ABSENT <5% [1]

Comments   

Cover  
Maximum  
20  
  

**3) CHANNEL MORPHOLOGY** Check ONE in each category (Or 2 & average)

- |                                              |                                              |                                                    |                                              |
|----------------------------------------------|----------------------------------------------|----------------------------------------------------|----------------------------------------------|
| <b>SINUOSITY</b>                             | <b>DEVELOPMENT</b>                           | <b>CHANNELIZATION</b>                              | <b>STABILITY</b>                             |
| <input type="checkbox"/> HIGH [4]            | <input type="checkbox"/> EXCELLENT [7]       | <input checked="" type="checkbox"/> NONE [6]       | <input checked="" type="checkbox"/> HIGH [3] |
| <input type="checkbox"/> MODERATE [3]        | <input checked="" type="checkbox"/> GOOD [5] | <input type="checkbox"/> RECOVERED [4]             | <input type="checkbox"/> MODERATE [2]        |
| <input type="checkbox"/> LOW [2]             | <input type="checkbox"/> FAIR [3]            | <input type="checkbox"/> RECOVERING [3]            | <input type="checkbox"/> LOW [1]             |
| <input checked="" type="checkbox"/> NONE [1] | <input type="checkbox"/> POOR [1]            | <input type="checkbox"/> RECENT OR NO RECOVERY [1] |                                              |

Comments   

Channel  
Maximum  
20  
15

**4) BANK EROSION AND RIPARIAN ZONE** Check ONE in each category for EACH BANK (Or 2 per bank & average)

- |                                             |                                               |                                                           |
|---------------------------------------------|-----------------------------------------------|-----------------------------------------------------------|
| <b>EROSION</b>                              | <b>RIPARIAN WIDTH</b>                         | <b>FLOOD PLAIN QUALITY</b>                                |
| <input type="checkbox"/> NONE / LITTLE [3]  | <input type="checkbox"/> WIDE > 50m [4]       | <input type="checkbox"/> FOREST, SWAMP [3]                |
| <input type="checkbox"/> MODERATE [2]       | <input type="checkbox"/> MODERATE 10-50m [3]  | <input type="checkbox"/> SHRUB OR OLD FIELD [2]           |
| <input type="checkbox"/> HEAVY / SEVERE [1] | <input type="checkbox"/> NARROW 5-10m [2]     | <input type="checkbox"/> RESIDENTIAL, PARK, NEW FIELD [1] |
|                                             | <input type="checkbox"/> VERY NARROW < 5m [1] | <input type="checkbox"/> FENCED PASTURE [1]               |
|                                             | <input type="checkbox"/> NONE [0]             | <input type="checkbox"/> OPEN PASTURE, ROWCROP [0]        |

Indicate predominant land use(s) past 100m riparian.

CONSERVATION TILLAGE [1]  
URBAN OR INDUSTRIAL [0]  
MINING / CONSTRUCTION [0]

Comments   

Riparian  
Maximum  
10  
  

**5) POOL / GLIDE AND RIFFLE / RUN QUALITY**

- |                                                 |                                                                   |                                                  |
|-------------------------------------------------|-------------------------------------------------------------------|--------------------------------------------------|
| <b>MAXIMUM DEPTH</b>                            | <b>CHANNEL WIDTH</b>                                              | <b>CURRENT VELOCITY</b>                          |
| Check ONE (ONLY)                                | Check ONE (Or 2 & average)                                        | Check ALL that apply                             |
| <input type="checkbox"/> > 1m [6]               | <input type="checkbox"/> POOL WIDTH > RIFFLE WIDTH [2]            | <input type="checkbox"/> TORRENTIAL [-1]         |
| <input checked="" type="checkbox"/> 0.7-<1m [4] | <input checked="" type="checkbox"/> POOL WIDTH = RIFFLE WIDTH [1] | <input checked="" type="checkbox"/> SLOW [1]     |
| <input type="checkbox"/> 0.4-<0.7m [2]          | <input type="checkbox"/> POOL WIDTH > RIFFLE WIDTH [0]            | <input type="checkbox"/> VERY FAST [1]           |
| <input type="checkbox"/> 0.2-<0.4m [1]          |                                                                   | <input type="checkbox"/> INTERSTITIAL [-1]       |
| <input type="checkbox"/> < 0.2m [0]             |                                                                   | <input checked="" type="checkbox"/> FAST [1]     |
|                                                 |                                                                   | <input type="checkbox"/> INTERMITTENT [-2]       |
|                                                 |                                                                   | <input checked="" type="checkbox"/> MODERATE [1] |
|                                                 |                                                                   | <input checked="" type="checkbox"/> EDDIES [1]   |

Indicate for reach - pools and riffles.

Comments   

**Recreation Potential**  
**Primary Contact**  
**Secondary Contact**  
(circle one and comment on back)

Pool /  
Current  
Maximum  
12  
9

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species: Check ONE (Or 2 & average).

- |                                                           |                                                        |                                                                        |                                              |
|-----------------------------------------------------------|--------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------|
| <b>RIFFLE DEPTH</b>                                       | <b>RUN DEPTH</b>                                       | <b>RIFFLE / RUN SUBSTRATE</b>                                          | <b>RIFFLE / RUN EMBEDDEDNESS</b>             |
| <input checked="" type="checkbox"/> BEST AREAS > 10cm [2] | <input checked="" type="checkbox"/> MAXIMUM > 50cm [2] | <input checked="" type="checkbox"/> STABLE (e.g., Cobble, Boulder) [2] | <input checked="" type="checkbox"/> NONE [2] |
| <input type="checkbox"/> BEST AREAS 5-10cm [1]            | <input type="checkbox"/> MAXIMUM < 50cm [1]            | <input type="checkbox"/> MOD. STABLE (e.g., Large Gravel) [1]          | <input type="checkbox"/> LOW [1]             |
| <input type="checkbox"/> BEST AREAS < 5cm [metric=0]      |                                                        | <input type="checkbox"/> UNSTABLE (e.g., Fine Gravel, Sand) [0]        | <input type="checkbox"/> MODERATE [0]        |
|                                                           |                                                        |                                                                        | <input type="checkbox"/> EXTENSIVE [-1]      |

Comments   

Riffle /  
Run  
Maximum  
8  
8

- 6) GRADIENT** ( ft/mi)  VERY LOW - LOW [2-4]  
**DRAINAGE AREA** ( mi<sup>2</sup>)  MODERATE [6-10]  
 HIGH - VERY HIGH [10-6]

%POOL: 25 %GLIDE:     
%RUN: 25 %RIFFLE: 50

Gradient  
Maximum  
10

# AJ SAMPLED REACH

Check ALL that apply

- METHOD**
- BOAT
  - WADE
  - L. LINE
  - OTHER
- DISTANCE**
- 0.5 Km
  - 0.2 Km
  - 0.15 Km
  - 0.12 Km
  - OTHER

- STAGE**
- HIGH
  - UP
  - NORMAL
  - LOW
  - DRY
- CLARITY**
- 1st --sample pass-- 2nd
- < 20 cm
  - 20-<40 cm
  - 40-70 cm
  - > 70 cm/ CTB
  - SECCHI DEPTH

- CANOPY**
- 1st pass \_\_\_\_\_ cm
- 2nd pass \_\_\_\_\_ cm
- > 85% - OPEN
  - 55% - <85%
  - 30% - <55%
  - 10% - <30%
  - <10% - CLOSED

Comment RE: Reach consistency/ Is reach typical of stream?, Recreation/ Observed - Inferred, Other/ Sampling observations, Concerns, Access directions, etc.

S-II2: Reach limited to LOD. stream dominated by bedrock. Riffles drop into pools throughout entire stream. Some Islands of timber/logs.

**STEP-POOL**

- BJ AESTHETICS**
- NUISANCE ALGAE
  - INVASIVE MACROPHYTES
  - EXCESS TURBIDITY
  - DISCOLORATION
  - FOAM / SCUM
  - OIL SHEEN
  - TRASH / LITTER
  - NUISANCE ODOR
  - SLUDGE DEPOSITS
  - CSOs/SSOs/OUTFALLS

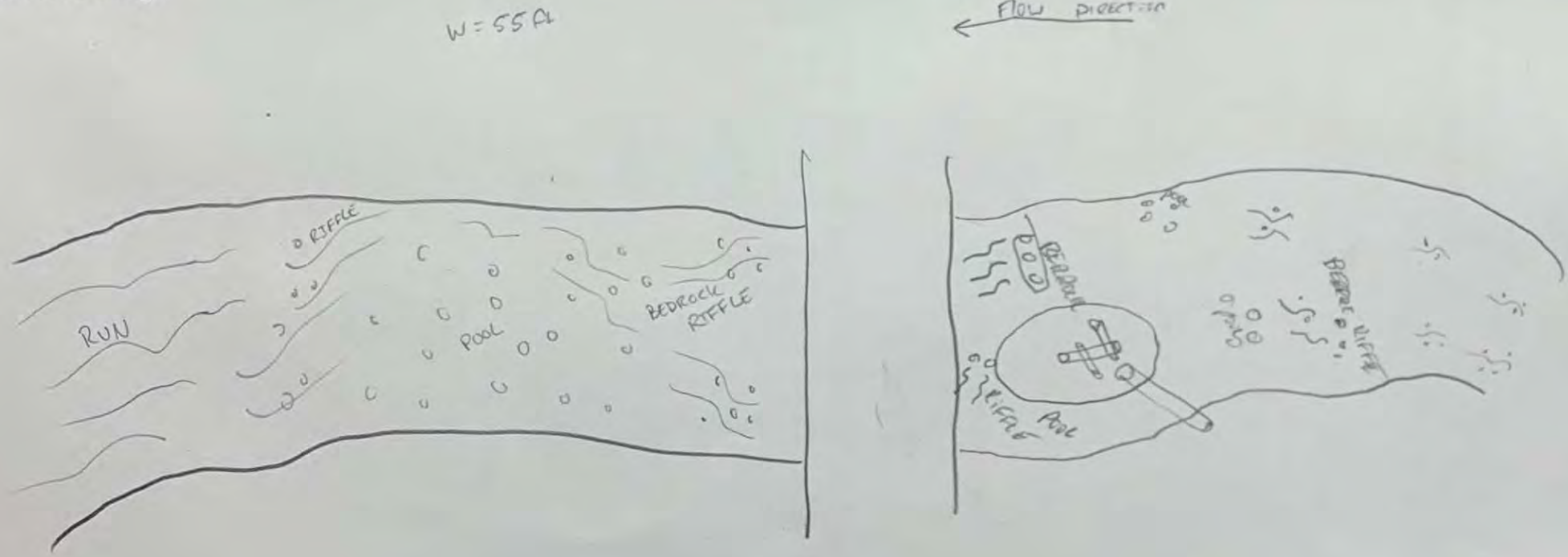
- DJ MAINTENANCE**
- Circle some & COMMENT
- PUBLIC / PRIVATE / BOTH / NA
  - ACTIVE / HISTORIC / BOTH / NA
  - YOUNG-SUCCESSION-OLD
  - SPRAY / SNAG / REMOVED
  - MODIFIED / DIPPED OUT / NA
  - LEVEED / ONE SIDED
  - RELOCATED / CUTOFFS
  - MOVING-BEDLOAD-STABLE
  - ARMoured / SLUMPS
  - ISLANDS / SCoured
  - IMPOUNDED / DESICCATED
  - FLOOD CONTROL / DRAINAGE

- EJ ISSUES**
- WWTP / CSO / NPDES / INDUSTRY
  - HARDENED / URBAN / DIRT&GRIME
  - CONTAMINATED / LANDFILL
  - BMPs-CONSTRUCTION-SEDIMENT
  - LOGGING / IRRIGATION / COOLING
  - BANK / EROSION / SURFACE
  - FALSE BANK / MANURE / LAGOON
  - WASH H<sub>2</sub>O / TILE / H<sub>2</sub>O TABLE
  - ACID / MINE / QUARRY / FLOW
  - NATURAL / WETLAND / STAGNANT
  - PARK / GOLF / LAWN / HOME
  - ATMOSPHERE / DATA PAUCITY

- FJ MEASUREMENTS**
- $\bar{x}$  width
  - $\bar{x}$  depth
  - max. depth
  - $\bar{x}$  bankfull width
  - bankfull  $\bar{x}$  depth
  - W/D ratio
  - bankfull max. depth
  - floodprone  $x^2$  width
  - entrench. ratio
- Legacy Tree:

- CJ RECREATION**
- AREA DEPTH
- POOL:  >100ft<sup>2</sup>  >3ft

## Stream Drawing:





Stream & Location: S-1510 12:07-12:22 RM:    Date: 11/19/21

Scorers Full Name & Affiliation: LK/MB

River Code:    STORET #:    Lat./Long.: 37.089179, -80.005026 Office verified location

1] SUBSTRATE Check ONLY Two substrate TYPE BOXES; estimate % or note every type present

Check ONE (Or 2 & average)

<p><b>BEST TYPES</b></p> <input type="checkbox"/> BLD R/S LABS [10] <input type="checkbox"/> BOULDER [9] <input type="checkbox"/> COBBLE [8] <input checked="" type="checkbox"/> GRAVEL [7] <input type="checkbox"/> SAND [6] <input type="checkbox"/> BEDROCK [5]	<p><b>POOL RIFFLE</b></p> <p>_____</p>	<p><b>OTHER TYPES</b></p> <input type="checkbox"/> HARDPAN [4] <input type="checkbox"/> DETRITUS [3] <input type="checkbox"/> MUCK [2] <input checked="" type="checkbox"/> SILT [2] <input type="checkbox"/> ARTIFICIAL [0]	<p><b>POOL RIFFLE</b></p> <p>_____</p>	<p><b>ORIGIN</b></p> <input type="checkbox"/> LIMESTONE [1] <input type="checkbox"/> TILLS [1] <input type="checkbox"/> WETLANDS [0] <input type="checkbox"/> HARDPAN [0] <input type="checkbox"/> SANDSTONE [0] <input type="checkbox"/> RIP/RAP [0] <input type="checkbox"/> LACUSTURINE [0] <input type="checkbox"/> SHALE [-1] <input type="checkbox"/> COAL FINES [-2]	<p><b>QUALITY</b></p> <input type="checkbox"/> HEAVY [-2] <input type="checkbox"/> MODERATE [-1] <input type="checkbox"/> NORMAL [0] <input type="checkbox"/> FREE [1] <input type="checkbox"/> EXTENSIVE [-2] <input type="checkbox"/> MODERATE [-1] <input type="checkbox"/> NORMAL [0] <input type="checkbox"/> NONE [1]	<p>SILT</p> <p>EMBEDDEDNESS</p>	<p>Substrate</p> <div style="border: 1px solid black; border-radius: 50%; width: 40px; height: 40px; display: flex; align-items: center; justify-content: center; margin: 0 auto;">15</div> <p>Maximum 20</p>
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NUMBER OF BEST TYPES:  4 or more [2]  3 or less [0] (Score natural substrates; ignore sludge from point-sources)

Comments

2] INSTREAM COVER Indicate presence 0 to 3: 0-Absent; 1-Very small amounts or if more common of marginal quality; 2-Moderate amounts, but not of highest quality or in small amounts of highest quality; 3-Highest quality in moderate or greater amounts (e.g., very large boulders in deep or fast water, large diameter log that is stable, well developed rootwad in deep / fast water, or deep, well-defined, functional pools.

AMOUNT

Check ONE (Or 2 & average)

<p>_____ UNDERCUT BANKS [1]          _____ OVERHANGING VEGETATION [1]          _____ SHALLOWS (IN SLOW WATER) [1]          _____ ROOTMATS [1]</p>	<p>_____ POOLS &gt; 70cm [2]          _____ ROOTWADS [1]          _____ BOULDERS [1]</p>	<p>_____ OXBOWS, BACKWATERS [1]          _____ AQUATIC MACROPHYTES [1]          _____ LOGS OR WOODY DEBRIS [1]</p>	<p>Check ONE (Or 2 &amp; average)</p> <input type="checkbox"/> EXTENSIVE >75% [11] <input type="checkbox"/> MODERATE 25-75% [7] <input type="checkbox"/> SPARSE 5-<25% [3] <input type="checkbox"/> NEARLY ABSENT <5% [1]
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Comments

Cover Maximum 20

3] CHANNEL MORPHOLOGY Check ONE in each category (Or 2 & average)

<p><b>SINUOSITY</b></p> <input type="checkbox"/> HIGH [4] <input checked="" type="checkbox"/> MODERATE [3] <input type="checkbox"/> LOW [2] <input type="checkbox"/> NONE [1]	<p><b>DEVELOPMENT</b></p> <input checked="" type="checkbox"/> EXCELLENT [7] <input type="checkbox"/> GOOD [5] <input type="checkbox"/> FAIR [3] <input type="checkbox"/> POOR [1]	<p><b>CHANNELIZATION</b></p> <input checked="" type="checkbox"/> NONE [6] <input type="checkbox"/> RECOVERED [4] <input type="checkbox"/> RECOVERING [3] <input type="checkbox"/> RECENT OR NO RECOVERY [1]	<p><b>STABILITY</b></p> <input type="checkbox"/> HIGH [3] <input checked="" type="checkbox"/> MODERATE [2] <input type="checkbox"/> LOW [1]
----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	---------------------------------------------------------------------------------------------------------------------------------------------------

Comments

Channel Maximum 20

4] BANK EROSION AND RIPARIAN ZONE Check ONE in each category for EACH BANK (Or 2 per bank & average)

River right looking downstream

<p><b>EROSION</b></p> <input type="checkbox"/> NONE / LITTLE [3] <input type="checkbox"/> MODERATE [2] <input type="checkbox"/> HEAVY / SEVERE [1]	<p><b>RIPARIAN WIDTH</b></p> <input type="checkbox"/> WIDE > 50m [4] <input type="checkbox"/> MODERATE 10-50m [3] <input type="checkbox"/> NARROW 5-10m [2] <input type="checkbox"/> VERY NARROW < 5m [1] <input type="checkbox"/> NONE [0]	<p><b>FLOOD PLAIN QUALITY</b></p> <input type="checkbox"/> FOREST, SWAMP [3] <input type="checkbox"/> SHRUB OR OLD FIELD [2] <input type="checkbox"/> RESIDENTIAL, PARK, NEW FIELD [1] <input type="checkbox"/> FENCED PASTURE [1] <input type="checkbox"/> OPEN PASTURE, ROWCROP [0]	<p><b>CONSERVATION TILLAGE [1]</b>  <b>URBAN OR INDUSTRIAL [0]</b>  <b>MINING / CONSTRUCTION [0]</b></p>
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Indicate predominant land use(s) past 100m riparian.

Comments

Riparian Maximum 10

5] POOL / GLIDE AND RIFFLE / RUN QUALITY

MAXIMUM DEPTH

Check ONE (ONLY!)

> 1m [6]  
 0.7-<1m [4]  
 0.4-<0.7m [2]  
 0.2-<0.4m [1]  
 < 0.2m [0]

CHANNEL WIDTH

Check ONE (Or 2 & average)

POOL WIDTH > RIFFLE WIDTH [2]  
 POOL WIDTH = RIFFLE WIDTH [1]  
 POOL WIDTH < RIFFLE WIDTH [0]

CURRENT VELOCITY

Check ALL that apply

TORRENTIAL [-1]  SLOW [1]  
 VERY FAST [1]  INTERSTITIAL [-1]  
 FAST [1]  INTERMITTENT [-2]  
 MODERATE [1]  EDDIES [1]

Indicate for reach - pools and riffles.

Recreation Potential

Primary Contact  
Secondary Contact  
(circle one and comment on back)

Pool / Current Maximum 12

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species:

Check ONE (Or 2 & average).

NO RIFFLE [metric=0]

<p><b>RIFFLE DEPTH</b></p> <input checked="" type="checkbox"/> BEST AREAS > 10cm [2] <input type="checkbox"/> BEST AREAS 5-10cm [1] <input type="checkbox"/> BEST AREAS < 5cm [metric=0]	<p><b>RUN DEPTH</b></p> <input type="checkbox"/> MAXIMUM > 50cm [2] <input checked="" type="checkbox"/> MAXIMUM < 50cm [1]	<p><b>RIFFLE / RUN SUBSTRATE</b></p> <input type="checkbox"/> STABLE (e.g., Cobble, Boulder) [2] <input checked="" type="checkbox"/> MOD. STABLE (e.g., Large Gravel) [1] <input type="checkbox"/> UNSTABLE (e.g., Fine Gravel, Sand) [0]	<p><b>RIFFLE / RUN EMBEDDEDNESS</b></p> <input type="checkbox"/> NONE [2] <input type="checkbox"/> LOW [1] <input checked="" type="checkbox"/> MODERATE [0] <input type="checkbox"/> EXTENSIVE [-1]
------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-------------------------------------------------------------------------------------------------------------------------------	-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

Comments

Riffle / Run Maximum 8

6] GRADIENT (

DRAINAGE AREA (

ft/mi)  VERY LOW - LOW [2-4]  
 MODERATE [6-10]  
 HIGH - VERY HIGH [10-6]  
 mi<sup>2</sup>)

%POOL: 10 %GLIDE:    
 %RUN: 30 %RIFFLE: 60

Gradient Maximum 10

**A) SAMPLED REACH**

Check ALL that apply

**METHOD**

- BOAT
- WADE
- L. LINE
- OTHER

**DISTANCE**

- 0.5 Km
- 0.2 Km
- 0.15 Km
- 0.12 Km
- OTHER

meters

**CANOPY**

- > 85%- OPEN
- 55%-<85%
- 30%-<55%
- 10%-<30%
- <10%- CLOSED

**STAGE**

1st-sample pass- 2nd

- HIGH
- UP
- NORMAL
- LOW
- DRY

**CLARITY**

1st --sample pass-- 2nd

- < 20 cm
- 20-<40 cm
- 40-70 cm
- > 70 cm/ CTB
- SECCHI DEPTH

1st \_\_\_\_\_ cm

2nd \_\_\_\_\_ cm

**C) RECREATION**

AREA DEPTH

POOL:  >100ft<sup>2</sup>  >3ft

Comment RE: Reach consistency/Is reach typical of stream?, Recreation/Observed - Inferred, Other/Sampling observations, Concerns, Access directions, etc.

S-15 10: Only observed from within LOD. Up stream appears to be a step-pool that transitions into an riffle-pool complex. Silt accumulation in the run. No silt or embeddedness in riffles. Shallow Pools.

Poorly Formed Riffle-Pool complex

**B) AESTHETICS**

- NUISANCE ALGAE
- INVASIVE MACROPHYTES
- EXCESS TURBIDITY
- DISCOLORATION
- FOAM / SCUM
- OIL SHEEN
- TRASH / LITTER
- NUISANCE ODOR
- SLUDGE DEPOSITS
- CSOs/SSOs/OUTFALLS

**D) MAINTENANCE**

Circle some & COMMENT

- PUBLIC / PRIVATE / BOTH / NA
- ACTIVE / HISTORIC / BOTH / NA
- YOUNG-SUCCESSION-OLD
- SPRAY / SNAG / REMOVED
- MODIFIED / DIPPED OUT / NA
- LEVEED / ONE SIDED
- RELOCATED / CUTOFFS
- MOVING-BEDLOAD-STABLE
- ARMoured / SLUMPS
- ISLANDS / SCOURED
- IMPOUNDED / DESICCATED
- FLOOD CONTROL / DRAINAGE

**E) ISSUES**

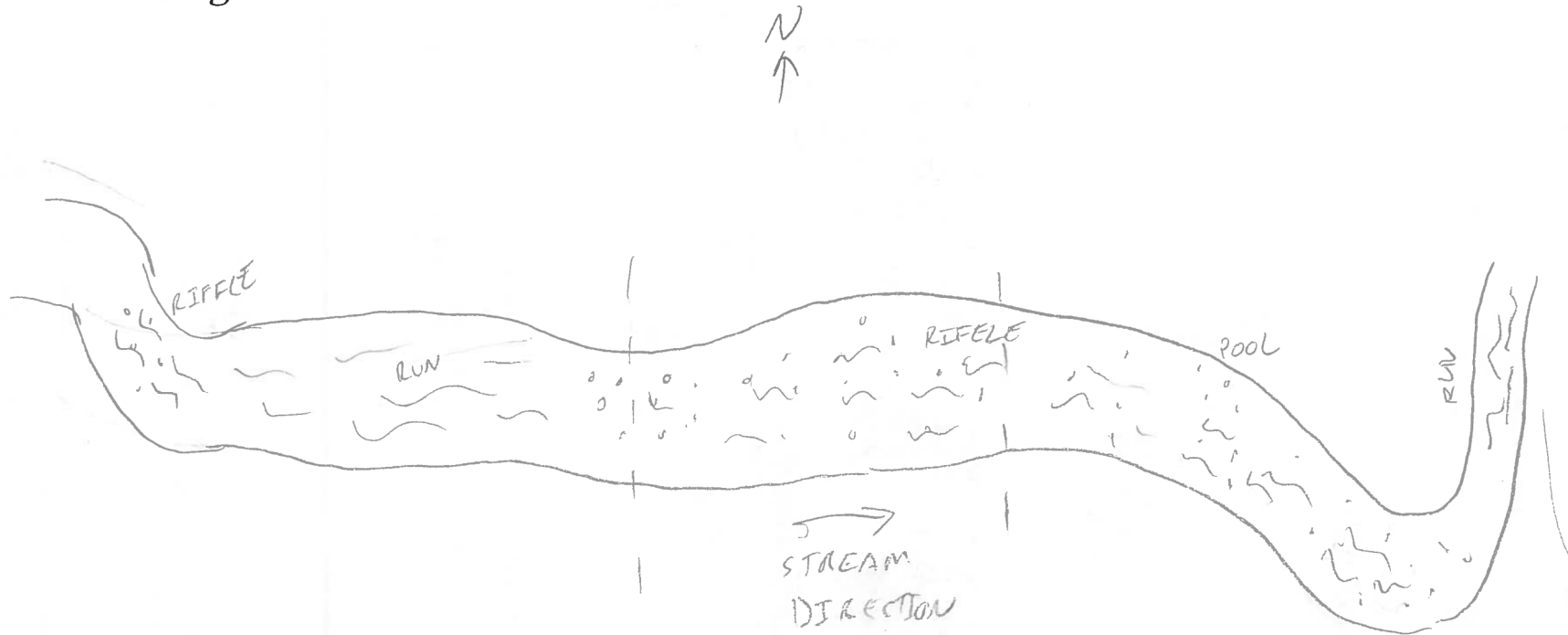
- WWTP / CSO / NPDES / INDUSTRY
- HARDENED / URBAN / DIRT&GRIME
- CONTAMINATED / LANDFILL
- BMPs-CONSTRUCTION-SEDIMENT
- LOGGING / IRRIGATION / COOLING
- BANK / EROSION / SURFACE
- FALSE BANK / MANURE / LAGOON
- WASH H<sub>2</sub>O / TILE / H<sub>2</sub>O TABLE
- ACID / MINE / QUARRY / FLOW
- NATURAL / WETLAND / STAGNANT
- PARK / GOLF / LAWN / HOME
- ATMOSPHERE / DATA PAUCITY

**F) MEASUREMENTS**

- $\bar{x}$  width
- $\bar{x}$  depth
- max. depth
- $\bar{x}$  bankfull width
- bankfull  $\bar{x}$  depth
- W/D ratio
- bankfull max. depth
- floodprone  $x^2$  width
- entrench. ratio

Legacy Tree:

**Stream Drawing:**



Stream & Location: S-III RM:    Date: 11/19/21

Scorers Full Name & Affiliation: LK / MB  
River Code:    STORET #:    Lat./Long.: 37.115679, -80.060300 Office verified location

**1] SUBSTRATE** Check ONLY Two substrate TYPE BOXES; estimate % or note every type present

<b>BEST TYPES</b>	<b>POOL RIFFLE</b>	<b>OTHER TYPES</b>	<b>POOL RIFFLE</b>	<b>ORIGIN</b>	<b>QUALITY</b>
<input type="checkbox"/> BLDR /SLABS [10]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> HARDPAN [4]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> LIMESTONE [1]	<input type="checkbox"/> HEAVY [-2]
<input type="checkbox"/> BOULDER [9]	<input type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> DETRITUS [3]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> TILLS [1]	<input type="checkbox"/> MODERATE [-1]
<input checked="" type="checkbox"/> COBBLE [8]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> MUCK [2]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> WETLANDS [0]	<input type="checkbox"/> NORMAL [0]
<input checked="" type="checkbox"/> GRAVEL [7]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> SILT [2]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> HARDPAN [0]	<input type="checkbox"/> FREE [1]
<input type="checkbox"/> SAND [6]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> ARTIFICIAL [0]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> SANDSTONE [0]	<input type="checkbox"/> EXTENSIVE [-2]
<input type="checkbox"/> BEDROCK [5]	<input type="checkbox"/> <input type="checkbox"/>			<input type="checkbox"/> RIP/RAP [0]	<input type="checkbox"/> MODERATE [-1]

NUMBER OF BEST TYPES:  4 or more [2]  3 or less [0]

Comments:   

Substrate 18  
Maximum 20

**2] INSTREAM COVER** Indicate presence 0 to 3: 0-Absent; 1-Very small amounts or if more common of marginal quality; 2-Moderate amounts, but not of highest quality or in small amounts of highest quality; 3-Highest quality in moderate or greater amounts (e.g., very large boulders in deep or fast water, large diameter log that is stable, well developed rootwad in deep / fast water, or deep, well-defined, functional pools.

<input type="checkbox"/> UNDERCUT BANKS [1]	<input type="checkbox"/> POOLS > 70cm [2]	<input type="checkbox"/> OXBOWS, BACKWATERS [1]	<b>AMOUNT</b>
<input type="checkbox"/> OVERHANGING VEGETATION [1]	<input type="checkbox"/> ROOTWADS [1]	<input type="checkbox"/> AQUATIC MACROPHYTES [1]	Check ONE (Or 2 & average)
<input type="checkbox"/> SHALLOWS (IN SLOW WATER) [1]	<input type="checkbox"/> BOULDERS [1]	<input type="checkbox"/> LOGS OR WOODY DEBRIS [1]	<input type="checkbox"/> EXTENSIVE >75% [11]
<input type="checkbox"/> ROOTMATS [1]			<input type="checkbox"/> MODERATE 25-75% [7]
			<input type="checkbox"/> SPARSE 5-<25% [3]
			<input type="checkbox"/> NEARLY ABSENT <5% [1]

Comments:   

Cover    
Maximum 20

**3] CHANNEL MORPHOLOGY** Check ONE in each category (Or 2 & average)

<b>SINUOSITY</b>	<b>DEVELOPMENT</b>	<b>CHANNELIZATION</b>	<b>STABILITY</b>
<input type="checkbox"/> HIGH [4]	<input type="checkbox"/> EXCELLENT [7]	<input checked="" type="checkbox"/> NONE [6]	<input checked="" type="checkbox"/> HIGH [3]
<input type="checkbox"/> MODERATE [3]	<input type="checkbox"/> GOOD [5]	<input type="checkbox"/> RECOVERED [4]	<input type="checkbox"/> MODERATE [2]
<input checked="" type="checkbox"/> LOW [2]	<input checked="" type="checkbox"/> FAIR [3]	<input type="checkbox"/> RECOVERING [3]	<input type="checkbox"/> LOW [1]
<input type="checkbox"/> NONE [1]	<input type="checkbox"/> POOR [1]	<input type="checkbox"/> RECENT OR NO RECOVERY [1]	

Comments:   

Channel 14  
Maximum 20

**4] BANK EROSION AND RIPARIAN ZONE** Check ONE in each category for EACH BANK (Or 2 per bank & average)

<b>EROSION</b>	<b>RIPARIAN WIDTH</b>	<b>FLOOD PLAIN QUALITY</b>	<b>CONSERVATION TILLAGE</b>
<input type="checkbox"/> NONE / LITTLE [3]	<input type="checkbox"/> WIDE > 50m [4]	<input type="checkbox"/> FOREST, SWAMP [3]	<input type="checkbox"/> URBAN OR INDUSTRIAL [0]
<input type="checkbox"/> MODERATE [2]	<input type="checkbox"/> MODERATE 10-50m [3]	<input type="checkbox"/> SHRUB OR OLD FIELD [2]	<input type="checkbox"/> MINING / CONSTRUCTION [0]
<input type="checkbox"/> HEAVY / SEVERE [1]	<input type="checkbox"/> NARROW 5-10m [2]	<input type="checkbox"/> RESIDENTIAL, PARK, NEW FIELD [1]	
	<input type="checkbox"/> VERY NARROW < 5m [1]	<input type="checkbox"/> FENCED PASTURE [1]	
	<input type="checkbox"/> NONE [0]	<input type="checkbox"/> OPEN PASTURE, ROWCROP [0]	

Comments:   

Riparian    
Maximum 10

**5] POOL / GLIDE AND RIFFLE / RUN QUALITY**

<b>MAXIMUM DEPTH</b>	<b>CHANNEL WIDTH</b>	<b>CURRENT VELOCITY</b>	<b>Recreation Potential</b>
Check ONE (ONLY!)	Check ONE (Or 2 & average)	Check ALL that apply	Primary Contact
<input type="checkbox"/> > 1m [6]	<input type="checkbox"/> POOL WIDTH > RIFFLE WIDTH [2]	<input type="checkbox"/> TORRENTIAL [-1]	Secondary Contact
<input type="checkbox"/> 0.7-<1m [4]	<input checked="" type="checkbox"/> POOL WIDTH = RIFFLE WIDTH [1]	<input checked="" type="checkbox"/> SLOW [1]	(circle one and comment on back)
<input type="checkbox"/> 0.4-<0.7m [2]	<input type="checkbox"/> POOL WIDTH > RIFFLE WIDTH [0]	<input type="checkbox"/> VERY FAST [1]	
<input checked="" type="checkbox"/> 0.2-<0.4m [1]		<input checked="" type="checkbox"/> FAST [1]	
<input type="checkbox"/> < 0.2m [0]		<input type="checkbox"/> INTERSTITIAL [-1]	
		<input type="checkbox"/> INTERMITTENT [-2]	
		<input checked="" type="checkbox"/> MODERATE [1]	
		<input type="checkbox"/> EDDIES [1]	

Comments:   

Pool / Current 5  
Maximum 12

**Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species:** Check ONE (Or 2 & average).  NO RIFFLE [metric=0]

<b>RIFFLE DEPTH</b>	<b>RUN DEPTH</b>	<b>RIFFLE / RUN SUBSTRATE</b>	<b>RIFFLE / RUN EMBEDDEDNESS</b>
<input checked="" type="checkbox"/> BEST AREAS > 10cm [2]	<input type="checkbox"/> MAXIMUM > 50cm [2]	<input checked="" type="checkbox"/> STABLE (e.g., Cobble, Boulder) [2]	<input checked="" type="checkbox"/> NONE [2]
<input type="checkbox"/> BEST AREAS 5-10cm [1]	<input checked="" type="checkbox"/> MAXIMUM < 50cm [1]	<input type="checkbox"/> MOD. STABLE (e.g., Large Gravel) [1]	<input type="checkbox"/> LOW [1]
<input type="checkbox"/> BEST AREAS < 5cm [metric=0]		<input type="checkbox"/> UNSTABLE (e.g., Fine Gravel, Sand) [0]	<input type="checkbox"/> MODERATE [0]
			<input type="checkbox"/> EXTENSIVE [-1]

Comments:   

Riffle / Run 7  
Maximum 8

**6] GRADIENT (** ft/mi)  VERY LOW - LOW [2-4] **%POOL:** 15 **%GLIDE:**  

**DRAINAGE AREA** ( mi<sup>2</sup>)  MODERATE [6-10] **%RUN:** 5 **%RIFFLE:** 80

HIGH - VERY HIGH [10-6] **Gradient**    
Maximum 10

**A) SAMPLED REACH**

Check ALL that apply

**METHOD**

- BOAT
- WADE
- L. LINE
- OTHER

**DISTANCE**

- 0.5 Km
- 0.2 Km
- 0.15 Km
- 0.12 Km
- OTHER

meters

**CANOPY**

- > 85%- OPEN
- 55%~<85%
- 30%~<55%
- 10%~<30%
- <10%- CLOSED

**STAGE**

1st-sample pass- 2nd

- HIGH
- UP
- NORMAL
- LOW
- DRY

**CLARITY**

1st --sample pass-- 2nd

- < 20 cm
- 20-<40 cm
- 40-70 cm
- > 70 cm/ CTB
- SECCHI DEPTH

1st \_\_\_\_\_ cm

2nd \_\_\_\_\_ cm

**C) RECREATION**

AREA DEPTH

POOL:  >100ft<sup>2</sup>  >3ft

Comment RE: Reach consistency/Is reach typical of stream?, Recreation/ Observed - Inferred, Other/ Sampling observations, Concerns, Access directions, etc.

S-III4: Reach limited to LOTS UP/DOWN STREAM is an excellent riffle pool

complex; However due to shallow depth of pools and short pool lengths this is classified as a plane bed.

Plane Bed

**B) AESTHETICS**

- NUISANCE ALGAE
- INVASIVE MACROPHYTES
- EXCESS TURBIDITY
- DISCOLORATION
- FOAM / SCUM
- OIL SHEEN
- TRASH / LITTER
- NUISANCE ODOR
- SLUDGE DEPOSITS
- CSOs/SSOs/OUTFALLS

**D) MAINTENANCE**

Circle some & COMMENT

- PUBLIC / PRIVATE / BOTH / NA
- ACTIVE / HISTORIC / BOTH / NA
- YOUNG-SUCCESSION-OLD
- SPRAY / SNAG / REMOVED
- MODIFIED / DIPPED OUT / NA
- LEVEED / ONE SIDED
- RELOCATED / CUTOFFS
- MOVING-BEDLOAD-STABLE
- ARMoured / SLUMPS
- ISLANDS / SCOURED
- IMPOUNDED / DESICCATED
- FLOOD CONTROL / DRAINAGE

**E) ISSUES**

- WWTP / CSO / NPDES / INDUSTRY
- HARDENED / URBAN / DIRT&GRIME
- CONTAMINATED / LANDFILL
- BMPs-CONSTRUCTION-SEDIMENT
- LOGGING / IRRIGATION / COOLING
- BANK / EROSION / SURFACE
- FALSE BANK / MANURE / LAGOON
- WASH H<sub>2</sub>O / TILE / H<sub>2</sub>O TABLE
- ACID / MINE / QUARRY / FLOW
- NATURAL / WETLAND / STAGNANT
- PARK / GOLF / LAWN / HOME
- ATMOSPHERE / DATA PAUCITY

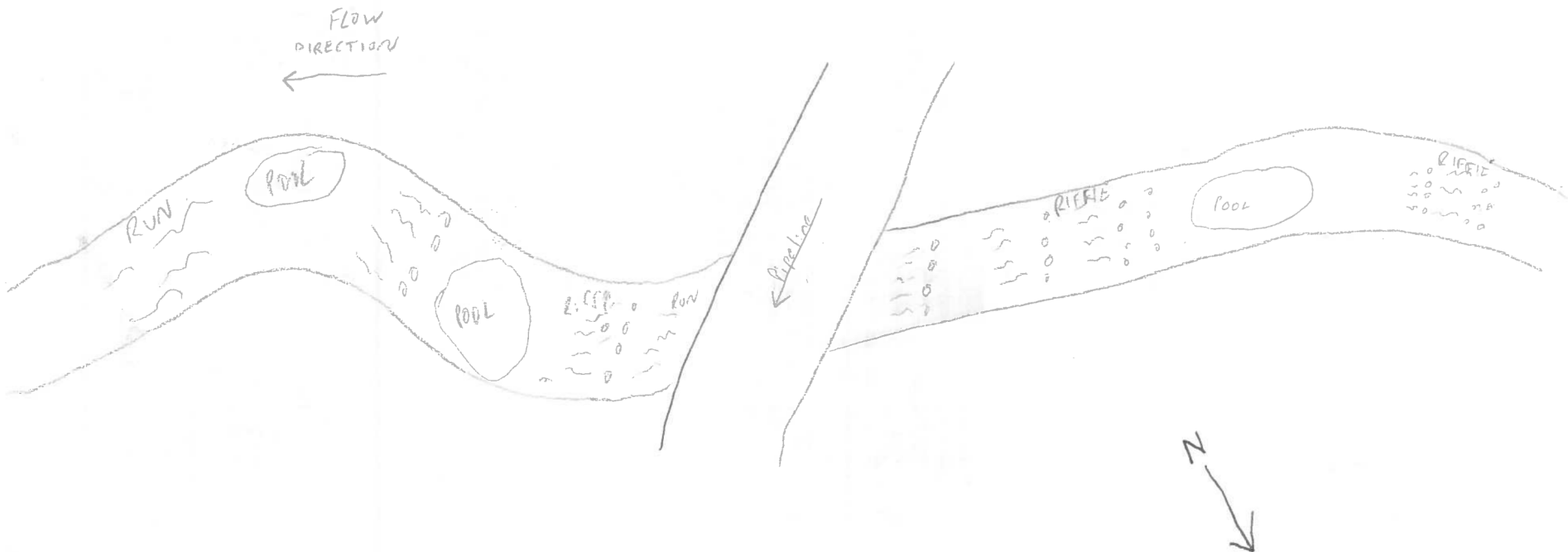
**F) MEASUREMENTS**

- $\bar{x}$  width
- $\bar{x}$  depth
- max. depth
- $\bar{x}$  bankfull width
- bankfull  $\bar{x}$  depth
- W/D ratio
- bankfull max. depth
- floodprone  $x^2$  width
- entrench. ratio

Legacy Tree:

**Stream Drawing:**

W = 7feet  
D = 1foot or  $\approx 30cm$



Stream & Location: IJ 88 RM:    Date: 11/19/21

Scorers Full Name & Affiliation: LK/MB  
River Code:    STORET #:    Lat./Long.: 37.168395, -80.138295 Office verified location

1] **SUBSTRATE** Check ONLY Two substrate TYPE BOXES; estimate % or note every type present

<b>BEST TYPES</b>	<b>POOL RIFFLE</b>	<b>OTHER TYPES</b>	<b>POOL RIFFLE</b>	<b>ORIGIN</b>	<b>QUALITY</b>
<input type="checkbox"/> BLDR /SLABS [10]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> HARDPAN [4]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> LIMESTONE [1]	<input type="checkbox"/> HEAVY [-2]
<input type="checkbox"/> BOULDER [9]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> DETRITUS [3]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> TILLS [1]	<input type="checkbox"/> MODERATE [-1]
<input type="checkbox"/> COBBLE [8]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> MUCK [2]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> WETLANDS [0]	<input type="checkbox"/> NORMAL [0]
<input checked="" type="checkbox"/> GRAVEL [7]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> SILT [2]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> HARDPAN [0]	<input type="checkbox"/> FREE [1]
<input type="checkbox"/> SAND [6]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> ARTIFICIAL [0]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> SANDSTONE [0]	<input type="checkbox"/> EXTENSIVE [-2]
<input type="checkbox"/> BEDROCK [5]	<input type="checkbox"/> <input type="checkbox"/>			<input type="checkbox"/> RIP/RAP [0]	<input type="checkbox"/> MODERATE [-1]

NUMBER OF BEST TYPES:  4 or more [2]  3 or less [0]

Comments:   

2] **INSTREAM COVER** Indicate presence 0 to 3: 0-Absent; 1-Very small amounts or if more common of marginal quality; 2-Moderate amounts, but not of highest quality or in small amounts of highest quality; 3-Highest quality in moderate or greater amounts (e.g., very large boulders in deep or fast water, large diameter log that is stable, well developed rootwad in deep / fast water, or deep, well-defined, functional pools.

<input type="checkbox"/> UNDERCUT BANKS [1]	<input type="checkbox"/> POOLS > 70cm [2]	<input type="checkbox"/> OXBOWS, BACKWATERS [1]	<input type="checkbox"/> EXTENSIVE >75% [11]
<input type="checkbox"/> OVERHANGING VEGETATION [1]	<input type="checkbox"/> ROOTWADS [1]	<input type="checkbox"/> AQUATIC MACROPHYTES [1]	<input type="checkbox"/> MODERATE 25-75% [7]
<input type="checkbox"/> SHALLOWS (IN SLOW WATER) [1]	<input type="checkbox"/> BOULDERS [1]	<input type="checkbox"/> LOGS OR WOODY DEBRIS [1]	<input type="checkbox"/> SPARSE 5-<25% [3]
<input type="checkbox"/> ROOTMATS [1]			<input type="checkbox"/> NEARLY ABSENT <5% [1]

Comments:   

3] **CHANNEL MORPHOLOGY** Check ONE in each category (Or 2 & average)

<b>SINUOSITY</b>	<b>DEVELOPMENT</b>	<b>CHANNELIZATION</b>	<b>STABILITY</b>
<input type="checkbox"/> HIGH [4]	<input checked="" type="checkbox"/> EXCELLENT [7]	<input checked="" type="checkbox"/> NONE [6]	<input checked="" type="checkbox"/> HIGH [3]
<input checked="" type="checkbox"/> MODERATE [3]	<input type="checkbox"/> GOOD [5]	<input type="checkbox"/> RECOVERED [4]	<input type="checkbox"/> MODERATE [2]
<input type="checkbox"/> LOW [2]	<input type="checkbox"/> FAIR [3]	<input type="checkbox"/> RECOVERING [3]	<input type="checkbox"/> LOW [1]
<input type="checkbox"/> NONE [1]	<input type="checkbox"/> POOR [1]	<input type="checkbox"/> RECENT OR NO RECOVERY [1]	

Comments:   

4] **BANK EROSION AND RIPARIAN ZONE** Check ONE in each category for EACH BANK (Or 2 per bank & average)

<b>EROSION</b>	<b>RIPARIAN WIDTH</b>	<b>FLOOD PLAIN QUALITY</b>
<input type="checkbox"/> NONE / LITTLE [3]	<input type="checkbox"/> WIDE > 50m [4]	<input type="checkbox"/> FOREST, SWAMP [3]
<input type="checkbox"/> MODERATE [2]	<input type="checkbox"/> MODERATE 10-50m [3]	<input type="checkbox"/> SHRUB OR OLD FIELD [2]
<input type="checkbox"/> HEAVY / SEVERE [1]	<input type="checkbox"/> NARROW 5-10m [2]	<input type="checkbox"/> RESIDENTIAL, PARK, NEW FIELD [1]
	<input type="checkbox"/> VERY NARROW < 5m [1]	<input type="checkbox"/> FENCED PASTURE [1]
	<input type="checkbox"/> NONE [0]	<input type="checkbox"/> OPEN PASTURE, ROWCROP [0]

Comments:   

5] **POOL / GLIDE AND RIFFLE / RUN QUALITY**

<b>MAXIMUM DEPTH</b>	<b>CHANNEL WIDTH</b>	<b>CURRENT VELOCITY</b>
<input checked="" type="checkbox"/> > 1m [6]	<input checked="" type="checkbox"/> POOL WIDTH > RIFFLE WIDTH [2]	<input type="checkbox"/> TORRENTIAL [-1]
<input type="checkbox"/> 0.7-<1m [4]	<input type="checkbox"/> POOL WIDTH = RIFFLE WIDTH [1]	<input checked="" type="checkbox"/> SLOW [1]
<input type="checkbox"/> 0.4-<0.7m [2]	<input type="checkbox"/> POOL WIDTH > RIFFLE WIDTH [0]	<input type="checkbox"/> INTERSTITIAL [-1]
<input type="checkbox"/> 0.2-<0.4m [1]		<input type="checkbox"/> INTERMITTENT [-2]
<input type="checkbox"/> < 0.2m [0]		<input checked="" type="checkbox"/> MODERATE [1]

Comments:   

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species:  NO RIFFLE [metric=0]

<b>RIFFLE DEPTH</b>	<b>RUN DEPTH</b>	<b>RIFFLE / RUN SUBSTRATE</b>	<b>RIFFLE / RUN EMBEDDEDNESS</b>
<input checked="" type="checkbox"/> BEST AREAS > 10cm [2]	<input checked="" type="checkbox"/> MAXIMUM > 50cm [2]	<input type="checkbox"/> STABLE (e.g., Cobble, Boulder) [2]	<input type="checkbox"/> NONE [2]
<input type="checkbox"/> BEST AREAS 5-10cm [1]	<input type="checkbox"/> MAXIMUM < 50cm [1]	<input checked="" type="checkbox"/> MOD. STABLE (e.g., Large Gravel) [1]	<input type="checkbox"/> LOW [1]
<input type="checkbox"/> BEST AREAS < 5cm [metric=0]		<input type="checkbox"/> UNSTABLE (e.g., Fine Gravel, Sand) [0]	<input checked="" type="checkbox"/> MODERATE [0]
			<input type="checkbox"/> EXTENSIVE [-1]

Comments:   

6] **GRADIENT** (ft/mi)  VERY LOW - LOW [2-4]  MODERATE [6-10]  HIGH - VERY HIGH [10-6]

**DRAINAGE AREA** (mi<sup>2</sup>)

%POOL: 30 %GLIDE:    %RUN: 50 %RIFFLE: 20

Comments:

**A) SAMPLED REACH**

Check ALL that apply

**METHOD**

- BOAT
- WADE
- L. LINE
- OTHER

**DISTANCE**

- 0.5 Km
- 0.2 Km
- 0.15 Km
- 0.12 Km
- OTHER

meters

**CANOPY**

- > 85%- OPEN
- 55%~<85%
- 30%~<55%
- 10%~<30%
- <10%- CLOSED

**STAGE**

1st -sample pass- 2nd

- HIGH
- UP
- NORMAL
- LOW
- DRY

**CLARITY**

1st --sample pass-- 2nd

- < 20 cm
- 20~<40 cm
- 40-70 cm
- > 70 cm/ CTB
- SECCHI DEPTH

1st \_\_\_\_\_ cm

2nd \_\_\_\_\_ cm

**CJ RECREATION**

AREA DEPTH

POOL:  >100ft<sup>2</sup>  >3ft

**BJ AESTHETICS**

- NUISANCE ALGAE
- INVASIVE MACROPHYTES
- EXCESS TURBIDITY
- DISCOLORATION
- FOAM / SCUM
- OIL SHEEN
- TRASH / LITTER
- NUISANCE ODOR
- SLUDGE DEPOSITS
- CSOs/SSOs/OUTFALLS

**DJ MAINTENANCE**

- PUBLIC / PRIVATE / BOTH / NA
- ACTIVE / HISTORIC / BOTH / NA
- YOUNG-SUCCESSION-OLD
- SPRAY / SNAG / REMOVED
- MODIFIED / DIPPED OUT / NA
- LEVEED / ONE SIDED
- RELOCATED / CUTOFFS
- MOVING-BEDLOAD-STABLE
- ARMOURED / SLUMPS
- ISLANDS / SCOURED
- IMPOUNDED / DESICCATED
- FLOOD CONTROL / DRAINAGE

Circle some & COMMENT

**EJ ISSUES**

- WWTP / CSO / NPDES / INDUSTRY
- HARDENED / URBAN / DIRT&GRIME
- CONTAMINATED / LANDFILL
- BMPs-CONSTRUCTION-SEDIMENT
- LOGGING / IRRIGATION / COOLING
- BANK / EROSION / SURFACE
- FALSE BANK / MANURE / LAGOON
- WASH H<sub>2</sub>O / TILE / H<sub>2</sub>O TABLE
- ACID / MINE / QUARRY / FLOW
- NATURAL / WETLAND / STAGNANT
- PARK / GOLF / LAWN / HOME
- ATMOSPHERE / DATA PAUCITY

**FJ MEASUREMENTS**

- $\bar{x}$  width
- $\bar{x}$  depth
- max. depth
- $\bar{x}$  bankfull width
- bankfull  $\bar{x}$  depth
- W/D ratio
- bankfull max. depth
- floodprone  $x^2$  width
- entrench. ratio

Legacy Tree:

Comment RE: Reach consistency/ Is reach typical of stream?, Recreation/ Observed - Inferred, Other/ Sampling observations, Concerns, Access directions, etc.

S-IBB: Reach limited to 100' Exposed riffle pool development. No pool bars

No timber snags. small cobbles/gravel in riffles. Pool bottoms are ~3.25' deep with sand deposits. Plenty of snags and fish species present.

Riffle-Pool

**Stream Drawing:**



Stream & Location: S-021 RM:    Date: 11/20/21

Scorers Full Name & Affiliation: LK MBCC

River Code:    STORET #:    Lat./ Long.: 37.251791, -80.258990 Office verified location

1] SUBSTRATE Check ONLY Two substrate TYPE BOXES; estimate % or note every type present

Check ONE (Or 2 & average)

<b>BEST TYPES</b>	<b>POOL RIFFLE</b>	<b>OTHER TYPES</b>	<b>POOL RIFFLE</b>	<b>ORIGIN</b>	<b>QUALITY</b>
<input type="checkbox"/> BLDR /SLABS [10]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> HARDPAN [4]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> LIMESTONE [1]	<input type="checkbox"/> HEAVY [-2]
<input type="checkbox"/> BOULDER [9]	<input type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> DETRITUS [3]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> TILLS [1]	<input type="checkbox"/> MODERATE [-1]
<input checked="" type="checkbox"/> COBBLE [8]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> MUCK [2]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> WETLANDS [0]	<input type="checkbox"/> NORMAL [0]
<input type="checkbox"/> GRAVEL [7]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> SILT [2]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> HARDPAN [0]	<input type="checkbox"/> FREE [1]
<input checked="" type="checkbox"/> SAND [6]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> ARTIFICIAL [0]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> SANDSTONE [0]	<input type="checkbox"/> EXTENSIVE [-2]
<input type="checkbox"/> BEDROCK [5]	<input type="checkbox"/> <input type="checkbox"/>			<input type="checkbox"/> RIP/RAP [0]	<input type="checkbox"/> MODERATE [-1]
(Score natural substrates; ignore sludge from point-sources)				<input type="checkbox"/> LACUSTURINE [0]	<input type="checkbox"/> NORMAL [0]
<b>NUMBER OF BEST TYPES:</b> <input type="checkbox"/> 4 or more [2] <input type="checkbox"/> 3 or less [0]				<input type="checkbox"/> SHALE [-1]	<input type="checkbox"/> NONE [1]
<i>Comments</i>				<input type="checkbox"/> COAL FINES [-2]	<b>Substrate</b> <span style="border: 1px solid black; border-radius: 50%; padding: 5px; display: inline-block; text-align: center;">17</span> Maximum 20

2] INSTREAM COVER Indicate presence 0 to 3: 0-Absent; 1-Very small amounts or if more common of marginal quality; 2-Moderate amounts, but not of highest quality or in small amounts of highest quality; 3-Highest quality in moderate or greater amounts (e.g., very large boulders in deep or fast water, large diameter log that is stable, well developed rootwad in deep / fast water, or deep, well-defined, functional pools.

AMOUNT

Check ONE (Or 2 & average)

<input type="checkbox"/> UNDERCUT BANKS [1]	<input type="checkbox"/> POOLS > 70cm [2]	<input type="checkbox"/> OXBOWS, BACKWATERS [1]	<input type="checkbox"/> EXTENSIVE >75% [11]
<input type="checkbox"/> OVERHANGING VEGETATION [1]	<input type="checkbox"/> ROOTWADS [1]	<input type="checkbox"/> AQUATIC MACROPHYTES [1]	<input type="checkbox"/> MODERATE 25-75% [7]
<input type="checkbox"/> SHALLOWS (IN SLOW WATER) [1]	<input type="checkbox"/> BOULDERS [1]	<input type="checkbox"/> LOGS OR WOODY DEBRIS [1]	<input type="checkbox"/> SPARSE 5-<25% [3]
<input type="checkbox"/> ROOTMATS [1]			<input type="checkbox"/> NEARLY ABSENT <5% [1]
<i>Comments</i>			<b>Cover</b> Maximum 20 <span style="border: 1px solid black; border-radius: 50%; padding: 2px 10px;">  </span>

3] CHANNEL MORPHOLOGY Check ONE in each category (Or 2 & average)

<b>SINUOSITY</b>	<b>DEVELOPMENT</b>	<b>CHANNELIZATION</b>	<b>STABILITY</b>
<input type="checkbox"/> HIGH [4]	<input type="checkbox"/> EXCELLENT [7]	<input checked="" type="checkbox"/> NONE [6]	<input type="checkbox"/> HIGH [3]
<input type="checkbox"/> MODERATE [3]	<input type="checkbox"/> GOOD [5]	<input type="checkbox"/> RECOVERED [4]	<input checked="" type="checkbox"/> MODERATE [2]
<input checked="" type="checkbox"/> LOW [2]	<input checked="" type="checkbox"/> FAIR [3]	<input type="checkbox"/> RECOVERING [3]	<input type="checkbox"/> LOW [1]
<input checked="" type="checkbox"/> NONE [1]	<input type="checkbox"/> POOR [1]	<input type="checkbox"/> RECENT OR NO RECOVERY [1]	
<i>Comments</i>			<b>Channel</b> Maximum 20 <span style="border: 1px solid black; border-radius: 50%; padding: 2px 10px;">12</span>

4] BANK EROSION AND RIPARIAN ZONE Check ONE in each category for EACH BANK (Or 2 per bank & average)

<b>EROSION</b>	<b>RIPARIAN WIDTH</b>	<b>FLOOD PLAIN QUALITY</b>
<input type="checkbox"/> NONE / LITTLE [3]	<input type="checkbox"/> WIDE > 50m [4]	<input type="checkbox"/> FOREST, SWAMP [3]
<input type="checkbox"/> MODERATE [2]	<input type="checkbox"/> MODERATE 10-50m [3]	<input type="checkbox"/> SHRUB OR OLD FIELD [2]
<input type="checkbox"/> HEAVY / SEVERE [1]	<input type="checkbox"/> NARROW 5-10m [2]	<input type="checkbox"/> RESIDENTIAL, PARK, NEW FIELD [1]
	<input type="checkbox"/> VERY NARROW < 5m [1]	<input type="checkbox"/> FENCED PASTURE [1]
	<input type="checkbox"/> NONE [0]	<input type="checkbox"/> OPEN PASTURE, ROWCROP [0]
		<input type="checkbox"/> CONSERVATION TILLAGE [1]
		<input type="checkbox"/> URBAN OR INDUSTRIAL [0]
		<input type="checkbox"/> MINING / CONSTRUCTION [0]
<i>Comments</i>		
Indicate predominant land use(s) past 100m riparian. <b>Riparian</b> Maximum 10 <span style="border: 1px solid black; border-radius: 50%; padding: 2px 10px;">  </span>		

5] POOL / GLIDE AND RIFFLE / RUN QUALITY

<b>MAXIMUM DEPTH</b>	<b>CHANNEL WIDTH</b>	<b>CURRENT VELOCITY</b>	<b>Recreation Potential</b>
Check ONE (ONLY!)	Check ONE (Or 2 & average)	Check ALL that apply	Primary Contact
<input type="checkbox"/> > 1m [6]	<input checked="" type="checkbox"/> POOL WIDTH > RIFFLE WIDTH [2]	<input type="checkbox"/> TORRENTIAL [-1]	Secondary Contact
<input type="checkbox"/> 0.7-<1m [4]	<input type="checkbox"/> POOL WIDTH = RIFFLE WIDTH [1]	<input type="checkbox"/> VERY FAST [1]	(circle one and comment on back)
<input checked="" type="checkbox"/> 0.4-<0.7m [2]	<input type="checkbox"/> POOL WIDTH > RIFFLE WIDTH [0]	<input type="checkbox"/> FAST [1]	
<input type="checkbox"/> 0.2-<0.4m [1]		<input checked="" type="checkbox"/> MODERATE [1]	
<input type="checkbox"/> < 0.2m [0]		<input type="checkbox"/> INTERSTITIAL [-1]	
		<input type="checkbox"/> INTERMITTENT [-2]	
		<input type="checkbox"/> EDDIES [1]	
<i>Comments</i>			<b>Pool / Current</b> Maximum 12 <span style="border: 1px solid black; border-radius: 50%; padding: 2px 10px;">6</span>

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species:

Check ONE (Or 2 & average).

NO RIFFLE [metric=0]

<b>RIFFLE DEPTH</b>	<b>RUN DEPTH</b>	<b>RIFFLE / RUN SUBSTRATE</b>	<b>RIFFLE / RUN EMBEDDEDNESS</b>
<input checked="" type="checkbox"/> BEST AREAS > 10cm [2]	<input checked="" type="checkbox"/> MAXIMUM > 50cm [2]	<input checked="" type="checkbox"/> STABLE (e.g., Cobble, Boulder) [2]	<input type="checkbox"/> NONE [2]
<input type="checkbox"/> BEST AREAS 5-10cm [1]	<input type="checkbox"/> MAXIMUM < 50cm [1]	<input type="checkbox"/> MOD. STABLE (e.g., Large Gravel) [1]	<input checked="" type="checkbox"/> LOW [1]
<input type="checkbox"/> BEST AREAS < 5cm [metric=0]		<input type="checkbox"/> UNSTABLE (e.g., Fine Gravel, Sand) [0]	<input type="checkbox"/> MODERATE [0]
			<input type="checkbox"/> EXTENSIVE [-1]
<i>Comments</i>			<b>Riffle / Run</b> Maximum 8 <span style="border: 1px solid black; border-radius: 50%; padding: 2px 10px;">7</span>

6] GRADIENT ( ft/mi)  VERY LOW - LOW [2-4]  MODERATE [6-10]  HIGH - VERY HIGH [10-6]

%POOL: 10 %GLIDE:     
%RUN: 65 %RIFFLE: 25

**Gradient**  
Maximum 10

**A) SAMPLED REACH**

Check ALL that apply

**METHOD**

- BOAT
- WADE
- L. LINE
- OTHER

**STAGE**

- 1st -sample pass- 2nd
- HIGH
  - UP
  - NORMAL
  - LOW
  - DRY

**DISTANCE**

- 0.5 Km
- 0.2 Km
- 0.15 Km
- 0.12 Km
- OTHER

**CLARITY**

- 1st --sample pass-- 2nd
- < 20 cm
  - 20-<40 cm
  - 40-70 cm
  - > 70 cm/ CTB
  - SECCHI DEPTH

**CANOPY**

- 1st \_\_\_\_\_ cm  
pass  
2nd \_\_\_\_\_ cm
- > 85%- OPEN
  - 55%-<85%
  - 30%-<55%
  - 10%-<30%
  - <10%- CLOSED

**C) RECREATION**

AREA DEPTH

POOL:  >100ft<sup>2</sup>  >3ft

**B) AESTHETICS**

- NUISANCE ALGAE
- INVASIVE MACROPHYTES
- EXCESS TURBIDITY
- DISCOLORATION
- FOAM / SCUM
- OIL SHEEN
- TRASH / LITTER
- NUISANCE ODOR
- SLUDGE DEPOSITS
- CSOs/SSOs/OUTFALLS

**D) MAINTENANCE**

- PUBLIC / PRIVATE / BOTH / NA
- ACTIVE / HISTORIC / BOTH / NA
- YOUNG-SUCCESSION-OLD
- SPRAY / SNAG / REMOVED
- MODIFIED / DIPPED OUT / NA
- LEVEED / ONE SIDED
- RELOCATED / CUTOFFS
- MOVING-BEDLOAD-STABLE
- ARMOURED / SLUMPS
- ISLANDS / SCOURED
- IMPOUNDED / DESICCATED
- FLOOD CONTROL / DRAINAGE

Circle some & COMMENT

**E) ISSUES**

- WWTP / CSO / NPDES / INDUSTRY
- HARDENED / URBAN / DIRT&GRIME
- CONTAMINATED / LANDFILL
- BMPs-CONSTRUCTION-SEDIMENT
- LOGGING / IRRIGATION / COOLING
- BANK / EROSION / SURFACE
- FALSE BANK / MANURE / LAGOON
- WASH H<sub>2</sub>O / TILE / H<sub>2</sub>O TABLE
- ACID / MINE / QUARRY / FLOW
- NATURAL / WETLAND / STAGNANT
- PARK / GOLF / LAWN / HOME
- ATMOSPHERE / DATA PAUCITY

**F) MEASUREMENTS**

- $\bar{x}$  width
- $\bar{x}$  depth
- max. depth
- $\bar{x}$  bankfull width
- bankfull  $\bar{x}$  depth
- W/D ratio
- bankfull max. depth
- floodprone  $x^2$  width
- entrench. ratio

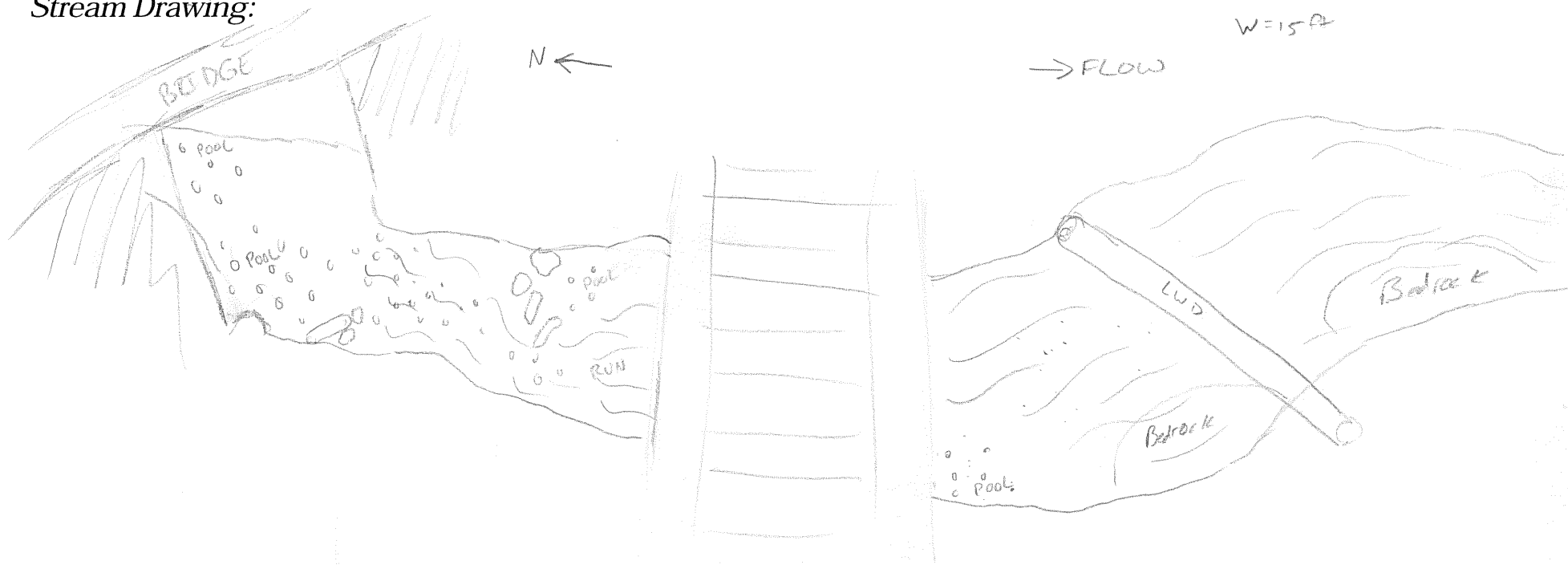
Legacy Tree:

Comment RE: Reach consistency/ Is reach typical of stream?, Recreation/ Observed - Inferred, Other/ Sampling observations, Concerns, Access directions, etc.

S-C21 - Reach limited to cob. R.O/s are rubble. some sand deposits in pools. The gradient is very low downstream. Lots of bedrock

Plane - Bed

**Stream Drawing:**





Stream & Location: S-NN17

RM:    Date: 11/20/21

Scorers Full Name & Affiliation: UC/MB/CC

River Code:    STORET #:    Lat./Long.: 37.311616, -80.515786 Office verified location

1] SUBSTRATE Check ONLY Two substrate TYPE BOXES; estimate % or note every type present

Check ONE (Or 2 & average)

<b>BEST TYPES</b>	<b>POOL RIFFLE</b>	<b>OTHER TYPES</b>	<b>POOL RIFFLE</b>	<b>ORIGIN</b>	<b>QUALITY</b>	17 Substrate Maximum 20
<input type="checkbox"/> BLDR /SLABS [10]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> HARDPAN [4]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> LIMESTONE [1]	<input type="checkbox"/> HEAVY [-2]	
<input checked="" type="checkbox"/> BOULDER [9]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> DETRITUS [3]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> TILLS [1]	<input type="checkbox"/> MODERATE [-1]	
<input checked="" type="checkbox"/> COBBLE [8]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> MUCK [2]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> WETLANDS [0]	<input type="checkbox"/> NORMAL [0]	
<input type="checkbox"/> GRAVEL [7]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> SILT [2]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> HARDPAN [0]	<input type="checkbox"/> FREE [1]	
<input type="checkbox"/> SAND [6]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> ARTIFICIAL [0]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> SANDSTONE [0]	<input type="checkbox"/> EXTENSIVE [-2]	
<input type="checkbox"/> BEDROCK [5]	<input type="checkbox"/> <input type="checkbox"/>	(Score natural substrates; ignore sludge from point-sources)		<input type="checkbox"/> RIP/RAP [0]	<input type="checkbox"/> MODERATE [-1]	
<b>NUMBER OF BEST TYPES:</b>	<input type="checkbox"/> 4 or more [2]	<input type="checkbox"/> 3 or less [0]		<input type="checkbox"/> LACUSTURINE [0]	<input type="checkbox"/> NORMAL [0]	
<i>Comments</i>				<input type="checkbox"/> SHALE [-1]	<input type="checkbox"/> NONE [1]	
				<input type="checkbox"/> COAL FINES [-2]		

2] INSTREAM COVER Indicate presence 0 to 3: 0-Absent; 1-Very small amounts or if more common of marginal quality; 2-Moderate amounts, but not of highest quality or in small amounts of highest quality; 3-Highest quality in moderate or greater amounts (e.g., very large boulders in deep or fast water, large diameter log that is stable, well developed rootwad in deep / fast water, or deep, well-defined, functional pools.

AMOUNT

Check ONE (Or 2 & average)

<input type="checkbox"/> UNDERCUT BANKS [1]	<input type="checkbox"/> POOLS > 70cm [2]	<input type="checkbox"/> OXBOWS, BACKWATERS [1]	<input type="checkbox"/> EXTENSIVE >75% [11]
<input type="checkbox"/> OVERHANGING VEGETATION [1]	<input type="checkbox"/> ROOTWADS [1]	<input type="checkbox"/> AQUATIC MACROPHYTES [1]	<input type="checkbox"/> MODERATE 25-75% [7]
<input type="checkbox"/> SHALLOWS (IN SLOW WATER) [1]	<input type="checkbox"/> BOULDERS [1]	<input type="checkbox"/> LOGS OR WOODY DEBRIS [1]	<input type="checkbox"/> SPARSE 5-<25% [3]
<input type="checkbox"/> ROOTMATS [1]			<input type="checkbox"/> NEARLY ABSENT <5% [1]
<i>Comments</i>			Cover Maximum 20

3] CHANNEL MORPHOLOGY Check ONE in each category (Or 2 & average)

<b>SINUOSITY</b>	<b>DEVELOPMENT</b>	<b>CHANNELIZATION</b>	<b>STABILITY</b>	Channel Maximum 20
<input type="checkbox"/> HIGH [4]	<input type="checkbox"/> EXCELLENT [7]	<input checked="" type="checkbox"/> NONE [6]	<input type="checkbox"/> HIGH [3]	
<input type="checkbox"/> MODERATE [3]	<input checked="" type="checkbox"/> GOOD [5]	<input type="checkbox"/> RECOVERED [4]	<input checked="" type="checkbox"/> MODERATE [2]	
<input type="checkbox"/> LOW [2]	<input type="checkbox"/> FAIR [3]	<input type="checkbox"/> RECOVERING [3]	<input type="checkbox"/> LOW [1]	
<input checked="" type="checkbox"/> NONE [1]	<input type="checkbox"/> POOR [1]	<input type="checkbox"/> RECENT OR NO RECOVERY [1]		
<i>Comments</i>				14

4] BANK EROSION AND RIPARIAN ZONE Check ONE in each category for EACH BANK (Or 2 per bank & average)

<b>EROSION</b>	<b>RIPARIAN WIDTH</b>	<b>FLOOD PLAIN QUALITY</b>	5 Riparian Maximum 10
<input type="checkbox"/> NONE / LITTLE [3]	<input type="checkbox"/> WIDE > 50m [4]	<input type="checkbox"/> FOREST, SWAMP [3]	
<input checked="" type="checkbox"/> MODERATE [2]	<input type="checkbox"/> MODERATE 10-50m [3]	<input type="checkbox"/> SHRUB OR OLD FIELD [2]	
<input type="checkbox"/> HEAVY / SEVERE [1]	<input type="checkbox"/> NARROW 5-10m [2]	<input type="checkbox"/> RESIDENTIAL, PARK, NEW FIELD [1]	
	<input type="checkbox"/> VERY NARROW < 5m [1]	<input type="checkbox"/> FENCED PASTURE [1]	
	<input type="checkbox"/> NONE [0]	<input type="checkbox"/> OPEN PASTURE, ROWCROP [0]	
<i>Comments</i>			9

5] POOL / GLIDE AND RIFFLE / RUN QUALITY

<b>MAXIMUM DEPTH</b>	<b>CHANNEL WIDTH</b>	<b>CURRENT VELOCITY</b>	Recreation Potential Primary Contact Secondary Contact (circle one and comment on back)
<input checked="" type="checkbox"/> > 1m [6]	<input checked="" type="checkbox"/> POOL WIDTH > RIFFLE WIDTH [2]	<input type="checkbox"/> TORRENTIAL [-1]	
<input type="checkbox"/> 0.7-<1m [4]	<input type="checkbox"/> POOL WIDTH = RIFFLE WIDTH [1]	<input checked="" type="checkbox"/> SLOW [1]	
<input type="checkbox"/> 0.4-<0.7m [2]	<input type="checkbox"/> POOL WIDTH > RIFFLE WIDTH [0]	<input type="checkbox"/> VERY FAST [1]	
<input type="checkbox"/> 0.2-<0.4m [1]		<input type="checkbox"/> FAST [1]	
<input type="checkbox"/> < 0.2m [0]		<input type="checkbox"/> MODERATE [1]	
<i>Comments</i>			Pool / Current Maximum 12

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species:

Check ONE (Or 2 & average).

NO RIFFLE [metric=0]

<b>RIFFLE DEPTH</b>	<b>RUN DEPTH</b>	<b>RIFFLE / RUN SUBSTRATE</b>	<b>RIFFLE / RUN EMBEDDEDNESS</b>	Riffle / Run Maximum 8
<input checked="" type="checkbox"/> BEST AREAS > 10cm [2]	<input checked="" type="checkbox"/> MAXIMUM > 50cm [2]	<input checked="" type="checkbox"/> STABLE (e.g., Cobble, Boulder) [2]	<input checked="" type="checkbox"/> NONE [2]	
<input type="checkbox"/> BEST AREAS 5-10cm [1]	<input type="checkbox"/> MAXIMUM < 50cm [1]	<input type="checkbox"/> MOD. STABLE (e.g., Large Gravel) [1]	<input type="checkbox"/> LOW [1]	
<input type="checkbox"/> BEST AREAS < 5cm [metric=0]		<input type="checkbox"/> UNSTABLE (e.g., Fine Gravel, Sand) [0]	<input type="checkbox"/> MODERATE [0]	
<i>Comments</i>			<input type="checkbox"/> EXTENSIVE [-1]	8

6] GRADIENT (	ft/mi)	<input type="checkbox"/> VERY LOW - LOW [2-4]	%POOL: <span style="border: 1px solid black; border-radius: 15px; padding: 2px 10px;">10</span>	%GLIDE: <span style="border: 1px solid black; border-radius: 15px; padding: 2px 10px;"> </span>	Gradient Maximum 10
DRAINAGE AREA	(	<input type="checkbox"/> MODERATE [6-10]	%RUN: <span style="border: 1px solid black; border-radius: 15px; padding: 2px 10px;">60</span>	%RIFFLE: <span style="border: 1px solid black; border-radius: 15px; padding: 2px 10px;">30</span>	
	mi <sup>2</sup> )	<input type="checkbox"/> HIGH - VERY HIGH [10-6]			

**A) SAMPLED REACH**

Check ALL that apply

**METHOD**

- BOAT
- WADE
- L. LINE
- OTHER

**STAGE**

- 1st -sample pass- 2nd
- HIGH
  - UP
  - NORMAL
  - LOW
  - DRY

**DISTANCE**

- 0.5 Km
- 0.2 Km
- 0.15 Km
- 0.12 Km
- OTHER

meters

**CANOPY**

- > 85%- OPEN
- 55%-<85%
- 30%-<55%
- 10%-<30%
- <10%- CLOSED

**CLARITY**

- 1st --sample pass-- 2nd
- < 20 cm
  - 20-<40 cm
  - 40-70 cm
  - > 70 cm/ CTB
  - SECCHI DEPTH

- 1st \_\_\_\_\_ cm
- pass
- 2nd \_\_\_\_\_ cm

**CJ RECREATION**

- AREA DEPTH
- POOL:  >100ft<sup>2</sup>  >3ft

Comment RE: Reach consistency/ Is reach typical of stream?, Recreation/ Observed - Inferred, Other/ Sampling observations, Concerns, Access directions, etc.

S-MN17. Reach limited to LOD, P. PAs further down stream.

Upstream of at LOD is all RUN, 2330 feet of riffles downstream of LOD

Riffle-Pool Complex

**B) AESTHETICS**

- NUISANCE ALGAE
- INVASIVE MACROPHYTES
- EXCESS TURBIDITY
- DISCOLORATION
- FOAM / SCUM
- OIL SHEEN
- TRASH / LITTER
- NUISANCE ODOR
- SLUDGE DEPOSITS
- CSOs/SSOs/OUTFALLS

**D) MAINTENANCE**

- PUBLIC / PRIVATE / BOTH / NA
- ACTIVE / HISTORIC / BOTH / NA
- YOUNG-SUCCESSION-OLD
- SPRAY / SNAG / REMOVED
- MODIFIED / DIPPED OUT / NA
- LEVEED / ONE SIDED
- RELOCATED / CUTOFFS
- MOVING-BEDLOAD-STABLE
- ARMoured / SLUMPS
- ISLANDS / SCoured
- IMPOUNDED / DESICCATED
- FLOOD CONTROL / DRAINAGE

Circle some & COMMENT

**E) ISSUES**

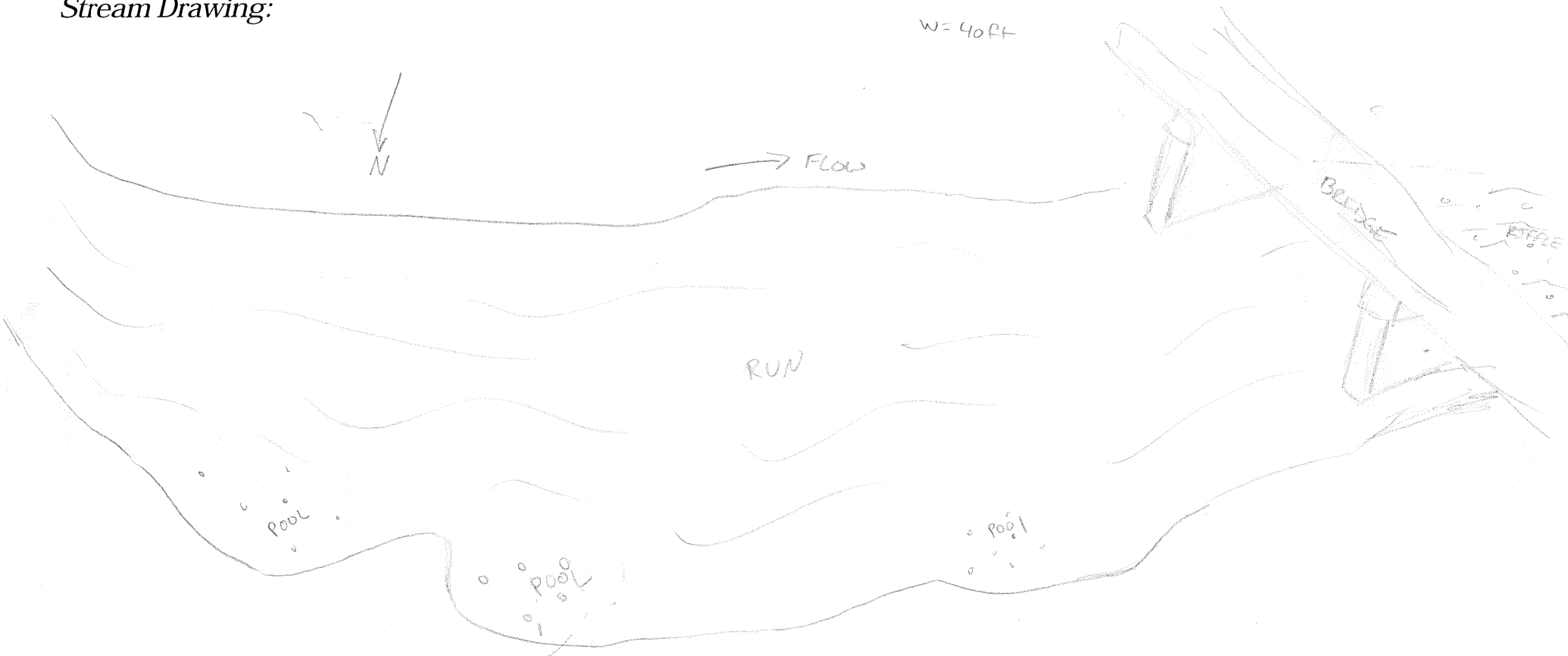
- WWTP / CSO / NPDES / INDUSTRY
- HARDENED / URBAN / DIRT&GRIME
- CONTAMINATED / LANDFILL
- BMPs-CONSTRUCTION-SEDIMENT
- LOGGING / IRRIGATION / COOLING
- BANK / EROSION / SURFACE
- FALSE BANK / MANURE / LAGOON
- WASH H<sub>2</sub>O / TILE / H<sub>2</sub>O TABLE
- ACID / MINE / QUARRY / FLOW
- NATURAL / WETLAND / STAGNANT
- PARK / GOLF / LAWN / HOME
- ATMOSPHERE / DATA PAUCITY

**F) MEASUREMENTS**

- $\bar{x}$  width
- $\bar{x}$  depth
- max. depth
- $\bar{x}$  bankfull width
- bankfull  $\bar{x}$  depth
- W/D ratio
- bankfull max. depth
- floodprone  $x^2$  width
- entrench. ratio

Legacy Tree:

**Stream Drawing:**



Stream & Location: S-006

RM:    Date: 11/20/21

Scorers Full Name & Affiliation: LK

River Code:    STORET #:    Lat./Long.: 37.313511, -80.404606 Office verified location

1] SUBSTRATE Check ONLY Two substrate TYPE BOXES; estimate % or note every type present

Check ONE (Or 2 & average)

<b>BEST TYPES</b>	<b>POOL RIFFLE</b>	<b>OTHER TYPES</b>	<b>POOL RIFFLE</b>	<b>ORIGIN</b>	<b>QUALITY</b>
<input type="checkbox"/> BLDR /SLABS [10]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> HARDPAN [4]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> LIMESTONE [1]	<input type="checkbox"/> HEAVY [-2]
<input type="checkbox"/> BOULDER [9]	<input type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> DETRITUS [3]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> TILLS [1]	<input type="checkbox"/> MODERATE [-1]
<input checked="" type="checkbox"/> COBBLE [8]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> MUCK [2]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> WETLANDS [0]	<input type="checkbox"/> NORMAL [0]
<input checked="" type="checkbox"/> GRAVEL [7]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> SILT [2]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> HARDPAN [0]	<input type="checkbox"/> FREE [1]
<input type="checkbox"/> SAND [6]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> ARTIFICIAL [0]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> SANDSTONE [0]	<input type="checkbox"/> EXTENSIVE [-2]
<input type="checkbox"/> BEDROCK [5]	<input type="checkbox"/> <input type="checkbox"/>	(Score natural substrates; ignore sludge from point-sources)		<input type="checkbox"/> RIP/RAP [0]	<input type="checkbox"/> MODERATE [-1]
<b>NUMBER OF BEST TYPES:</b>	<input type="checkbox"/> 4 or more [2]	<input type="checkbox"/> 3 or less [0]		<input type="checkbox"/> LACUSTURINE [0]	<input type="checkbox"/> NORMAL [0]
<i>Comments</i>				<input type="checkbox"/> SHALE [-1]	<input type="checkbox"/> NONE [1]
				<input type="checkbox"/> COAL FINES [-2]	

*Bedrock at pool bottoms.*

Substrate  
18  
Maximum 20

2] INSTREAM COVER Indicate presence 0 to 3: 0-Absent; 1-Very small amounts or if more common of marginal quality; 2-Moderate amounts, but not of highest quality or in small amounts of highest quality; 3-Highest quality in moderate or greater amounts (e.g., very large boulders in deep or fast water, large diameter log that is stable, well developed rootwad in deep / fast water, or deep, well-defined, functional pools.

AMOUNT

Check ONE (Or 2 & average)

<input type="checkbox"/> UNDERCUT BANKS [1]	<input type="checkbox"/> POOLS > 70cm [2]	<input type="checkbox"/> OXBOWS, BACKWATERS [1]	<input type="checkbox"/> EXTENSIVE >75% [1]
<input type="checkbox"/> OVERHANGING VEGETATION [1]	<input type="checkbox"/> ROOTWADS [1]	<input type="checkbox"/> AQUATIC MACROPHYTES [1]	<input type="checkbox"/> MODERATE 25-75% [7]
<input type="checkbox"/> SHALLOWS (IN SLOW WATER) [1]	<input type="checkbox"/> BOULDERS [1]	<input type="checkbox"/> LOGS OR WOODY DEBRIS [1]	<input type="checkbox"/> SPARSE 5-<25% [3]
<input type="checkbox"/> ROOTMATS [1]			<input type="checkbox"/> NEARLY ABSENT <5% [1]

*Comments*

Cover  
Maximum    
20

3] CHANNEL MORPHOLOGY Check ONE in each category (Or 2 & average)

<b>SINUOSITY</b>	<b>DEVELOPMENT</b>	<b>CHANNELIZATION</b>	<b>STABILITY</b>
<input type="checkbox"/> HIGH [4]	<input checked="" type="checkbox"/> EXCELLENT [7]	<input checked="" type="checkbox"/> NONE [6]	<input type="checkbox"/> HIGH [3]
<input type="checkbox"/> MODERATE [3]	<input type="checkbox"/> GOOD [5]	<input type="checkbox"/> RECOVERED [4]	<input checked="" type="checkbox"/> MODERATE [2]
<input checked="" type="checkbox"/> LOW [2]	<input type="checkbox"/> FAIR [3]	<input type="checkbox"/> RECOVERING [3]	<input type="checkbox"/> LOW [1]
<input type="checkbox"/> NONE [1]	<input type="checkbox"/> POOR [1]	<input type="checkbox"/> RECENT OR NO RECOVERY [1]	

*Comments*

*Left bank stable right bank has 2' cut bank*

Channel  
Maximum 17  
20

4] BANK EROSION AND RIPARIAN ZONE Check ONE in each category for EACH BANK (Or 2 per bank & average)

River right looking downstream

<b>EROSION</b>	<b>RIPARIAN WIDTH</b>	<b>FLOOD PLAIN QUALITY</b>
<input type="checkbox"/> NONE / LITTLE [3]	<input type="checkbox"/> WIDE > 50m [4]	<input type="checkbox"/> FOREST, SWAMP [3]
<input type="checkbox"/> MODERATE [2]	<input type="checkbox"/> MODERATE 10-50m [3]	<input type="checkbox"/> SHRUB OR OLD FIELD [2]
<input type="checkbox"/> HEAVY / SEVERE [1]	<input type="checkbox"/> NARROW 5-10m [2]	<input type="checkbox"/> RESIDENTIAL, PARK, NEW FIELD [1]
	<input type="checkbox"/> VERY NARROW < 5m [1]	<input type="checkbox"/> FENCED PASTURE [1]
	<input type="checkbox"/> NONE [0]	<input type="checkbox"/> OPEN PASTURE, ROWCROP [0]
		<input type="checkbox"/> CONSERVATION TILLAGE [1]
		<input type="checkbox"/> URBAN OR INDUSTRIAL [0]
		<input type="checkbox"/> MINING / CONSTRUCTION [0]

*Comments*

Indicate predominant land use(s) past 100m riparian.  
Riparian  
Maximum    
10

5] POOL / GLIDE AND RIFFLE / RUN QUALITY

MAXIMUM DEPTH

Check ONE (ONLY!)

> 1m [6]  
 0.7-<1m [4]  
 0.4-<0.7m [2]  
 0.2-<0.4m [1]  
 < 0.2m [0]

CHANNEL WIDTH

Check ONE (Or 2 & average)

POOL WIDTH > RIFFLE WIDTH [2]  
 POOL WIDTH = RIFFLE WIDTH [1]  
 POOL WIDTH < RIFFLE WIDTH [0]

CURRENT VELOCITY

Check ALL that apply

TORRENTIAL [-1]  SLOW [1]  
 VERY FAST [1]  INTERSTITIAL [-1]  
 FAST [1]  INTERMITTENT [-2]  
 MODERATE [1]  EDDIES [1]

Indicate for reach - pools and riffles.

*Comments*

Recreation Potential  
Primary Contact  
Secondary Contact  
(circle one and comment on back)

Pool / Current  
Maximum 12  
12

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species:

Check ONE (Or 2 & average).

NO RIFFLE [metric=0]

<b>RIFFLE DEPTH</b>	<b>RUN DEPTH</b>	<b>RIFFLE / RUN SUBSTRATE</b>	<b>RIFFLE / RUN EMBEDDEDNESS</b>
<input checked="" type="checkbox"/> BEST AREAS > 10cm [2]	<input type="checkbox"/> MAXIMUM > 50cm [2]	<input checked="" type="checkbox"/> STABLE (e.g., Cobble, Boulder) [2]	<input checked="" type="checkbox"/> NONE [2]
<input type="checkbox"/> BEST AREAS 5-10cm [1]	<input checked="" type="checkbox"/> MAXIMUM < 50cm [1]	<input type="checkbox"/> MOD. STABLE (e.g., Large Gravel) [1]	<input type="checkbox"/> LOW [1]
<input type="checkbox"/> BEST AREAS < 5cm [metric=0]		<input type="checkbox"/> UNSTABLE (e.g., Fine Gravel, Sand) [0]	<input type="checkbox"/> MODERATE [0]
			<input type="checkbox"/> EXTENSIVE [-1]

*Comments*

Riffle / Run  
Maximum 7  
8

6] GRADIENT ( ft/mi)  VERY LOW - LOW [2-4]  MODERATE [6-10]  HIGH - VERY HIGH [10-6]

DRAINAGE AREA ( mi<sup>2</sup>)

%POOL: 60 %GLIDE:    
 %RUN: 10 %RIFFLE: 30

Gradient  
Maximum    
10

**A) SAMPLED REACH**

Check ALL that apply

**METHOD**

- BOAT
- WADE
- L. LINE
- OTHER

**DISTANCE**

- 0.5 Km
- 0.2 Km
- 0.15 Km
- 0.12 Km
- OTHER

meters

**CANOPY**

- > 85%- OPEN
- 55%~<85%
- 30%~<55%
- 10%~<30%
- <10%- CLOSED

**STAGE**

1st -sample pass- 2nd

- HIGH
- UP
- NORMAL
- LOW
- DRY

**CLARITY**

1st --sample pass-- 2nd

- < 20 cm
- 20~<40 cm
- 40-70 cm
- > 70 cm/ CTB
- SECCHI DEPTH

1st \_\_\_\_\_ cm

2nd \_\_\_\_\_ cm

**C) RECREATION**

AREA DEPTH

POOL:  >100ft<sup>2</sup>  >3ft

Comment RE: Reach consistency/ Is reach typical of stream?, Recreation/ Observed - Inferred, Other/ Sampling observations, Concerns, Access directions, etc.

S-006: Reach limited to 20m. 12' pool width at riffle. Riffles are

75 feet apart. Pools have bed detail on top of bedrock Right

bank shows erosion. No signs of sand or silt deposits. Cobble

bar top

R. Fe - Pool Complex

**B) AESTHETICS**

- NUISANCE ALGAE
- INVASIVE MACROPHYTES
- EXCESS TURBIDITY
- DISCOLORATION
- FOAM / SCUM
- OIL SHEEN
- TRASH / LITTER
- NUISANCE ODOR
- SLUDGE DEPOSITS
- CSOs/SSOs/OUTFALLS

**D) MAINTENANCE**

Circle some & COMMENT

- PUBLIC / PRIVATE / BOTH / NA
- ACTIVE / HISTORIC / BOTH / NA
- YOUNG-SUCCESSION-OLD
- SPRAY / SNAG / REMOVED
- MODIFIED / DIPPED OUT / NA
- LEVEED / ONE SIDED
- RELOCATED / CUTOFFS
- MOVING-BEDLOAD-STABLE
- ARMOURED / SLUMPS
- ISLANDS / SCOURED
- IMPOUNDED / DESICCATED
- FLOOD CONTROL / DRAINAGE

**E) ISSUES**

- WWTP / CSO / NPDES / INDUSTRY
- HARDENED / URBAN / DIRT&GRIME
- CONTAMINATED / LANDFILL
- BMPs-CONSTRUCTION-SEDIMENT
- LOGGING / IRRIGATION / COOLING
- BANK / EROSION / SURFACE
- FALSE BANK / MANURE / LAGOON
- WASH H<sub>2</sub>O / TILE / H<sub>2</sub>O TABLE
- ACID / MINE / QUARRY / FLOW
- NATURAL / WETLAND / STAGNANT
- PARK / GOLF / LAWN / HOME
- ATMOSPHERE / DATA PAUCITY

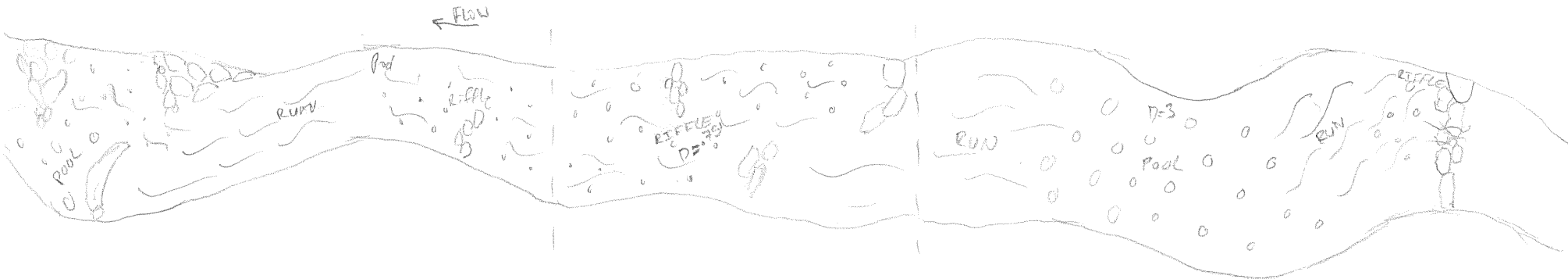
**F) MEASUREMENTS**

- $\bar{x}$  width
- $\bar{x}$  depth
- max. depth
- $\bar{x}$  bankfull width
- bankfull  $\bar{x}$  depth
- W/D ratio
- bankfull max. depth
- floodprone  $x^2$  width
- entrench. ratio

Legacy Tree:

**Stream Drawing:**

W = 12 ft



75'

Stream & Location: S-002 RM:    Date: 11/20/21

Scorers Full Name & Affiliation: LK/MBJ/CC  
River Code:    STORET #:    Lat./Long.: 37.333152/80.429438 Office verified location

**1] SUBSTRATE** Check ONLY Two substrate TYPE BOXES; estimate % or note every type present

<b>BEST TYPES</b>	<b>POOL RIFFLE</b>	<b>OTHER TYPES</b>	<b>POOL RIFFLE</b>	<b>ORIGIN</b>	<b>QUALITY</b>
<input type="checkbox"/> BLDR /SLABS [10]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> HARDPAN [4]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> LIMESTONE [1]	<input type="checkbox"/> HEAVY [-2]
<input type="checkbox"/> BOULDER [9]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> DETRITUS [3]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> TILLS [1]	<input type="checkbox"/> MODERATE [-1]
<input checked="" type="checkbox"/> COBBLE [8]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> MUCK [2]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> WETLANDS [0]	<input type="checkbox"/> NORMAL [0]
<input type="checkbox"/> GRAVEL [7]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> SILT [2]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> HARDPAN [0]	<input type="checkbox"/> FREE [1]
<input type="checkbox"/> SAND [6]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> ARTIFICIAL [0]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> SANDSTONE [0]	<input type="checkbox"/> EXTENSIVE [-2]
<input type="checkbox"/> BEDROCK [5]	<input type="checkbox"/> <input type="checkbox"/>			<input type="checkbox"/> RIP/RAP [0]	<input type="checkbox"/> MODERATE [-1]
(Score natural substrates; ignore sludge from point-sources)				<input type="checkbox"/> LACUSTURINE [0]	<input type="checkbox"/> NORMAL [0]
<b>NUMBER OF BEST TYPES:</b>	<input type="checkbox"/> 4 or more [2]	<input type="checkbox"/> 3 or less [0]		<input type="checkbox"/> SHALE [-1]	<input type="checkbox"/> NONE [1]

Check ONE (Or 2 & average)

**Comments**

Substrate 15  
Maximum 20

**2] INSTREAM COVER** Indicate presence 0 to 3: 0-Absent; 1-Very small amounts or if more common of marginal quality; 2-Moderate amounts, but not of highest quality or in small amounts of highest quality; 3-Highest quality in moderate or greater amounts (e.g., very large boulders in deep or fast water, large diameter log that is stable, well developed rootwad in deep / fast water, or deep, well-defined, functional pools.

<input type="checkbox"/> UNDERCUT BANKS [1]	<input type="checkbox"/> POOLS > 70cm [2]	<input type="checkbox"/> OXBOWS, BACKWATERS [1]	<b>AMOUNT</b>
<input type="checkbox"/> OVERHANGING VEGETATION [1]	<input type="checkbox"/> ROOTWADS [1]	<input type="checkbox"/> AQUATIC MACROPHYTES [1]	Check ONE (Or 2 & average)
<input type="checkbox"/> SHALLOWS (IN SHALLOW WATER) [1]	<input type="checkbox"/> BOULDERS [1]	<input type="checkbox"/> LOGS OR WOODY DEBRIS [1]	<input type="checkbox"/> EXTENSIVE >75% [1]
<input type="checkbox"/> ROOTMATS [1]			<input type="checkbox"/> MODERATE 25-75% [7]
			<input type="checkbox"/> SPARSE 5-<25% [3]
			<input type="checkbox"/> NEARLY ABSENT <5% [1]

**Comments**

Cover    
Maximum 20

**3] CHANNEL MORPHOLOGY** Check ONE in each category (Or 2 & average)

<b>SINUOSITY</b>	<b>DEVELOPMENT</b>	<b>CHANNELIZATION</b>	<b>STABILITY</b>
<input type="checkbox"/> HIGH [4]	<input type="checkbox"/> EXCELLENT [7]	<input checked="" type="checkbox"/> NONE [6]	<input checked="" type="checkbox"/> HIGH [3]
<input type="checkbox"/> MODERATE [3]	<input type="checkbox"/> GOOD [5]	<input type="checkbox"/> RECOVERED [4]	<input type="checkbox"/> MODERATE [2]
<input type="checkbox"/> LOW [2]	<input checked="" type="checkbox"/> FAIR [3]	<input type="checkbox"/> RECOVERING [3]	<input type="checkbox"/> LOW [1]
<input checked="" type="checkbox"/> NONE [1]	<input type="checkbox"/> POOR [1]	<input type="checkbox"/> RECENT OR NO RECOVERY [1]	

**Comments**

Channel 13  
Maximum 20

**4] BANK EROSION AND RIPARIAN ZONE** Check ONE in each category for EACH BANK (Or 2 per bank & average)

<b>EROSION</b>	<b>RIPARIAN WIDTH</b>	<b>FLOOD PLAIN QUALITY</b>
<input type="checkbox"/> NONE / LITTLE [3]	<input type="checkbox"/> WIDE > 50m [4]	<input type="checkbox"/> FOREST, SWAMP [3]
<input type="checkbox"/> MODERATE [2]	<input type="checkbox"/> MODERATE 10-50m [3]	<input type="checkbox"/> SHRUB OR OLD FIELD [2]
<input type="checkbox"/> HEAVY / SEVERE [1]	<input type="checkbox"/> NARROW 5-10m [2]	<input type="checkbox"/> RESIDENTIAL, PARK, NEW FIELD [1]
	<input type="checkbox"/> VERY NARROW < 5m [1]	<input type="checkbox"/> FENCED PASTURE [1]
	<input type="checkbox"/> NONE [0]	<input type="checkbox"/> OPEN PASTURE, ROWCROP [0]
		<input type="checkbox"/> CONSERVATION TILLAGE [1]
		<input type="checkbox"/> URBAN OR INDUSTRIAL [0]
		<input type="checkbox"/> MINING / CONSTRUCTION [0]

**Comments**

Indicate predominant land use(s) past 100m riparian.    
Riparian Maximum 10

**5] POOL / GLIDE AND RIFFLE / RUN QUALITY**

<b>MAXIMUM DEPTH</b>	<b>CHANNEL WIDTH</b>	<b>CURRENT VELOCITY</b>	<b>Recreation Potential</b> Primary Contact Secondary Contact (circle one and comment on back)
Check ONE (ONLY!)	Check ONE (Or 2 & average)	Check ALL that apply	
<input type="checkbox"/> > 1m [6]	<input checked="" type="checkbox"/> POOL WIDTH > RIFFLE WIDTH [2]	<input type="checkbox"/> TORRENTIAL [-1]	<b>Pool / Current</b> <span style="border: 1px solid black; border-radius: 50%; padding: 5px;">8</span> Maximum 12
<input type="checkbox"/> 0.7-<1m [4]	<input type="checkbox"/> POOL WIDTH = RIFFLE WIDTH [1]	<input type="checkbox"/> VERY FAST [1]	
<input checked="" type="checkbox"/> 0.4-<0.7m [2]	<input type="checkbox"/> POOL WIDTH > RIFFLE WIDTH [0]	<input type="checkbox"/> INTERSTITIAL [-1]	
<input type="checkbox"/> 0.2-<0.4m [1]		<input checked="" type="checkbox"/> FAST [1]	
<input type="checkbox"/> < 0.2m [0]		<input type="checkbox"/> INTERMITTENT [-2]	
		<input checked="" type="checkbox"/> MODERATE [1]	
		<input checked="" type="checkbox"/> EDDIES [1]	

**Comments**

**Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species:**

<b>RIFFLE DEPTH</b>	<b>RUN DEPTH</b>	<b>RIFFLE / RUN SUBSTRATE</b>	<b>RIFFLE / RUN EMBEDDEDNESS</b>
<input checked="" type="checkbox"/> BEST AREAS > 10cm [2]	<input checked="" type="checkbox"/> MAXIMUM > 50cm [2]	<input checked="" type="checkbox"/> STABLE (e.g., Cobble, Boulder) [2]	<input checked="" type="checkbox"/> NONE [2]
<input type="checkbox"/> BEST AREAS 5-10cm [1]	<input type="checkbox"/> MAXIMUM < 50cm [1]	<input type="checkbox"/> MOD. STABLE (e.g., Large Gravel) [1]	<input type="checkbox"/> LOW [1]
<input type="checkbox"/> BEST AREAS < 5cm [metric=0]		<input type="checkbox"/> UNSTABLE (e.g., Fine Gravel, Sand) [0]	<input type="checkbox"/> MODERATE [0]
			<input type="checkbox"/> EXTENSIVE [-1]

**Comments**

Riffle / Run 8  
Maximum 8

**6] GRADIENT (** ft/mi)  VERY LOW - LOW [2-4]  MODERATE [6-10]  HIGH - VERY HIGH [10-6]

**DRAINAGE AREA** ( mi<sup>2</sup>)

**%POOL:** 35 **%GLIDE:**  

**%RUN:** 40 **%RIFFLE:** 25

**Comments**

Gradient    
Maximum 10

**A) SAMPLED REACH**

Check ALL that apply

**METHOD**

- BOAT
- WADE
- L. LINE
- OTHER

**DISTANCE**

- 0.5 Km
- 0.2 Km
- 0.15 Km
- 0.12 Km
- OTHER

meters

**CANOPY**

- > 85%- OPEN
- 55%~<85%
- 30%~<55%
- 10%~<30%
- <10%- CLOSED

**STAGE**

1st-sample pass- 2nd

- HIGH
- UP
- NORMAL
- LOW
- DRY

**CLARITY**

1st --sample pass-- 2nd

- < 20 cm
- 20~<40 cm
- 40-70 cm
- > 70 cm/ CTB
- SECCHI DEPTH

1st \_\_\_\_\_ cm

2nd \_\_\_\_\_ cm

**C) RECREATION**

AREA DEPTH

POOL:  >100ft<sup>2</sup>  >3ft

Comment RE: Reach consistency/ Is reach typical of stream?, Recreation/ Observed - Inferred, Other/ Sampling observations, Concerns, Access directions, etc.

S-QR 2. Reach limited by logs. Most riffles are caused by

steps or debris. 2 riffles down stream followed by large pools and runs.

Large riffle upstream, long 100' run downstream. Good frequency of riffle/pools.

Poorly Formed Riffle - Pool Complex

**B) AESTHETICS**

- NUISANCE ALGAE
- INVASIVE MACROPHYTES
- EXCESS TURBIDITY
- DISCOLORATION
- FOAM / SCUM
- OIL SHEEN
- TRASH / LITTER
- NUISANCE ODOR
- SLUDGE DEPOSITS
- CSOs/SSOs/OUTFALLS

**D) MAINTENANCE**

- PUBLIC / PRIVATE / BOTH / NA
- ACTIVE / HISTORIC / BOTH / NA
- YOUNG-SUCCESSION-OLD
- SPRAY / SNAG / REMOVED
- MODIFIED / DIPPED OUT / NA
- LEVEED / ONE SIDED
- RELOCATED / CUTOFFS
- MOVING-BEDLOAD-STABLE
- ARMoured / SLUMPS
- ISLANDS / SCoured
- IMPOUNDED / DESICCATED
- FLOOD CONTROL / DRAINAGE

Circle some & COMMENT

**E) ISSUES**

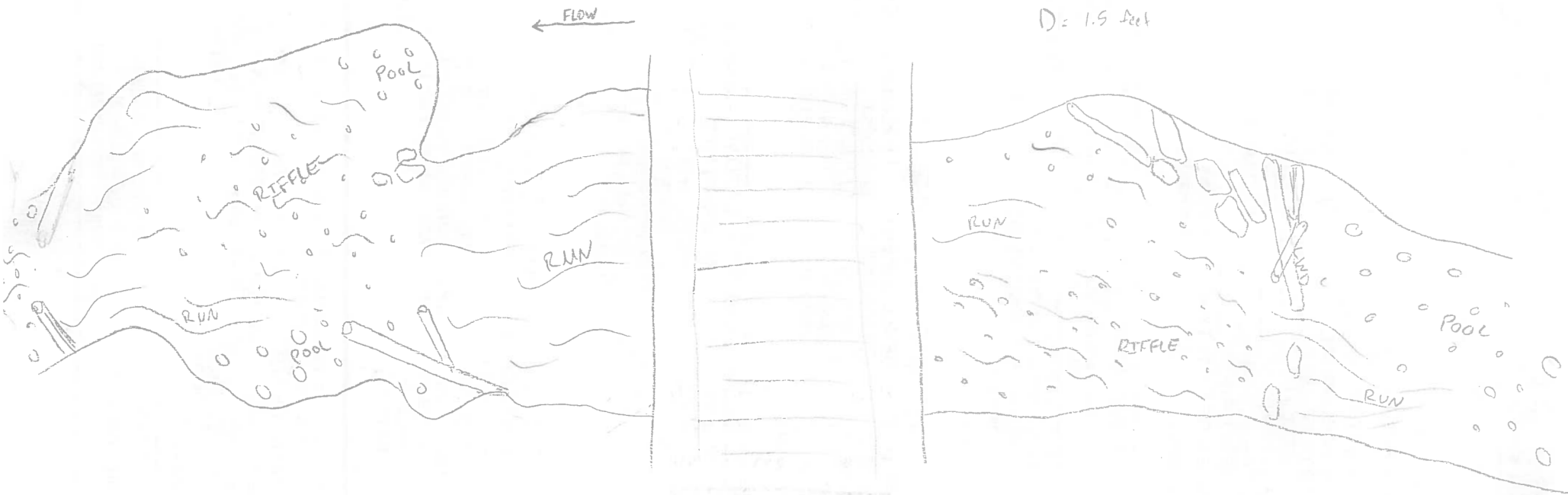
- WWTP / CSO / NPDES / INDUSTRY
- HARDENED / URBAN / DIRT&GRIME
- CONTAMINATED / LANDFILL
- BMPs-CONSTRUCTION-SEDIMENT
- LOGGING / IRRIGATION / COOLING
- BANK / EROSION / SURFACE
- FALSE BANK / MANURE / LAGOON
- WASH H<sub>2</sub>O / TILE / H<sub>2</sub>O TABLE
- ACID / MINE / QUARRY / FLOW
- NATURAL / WETLAND / STAGNANT
- PARK / GOLF / LAWN / HOME
- ATMOSPHERE / DATA PAUCITY

**F) MEASUREMENTS**

- $\bar{x}$  width
- $\bar{x}$  depth
- max. depth
- $\bar{x}$  bankfull width
- bankfull  $\bar{x}$  depth
- W/D ratio
- bankfull max. depth
- floodprone  $x^2$  width
- entrench. ratio

Legacy Tree:

**Stream Drawing:**





**A) SAMPLED REACH**

Check ALL that apply

**METHOD**

- BOAT
- WADE
- L. LINE
- OTHER

**DISTANCE**

- 0.5 Km
- 0.2 Km
- 0.15 Km
- 0.12 Km
- OTHER

meters

**CANOPY**

- > 85%- OPEN
- 55%-<85%
- 30%-<55%
- 10%-<30%
- <10%- CLOSED

**STAGE**

1st -sample pass- 2nd

- HIGH
- UP
- NORMAL
- LOW
- DRY

**CLARITY**

1st --sample pass-- 2nd

- < 20 cm
- 20-<40 cm
- 40-70 cm
- > 70 cm/ CTB
- SECCHI DEPTH

1st \_\_\_\_\_ cm

2nd \_\_\_\_\_ cm

Comment RE: Reach consistency/ Is reach typical of stream?, Recreation/ Observed - Inferred, Other/ Sampling observations, Concerns, Access directions, etc.

S-SS: Reach limited to LOD. Logar - small boulders with large cobbles. High gradient almost cascading, upstream, stable banks,

Plane Bed

**B) AESTHETICS**

- NUISANCE ALGAE
- INVASIVE MACROPHYTES
- EXCESS TURBIDITY
- DISCOLORATION
- FOAM / SCUM
- OIL SHEEN
- TRASH / LITTER
- NUISANCE ODOR
- SLUDGE DEPOSITS
- CSOs/SSOs/OUTFALLS

**D) MAINTENANCE**

- PUBLIC / PRIVATE / BOTH / NA
- ACTIVE / HISTORIC / BOTH / NA
- YOUNG-SUCCESSION-OLD
- SPRAY / SNAG / REMOVED
- MODIFIED / DIPPED OUT / NA
- LEVEED / ONE SIDED
- RELOCATED / CUTOFFS
- MOVING-BEDLOAD-STABLE
- ARMoured / SLUMPS
- ISLANDS / SCoured
- IMPOUNDED / DESICCATED
- FLOOD CONTROL / DRAINAGE

Circle some & COMMENT

**E) ISSUES**

- WWTP / CSO / NPDES / INDUSTRY
- HARDENED / URBAN / DIRT&GRIME
- CONTAMINATED / LANDFILL
- BMPs-CONSTRUCTION-SEDIMENT
- LOGGING / IRRIGATION / COOLING
- BANK / EROSION / SURFACE
- FALSE BANK / MANURE / LAGOON
- WASH H<sub>2</sub>O / TILE / H<sub>2</sub>O TABLE
- ACID / MINE / QUARRY / FLOW
- NATURAL / WETLAND / STAGNANT
- PARK / GOLF / LAWN / HOME
- ATMOSPHERE / DATA PAUCITY

**F) MEASUREMENTS**

- $\bar{x}$  width
- $\bar{x}$  depth
- max. depth
- $\bar{x}$  bankfull width
- bankfull  $\bar{x}$  depth
- W/D ratio
- bankfull max. depth
- floodprone  $x^2$  width
- entrench. ratio

Legacy Tree:

**C) RECREATION** AREA DEPTH  
 POOL:  >100ft<sup>2</sup>  >3ft

**Stream Drawing:**





Stream & Location: S-003 14:55 RM:   Date: 1/15/21

River Code:   STORET #:   Scorers Full Name & Affiliation: LK Lat./Long.: 36.969118, -79.645042 Office verified location

**1] SUBSTRATE** Check ONLY two substrate TYPE BOXES; estimate % or note every type present. Check ONE (Or 2 & average)

<b>BEST TYPES</b>	<b>POOL RIFFLE</b>	<b>OTHER TYPES</b>	<b>POOL RIFFLE</b>	<b>ORIGIN</b>	<b>QUALITY</b>
<input type="checkbox"/> BLDR /SLABS [10]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> HARDPAN [4]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> LIMESTONE [1]	<input type="checkbox"/> HEAVY [-2]
<input type="checkbox"/> BOULDER [9]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> DETRITUS [3]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> TILLS [1]	<input type="checkbox"/> MODERATE [-1]
<input checked="" type="checkbox"/> COBBLE [8]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> MUCK [2]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> WETLANDS [0]	<input type="checkbox"/> NORMAL [0]
<input checked="" type="checkbox"/> GRAVEL [7]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> SILT [2]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> HARDPAN [0]	<input type="checkbox"/> FREE [1]
<input type="checkbox"/> SAND [6]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> ARTIFICIAL [0]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> SANDSTONE [0]	<input type="checkbox"/> EXTENSIVE [-2]
<input type="checkbox"/> BEDROCK [5]	<input type="checkbox"/> <input type="checkbox"/>			<input type="checkbox"/> RIP/RAP [0]	<input type="checkbox"/> MODERATE [-1]

NUMBER OF BEST TYPES:  4 or more [2]  3 or less [0]

Comments:  

Substrate Maximum 20: 15

**2] INSTREAM COVER** Indicate presence 0 to 3: 0-Absent; 1-Very small amounts or if more common of marginal quality; 2-Moderate amounts, but not of highest quality or in small amounts of highest quality; 3-Highest quality in moderate or greater amounts (e.g., very large boulders in deep or fast water, large diameter log that is stable, well developed rootwad in deep / fast water, or deep, well-defined, functional pools). Check ONE (Or 2 & average)

<input type="checkbox"/> UNDERCUT BANKS [1]	<input type="checkbox"/> POOLS > 70cm [2]	<input type="checkbox"/> OXBOWS, BACKWATERS [1]	<input type="checkbox"/> AMOUNT
<input type="checkbox"/> OVERHANGING VEGETATION [1]	<input type="checkbox"/> ROOTWADS [1]	<input type="checkbox"/> AQUATIC MACROPHYTES [1]	<input type="checkbox"/> EXTENSIVE >75% [11]
<input type="checkbox"/> SHALLOWS (IN SLOW WATER) [1]	<input type="checkbox"/> BOULDERS [1]	<input type="checkbox"/> LOGS OR WOODY DEBRIS [1]	<input type="checkbox"/> MODERATE 25-75% [7]
<input type="checkbox"/> ROOTMATS [1]			<input type="checkbox"/> SPARSE 5-<25% [3]
			<input type="checkbox"/> NEARLY ABSENT <5% [1]

Comments:  

Cover Maximum 20:  

**3] CHANNEL MORPHOLOGY** Check ONE in each category (Or 2 & average)

<b>SINUOSITY</b>	<b>DEVELOPMENT</b>	<b>CHANNELIZATION</b>	<b>STABILITY</b>
<input checked="" type="checkbox"/> HIGH [4]	<input type="checkbox"/> EXCELLENT [7]	<input checked="" type="checkbox"/> NONE [6]	<input type="checkbox"/> HIGH [3]
<input type="checkbox"/> MODERATE [3]	<input checked="" type="checkbox"/> GOOD [5]	<input type="checkbox"/> RECOVERED [4]	<input type="checkbox"/> MODERATE [2]
<input type="checkbox"/> LOW [2]	<input type="checkbox"/> FAIR [3]	<input type="checkbox"/> RECOVERING [3]	<input type="checkbox"/> LOW [1]
<input type="checkbox"/> NONE [1]	<input type="checkbox"/> POOR [1]	<input type="checkbox"/> RECENT OR NO RECOVERY [1]	

Comments:  

Channel Maximum 20: 15

**4] BANK EROSION AND RIPARIAN ZONE** Check ONE in each category for EACH BANK (Or 2 per bank & average)

<b>EROSION</b>	<b>RIPARIAN WIDTH</b>	<b>FLOOD PLAIN QUALITY</b>
<input type="checkbox"/> NONE / LITTLE [3]	<input type="checkbox"/> WIDE > 50m [4]	<input type="checkbox"/> FOREST, SWAMP [3]
<input type="checkbox"/> MODERATE [2]	<input type="checkbox"/> MODERATE 10-50m [3]	<input type="checkbox"/> SHRUB OR OLD FIELD [2]
<input type="checkbox"/> HEAVY / SEVERE [1]	<input type="checkbox"/> NARROW 5-10m [2]	<input type="checkbox"/> RESIDENTIAL, PARK, NEW FIELD [1]
	<input type="checkbox"/> VERY NARROW < 5m [1]	<input type="checkbox"/> FENCED PASTURE [1]
	<input type="checkbox"/> NONE [0]	<input type="checkbox"/> OPEN PASTURE, ROWCROP [0]

Comments:  

Riparian Maximum 10:  

**5] POOL / GLIDE AND RIFFLE / RUN QUALITY**

<b>MAXIMUM DEPTH</b>	<b>CHANNEL WIDTH</b>	<b>CURRENT VELOCITY</b>	<b>Recreation Potential</b>
<input type="checkbox"/> > 1m [6]	<input checked="" type="checkbox"/> POOL WIDTH > RIFFLE WIDTH [2]	<input type="checkbox"/> TORRENTIAL [-1]	<b>Primary Contact</b>
<input checked="" type="checkbox"/> 0.7-<1m [4]	<input type="checkbox"/> POOL WIDTH = RIFFLE WIDTH [1]	<input type="checkbox"/> VERY FAST [1]	<b>Secondary Contact</b>
<input type="checkbox"/> 0.4-<0.7m [2]	<input type="checkbox"/> POOL WIDTH > RIFFLE WIDTH [0]	<input type="checkbox"/> FAST [1]	(circle one and comment on back)
<input type="checkbox"/> 0.2-<0.4m [1]		<input checked="" type="checkbox"/> MODERATE [1]	
<input type="checkbox"/> < 0.2m [0]		<input type="checkbox"/> SLOW [1]	
		<input type="checkbox"/> INTERSTITIAL [-1]	
		<input type="checkbox"/> INTERMITTENT [-2]	
		<input type="checkbox"/> EDDIES [1]	

Comments:  

Pool / Current Maximum 12: 7

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species: Check ONE (Or 2 & average).  NO RIFFLE [metric=0]

<b>RIFFLE DEPTH</b>	<b>RUN DEPTH</b>	<b>RIFFLE / RUN SUBSTRATE</b>	<b>RIFFLE / RUN EMBEDDEDNESS</b>
<input type="checkbox"/> BEST AREAS > 10cm [2]	<input type="checkbox"/> MAXIMUM > 50cm [2]	<input checked="" type="checkbox"/> STABLE (e.g., Cobble, Boulder) [2]	<input type="checkbox"/> NONE [2]
<input checked="" type="checkbox"/> BEST AREAS 5-10cm [1]	<input checked="" type="checkbox"/> MAXIMUM < 50cm [1]	<input type="checkbox"/> MOD. STABLE (e.g., Large Gravel) [1]	<input checked="" type="checkbox"/> LOW [1]
<input type="checkbox"/> BEST AREAS < 5cm [metric=0]		<input type="checkbox"/> UNSTABLE (e.g., Fine Gravel, Sand) [0]	<input type="checkbox"/> MODERATE [0]
			<input type="checkbox"/> EXTENSIVE [-1]

Comments:  

Riffle / Run Maximum 8: 5

**6] GRADIENT (** ft/ml)  VERY LOW - LOW [2-4]  MODERATE [6-10]  HIGH - VERY HIGH [10-6]

**DRAINAGE AREA** ( ml<sup>2</sup>)

%POOL: 30 %GLIDE:  

%RUN: 40 %RIFFLE: 30

Gradient Maximum 10:

**A] SAMPLED REACH**

Check ALL that apply

- METHOD**
- BOAT
  - WADE
  - L. LINE
  - OTHER
- DISTANCE**
- 0.5 Km
  - 0.2 Km
  - 0.15 Km
  - 0.12 Km
  - OTHER

- STAGE**
- HIGH
  - UP
  - NORMAL
  - LOW
  - DRY

- CLARITY**
- 1st --sample pass-- 2nd
- < 20 cm
  - 20-40 cm
  - 40-70 cm
  - > 70 cm/ CTB
  - SECCHI DEPTH

- CANOPY**
- 1st pass \_\_\_\_\_ cm
- 2nd pass \_\_\_\_\_ cm
- > 85% - OPEN
  - 55% - 85%
  - 30% - 55%
  - 10% - 30%
  - < 10% - CLOSED

- C] RECREATION**
- AREA DEPTH
- POOL:  >100ft<sup>2</sup>  >3ft

Comment RE: Reach consistency/ Is reach typical of stream?, Recreation/ Observed - Inferred, Other/ Sampling observations, Concerns, Access directions, etc.

S- DD 3

SHALLOW BUT WELL DEFINED RIFFLES, FREQUENT RIFFLES

DEEP POOLS.

RIFFLE-POOL COMPLEX

**B] AESTHETICS**

- NUISANCE ALGAE
- INVASIVE MACROPHYTES
- EXCESS TURBIDITY
- DISCOLORATION
- FOAM / SCUM
- OIL SHEEN
- TRASH / LITTER
- NUISANCE ODOR
- SLUDGE DEPOSITS
- CSOs/SSOs/OUTFALLS

**D] MAINTENANCE**

- PUBLIC / PRIVATE / BOTH / NA
- ACTIVE / HISTORIC / BOTH / NA
- YOUNG-SUCCESSION-OLD
- SPRAY / SNAG / REMOVED
- MODIFIED / DIPPED OUT / NA
- LEVEED / ONE SIDED
- RELOCATED / CUTOFFS
- MOVING-BEDLOAD-STABLE
- ARMoured / SLUMPS
- ISLANDS / SCOURED
- IMPOUNDED / DESICCATED
- FLOOD CONTROL / DRAINAGE

Circle some & COMMENT

**E] ISSUES**

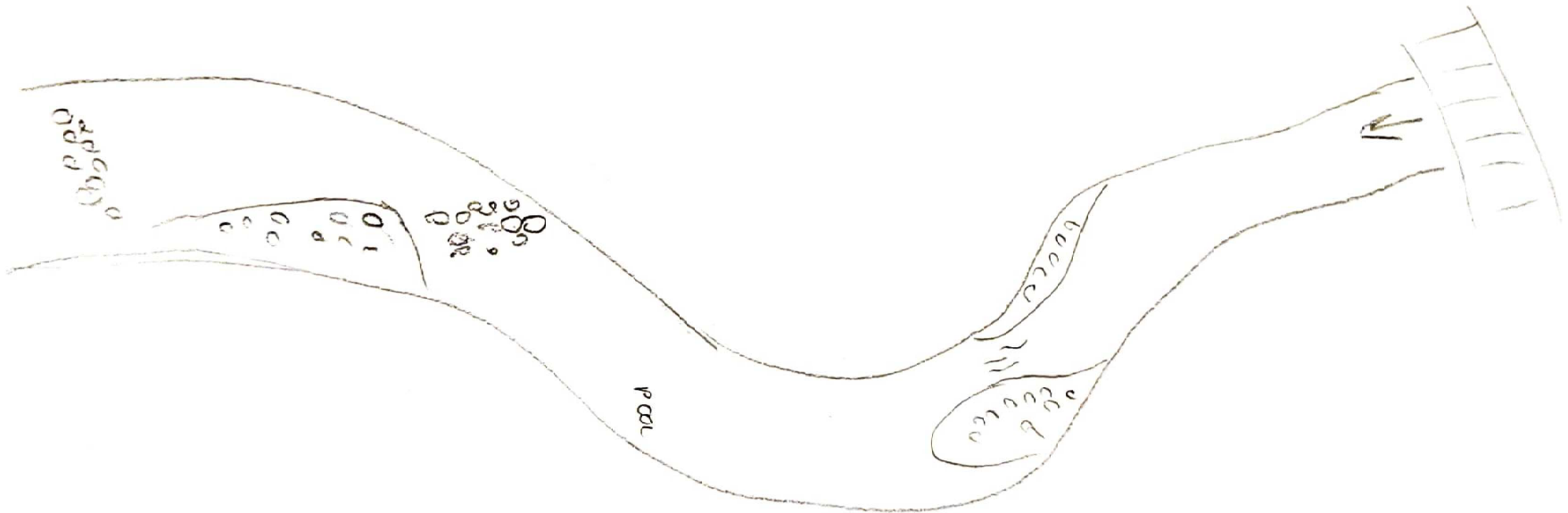
- WWTP / CSO / NPDES / INDUSTRY
- HARDENED / URBAN / DIRT&GRIME
- CONTAMINATED / LANDFILL
- BMPs-CONSTRUCTION-SEDIMENT
- LOGGING / IRRIGATION / COOLING
- BANK / EROSION / SURFACE
- FALSE BANK / MANURE / LAGOON
- WASH H<sub>2</sub>O / TILE / H<sub>2</sub>O TABLE
- ACID / MINE / QUARRY / FLOW
- NATURAL / WETLAND / STAGNANT
- PARK / GOLF / LAWN / HOME
- ATMOSPHERE / DATA PAUCITY

**F] MEASUREMENTS**

- $\bar{x}$  width
- $\bar{x}$  depth
- max. depth
- $\bar{x}$  bankfull width
- bankfull  $\bar{x}$  depth
- W/D ratio
- bankfull max. depth
- floodprone  $x^2$  width
- entrench. ratio

Legacy Tree:

**Stream Drawing:**



Stream & Location: S-006 7.25 RM:    Date: 11/16/21

Scorers Full Name & Affiliation: LK

River Code:    STORET #:    (NAD 83 - decimal) Lat./ Long.: 37.057584, -79.913921 Office verified location

1) **SUBSTRATE** Check ONLY Two substrate TYPE BOXES; estimate % or note every type present

Check ONE (Or 2 & average)

<b>BEST TYPES</b>		<b>POOL RIFFLE</b>	<b>OTHER TYPES</b>		<b>POOL RIFFLE</b>	<b>ORIGIN</b>		<b>QUALITY</b>		Substrate  14  Maximum 20																	
<input type="checkbox"/> Bldr /slabs [10]	<input type="checkbox"/> Boulder [9]	<input type="checkbox"/> Cobble [8]	<input type="checkbox"/> Gravel [7]	<input type="checkbox"/> Sand [6]	<input type="checkbox"/> Bedrock [5]	<input type="checkbox"/> Hardpan [4]	<input type="checkbox"/> Detritus [3]	<input type="checkbox"/> Muck [2]	<input type="checkbox"/> Silt [2]		<input type="checkbox"/> Artificial [0]	<input type="checkbox"/> Limestone [1]	<input type="checkbox"/> Tills [1]	<input type="checkbox"/> Wetlands [0]	<input type="checkbox"/> Hardpan [0]	<input type="checkbox"/> Sandstone [0]	<input type="checkbox"/> Rip/Rap [0]	<input type="checkbox"/> Lacustrine [0]	<input type="checkbox"/> Shale [-1]	<input type="checkbox"/> Coal fines [-2]	<input type="checkbox"/> Heavy [-2]	<input type="checkbox"/> Moderate [-1]	<input type="checkbox"/> Normal [0]	<input type="checkbox"/> Free [1]	<input type="checkbox"/> Extensive [-2]	<input type="checkbox"/> Moderate [-1]	<input type="checkbox"/> Normal [0]

NUMBER OF BEST TYPES:  4 or more [2]  3 or less [0]

Comments:   

2) **INSTREAM COVER** Indicate presence 0 to 3: 0-Absent; 1-Very small amounts or if more common of marginal quality; 2-Moderate amounts, but not of highest quality or in small amounts of highest quality; 3-Highest quality in moderate or greater amounts (e.g., very large boulders in deep or fast water, large diameter log that is stable, well developed rootwad in deep / fast water, or deep, well-defined, functional pools.

<input type="checkbox"/> Undercut banks [1]	<input type="checkbox"/> Overhanging vegetation [1]	<input type="checkbox"/> Shallows (in slow water) [1]	<input type="checkbox"/> Rootmats [1]	<input type="checkbox"/> Pools > 70cm [2]	<input type="checkbox"/> Rootwads [1]	<input type="checkbox"/> Boulders [1]	<input type="checkbox"/> Oxbows, backwaters [1]	<input type="checkbox"/> Aquatic macrophytes [1]	<input type="checkbox"/> Logs or woody debris [1]	<b>AMOUNT</b> Check ONE (Or 2 & average)		
									<input type="checkbox"/> Extensive >75% [11]	<input type="checkbox"/> Moderate 25-75% [7]	<input type="checkbox"/> Sparse 5-<25% [3]	<input type="checkbox"/> Nearly absent <5% [1]

Comments:   

Cover Maximum    20

3) **CHANNEL MORPHOLOGY** Check ONE in each category (Or 2 & average)

<b>SINUOSITY</b>	<b>DEVELOPMENT</b>	<b>CHANNELIZATION</b>	<b>STABILITY</b>	Channel Maximum 20  16
<input type="checkbox"/> High [4]	<input type="checkbox"/> Excellent [7]	<input checked="" type="checkbox"/> None [6]	<input type="checkbox"/> High [3]	
<input checked="" type="checkbox"/> Moderate [3]	<input checked="" type="checkbox"/> Good [5]	<input type="checkbox"/> Recovered [4]	<input checked="" type="checkbox"/> Moderate [2]	
<input type="checkbox"/> Low [2]	<input type="checkbox"/> Fair [3]	<input type="checkbox"/> Recovering [3]	<input type="checkbox"/> Low [1]	
<input type="checkbox"/> None [1]	<input type="checkbox"/> Poor [1]	<input type="checkbox"/> Recent or no recovery [1]		

Comments:   

4) **BANK EROSION AND RIPARIAN ZONE** Check ONE in each category for EACH BANK (Or 2 per bank & average)

<b>EROSION</b>		<b>RIPARIAN WIDTH</b>		<b>FLOOD PLAIN QUALITY</b>		<b>CONSERVATION</b>					
<input type="checkbox"/> None / Little [3]	<input type="checkbox"/> Moderate [2]	<input type="checkbox"/> None / Little [3]	<input type="checkbox"/> Moderate [2]	<input type="checkbox"/> Forest, Swamp [3]	<input type="checkbox"/> Shrub or old field [2]	<input type="checkbox"/> Residential, Park, New Field [1]	<input type="checkbox"/> Fenced Pasture [1]	<input type="checkbox"/> Open Pasture, Rowcrop [0]	<input type="checkbox"/> Conservation Tillage [1]	<input type="checkbox"/> Urban or Industrial [0]	<input type="checkbox"/> Mining / Construction [0]

Comments:   

Indicate predominant land use(s) past 100m riparian. Riparian Maximum    10

5) **POOL / GLIDE AND RIFFLE / RUN QUALITY**

<b>MAXIMUM DEPTH</b>	<b>CHANNEL WIDTH</b>	<b>CURRENT VELOCITY</b>	Recreation Potential Primary Contact Secondary Contact (circle one and comment on back)
Check ONE (ONLY!) <input type="checkbox"/> > 1m [6] <input checked="" type="checkbox"/> 0.7-1m [4] <input type="checkbox"/> 0.4-0.7m [2] <input type="checkbox"/> 0.2-0.4m [1] <input type="checkbox"/> < 0.2m [0]	Check ONE (Or 2 & average) <input type="checkbox"/> Pool width > riffle width [2] <input checked="" type="checkbox"/> Pool width = riffle width [1] <input type="checkbox"/> Pool width < riffle width [0]	Check ALL that apply <input type="checkbox"/> Torrential [-1] <input type="checkbox"/> Very Fast [1] <input checked="" type="checkbox"/> Fast [1] <input type="checkbox"/> Moderate [1] <input type="checkbox"/> Slow [1] <input type="checkbox"/> Interstitial [-1] <input type="checkbox"/> Intermittent [-2] <input type="checkbox"/> Eddies [1]	

Comments:   

Pool / Current Maximum    12

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species: Check ONE (Or 2 & average)  NO RIFFLE [metric=0]

<b>RIFFLE DEPTH</b>	<b>RUN DEPTH</b>	<b>RIFFLE / RUN SUBSTRATE</b>	<b>RIFFLE / RUN EMBEDDEDNESS</b>	Riffle / Run Maximum 8  5
<input checked="" type="checkbox"/> Best areas > 10cm [2] <input type="checkbox"/> Best areas 5-10cm [1] <input type="checkbox"/> Best areas < 5cm [metric=0]	<input type="checkbox"/> Maximum > 50cm [2] <input checked="" type="checkbox"/> Maximum < 50cm [1]	<input type="checkbox"/> Stable (e.g., Cobble, Boulder) [2] <input checked="" type="checkbox"/> Mod. Stable (e.g., Large Gravel) [1] <input type="checkbox"/> Unstable (e.g., Fine Gravel, Sand) [0]	<input type="checkbox"/> None [2] <input type="checkbox"/> Low [1] <input type="checkbox"/> Moderate [0] <input type="checkbox"/> Extensive [-1]	

Comments:   

6) **GRADIENT** (ft/mi)  Very Low - Low [2-4]  Moderate [6-10]  High - Very High [10-8]

**DRAINAGE AREA** (mi<sup>2</sup>)  Very Low - Low [2-4]  Moderate [6-10]  High - Very High [10-8]

%POOL: 20 %GLIDE:   

%RUN: 70 %RIFFLE: 16

Gradient Maximum    10

S-c DG

A) SAMPLED REACH

Check ALL that apply

Comment RE: Reach consistency/ Is reach typical of stream?, Recreation/ Observed - Inferred, Other/ Sampling observations, Concerns, Access directions, etc.

METHOD

STAGE

- BOAT
- WADE
- L. LINE
- OTHER

- 1st -sample pass- 2nd
- HIGH
  - UP
  - NORMAL
  - LOW
  - DRY

POOL RIPPED-POOL COMPLEX

REASONABLE PROPORTIONS OF POOL/DIPPLE/RUN

IN LENGTH AND DISTR. BEDROCK CONTROLS

RIPPLES OTHERWISE WOULD BE PLANT BED

DISTANCE

- 0.5 Km
- 0.2 Km
- 0.15 Km
- 0.12 Km
- OTHER

CLARITY

- 1st -sample pass- 2nd
- < 20 cm
  - 20-40 cm
  - 40-70 cm
  - > 70 cm/ CTB
  - SECCHI DEPTH

B) AESTHETICS

- NUISANCE ALGAE
- INVASIVE MACROPHYTES
- EXCESS TURBIDITY
- DISCOLORATION
- FOAM / SCUM
- OIL SHEEN
- TRASH / LITTER
- NUISANCE ODOR
- SLUDGE DEPOSITS
- CSOs/SSOs/OUTFALLS

D) MAINTENANCE

- PUBLIC / PRIVATE / BOTH / NA
- ACTIVE / HISTORIC / BOTH / NA
- YOUNG-SUCCESSION-OLD
- SPRAY / SNAG / REMOVED
- MODIFIED / DIPPED OUT / NA
- LEVEED / ONE SIDED
- RELOCATED / CUTOFFS
- MOVING-BEDLOAD-STABLE
- ARMoured / SLUMPS
- ISLANDS / SCoured
- IMPOUNDED / DESICCATED
- FLOOD CONTROL / DRAINAGE

Circle some & COMMENT

E) ISSUES

- WWTP / CSO / NPDES / INDUSTRY
- HARDENED / URBAN / DIRT&GRIME
- CONTAMINATED / LANDFILL
- BMPs-CONSTRUCTION-SEDIMENT
- LOGGING / IRRIGATION / COOLING
- BANK / EROSION / SURFACE
- FALSE BANK / MANURE / LAGOON
- WASH H<sub>2</sub>O / TILE / H<sub>2</sub>O TABLE
- ACID / MINE / QUARRY / FLOW
- NATURAL / WETLAND / STAGNANT
- PARK / GOLF / LAWN / HOME
- ATMOSPHERE / DATA PAUCITY

F) MEASUREMENTS

- $\bar{x}$  width
- $\bar{x}$  depth
- max. depth
- $\bar{x}$  bankfull width
- bankfull  $\bar{x}$  depth
- W/D ratio
- bankfull max. depth
- floodprone  $x^2$  width
- entrench. ratio

Legacy Tree:

CANOPY

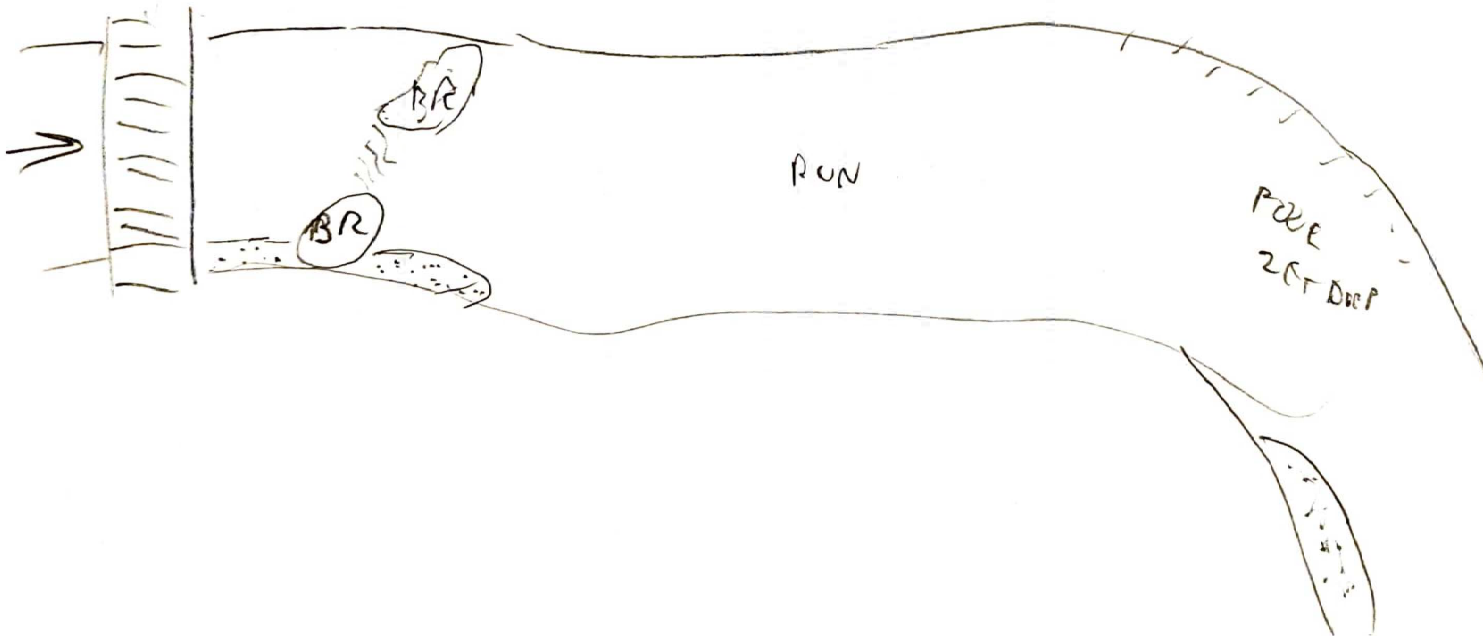
- > 85% - OPEN
- 55% - 85%
- 30% - 55%
- 10% - 30%
- < 10% - CLOSED

C) RECREATION

AREA DEPTH

POOL:  >100ft<sup>2</sup>  >3ft

Stream Drawing:



Stream & Location: S-C14

RM:    Date: 11/30/06 Z1

Scorers Full Name & Affiliation: LK/MB

River Code:    STORET #:    Lat./ Long.:    37.063956, -79.921985 Office verified location

**1] SUBSTRATE** Check ONLY Two substrate TYPE BOXES; estimate % or note every type present

<b>BEST TYPES</b>	<b>POOL RIFFLE</b>	<b>OTHER TYPES</b>	<b>POOL RIFFLE</b>	<b>ORIGIN</b>	<b>QUALITY</b>
<input type="checkbox"/> BLDR /SLABS [10]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> HARDPAN [4]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> LIMESTONE [1]	<input type="checkbox"/> HEAVY [-2]
<input type="checkbox"/> BOULDER [9]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> DETRITUS [3]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> TILLS [1]	<input type="checkbox"/> MODERATE [-1]
<input checked="" type="checkbox"/> COBBLE [8]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> MUCK [2]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> WETLANDS [0]	<input type="checkbox"/> NORMAL [0]
<input type="checkbox"/> GRAVEL [7]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> SILT [2]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> HARDPAN [0]	<input type="checkbox"/> FREE [1]
<input type="checkbox"/> SAND [6]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> ARTIFICIAL [0]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> SANDSTONE [0]	<input type="checkbox"/> EXTENSIVE [-2]
<input checked="" type="checkbox"/> BEDROCK [5]	<input type="checkbox"/> <input type="checkbox"/>			<input type="checkbox"/> RIP/RAP [0]	<input type="checkbox"/> MODERATE [-1]

NUMBER OF BEST TYPES:  4 or more [2]  3 or less [0]

Comments:   

Substrate 15  
Maximum 20

**2] INSTREAM COVER** Indicate presence 0 to 3: 0-Absent; 1-Very small amounts or if more common of marginal quality; 2-Moderate amounts, but not of highest quality or in small amounts of highest quality; 3-Highest quality in moderate or greater amounts (e.g., very large boulders in deep or fast water, large diameter log that is stable, well developed rootwad in deep / fast water, or deep, well-defined, functional pools.

<input type="checkbox"/> UNDERCUT BANKS [1]	<input type="checkbox"/> POOLS > 70cm [2]	<input type="checkbox"/> OXBOWS, BACKWATERS [1]	<input type="checkbox"/> EXTENSIVE >75% [11]
<input type="checkbox"/> OVERHANGING VEGETATION [1]	<input type="checkbox"/> ROOTWADS [1]	<input type="checkbox"/> AQUATIC MACROPHYTES [1]	<input type="checkbox"/> MODERATE 25-75% [7]
<input type="checkbox"/> SHALLOWS (IN SLOW WATER) [1]	<input type="checkbox"/> BOULDERS [1]	<input type="checkbox"/> LOGS OR WOODY DEBRIS [1]	<input type="checkbox"/> SPARSE 5-<25% [3]
<input type="checkbox"/> ROOTMATS [1]			<input type="checkbox"/> NEARLY ABSENT <5% [1]

Comments:   

Cover     
Maximum 20

**3] CHANNEL MORPHOLOGY** Check ONE in each category (Or 2 & average)

<b>SINUOSITY</b>	<b>DEVELOPMENT</b>	<b>CHANNELIZATION</b>	<b>STABILITY</b>
<input type="checkbox"/> HIGH [4]	<input type="checkbox"/> EXCELLENT [7]	<input checked="" type="checkbox"/> NONE [6]	<input type="checkbox"/> HIGH [3]
<input type="checkbox"/> MODERATE [3]	<input type="checkbox"/> GOOD [5]	<input type="checkbox"/> RECOVERED [4]	<input checked="" type="checkbox"/> MODERATE [2]
<input checked="" type="checkbox"/> LOW [2]	<input checked="" type="checkbox"/> FAIR [3]	<input type="checkbox"/> RECOVERING [3]	<input type="checkbox"/> LOW [1]
<input type="checkbox"/> NONE [1]	<input type="checkbox"/> POOR [1]	<input type="checkbox"/> RECENT OR NO RECOVERY [1]	

Comments:   

Channel 13  
Maximum 20

**4] BANK EROSION AND RIPARIAN ZONE** Check ONE in each category for EACH BANK (Or 2 per bank & average)

<b>EROSION</b>	<b>RIPARIAN WIDTH</b>	<b>FLOOD PLAIN QUALITY</b>
<input type="checkbox"/> NONE / LITTLE [3]	<input type="checkbox"/> WIDE > 50m [4]	<input type="checkbox"/> FOREST, SWAMP [3]
<input type="checkbox"/> MODERATE [2]	<input type="checkbox"/> MODERATE 10-50m [3]	<input type="checkbox"/> SHRUB OR OLD FIELD [2]
<input type="checkbox"/> HEAVY / SEVERE [1]	<input type="checkbox"/> NARROW 5-10m [2]	<input type="checkbox"/> RESIDENTIAL, PARK, NEW FIELD [1]
	<input type="checkbox"/> VERY NARROW < 5m [1]	<input type="checkbox"/> FENCED PASTURE [1]
	<input type="checkbox"/> NONE [0]	<input type="checkbox"/> OPEN PASTURE, ROWCROP [0]

Comments:   

Riparian     
Maximum 10

**5] POOL / GLIDE AND RIFFLE / RUN QUALITY**

<b>MAXIMUM DEPTH</b>	<b>CHANNEL WIDTH</b>	<b>CURRENT VELOCITY</b>	<b>Recreation Potential</b> Primary Contact Secondary Contact <small>(circle one and comment on back)</small>
Check ONE (ONLY)	Check ONE (Or 2 & average)	Check ALL that apply	
<input type="checkbox"/> > 1m [6]	<input type="checkbox"/> POOL WIDTH > RIFFLE WIDTH [2]	<input type="checkbox"/> TORRENTIAL [-1] <input checked="" type="checkbox"/> SLOW [1]	
<input type="checkbox"/> 0.7-<1m [4]	<input checked="" type="checkbox"/> POOL WIDTH = RIFFLE WIDTH [1]	<input type="checkbox"/> VERY FAST [1] <input type="checkbox"/> INTERSTITIAL [-1]	

Comments:   

Pool / Current 4  
Maximum 12

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species:  NO RIFFLE [metric=0]

<b>RIFFLE DEPTH</b>	<b>RUN DEPTH</b>	<b>RIFFLE / RUN SUBSTRATE</b>	<b>RIFFLE / RUN EMBEDDEDNESS</b>
<input type="checkbox"/> BEST AREAS > 10cm [2]	<input type="checkbox"/> MAXIMUM > 50cm [2]	<input type="checkbox"/> STABLE (e.g., Cobble, Boulder) [2]	<input type="checkbox"/> NONE [2]
<input checked="" type="checkbox"/> BEST AREAS 5-10cm [1]	<input checked="" type="checkbox"/> MAXIMUM < 50cm [1]	<input checked="" type="checkbox"/> MOD. STABLE (e.g., Large Gravel) [1]	<input type="checkbox"/> LOW [1]
<input type="checkbox"/> BEST AREAS < 5cm [metric=0]		<input type="checkbox"/> UNSTABLE (e.g., Fine Gravel, Sand) [0]	<input checked="" type="checkbox"/> MODERATE [0]

Comments:   

Riffle / Run 3  
Maximum 8

**6] GRADIENT** (ft/mi)  VERY LOW - LOW [2-4] %POOL: 15 %GLIDE:   

**DRAINAGE AREA** (mi<sup>2</sup>)  MODERATE [6-10] %RUN: 50 %RIFFLE: 35

HIGH - VERY HIGH [10-6]      

Comments:   

Gradient     
Maximum 10

# AJ SAMPLED REACH

Check ALL that apply

- METHOD**
- BOAT  
 WADE  
 L. LINE  
 OTHER
- DISTANCE**
- 0.5 Km  
 0.2 Km  
 0.15 Km  
 0.12 Km  
 OTHER

- STAGE**
- 1st -sample pass- 2nd
- HIGH   
 UP   
 NORMAL   
 LOW   
 DRY
- CLARITY**
- 1st --sample pass-- 2nd
- < 20 cm   
 20-<40 cm   
 40-70 cm   
 > 70 cm/ CTB   
 SECCHI DEPTH

- CANOPY**
- 1st \_\_\_\_\_ cm  
 pass  
 2nd \_\_\_\_\_ cm
- > 85%- OPEN  
 55%-<85%  
 30%-<55%  
 10%-<30%  
 <10%- CLOSED

Comment RE: Reach consistency/ Is reach typical of stream?, Recreation/ Observed - Inferred, Other/ Sampling observations, Concerns, Access directions, etc.

S-C14 Reach limited to LOD, bedrock underlying streambed + exposed in places. Cobbles on top.

Further upstream, substrate is primarily gravel + small cobbles. Downstream substrate is cobbles + sand. Banks mostly stable, slightly undercut in locations. Heavily vegetated.

PLANE BED

- BJ AESTHETICS**
- NUISANCE ALGAE  
 INVASIVE MACROPHYTES  
 EXCESS TURBIDITY  
 DISCOLORATION  
 FOAM / SCUM  
 OIL SHEEN  
 TRASH / LITTER  
 NUISANCE ODOR  
 SLUDGE DEPOSITS  
 CSOs/SSOs/OUTFALLS

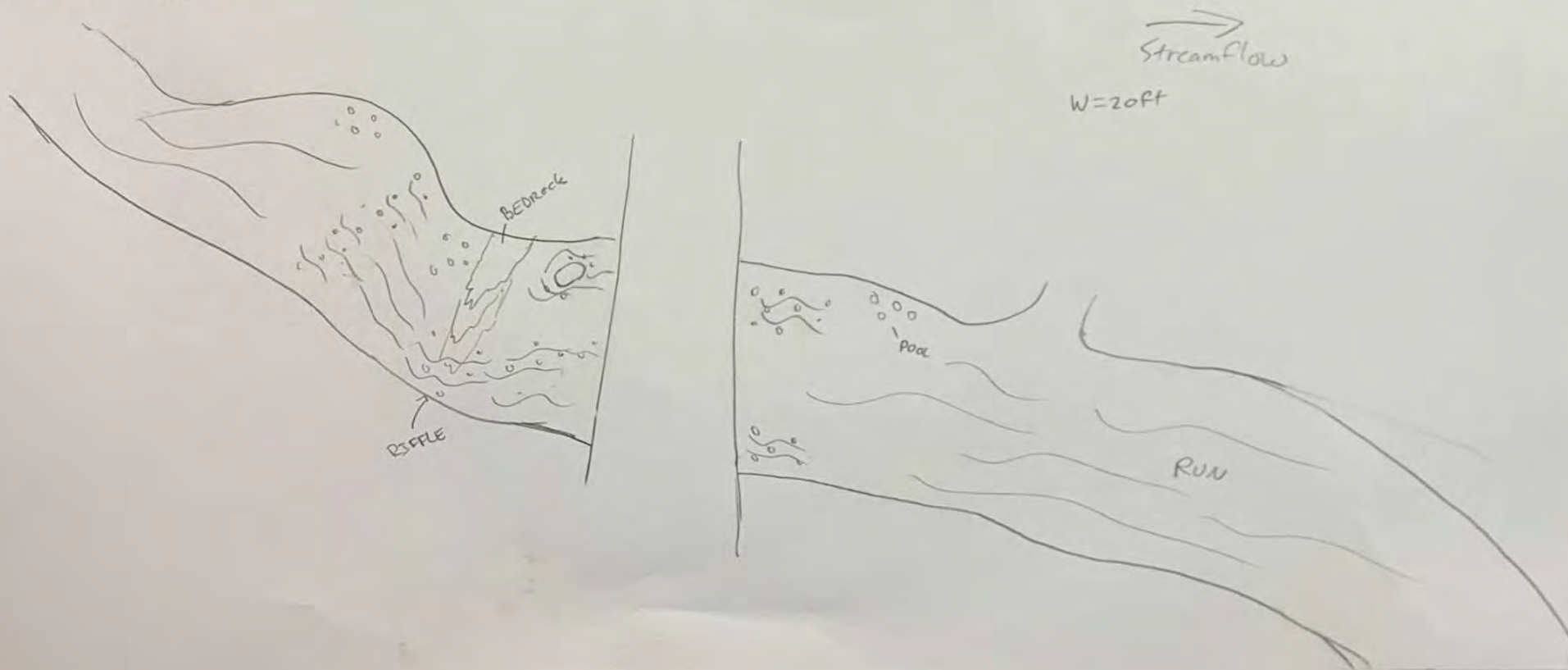
- DJ MAINTENANCE**
- CIRCLE SOME & COMMENT
- PUBLIC / PRIVATE / BOTH / NA  
 ACTIVE / HISTORIC / BOTH / NA  
 YOUNG-SUCCESSION-OLD  
 SPRAY / SNAG / REMOVED  
 MODIFIED / DIPPED OUT / NA  
 LEVEED / ONE SIDED  
 RELOCATED / CUTOFFS  
 MOVING-BEDLOAD-STABLE  
 ARMORED / SLUMPS  
 ISLANDS / SCOURED  
 IMPOUNDED / DESICCATED  
 FLOOD CONTROL / DRAINAGE

- EJ ISSUES**
- WWTP / CSO / NPDES / INDUSTRY  
 HARDENED / URBAN / DIRT&GRIME  
 CONTAMINATED / LANDFILL  
 BMPs-CONSTRUCTION-SEDIMENT  
 LOGGING / IRRIGATION / COOLING  
 BANK / EROSION / SURFACE  
 FALSE BANK / MANURE / LAGOON  
 WASH H<sub>2</sub>O / TILE / H<sub>2</sub>O TABLE  
 ACID / MINE / QUARRY / FLOW  
 NATURAL / WETLAND / STAGNANT  
 PARK / GOLF / LAWN / HOME  
 ATMOSPHERE / DATA PAUCITY

- FJ MEASUREMENTS**
- $\bar{x}$  width  
  $\bar{x}$  depth  
 max. depth  
  $\bar{x}$  bankfull width  
 bankfull  $\bar{x}$  depth  
 W/D ratio  
 bankfull max. depth  
 floodprone  $x^2$  width  
 entrench. ratio  
 Legacy Tree:

- CJ RECREATION**
- AREA DEPTH  
 POOL:  >100ft<sup>2</sup>  >3ft

## Stream Drawing:



Stream & Location: S-FF12 10:05 RM:    Date: 11/16/21

Scorers Full Name & Affiliation: LK

River Code:    STORET #:    Lat./Long.: 37.073367, -79.939865 Office verified location

1] SUBSTRATE Check ONLY Two substrate TYPE BOXES; estimate % or note every type present

BEST TYPES		POOL RIFFLE	OTHER TYPES	POOL RIFFLE	ORIGIN	QUALITY	SILT EMBEDDEDNESS	Substrate <span style="border: 1px solid black; border-radius: 50%; padding: 5px;">16</span> Maximum 20																			
<input type="checkbox"/> BLD R/SLABS [10]	<input type="checkbox"/> BOULDER [9]	<input type="checkbox"/> COBBLE [8]	<input type="checkbox"/> GRAVEL [7]	<input checked="" type="checkbox"/> SAND [6]	<input type="checkbox"/> BEDROCK [5]	<input type="checkbox"/> HARDPAN [4]			<input type="checkbox"/> DETRITUS [3]	<input type="checkbox"/> MUCK [2]	<input type="checkbox"/> SILT [2]	<input type="checkbox"/> ARTIFICIAL [0]	<input type="checkbox"/> LIMESTONE [1]	<input type="checkbox"/> TILLS [1]	<input type="checkbox"/> WETLANDS [0]	<input type="checkbox"/> HARDPAN [0]	<input type="checkbox"/> SANDSTONE [0]	<input type="checkbox"/> RIP/RAP [0]	<input type="checkbox"/> LACUSTURINE [0]	<input type="checkbox"/> SHALE [-1]	<input type="checkbox"/> COAL FINES [-2]	<input type="checkbox"/> HEAVY [-2]	<input type="checkbox"/> MODERATE [-1]	<input type="checkbox"/> NORMAL [0]	<input type="checkbox"/> FREE [1]	<input type="checkbox"/> EXTENSIVE [-2]	<input type="checkbox"/> MODERATE [-1]

NUMBER OF BEST TYPES:  4 or more [2]  3 or less [0]

Comments:   

2] INSTREAM COVER Indicate presence 0 to 3: 0-Absent; 1-Very small amounts or if more common of marginal quality; 2-Moderate amounts, but not of highest quality or in small amounts of highest quality; 3-Highest quality in moderate or greater amounts (e.g., very large boulders in deep or fast water, large diameter log that is stable, well developed rootwad in deep / fast water, or deep, well defined, functional pools)

<input type="checkbox"/> UNDERCUT BANKS [1]	<input type="checkbox"/> POOLS > 70cm [2]	<input type="checkbox"/> OXBOWS, BACKWATERS [1]	AMOUNT Check ONE (Or 2 & average)
<input type="checkbox"/> OVERHANGING VEGETATION [1]	<input type="checkbox"/> ROOTWADS [1]	<input type="checkbox"/> AQUATIC MACROPHYTES [1]	
<input type="checkbox"/> SHALLOWS (IN SLOW WATER) [1]	<input type="checkbox"/> BOULDERS [1]	<input type="checkbox"/> LOGS OR WOODY DEBRIS [1]	
<input type="checkbox"/> ROOTMATS [1]			

Check ONE (Or 2 & average):  
 EXTENSIVE >75% [11]  
 MODERATE 25-75% [7]  
 SPARSE 5-<25% [3]  
 NEARLY ABSENT <5% [1]

Comments:   

Cover Maximum    20

3] CHANNEL MORPHOLOGY Check ONE in each category (Or 2 & average)

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY	Channel Maximum <span style="border: 1px solid black; border-radius: 50%; padding: 5px;">16</span> 20
<input type="checkbox"/> HIGH [4]	<input type="checkbox"/> EXCELLENT [7]	<input checked="" type="checkbox"/> NONE [6]	<input type="checkbox"/> HIGH [3]	
<input checked="" type="checkbox"/> MODERATE [3]	<input checked="" type="checkbox"/> GOOD [5]	<input type="checkbox"/> RECOVERED [4]	<input checked="" type="checkbox"/> MODERATE [2]	
<input type="checkbox"/> LOW [2]	<input type="checkbox"/> FAIR [3]	<input type="checkbox"/> RECOVERING [3]	<input type="checkbox"/> LOW [1]	
<input type="checkbox"/> NONE [1]	<input type="checkbox"/> POOR [1]	<input type="checkbox"/> RECENT OR NO RECOVERY [1]		

Comments:   

4] BANK EROSION AND RIPARIAN ZONE Check ONE in each category for EACH BANK (Or 2 per bank & average)

EROSION		RIPARIAN WIDTH		FLOOD PLAIN QUALITY		Riparian Maximum <span style="border: 1px solid black; border-radius: 50%; padding: 5px;">  </span> 10										
<input type="checkbox"/> NONE / LITTLE [3]	<input type="checkbox"/> MODERATE [2]	<input type="checkbox"/> HEAVY / SEVERE [1]	<input type="checkbox"/> WIDE > 50m [4]	<input type="checkbox"/> MODERATE 10-50m [3]	<input type="checkbox"/> NARROW 5-10m [2]		<input type="checkbox"/> VERY NARROW < 5m [1]	<input type="checkbox"/> NONE [0]	<input type="checkbox"/> FOREST, SWAMP [3]	<input type="checkbox"/> SHRUB OR OLD FIELD [2]	<input type="checkbox"/> RESIDENTIAL, PARK, NEW FIELD [1]	<input type="checkbox"/> FENCED PASTURE [1]	<input type="checkbox"/> OPEN PASTURE, ROWCROP [0]	<input type="checkbox"/> CONSERVATION TILLAGE [1]	<input type="checkbox"/> URBAN OR INDUSTRIAL [0]	<input type="checkbox"/> MINING / CONSTRUCTION [0]

Indicate predominant land use(s) past 100m riparian.

Comments:   

5] POOL / GLIDE AND RIFFLE / RUN QUALITY

MAXIMUM DEPTH	CHANNEL WIDTH	CURRENT VELOCITY	Recreation Potential Primary Contact Secondary Contact (circle one and comment on back)	
Check ONE (ONLY!)	Check ONE (Or 2 & average)	Check ALL that apply		
<input type="checkbox"/> > 1m [6]	<input type="checkbox"/> POOL WIDTH > RIFFLE WIDTH [2]	<input type="checkbox"/> TORRENTIAL [-1]		<input type="checkbox"/> SLOW [1]
<input type="checkbox"/> 0.7-<1m [4]	<input checked="" type="checkbox"/> POOL WIDTH = RIFFLE WIDTH [1]	<input type="checkbox"/> VERY FAST [1]		<input type="checkbox"/> INTERSTITIAL [-1]
<input checked="" type="checkbox"/> 0.4-<0.7m [2]	<input type="checkbox"/> POOL WIDTH > RIFFLE WIDTH [0]	<input type="checkbox"/> FAST [1]	<input type="checkbox"/> INTERMITTENT [-2]	
<input type="checkbox"/> 0.2-<0.4m [1]		<input checked="" type="checkbox"/> MODERATE [1]	<input type="checkbox"/> EDDIES [1]	
<input type="checkbox"/> < 0.2m [0]		Indicate for reach - pools and riffles.		

Comments:   

Pool / Current Maximum 4 12

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species: Check ONE (Or 2 & average)  NO RIFFLE (metric=0)

RIFFLE DEPTH	RUN DEPTH	RIFFLE / RUN SUBSTRATE	RIFFLE / RUN EMBEDDEDNESS	Riffle / Run Maximum <span style="border: 1px solid black; border-radius: 50%; padding: 5px;">3</span> 8
<input type="checkbox"/> BEST AREAS > 10cm [2]	<input type="checkbox"/> MAXIMUM > 50cm [2]	<input type="checkbox"/> STABLE (e.g., Cobble, Boulder) [2]	<input type="checkbox"/> NONE [2]	
<input checked="" type="checkbox"/> BEST AREAS 5-10cm [1]	<input checked="" type="checkbox"/> MAXIMUM < 50cm [1]	<input checked="" type="checkbox"/> MOD. STABLE (e.g., Large Gravel) [1]	<input type="checkbox"/> LOW [1]	
<input type="checkbox"/> BEST AREAS < 5cm [metric=0]		<input type="checkbox"/> UNSTABLE (e.g., Fine Gravel, Sand) [0]	<input checked="" type="checkbox"/> MODERATE [0]	
			<input type="checkbox"/> EXTENSIVE [-1]	

Comments:   

6] GRADIENT ( ft/ml)  VERY LOW - LOW [2-4]  MODERATE [6-10]  HIGH - VERY HIGH [10-6]

DRAINAGE AREA ( ml<sup>2</sup>)

%POOL: 10 %GLIDE:   

%RUN: 80 %RIFFLE: 10

Gradient Maximum    10

**A) SAMPLED REACH**

Check ALL that apply

- METHOD**
- BOAT
  - WADE
  - L. LINE
  - OTHER

**DISTANCE**

- 0.5 Km
- 0.2 Km
- 0.15 Km
- 0.12 Km
- OTHER

meters

**CANOPY**

- > 85% - OPEN
- 55% - 85%
- 30% - 55%
- 10% - 30%
- < 10% - CLOSED

**STAGE**

1st -sample pass- 2nd

- HIGH
- UP
- NORMAL
- LOW
- DRY

**CLARITY**

1st -sample pass- 2nd

- < 20 cm
- 20 - 40 cm
- 40 - 70 cm
- > 70 cm / CTB
- SECCHI DEPTH

**C) RECREATION**

AREA DEPTH

POOL:  > 100ft<sup>2</sup>  > 3ft

Comment RE: Reach consistency/ Is reach typical of stream?, Recreation/ Observed - Inferred, Other/ Sampling observations, Concerns, Access directions, etc.

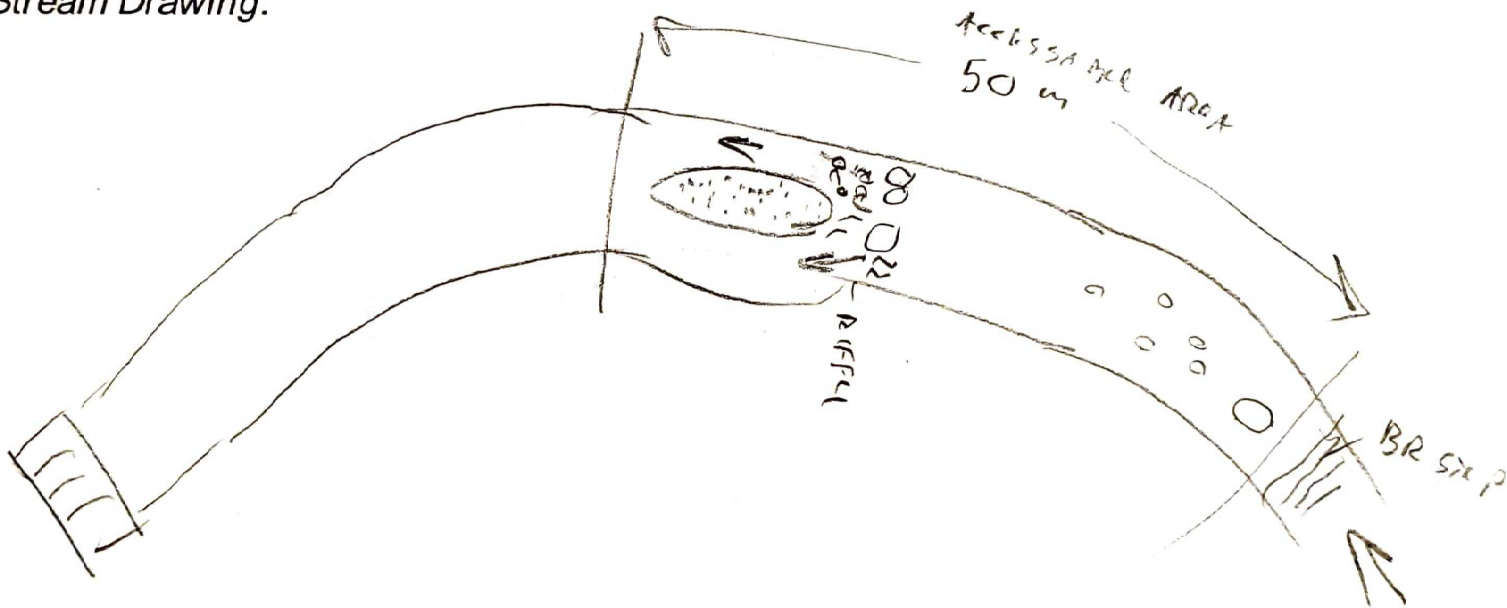
S-EF12

RUNS HEAVILY BRIMMED, BR STOPS CREATE RIFFLES, RIFFLES LOOK OK

(COBBLE / BR PEARL BR) WITH BR STOPS

B) AESTHETICS	D) MAINTENANCE	E) ISSUES	F) MEASUREMENTS
<input type="checkbox"/> NUISANCE ALGAE <input type="checkbox"/> INVASIVE MACROPHYTES <input type="checkbox"/> EXCESS TURBIDITY <input type="checkbox"/> DISCOLORATION <input type="checkbox"/> FOAM / SCUM <input type="checkbox"/> OIL SHEEN <input type="checkbox"/> TRASH / LITTER <input type="checkbox"/> NUISANCE ODOR <input type="checkbox"/> SLUDGE DEPOSITS <input type="checkbox"/> CSOs/SSOs/OUTFALLS	PUBLIC / PRIVATE / BOTH / NA ACTIVE / HISTORIC / BOTH / NA YOUNG-SUCCESSION-OLD SPRAY / SNAG / REMOVED MODIFIED / DIPPED OUT / NA LEVEED / ONE SIDED RELOCATED / CUTOFFS MOVING-BEDLOAD-STABLE ARMoured / SLUMPS ISLANDS / SCOURED IMPOUNDED / DESICCATED FLOOD CONTROL / DRAINAGE	Circle some & COMMENT WWTP / CSO / NPDES / INDUSTRY HARDENED / URBAN / DIRT&GRIME CONTAMINATED / LANDFILL BMPs-CONSTRUCTION-SEDIMENT LOGGING / IRRIGATION / COOLING BANK / EROSION / SURFACE FALSE BANK / MANURE / LAGOON WASH H <sub>2</sub> O / TILE / H <sub>2</sub> O TABLE ACID / MINE / QUARRY / FLOW NATURAL / WETLAND / STAGNANT PARK / GOLF / LAWN / HOME ATMOSPHERE / DATA PAUCITY	Legacy Tree: $\bar{x}$ width $\bar{x}$ depth max. depth $\bar{x}$ bankfull width bankfull $\bar{x}$ depth W/D ratio bankfull max. depth floodprone $x^2$ width entrench. ratio

**Stream Drawing:**





Stream & Location: S-E 28 10-30 RM: --- Date: 11/16/21

Scorers Full Name & Affiliation: LK

River Code: - - STORET #: --- Lat./ Long.: 37.085247, -79.948057 Office verified location

1) **SUBSTRATE** Check ONLY Two substrate TYPE BOXES, estimate % or note every type present

Check ONE (Or 2 & average)

BEST TYPES		OTHER TYPES		ORIGIN		QUALITY	
<input type="checkbox"/> BLDR / SLABS [10]	<input type="checkbox"/> POOL RIFFLE	<input type="checkbox"/> HARDPAN [4]	<input type="checkbox"/> POOL RIFFLE	<input type="checkbox"/> LIMESTONE [1]	<input type="checkbox"/> SILT	<input type="checkbox"/> HEAVY [-2]	Substrate <b>17</b> Maximum 20
<input type="checkbox"/> BOULDER [9]	<input type="checkbox"/>	<input type="checkbox"/> DETRITUS [3]	<input type="checkbox"/>	<input type="checkbox"/> TILLS [1]	<input type="checkbox"/>	<input type="checkbox"/> MODERATE [-1]	
<input checked="" type="checkbox"/> COBBLE [8]	<input type="checkbox"/>	<input type="checkbox"/> MUCK [2]	<input type="checkbox"/>	<input type="checkbox"/> WETLANDS [0]	<input type="checkbox"/>	<input type="checkbox"/> NORMAL [0]	
<input checked="" type="checkbox"/> GRAVEL [7]	<input type="checkbox"/>	<input checked="" type="checkbox"/> SILT [2]	<input type="checkbox"/>	<input type="checkbox"/> HARDPAN [0]	<input type="checkbox"/>	<input type="checkbox"/> FREE [1]	
<input type="checkbox"/> SAND [6]	<input type="checkbox"/>	<input type="checkbox"/> ARTIFICIAL [0]	<input type="checkbox"/>	<input type="checkbox"/> SANDSTONE [0]	<input type="checkbox"/>	<input type="checkbox"/> EXTENSIVE [-2]	
<input type="checkbox"/> BEDROCK [5]	<input type="checkbox"/>			<input type="checkbox"/> RIP/RAP [0]	<input type="checkbox"/>	<input type="checkbox"/> MODERATE [-1]	
NUMBER OF BEST TYPES: <input type="checkbox"/> 4 or more [2] <input type="checkbox"/> 3 or less [0]				LACUSTURINE [0]		<input type="checkbox"/> NORMAL [0]	
Comments				SHALE [-1]		<input type="checkbox"/> NONE [1]	
				COAL FINES [-2]			

2) **INSTREAM COVER** Indicate presence 0 to 3: 0-Absent; 1-Very small amounts or if more common of marginal quality; 2-Moderate amounts, but not of highest quality or in small amounts of highest quality; 3-Highest quality in moderate or greater amounts (e.g., very large boulders in deep or fast water, large diameter log that is stable, well developed rootwad in deep / fast water, or deep, well-defined, functional pools.

AMOUNT

Check ONE (Or 2 & average)

<input type="checkbox"/> UNDERCUT BANKS [1]	<input type="checkbox"/> POOLS > 70cm [2]	<input type="checkbox"/> OXBOWS, BACKWATERS [1]	<input type="checkbox"/> EXTENSIVE >75% [11]
<input type="checkbox"/> OVERHANGING VEGETATION [1]	<input type="checkbox"/> ROOTWADS [1]	<input type="checkbox"/> AQUATIC MACROPHYTES [1]	<input type="checkbox"/> MODERATE 25-75% [7]
<input type="checkbox"/> SHALLOWS (IN SLOW WATER) [1]	<input type="checkbox"/> BOULDERS [1]	<input type="checkbox"/> LOGS OR WOODY DEBRIS [1]	<input type="checkbox"/> SPARSE 5-<25% [3]
<input type="checkbox"/> ROOTMATS [1]			<input type="checkbox"/> NEARLY ABSENT <5% [1]

Comments Cover Maximum 0

3) **CHANNEL MORPHOLOGY** Check ONE in each category (Or 2 & average)

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY
<input type="checkbox"/> HIGH [4]	<input type="checkbox"/> EXCELLENT [7]	<input checked="" type="checkbox"/> NONE [6]	<input type="checkbox"/> HIGH [3]
<input checked="" type="checkbox"/> MODERATE [3]	<input checked="" type="checkbox"/> GOOD [5]	<input type="checkbox"/> RECOVERED [4]	<input checked="" type="checkbox"/> MODERATE [2]
<input type="checkbox"/> LOW [2]	<input type="checkbox"/> FAIR [3]	<input type="checkbox"/> RECOVERING [3]	<input type="checkbox"/> LOW [1]
<input type="checkbox"/> NONE [1]	<input type="checkbox"/> POOR [1]	<input type="checkbox"/> RECENT OR NO RECOVERY [1]	

Comments Channel Maximum 16

4) **BANK EROSION AND RIPARIAN ZONE** Check ONE in each category for EACH BANK (Or 2 per bank & average)

EROSION		RIPARIAN WIDTH		FLOOD PLAIN QUALITY		CONSERVATION									
<input type="checkbox"/> NONE / LITTLE [3]	<input type="checkbox"/> MODERATE [2]	<input type="checkbox"/> HEAVY / SEVERE [1]	<input type="checkbox"/> WIDE > 50m [4]	<input type="checkbox"/> MODERATE 10-50m [3]	<input type="checkbox"/> NARROW 5-10m [2]	<input type="checkbox"/> VERY NARROW < 5m [1]	<input type="checkbox"/> NONE [0]	<input type="checkbox"/> FOREST, SWAMP [3]	<input type="checkbox"/> SHRUB OR OLD FIELD [2]	<input type="checkbox"/> RESIDENTIAL, PARK, NEW FIELD [1]	<input type="checkbox"/> FENCED PASTURE [1]	<input type="checkbox"/> OPEN PASTURE, ROWCROP [0]	<input type="checkbox"/> CONSERVATION TILLAGE [1]	<input type="checkbox"/> URBAN OR INDUSTRIAL [0]	<input type="checkbox"/> MINING / CONSTRUCTION [0]

Comments Riparian Maximum 10

5) **POOL / GLIDE AND RIFFLE / RUN QUALITY**

MAXIMUM DEPTH	CHANNEL WIDTH	CURRENT VELOCITY	Recreation Potential
Check ONE (ONLY)	Check ONE (Or 2 & average)	Check ALL that apply	Primary Contact
<input type="checkbox"/> > 1m [6]	<input checked="" type="checkbox"/> POOL WIDTH > RIFFLE WIDTH [2]	<input type="checkbox"/> TORRENTIAL [-1]	Secondary Contact
<input type="checkbox"/> 0.7-1m [4]	<input type="checkbox"/> POOL WIDTH = RIFFLE WIDTH [1]	<input type="checkbox"/> VERY FAST [1]	(circle one and comment on back)
<input checked="" type="checkbox"/> 0.4-0.7m [2]	<input type="checkbox"/> POOL WIDTH > RIFFLE WIDTH [0]	<input checked="" type="checkbox"/> FAST [1]	
<input type="checkbox"/> 0.2-0.4m [1]		<input type="checkbox"/> MODERATE [1]	
<input type="checkbox"/> < 0.2m [0]		<input type="checkbox"/> SLOW [1]	
		<input type="checkbox"/> INTERSTITIAL [-1]	
		<input type="checkbox"/> INTERMITTENT [-2]	
		<input type="checkbox"/> EDDIES [1]	

Comments Pool / Current Maximum 5

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species:

Check ONE (Or 2 & average).

NO RIFFLE [metric=0]

RIFFLE DEPTH	RUN DEPTH	RIFFLE / RUN SUBSTRATE	RIFFLE / RUN EMBEDDEDNESS
<input type="checkbox"/> BEST AREAS > 10cm [2]	<input type="checkbox"/> MAXIMUM > 50cm [2]	<input type="checkbox"/> STABLE (e.g., Cobble, Boulder) [2]	<input type="checkbox"/> NONE [2]
<input checked="" type="checkbox"/> BEST AREAS 5-10cm [1]	<input checked="" type="checkbox"/> MAXIMUM < 50cm [1]	<input checked="" type="checkbox"/> MOD. STABLE (e.g., Large Gravel) [1]	<input type="checkbox"/> LOW [1]
<input type="checkbox"/> BEST AREAS < 5cm [metric=0]		<input type="checkbox"/> UNSTABLE (e.g., Fine Gravel, Sand) [0]	<input checked="" type="checkbox"/> MODERATE [0]
			<input type="checkbox"/> EXTENSIVE [-1]

Comments Riffle / Run Maximum 3

6) **GRADIENT** (ft/mi)  VERY LOW - LOW [2-4]  MODERATE [6-10]  HIGH - VERY HIGH [10-6]

**DRAINAGE AREA** (mi<sup>2</sup>)

%POOL: 20 %GLIDE: 0

%RUN: 55 %RIFFLE: 25

Gradient Maximum 10

**AJ SAMPLED REACH**

Check ALL that apply

**METHOD**

- BOAT
- WADE
- L. LINE
- OTHER

**DISTANCE**

- 0.5 Km
- 0.2 Km
- 0.15 Km
- 0.12 Km
- OTHER

meters

**CANOPY**

- > 85% - OPEN
- 55% - <85%
- 30% - <55%
- 10% - <30%
- <10% - CLOSED

**STAGE**

1st -sample pass- 2nd

- HIGH
- UP
- NORMAL
- LOW
- DRY

**CLARITY**

1st --sample pass-- 2nd

- < 20 cm
- 20 - <40 cm
- 40 - 70 cm
- > 70 cm/ CTB
- SECCHI DEPTH

1st \_\_\_\_\_ cm

2nd \_\_\_\_\_ cm

**CJ RECREATION**

AREA DEPTH

POOL:  >100ft<sup>2</sup>  >3ft

Comment RE: Reach consistency/ Is reach typical of stream?, Recreation/ Observed - Inferred, Other/ Sampling observations, Concerns, Access directions, etc.

S-E 28

EMF MODERATELY BAMBROOD POOL - RIFFLE, WELL FORMED RIFFLES,

SHALLOW POOLS. BAMBROOD RUNS. SANDY BARS

RIFLE - POOL COMPLEX

**BJ AESTHETICS**

- NUISANCE ALGAE
- INVASIVE MACROPHYTES
- EXCESS TURBIDITY
- DISCOLORATION
- FOAM / SCUM
- OIL SHEEN
- TRASH / LITTER
- NUISANCE ODOR
- SLUDGE DEPOSITS
- CSOs/SSOs/OUTFALLS

**DJ MAINTENANCE**

- PUBLIC / PRIVATE / BOTH / NA
- ACTIVE / HISTORIC / BOTH / NA
- YOUNG-SUCCESSION-OLD
- SPRAY / SNAG / REMOVED
- MODIFIED / DIPPED OUT / NA
- LEVEED / ONE SIDED
- RELOCATED / CUTOFFS
- MOVING-BEDLOAD-STABLE
- ARMoured / SLUMPS
- ISLANDS / SCURED
- IMPOUNDED / DESICCATED
- FLOOD CONTROL / DRAINAGE

Circle some & COMMENT

**EJ ISSUES**

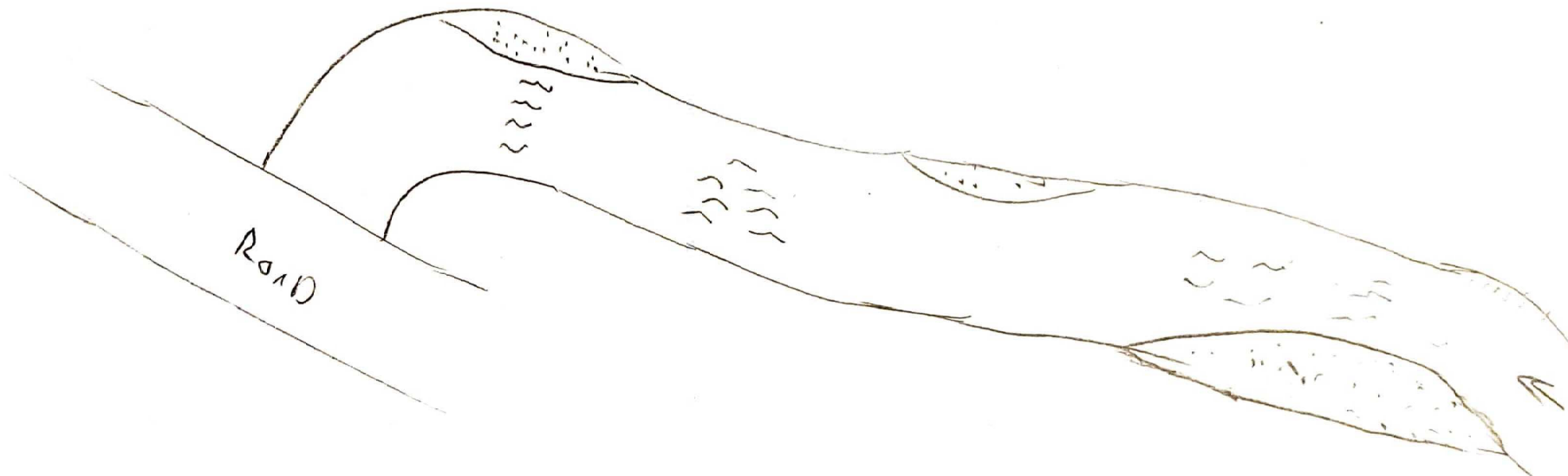
- WWTP / CSO / NPDES / INDUSTRY
- HARDENED / URBAN / DIRT&GRIME
- CONTAMINATED / LANDFILL
- BMPs-CONSTRUCTION-SEDIMENT
- LOGGING / IRRIGATION / COOLING
- BANK / EROSION / SURFACE
- FALSE BANK / MANURE / LAGOON
- WASH H<sub>2</sub>O / TILE / H<sub>2</sub>O TABLE
- ACID / MINE / QUARRY / FLOW
- NATURAL / WETLAND / STAGNANT
- PARK / GOLF / LAWN / HOME
- ATMOSPHERE / DATA PAUCITY

**FJ MEASUREMENTS**

- $\bar{x}$  width
- $\bar{x}$  depth
- max. depth
- $\bar{x}$  bankfull width
- bankfull  $\bar{x}$  depth
- W/D ratio
- bankfull max. depth
- floodprone  $x^2$  width
- entrench. ratio

Legacy Tree:

**Stream Drawing:**



Stream & Location: S-C19 16205 RM:    Date: 11/15/21

Scorers Full Name & Affiliation: LK  
River Code:    STORET #:    Lat./Long.: 37.055147, -79.830098 Office verified location

**1] SUBSTRATE** Check ONLY Two substrate TYPE BOXES; estimate % or note every type present

<b>BEST TYPES</b>	<b>POOL RIFFLE</b>	<b>OTHER TYPES</b>	<b>POOL RIFFLE</b>	<b>ORIGIN</b>	<b>QUALITY</b>
<input type="checkbox"/> BLDR /SLABS [10]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> HARDPAN [4]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> LIMESTONE [1]	<input type="checkbox"/> HEAVY [-2]
<input type="checkbox"/> BOULDER [9]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> DETRITUS [3]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> TILLS [1]	<input type="checkbox"/> MODERATE [-1]
<input checked="" type="checkbox"/> COBBLE [8]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> MUCK [2]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> WETLANDS [0]	<input type="checkbox"/> NORMAL [0]
<input checked="" type="checkbox"/> GRAVEL [7]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> SILT [2]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> HARDPAN [0]	<input type="checkbox"/> FREE [1]
<input type="checkbox"/> SAND [6]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> ARTIFICIAL [0]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> SANDSTONE [0]	<input type="checkbox"/> EXTENSIVE [-2]
<input type="checkbox"/> BEDROCK [5]	<input type="checkbox"/> <input type="checkbox"/>			<input type="checkbox"/> RIP/RAP [0]	<input type="checkbox"/> MODERATE [-1]
				<input type="checkbox"/> LACUSTURINE [0]	<input type="checkbox"/> NORMAL [0]
				<input type="checkbox"/> SHALE [-1]	<input type="checkbox"/> NONE [1]
				<input type="checkbox"/> COAL FINES [-2]	

Check ONE (Or 2 & average)

NUMBER OF BEST TYPES:  4 or more [2] sludge from point-sources  
 3 or less [0]

Comments:   

Substrate 15  
Maximum 20

**2] INSTREAM COVER** Indicate presence 0 to 3; 0-Absent; 1-Very small amounts or if more common of marginal quality; 2-Moderate amounts, but not of highest quality or in small amounts of highest quality; 3-Highest quality in moderate or greater amounts (e.g., very large boulders in deep or fast water, large diameter log that is stable, well developed rootwad in deep / fast water, or deep, well-defined, functional pools.

<input type="checkbox"/> UNDERCUT BANKS [1]	<input type="checkbox"/> POOLS > 70cm [2]	<input type="checkbox"/> OXBOWS, BACKWATERS [1]	<input type="checkbox"/> AMOUNT
<input type="checkbox"/> OVERHANGING VEGETATION [1]	<input type="checkbox"/> ROOTWADS [1]	<input type="checkbox"/> AQUATIC MACROPHYTES [1]	Check ONE (Or 2 & average)
<input type="checkbox"/> SHALLOWS (IN SLOW WATER) [1]	<input type="checkbox"/> BOULDERS [1]	<input type="checkbox"/> LOGS OR WOODY DEBRIS [1]	<input type="checkbox"/> EXTENSIVE >75% [11]
<input type="checkbox"/> ROOTMATS [1]			<input type="checkbox"/> MODERATE 25-75% [7]
			<input type="checkbox"/> SPARSE 5-<25% [3]
			<input type="checkbox"/> NEARLY ABSENT <5% [1]

Comments:   

Cover     
Maximum 20

**3] CHANNEL MORPHOLOGY** Check ONE in each category (Or 2 & average)

<b>SINUOSITY</b>	<b>DEVELOPMENT</b>	<b>CHANNELIZATION</b>	<b>STABILITY</b>
<input type="checkbox"/> HIGH [4]	<input type="checkbox"/> EXCELLENT [7]	<input checked="" type="checkbox"/> NONE [6]	<input type="checkbox"/> HIGH [3]
<input type="checkbox"/> MODERATE [3]	<input checked="" type="checkbox"/> GOOD [5]	<input type="checkbox"/> RECOVERED [4]	<input checked="" type="checkbox"/> MODERATE [2]
<input type="checkbox"/> LOW [2]	<input type="checkbox"/> FAIR [3]	<input type="checkbox"/> RECOVERING [3]	<input type="checkbox"/> LOW [1]
<input checked="" type="checkbox"/> NONE [1]	<input type="checkbox"/> POOR [1]	<input type="checkbox"/> RECENT OR NO RECOVERY [1]	

Comments:   

Channel 14  
Maximum 20

**4] BANK EROSION AND RIPARIAN ZONE** Check ONE in each category for EACH BANK (Or 2 per bank & average)

<b>EROSION</b>	<b>RIPARIAN WIDTH</b>	<b>FLOOD PLAIN QUALITY</b>
<input type="checkbox"/> NONE / LITTLE [3]	<input type="checkbox"/> WIDE > 50m [4]	<input type="checkbox"/> FOREST, SWAMP [3]
<input type="checkbox"/> MODERATE [2]	<input type="checkbox"/> MODERATE 10-50m [3]	<input type="checkbox"/> SHRUB OR OLD FIELD [2]
<input type="checkbox"/> HEAVY / SEVERE [1]	<input type="checkbox"/> NARROW 5-10m [2]	<input type="checkbox"/> RESIDENTIAL, PARK, NEW FIELD [1]
	<input type="checkbox"/> VERY NARROW < 5m [1]	<input type="checkbox"/> FENCED PASTURE [1]
	<input type="checkbox"/> NONE [0]	<input type="checkbox"/> OPEN PASTURE, ROWCROP [0]
		<input type="checkbox"/> CONSERVATION TILLAGE [1]
		<input type="checkbox"/> URBAN OR INDUSTRIAL [0]
		<input type="checkbox"/> MINING / CONSTRUCTION [0]

Indicate predominant land use(s) past 100m riparian.

Comments:   

Riparian     
Maximum 10

**5] POOL / GLIDE AND RIFFLE / RUN QUALITY**

<b>MAXIMUM DEPTH</b>	<b>CHANNEL WIDTH</b>	<b>CURRENT VELOCITY</b>	<b>Recreation Potential</b>
Check ONE (ONLY!)	Check ONE (Or 2 & average)	Check ALL that apply	Primary Contact
<input checked="" type="checkbox"/> > 1m [6]	<input type="checkbox"/> POOL WIDTH > RIFFLE WIDTH [2]	<input type="checkbox"/> TORRENTIAL [-1]	Secondary Contact
<input type="checkbox"/> 0.7-<1m [4]	<input checked="" type="checkbox"/> POOL WIDTH = RIFFLE WIDTH [1]	<input checked="" type="checkbox"/> VERY FAST [1]	(circle one and comment on back)
<input type="checkbox"/> 0.4-<0.7m [2]	<input type="checkbox"/> POOL WIDTH > RIFFLE WIDTH [0]	<input type="checkbox"/> FAST [1]	
<input type="checkbox"/> 0.2-<0.4m [1]		<input type="checkbox"/> MODERATE [1]	
<input type="checkbox"/> < 0.2m [0]		<input type="checkbox"/> SLOW [1]	
		<input type="checkbox"/> INTERSTITIAL [-1]	
		<input type="checkbox"/> INTERMITTENT [-2]	
		<input type="checkbox"/> EDDIES [1]	

Indicate for reach - pools and riffles.

Comments:   

Pool / Current 8  
Maximum 12

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species:

<b>RIFFLE DEPTH</b>	<b>RUN DEPTH</b>	<b>RIFFLE / RUN SUBSTRATE</b>	<b>RIFFLE / RUN EMBEDDEDNESS</b>
<input checked="" type="checkbox"/> BEST AREAS > 10cm [2]	<input checked="" type="checkbox"/> MAXIMUM > 50cm [2]	<input checked="" type="checkbox"/> STABLE (e.g., Cobble, Boulder) [2]	<input type="checkbox"/> NONE [2]
<input type="checkbox"/> BEST AREAS 5-10cm [1]	<input type="checkbox"/> MAXIMUM < 50cm [1]	<input type="checkbox"/> MOD. STABLE (e.g., Large Gravel) [1]	<input checked="" type="checkbox"/> LOW [1]
<input type="checkbox"/> BEST AREAS < 5cm [metric=0]		<input type="checkbox"/> UNSTABLE (e.g., Fine Gravel, Sand) [0]	<input type="checkbox"/> MODERATE [0]
			<input type="checkbox"/> EXTENSIVE [-1]

Check ONE (Or 2 & average)

Comments:   

Riffle / Run 7  
Maximum 8

**6] GRADIENT** (ft/mi)  VERY LOW - LOW [2-4] %POOL: 20 %GLIDE:   

**DRAINAGE AREA** (mi<sup>2</sup>)  MODERATE [6-10] %RUN: 50 %RIFFLE: 30

HIGH - VERY HIGH [10-6] Gradient     
Maximum 10

**A) SAMPLED REACH**

Check ALL that apply

- METHOD**
- BOAT
  - WADE
  - L. LINE
  - OTHER
- DISTANCE**
- 0.5 Km
  - 0.2 Km
  - 0.15 Km
  - 0.12 Km
  - OTHER

**STAGE**

- 1st -sample pass- 2nd
- HIGH
  - UP
  - NORMAL
  - LOW
  - DRY

**CLARITY**

- 1st --sample pass-- 2nd
- < 20 cm
  - 20-40 cm
  - 40-70 cm
  - > 70 cm/ CTB
  - SECCHI DEPTH

**CANOPY**

- 1st pass \_\_\_\_\_ cm
- 2nd pass \_\_\_\_\_ cm
- > 85% - OPEN
  - 55% - 85%
  - 30% - 55%
  - 10% - 30%
  - < 10% - CLOSED

Comment RE: Reach consistency/ Is reach typical of stream?, Recreation/ Observed - Inferred, Other/ Sampling observations, Concerns, Access directions, etc.

S-C 19

STRAIGHT REACH. DEEP POOLS. RIPPLES ARE FUNCTIONING

RIPPLE POOL COMPLEX

**B) AESTHETICS**

- NUISANCE ALGAE
- INVASIVE MACROPHYTES
- EXCESS TURBIDITY
- DISCOLORATION
- FOAM / SCUM
- OIL SHEEN
- TRASH / LITTER
- NUISANCE ODOR
- SLUDGE DEPOSITS
- CSOs/SSOs/OUTFALLS

**D) MAINTENANCE**

- Circle some & COMMENT
- PUBLIC / PRIVATE / BOTH / NA
  - ACTIVE / HISTORIC / BOTH / NA
  - YOUNG-SUCCESSION-OLD
  - SPRAY / SNAG / REMOVED
  - MODIFIED / DIPPED OUT / NA
  - LEVEED / ONE SIDED
  - RELOCATED / CUTOFFS
  - MOVING-BEDLOAD-STABLE
  - ARMoured / SLUMPS
  - ISLANDS / SCoured
  - IMPOUNDED / DESICCATED
  - FLOOD CONTROL / DRAINAGE

**E) ISSUES**

- WWTP / CSO / NPDES / INDUSTRY
- HARDENED / URBAN / DIRT&GRIME
- CONTAMINATED / LANDFILL
- BMPs-CONSTRUCTION-SEDIMENT
- LOGGING / IRRIGATION / COOLING
- BANK / EROSION / SURFACE
- FALSE BANK / MANURE / LAGOON
- WASH H<sub>2</sub>O / TILE / H<sub>2</sub>O TABLE
- ACID / MINE / QUARRY / FLOW
- NATURAL / WETLAND / STAGNANT
- PARK / GOLF / LAWN / HOME
- ATMOSPHERE / DATA PAUCITY

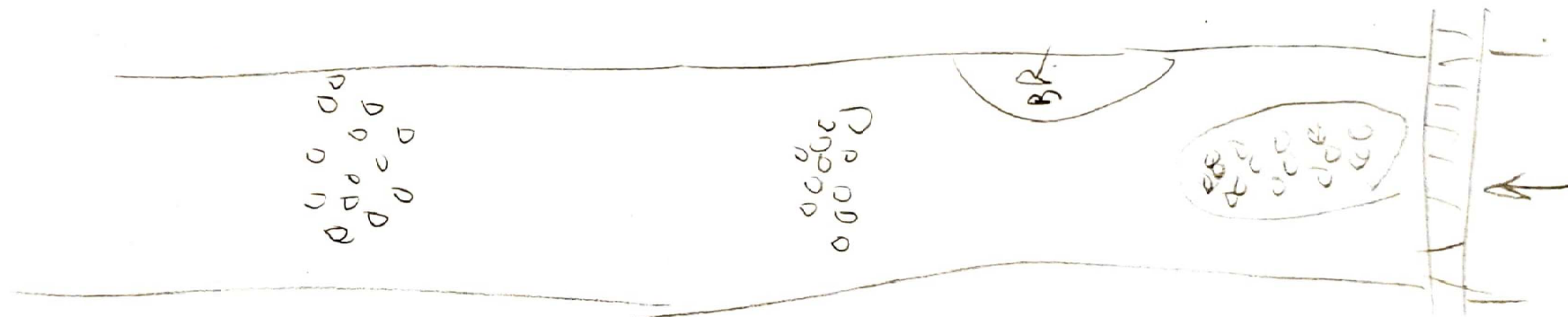
**F) MEASUREMENTS**

- $\bar{x}$  width
- $\bar{x}$  depth
- max. depth
- $\bar{x}$  bankfull width
- bankfull  $\bar{x}$  depth
- W/D ratio
- bankfull max. depth
- floodprone  $x^2$  width
- entrench. ratio

**C) RECREATION**

- AREA DEPTH
- POOL:  >100ft<sup>2</sup>  >3ft

Stream Drawing:



Stream & Location: S-C17 DS 8-20 RM:    Date: 11/18/21

Scorers Full Name & Affiliation: LK

River Code:    STORET #:    Lat./Long.: 37.05839, -79.918015 Office verified location

1] SUBSTRATE Check ONLY Two substrate TYPE BOXES; estimate % or note every type present

Check ONE (Or 2 & average)

<b>BEST TYPES</b>		<b>POOL RIFFLE</b>	<b>OTHER TYPES</b>		<b>POOL RIFFLE</b>	<b>ORIGIN</b>	<b>QUALITY</b>
<input type="checkbox"/> BLD R/SLABS [10]	<input type="checkbox"/> BOULDER [9]	<input type="checkbox"/> COBBLE [8]	<input type="checkbox"/> GRAVEL [7]	<input type="checkbox"/> SAND [6]	<input type="checkbox"/> BEDROCK [5]	<input type="checkbox"/> LIMESTONE [1]	<input type="checkbox"/> TILLS [1]
<input type="checkbox"/> HARDPAN [4]	<input type="checkbox"/> DETRITUS [3]	<input type="checkbox"/> MUCK [2]	<input type="checkbox"/> SILT [2]	<input type="checkbox"/> ARTIFICIAL [0]	<input type="checkbox"/> LACUSTURINE [0]	<input type="checkbox"/> SHALE [-1]	<input type="checkbox"/> COAL FINES [-2]
NUMBER OF BEST TYPES: <input type="checkbox"/> 4 or more [2] <input type="checkbox"/> 3 or less [0]						SILT <input type="checkbox"/> HEAVY [-2] <input type="checkbox"/> MODERATE [-1] <input type="checkbox"/> NORMAL [0] <input type="checkbox"/> FREE [1] <input type="checkbox"/> EXTENSIVE [-2] <input type="checkbox"/> MODERATE [-1] <input type="checkbox"/> NORMAL [0] <input type="checkbox"/> NONE [1]	

Comments:   

Substrate Maximum 20 15

2] INSTREAM COVER Indicate presence 0 to 3: 0-Absent; 1-Very small amounts or if more common of marginal quality; 2-Moderate amounts, but not of highest quality or in small amounts of highest quality; 3-Highest quality in moderate or greater amounts (e.g., very large boulders in deep or fast water, large diameter log that is stable, well developed rootwad in deep / fast water, or deep, well-defined, functional pools.

AMOUNT

Check ONE (Or 2 & average)

<input type="checkbox"/> UNDERCUT BANKS [1]	<input type="checkbox"/> POOLS > 70cm [2]	<input type="checkbox"/> OXBOWS, BACKWATERS [1]
<input type="checkbox"/> OVERHANGING VEGETATION [1]	<input type="checkbox"/> ROOTWADS [1]	<input type="checkbox"/> AQUATIC MACROPHYTES [1]
<input type="checkbox"/> SHALLOWS (IN SLOW WATER) [1]	<input type="checkbox"/> BOULDERS [1]	<input type="checkbox"/> LOGS OR WOODY DEBRIS [1]
<input type="checkbox"/> ROOTMATS [1]		

Cover Maximum 20   

3] CHANNEL MORPHOLOGY Check ONE in each category (Or 2 & average)

<b>SINUOSITY</b>	<b>DEVELOPMENT</b>	<b>CHANNELIZATION</b>	<b>STABILITY</b>
<input type="checkbox"/> HIGH [4]	<input checked="" type="checkbox"/> EXCELLENT [7]	<input checked="" type="checkbox"/> NONE [6]	<input type="checkbox"/> HIGH [3]
<input type="checkbox"/> MODERATE [3]	<input type="checkbox"/> GOOD [5]	<input type="checkbox"/> RECOVERED [4]	<input checked="" type="checkbox"/> MODERATE [2]
<input checked="" type="checkbox"/> LOW [2]	<input type="checkbox"/> FAIR [3]	<input type="checkbox"/> RECOVERING [3]	<input type="checkbox"/> LOW [1]
<input type="checkbox"/> NONE [1]	<input type="checkbox"/> POOR [1]	<input type="checkbox"/> RECENT OR NO RECOVERY [1]	

Channel Maximum 20 17

4] BANK EROSION AND RIPARIAN ZONE Check ONE in each category for EACH BANK (Or 2 per bank & average)

<b>EROSION</b>		<b>RIPARIAN WIDTH</b>		<b>FLOOD PLAIN QUALITY</b>		
<input type="checkbox"/> NONE / LITTLE [3]	<input type="checkbox"/> MODERATE [2]	<input type="checkbox"/> HEAVY / SEVERE [1]	<input type="checkbox"/> WIDE > 50m [4]	<input type="checkbox"/> MODERATE 10-50m [3]	<input type="checkbox"/> NARROW 5-10m [2]	<input type="checkbox"/> VERY NARROW < 5m [1]
<input type="checkbox"/> NONE [0]	<input type="checkbox"/> FOREST, SWAMP [3]	<input type="checkbox"/> SHRUB OR OLD FIELD [2]	<input type="checkbox"/> RESIDENTIAL, PARK, NEW FIELD [1]	<input type="checkbox"/> FENCED PASTURE [1]	<input type="checkbox"/> OPEN PASTURE, ROWCROP [0]	<input type="checkbox"/> CONSERVATION TILLAGE [1]
	<input type="checkbox"/> URBAN OR INDUSTRIAL [0]	<input type="checkbox"/> MINING / CONSTRUCTION [0]				

Riparian Maximum 10   

5] POOL / GLIDE AND RIFFLE / RUN QUALITY

MAXIMUM DEPTH

Check ONE (ONLY!)

> 1m [6]

0.7-1m [4]

0.4-0.7m [2]

0.2-0.4m [1]

< 0.2m [0]

CHANNEL WIDTH

Check ONE (Or 2 & average)

POOL WIDTH > RIFFLE WIDTH [2]

POOL WIDTH = RIFFLE WIDTH [1]

POOL WIDTH < RIFFLE WIDTH [0]

CURRENT VELOCITY

Check ALL that apply

TORRENTIAL [-1]

VERY FAST [1]

FAST [1]

MODERATE [1]

SLOW [1]

INTERSTITIAL [-1]

INTERMITTENT [-2]

EDDIES [1]

Indicate for reach - pools and riffles.

Recreation Potential

Primary Contact  
Secondary Contact  
(circle one and comment on back)

Pool / Current Maximum 12 4

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species:

Check ONE (Or 2 & average).

NO RIFFLE [metric=0]

RIFFLE DEPTH

RUN DEPTH

RIFFLE / RUN SUBSTRATE

RIFFLE / RUN EMBEDEDNESS

BEST AREAS > 10cm [2]

BEST AREAS 5-10cm [1]

BEST AREAS < 5cm [metric=0]

MAXIMUM > 50cm [2]

MAXIMUM < 50cm [1]

STABLE (e.g., Cobble, Boulder) [2]

MOD. STABLE (e.g., Large Gravel) [1]

UNSTABLE (e.g., Fine Gravel, Sand) [0]

NONE [2]

LOW [1]

MODERATE [0]

EXTENSIVE [-1]

Riffle / Run Maximum 8 6

Comments:   

6] GRADIENT (

DRAINAGE AREA

VERY LOW - LOW [2-4]

MODERATE [6-10]

HIGH - VERY HIGH [10-6]

% POOL: 10 % GLIDE:   

% RUN: 10 % RIFFLE: 80

Gradient Maximum 10

**A) SAMPLED REACH**

Check ALL that apply

**METHOD**

- BOAT
- WADE
- L. LINE
- OTHER

**STAGE**

- HIGH
- UP
- NORMAL
- LOW
- DRY

**DISTANCE**

- 0.5 Km
- 0.2 Km
- 0.15 Km
- 0.12 Km
- OTHER

**CLARITY**

- 1st -- sample pass-- 2nd
- < 20 cm
  - 20-<40 cm
  - 40-70 cm
  - > 70 cm/ CTB
  - SECCHI DEPTH

meters

**CANOPY**

- > 85%- OPEN
- 55%-<85%
- 30%-<55%
- 10%-<30%
- <10%- CLOSED

- 1st \_\_\_\_\_ cm
- 2nd \_\_\_\_\_ cm

**C) RECREATION**

- AREA DEPTH
- POOL:  >100ft<sup>2</sup>  >3ft

Comment RE: Reach consistency/ Is reach typical of stream?, Recreation/ Observed - Inferred, Other/ Sampling observations, Concerns, Access directions, etc.

S-C17

TOOLS IS BURIED IN SAND AND IS NOT A RIFFLE-POOL COMPLEX

LITTLE HAS WELL FORMED RIFFLES AND POORLY FORMED POOLS AND IS

RUN DOMINATED

NOT A POOL-RIFFLE COMPLEX

**B) AESTHETICS**

- NUISANCE ALGAE
- INVASIVE MACROPHYTES
- EXCESS TURBIDITY
- DISCOLORATION
- FOAM / SCUM
- OIL SHEEN
- TRASH / LITTER
- NUISANCE ODOR
- SLUDGE DEPOSITS
- CSOs/SSOs/OUTFALLS

**D) MAINTENANCE**

- PUBLIC / PRIVATE / BOTH / NA
- ACTIVE / HISTORIC / BOTH / NA
- YOUNG-SUCCESSION-OLD
- SPRAY / SNAG / REMOVED
- MODIFIED / DIPPED OUT / NA
- LEVEED / ONE SIDED
- RELOCATED / CUTOFFS
- MOVING-BEDLOAD-STABLE
- ARMoured / SLUMPS
- ISLANDS / SCoured
- IMPOUNDED / DESICCATED
- FLOOD CONTROL / DRAINAGE

Circle some & COMMENT

**E) ISSUES**

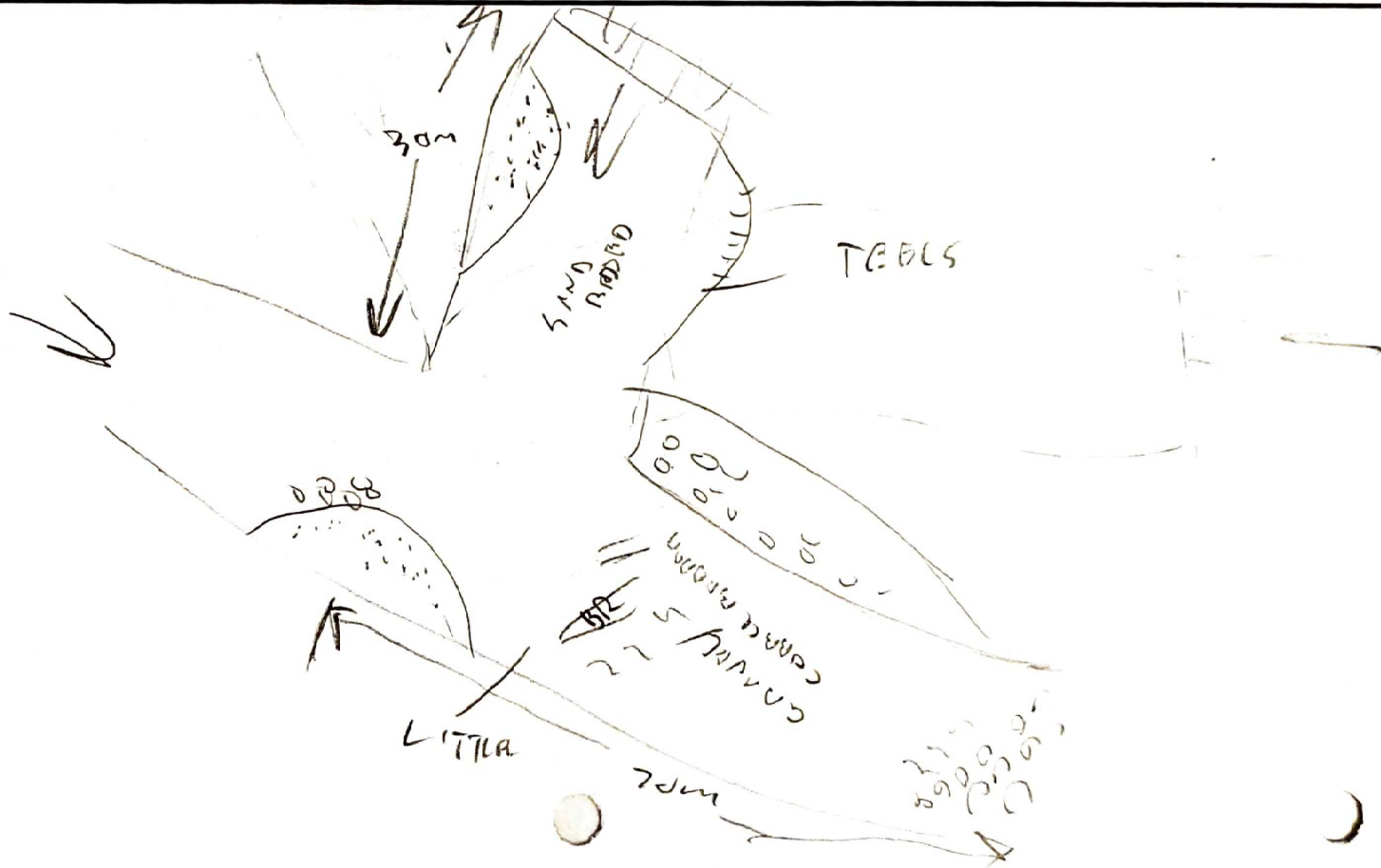
- WWTP / CSO / NPDES / INDUSTRY
- HARDENED / URBAN / DIRT&GRIME
- CONTAMINATED / LANDFILL
- BMPs-CONSTRUCTION-SEDIMENT
- LOGGING / IRRIGATION / COOLING
- BANK / EROSION / SURFACE
- FALSE BANK / MANURE / LAGOON
- WASH H<sub>2</sub>O / TILE / H<sub>2</sub>O TABLE
- ACID / MINE / QUARRY / FLOW
- NATURAL / WETLAND / STAGNANT
- PARK / GOLF / LAWN / HOME
- ATMOSPHERE / DATA PAUCITY

**F) MEASUREMENTS**

- $\bar{x}$  width
- $\bar{x}$  depth
- max. depth
- $\bar{x}$  bankfull width
- bankfull  $\bar{x}$  depth
- W/D ratio
- bankfull max. depth
- floodprone  $x^2$  width
- entrench. ratio

Legacy Tree:

**Stream Drawing:**



Stream & Location: S-022 9:05 RM:    Date: 11/16/21

Scorers Full Name & Affiliation: LK

River Code:    STORET #:    (NAD 83 decimal) Lat./ Long.: 37.070101, -79.929732 Office verified location

1] SUBSTRATE Check ONLY Two substrate TYPE BOXES; estimate % or note every type present

BEST TYPES		OTHER TYPES		ORIGIN		QUALITY	
<input type="checkbox"/> BLDR/SLABS [10]	<input type="checkbox"/> POOL RIFFLE	<input type="checkbox"/> HARDPAN [4]	<input type="checkbox"/> POOL RIFFLE	<input type="checkbox"/> LIMESTONE [1]	<input type="checkbox"/> SILT	<input type="checkbox"/> HEAVY [-2]	10
<input type="checkbox"/> BOULDER [9]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> DETRITUS [3]	<input type="checkbox"/>	<input type="checkbox"/> TILLS [1]	<input type="checkbox"/>	<input type="checkbox"/> MODERATE [-1]	
<input checked="" type="checkbox"/> COBBLE [8]	<input type="checkbox"/>	<input type="checkbox"/> MUCK [2]	<input type="checkbox"/>	<input type="checkbox"/> WETLANDS [0]	<input type="checkbox"/>	<input type="checkbox"/> NORMAL [0]	
<input type="checkbox"/> GRAVEL [7]	<input type="checkbox"/>	<input type="checkbox"/> SILT [2]	<input type="checkbox"/>	<input type="checkbox"/> HARDPAN [0]	<input type="checkbox"/>	<input type="checkbox"/> FREE [1]	
<input type="checkbox"/> SAND [6]	<input type="checkbox"/>	<input type="checkbox"/> ARTIFICIAL [0]	<input type="checkbox"/>	<input type="checkbox"/> SANDSTONE [0]	<input type="checkbox"/>	<input type="checkbox"/> EXTENSIVE [-2]	
<input type="checkbox"/> BEDROCK [5]	<input type="checkbox"/>	(Score natural substrates; ignore sludge from point-sources)		<input type="checkbox"/> RIP/RAP [0]	<input type="checkbox"/>	<input type="checkbox"/> MODERATE [-1]	
NUMBER OF BEST TYPES: <input type="checkbox"/> 4 or more <input checked="" type="checkbox"/> 2 <input type="checkbox"/> 3 or less <input type="checkbox"/> 0				<input type="checkbox"/> LACUSTURINE [0]	<input type="checkbox"/>	<input type="checkbox"/> NORMAL [0]	20
Comments				<input type="checkbox"/> SHALE [-1]	<input type="checkbox"/>	<input type="checkbox"/> NONE [1]	
				<input type="checkbox"/> COAL FINES [-2]	<input type="checkbox"/>		

2] INSTREAM COVER Indicate presence 0 to 3: 0-Absent, 1-Very small amounts or if more common of marginal quality, 2-Moderate amounts, but not of highest quality or in small amounts of highest quality, 3-Highest quality in moderate or greater amounts (e.g., very large boulders in deep or fast water, large diameter log that is stable, well developed rootwad in deep / fast water, or deep, well-defined, functional pools.

<input type="checkbox"/> UNDERCUT BANKS [1]	<input type="checkbox"/> POOLS > 70cm [2]	<input type="checkbox"/> OXBOWS, BACKWATERS [1]	
<input type="checkbox"/> OVERHANGING VEGETATION [1]	<input type="checkbox"/> ROOTWADS [1]	<input type="checkbox"/> AQUATIC MACROPHYTES [1]	
<input type="checkbox"/> SHALLOWS (IN SLOW WATER) [1]	<input type="checkbox"/> BOULDERS [1]	<input type="checkbox"/> LOGS OR WOODY DEBRIS [1]	
<input type="checkbox"/> ROOTMATS [1]			

AMOUNT Check ONE (Or 2 & average)

EXTENSIVE >75% [11]  
 MODERATE 25-75% [7]  
 SPARSE 5-<25% [3]  
 NEARLY ABSENT <5% [1]

Comments

Cover Maximum 20

3] CHANNEL MORPHOLOGY Check ONE in each category (Or 2 & average)

<input type="checkbox"/> HIGH [4]	<input type="checkbox"/> EXCELLENT [7]	<input checked="" type="checkbox"/> NONE [8]	<input type="checkbox"/> HIGH [3]
<input checked="" type="checkbox"/> MODERATE [3]	<input type="checkbox"/> GOOD [5]	<input type="checkbox"/> RECOVERED [4]	<input checked="" type="checkbox"/> MODERATE [2]
<input type="checkbox"/> LOW [2]	<input type="checkbox"/> FAIR [3]	<input type="checkbox"/> RECOVERING [3]	<input type="checkbox"/> LOW [1]
<input type="checkbox"/> NONE [1]	<input checked="" type="checkbox"/> POOR [1]	<input type="checkbox"/> RECENT OR NO RECOVERY [1]	

Comments

Channel Maximum 20

4] BANK EROSION AND RIPARIAN ZONE Check ONE in each category for EACH BANK (Or 2 per bank & average)

EROSION		RIPARIAN WIDTH		FLOOD PLAIN QUALITY		
<input type="checkbox"/> NONE / LITTLE [3]	<input type="checkbox"/> MODERATE [2]	<input type="checkbox"/> WIDE > 50m [4]	<input type="checkbox"/> MODERATE 10-50m [3]	<input type="checkbox"/> FOREST, SWAMP [3]	<input type="checkbox"/> SHRUB OR OLD FIELD [2]	
<input type="checkbox"/> MODERATE [2]	<input type="checkbox"/> HEAVY / SEVERE [1]	<input type="checkbox"/> NARROW 5-10m [2]	<input type="checkbox"/> VERY NARROW < 5m [1]	<input type="checkbox"/> RESIDENTIAL, PARK, NEW FIELD [1]	<input type="checkbox"/> FENCED PASTURE [1]	
<input type="checkbox"/> NONE [1]		<input type="checkbox"/> NONE [0]		<input type="checkbox"/> OPEN PASTURE, ROWCROP [0]	<input type="checkbox"/> CONSERVATION TILLAGE [1]	

Comments

Indicate predominant land use(s) past 100m riparian. Riparian Maximum 10

5] POOL / GLIDE AND RIFFLE / RUN QUALITY

<input type="checkbox"/> > 1m [6]	<input type="checkbox"/> POOL WIDTH > RIFFLE WIDTH [2]	<input type="checkbox"/> TORRENTIAL [-1]	<input type="checkbox"/> SLOW [1]	2
<input type="checkbox"/> 0.7-<1m [4]	<input checked="" type="checkbox"/> POOL WIDTH = RIFFLE WIDTH [1]	<input type="checkbox"/> VERY FAST [1]	<input type="checkbox"/> INTERSTITIAL [-1]	
<input type="checkbox"/> 0.4-<0.7m [2]	<input type="checkbox"/> POOL WIDTH > RIFFLE WIDTH [0]	<input type="checkbox"/> FAST [1]	<input type="checkbox"/> INTERMITTENT [-2]	
<input type="checkbox"/> 0.2-<0.4m [1]		<input checked="" type="checkbox"/> MODERATE [1]	<input type="checkbox"/> EDDIES [1]	

Comments

Recreation Potential  
 Primary Contact  
 Secondary Contact (circle one and comment on back)

Pool / Current Maximum 12

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species: Check ONE (Or 2 & average).

<input type="checkbox"/> BEST AREAS > 10cm [2]	<input type="checkbox"/> MAXIMUM > 50cm [2]	<input type="checkbox"/> STABLE (e.g., Cobble, Boulder) [2]	<input type="checkbox"/> NONE [2]	1
<input type="checkbox"/> BEST AREAS 5-10cm [1]	<input checked="" type="checkbox"/> MAXIMUM < 50cm [1]	<input type="checkbox"/> MOD. STABLE (e.g., Large Gravel) [1]	<input type="checkbox"/> LOW [1]	
<input checked="" type="checkbox"/> BEST AREAS < 5cm [metric=0]		<input checked="" type="checkbox"/> UNSTABLE (e.g., Fine Gravel, Sand) [0]	<input checked="" type="checkbox"/> MODERATE [0]	
			<input type="checkbox"/> EXTENSIVE [-1]	

Comments

Riffle / Run Maximum 8

6] GRADIENT (    ft/mi)  VERY LOW - LOW [2-4]  MODERATE [6-10]  HIGH - VERY HIGH [10-6]

DRAINAGE AREA (    mi<sup>2</sup>)

%POOL: 10 %GLIDE:     
 %RUN: 80 %RIFFLE: 10

Comments

Gradient Maximum 10

**A) SAMPLED REACH**

Check ALL that apply

- METHOD**
- BOAT
  - WADE
  - L. LINE
  - OTHER
- DISTANCE**
- 0.5 Km
  - 0.2 Km
  - 0.15 Km
  - 0.12 Km
  - OTHER

**STAGE**

- 1st -sample pass- 2nd
- HIGH
  - UP
  - NORMAL
  - LOW
  - DRY

**CLARITY**

- 1st -sample pass- 2nd
- < 20 cm
  - 20-40 cm
  - 40-70 cm
  - > 70 cm/ CTB
  - SECCHI DEPTH

**CANOPY**

- 1st \_\_\_\_\_ cm
- 2nd \_\_\_\_\_ cm
- > 85%- OPEN
  - 55%-85%
  - 30%-55%
  - 10%-30%
  - <10%-CLOSED

**C) RECREATION** AREA DEPTH  
 POOL:  >100ft<sup>2</sup>  >3ft

Comment RE: Reach consistency/ Is reach typical of stream?, Recreation/ Observed - Inferred, Other/ Sampling observations, Concerns, Access directions, etc.

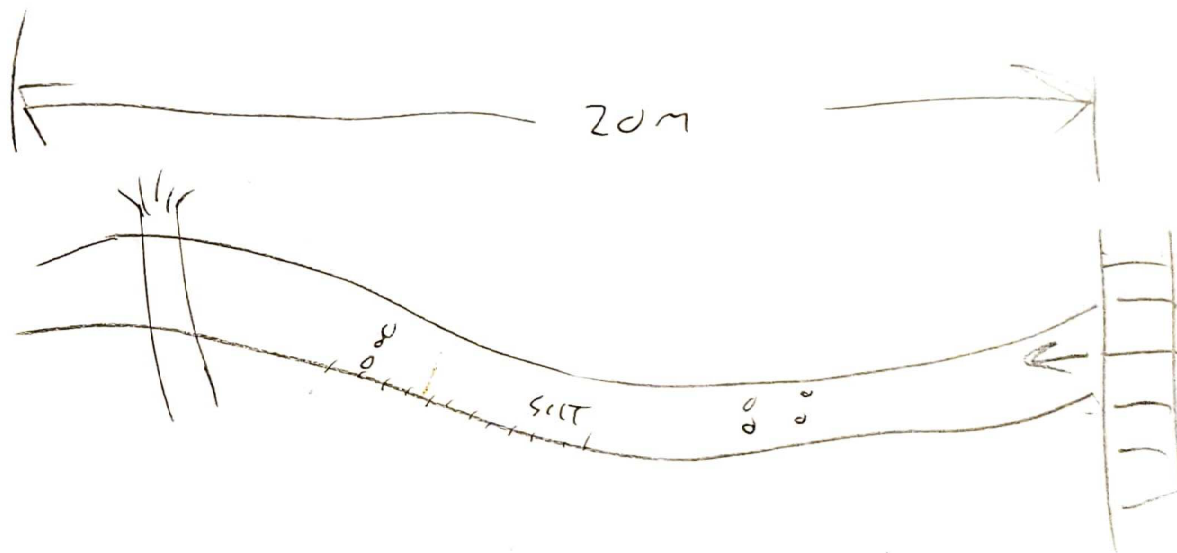
S-D 22

EMBEDDED COBBLES 14/10/17

EMBEDDED PLANE BED

- |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                          |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>B) AESTHETICS</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> NUISANCE ALGAE</li> <li><input type="checkbox"/> INVASIVE MACROPHYTES</li> <li><input type="checkbox"/> EXCESS TURBIDITY</li> <li><input type="checkbox"/> DISCOLORATION</li> <li><input type="checkbox"/> FOAM / SCUM</li> <li><input type="checkbox"/> OIL SHEEN</li> <li><input type="checkbox"/> TRASH / LITTER</li> <li><input type="checkbox"/> NUISANCE ODOR</li> <li><input type="checkbox"/> SLUDGE DEPOSITS</li> <li><input type="checkbox"/> CSOs/SSOs/OUTFALLS</li> </ul> | <p><b>D) MAINTENANCE</b></p> <ul style="list-style-type: none"> <li>PUBLIC / PRIVATE / BOTH / NA</li> <li>ACTIVE / HISTORIC / BOTH / NA</li> <li>YOUNG-SUCCESSION-OLD</li> <li>SPRAY / SNAG / REMOVED</li> <li>MODIFIED / DIPPED OUT / NA</li> <li>LEVEED / ONE SIDED</li> <li>RELOCATED / CUTOFFS</li> <li>MOVING-BEDLOAD-STABLE</li> <li>ARMOURED / SLUMPS</li> <li>ISLANDS / SCoured</li> <li>IMPOUNDED / DESICCATED</li> <li>FLOOD CONTROL / DRAINAGE</li> </ul> | <p>Circle some &amp; COMMENT</p> | <p><b>E) ISSUES</b></p> <ul style="list-style-type: none"> <li>WWTP / CSO / NPDES / INDUSTRY</li> <li>HARDENED / URBAN / DIRT&amp;GRIME</li> <li>CONTAMINATED / LANDFILL</li> <li>BMPs-CONSTRUCTION-SEDIMENT</li> <li>LOGGING / IRRIGATION / COOLING</li> <li>BANK / EROSION / SURFACE</li> <li>FALSE BANK / MANURE / LAGOON</li> <li>WASH H<sub>2</sub>O / TILE / H<sub>2</sub>O TABLE</li> <li>ACID / MINE / QUARRY / FLOW</li> <li>NATURAL / WETLAND / STAGNANT</li> <li>PARK / GOLF / LAWN / HOME</li> <li>ATMOSPHERE / DATA PAUCITY</li> </ul> | <p><b>F) MEASUREMENTS</b></p> <ul style="list-style-type: none"> <li><math>\bar{x}</math> width</li> <li><math>\bar{x}</math> depth</li> <li>max. depth</li> <li><math>\bar{x}</math> bankfull width</li> <li>bankfull <math>\bar{x}</math> depth</li> <li>W/D ratio</li> <li>bankfull max. depth</li> <li>floodprone <math>\bar{x}</math> width</li> <li>entrench. ratio</li> </ul> <p>Legacy Tree:</p> |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

**Stream Drawing:**





Stream & Location: S-D23 2:30 RM:    Date: 11/18/21

Scorers Full Name & Affiliation: LK

River Code:    STORET #:    (NAD 83 - decimal) Lat./Long.: 37.070322, -79.931039 Office verified location

1) SUBSTRATE Check ONLY Two substrate TYPE BOXES, estimate % or note every type present

Check ONE (Or 2 & average)

<b>BEST TYPES</b>		<b>POOL RIFFLE</b>	<b>OTHER TYPES</b>		<b>POOL RIFFLE</b>	<b>ORIGIN</b>	<b>QUALITY</b>																
<input type="checkbox"/> BLDR/SLABS [10]	<input type="checkbox"/> BOULDER [9]	<input type="checkbox"/> COBBLE [8]	<input checked="" type="checkbox"/> GRAVEL [7]	<input type="checkbox"/> SAND [6]	<input type="checkbox"/> BEDROCK [5]	<input type="checkbox"/> LIMESTONE [1]	<input type="checkbox"/> TILLS [1]	<input type="checkbox"/> WETLANDS [0]	<input type="checkbox"/> HARDPAN [0]	<input type="checkbox"/> SANDSTONE [0]	<input type="checkbox"/> RIP/RAP [0]	<input type="checkbox"/> LACUSTURINE [0]	<input type="checkbox"/> SHALE [-1]	<input type="checkbox"/> COAL FINES [-2]	<input type="checkbox"/> HEAVY [-2]	<input type="checkbox"/> MODERATE [-1]	<input type="checkbox"/> NORMAL [0]	<input type="checkbox"/> FREE [1]	<input type="checkbox"/> EXTENSIVE [-2]	<input type="checkbox"/> MODERATE [-1]	<input type="checkbox"/> NORMAL [0]	<input type="checkbox"/> NONE [1]	
						SILT		EMBEDDEDNESS															

NUMBER OF BEST TYPES:  4 or more [2]  3 or less [0]

Comments:   

2) INSTREAM COVER Indicate presence 0 to 3: 0-Absent, 1-Very small amounts or if more common of marginal quality, 2-Moderate amounts, but not of highest quality or in small amounts of highest quality, 3-Highest quality in moderate or greater amounts (e.g., very large boulders in deep or fast water, large diameter log that is stable, well developed rootwad in deep / fast water, or deep, well-defined, functional pools.

AMOUNT

Check ONE (Or 2 & average)

<input type="checkbox"/> UNDERCUT BANKS [1]	<input type="checkbox"/> POOLS > 70cm [2]	<input type="checkbox"/> OXBOWS, BACKWATERS [1]	<input type="checkbox"/> AQUATIC MACROPHYTES [1]	<input type="checkbox"/> LOGS OR WOODY DEBRIS [1]
<input type="checkbox"/> OVERHANGING VEGETATION [1]	<input type="checkbox"/> ROOTWADS [1]	<input type="checkbox"/> BOULDERS [1]		
<input type="checkbox"/> SHALLOWS (IN SLOW WATER) [1]				
<input type="checkbox"/> ROOTMATS [1]				

Comments:   

Cover Maximum 0

3) CHANNEL MORPHOLOGY Check ONE in each category (Or 2 & average)

<b>SINUOSITY</b>	<b>DEVELOPMENT</b>	<b>CHANNELIZATION</b>	<b>STABILITY</b>
<input type="checkbox"/> HIGH [4]	<input checked="" type="checkbox"/> EXCELLENT [7]	<input checked="" type="checkbox"/> NONE [6]	<input type="checkbox"/> HIGH [3]
<input checked="" type="checkbox"/> MODERATE [3]	<input type="checkbox"/> GOOD [5]	<input type="checkbox"/> RECOVERED [4]	<input checked="" type="checkbox"/> MODERATE [2]
<input type="checkbox"/> LOW [2]	<input type="checkbox"/> FAIR [3]	<input type="checkbox"/> RECOVERING [3]	<input type="checkbox"/> LOW [1]
<input type="checkbox"/> NONE [1]	<input type="checkbox"/> POOR [1]	<input type="checkbox"/> RECENT OR NO RECOVERY [1]	

Comments:   

Channel Maximum 18

4) BANK EROSION AND RIPARIAN ZONE Check ONE in each category for EACH BANK (Or 2 per bank & average)

<b>EROSION</b>		<b>RIPARIAN WIDTH</b>		<b>FLOOD PLAIN QUALITY</b>	
<input type="checkbox"/> NONE / LITTLE [3]	<input type="checkbox"/> MODERATE [2]	<input type="checkbox"/> HEAVY / SEVERE [1]	<input type="checkbox"/> WIDE > 50m [4]	<input type="checkbox"/> MODERATE 10-50m [3]	<input type="checkbox"/> NARROW 5-10m [2]
			<input type="checkbox"/> VERY NARROW < 5m [1]	<input type="checkbox"/> NONE [0]	
			<input type="checkbox"/> FOREST, SWAMP [3]	<input type="checkbox"/> SHRUB OR OLD FIELD [2]	<input type="checkbox"/> RESIDENTIAL, PARK, NEW FIELD [1]
			<input type="checkbox"/> FENCED PASTURE [1]	<input type="checkbox"/> OPEN PASTURE, ROWCROP [0]	<input type="checkbox"/> CONSERVATION TILLAGE [1]
					<input type="checkbox"/> URBAN OR INDUSTRIAL [0]
					<input type="checkbox"/> MINING / CONSTRUCTION [0]

Comments:   

Riparian Maximum 0

5) POOL / GLIDE AND RIFFLE / RUN QUALITY

<b>MAXIMUM DEPTH</b>	<b>CHANNEL WIDTH</b>	<b>CURRENT VELOCITY</b>	<b>Recreation Potential</b>
Check ONE (ONLY!)	Check ONE (Or 2 & average)	Check ALL that apply	Primary Contact
<input type="checkbox"/> > 1m [6]	<input checked="" type="checkbox"/> POOL WIDTH > RIFFLE WIDTH [2]	<input type="checkbox"/> TORRENTIAL [-1]	Secondary Contact
<input type="checkbox"/> 0.7-1m [4]	<input type="checkbox"/> POOL WIDTH = RIFFLE WIDTH [1]	<input type="checkbox"/> VERY FAST [1]	(circle one and comment on back)
<input checked="" type="checkbox"/> 0.4-0.7m [2]	<input type="checkbox"/> POOL WIDTH > RIFFLE WIDTH [0]	<input checked="" type="checkbox"/> FAST [1]	
<input type="checkbox"/> 0.2-0.4m [1]		<input type="checkbox"/> MODERATE [1]	
<input type="checkbox"/> < 0.2m [0]		<input type="checkbox"/> INTERSTITIAL [-1]	
		<input type="checkbox"/> INTERMITTENT [-2]	
		<input type="checkbox"/> EDDIES [1]	

Comments:   

Pool / Current Maximum 6

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species: Check ONE (Or 2 & average)

<b>RIFFLE DEPTH</b>	<b>RUN DEPTH</b>	<b>RIFFLE / RUN SUBSTRATE</b>	<b>RIFFLE / RUN EMBEDDEDNESS</b>
<input type="checkbox"/> BEST AREAS > 10cm [2]	<input type="checkbox"/> MAXIMUM > 50cm [2]	<input checked="" type="checkbox"/> STABLE (e.g., Cobble, Boulder) [2]	<input type="checkbox"/> NONE [2]
<input checked="" type="checkbox"/> BEST AREAS 5-10cm [1]	<input checked="" type="checkbox"/> MAXIMUM < 50cm [1]	<input type="checkbox"/> MOD. STABLE (e.g., Large Gravel) [1]	<input checked="" type="checkbox"/> LOW [1]
<input type="checkbox"/> BEST AREAS < 5cm [metric=0]		<input type="checkbox"/> UNSTABLE (e.g., Fine Gravel, Sand) [0]	<input type="checkbox"/> MODERATE [0]
			<input type="checkbox"/> EXTENSIVE [-1]

Comments:   

Riffle / Run Maximum 5

6) GRADIENT ( ft/mi)  VERY LOW - LOW [2-4]  MODERATE [6-10]  HIGH - VERY HIGH [10-6]

DRAINAGE AREA ( m<sup>2</sup>)

%POOL: 25 %GLIDE:   

%RUN: 60 %RIFFLE: 15

Gradient Maximum 0

**A) SAMPLED REACH**

Check ALL that apply

- METHOD**
- BOAT
  - WADE
  - L. LINE
  - OTHER

- DISTANCE**
- 0.5 Km
  - 0.2 Km
  - 0.15 Km
  - 0.12 Km
  - OTHER

- STAGE**
- 1st sample pass- 2nd
  - HIGH
  - UP
  - NORMAL
  - LOW
  - DRY

- CLARITY**
- 1st --sample pass-- 2nd
  - < 20 cm
  - 20-<40 cm
  - 40-70 cm
  - > 70 cm/ CTB
  - SECCHI DEPTH

- CANOPY**
- 1st \_\_\_\_\_ cm
  - 2nd \_\_\_\_\_ cm
  - > 85%- OPEN
  - 55%-<85%
  - 30%-<55%
  - 10%-<30%
  - <10%- CLOSED

- C) RECREATION**
- AREA DEPTH  
POOL:  >100ft<sup>2</sup>  >3ft

Comment RE: Reach consistency/ Is reach typical of stream?, Recreation/ Observed - Inferred, Other/ Sampling observations, Concerns, Access directions, etc.

S-D 23

WALL FORMATION RIFPLES, ESPECIALLY AT 74005 PND. NOT FORMED 05.

BR AT UPPER TAND

RIFPLE POOL COMPLEX

- B) AESTHETICS**
- NUISANCE ALGAE
  - INVASIVE MACROPHYTES
  - EXCESS TURBIDITY
  - DISCOLORATION
  - FOAM / SCUM
  - OIL SHEEN
  - TRASH / LITTER
  - NUISANCE ODOR
  - SLUDGE DEPOSITS
  - CSOs/SSOs/OUTFALLS

- D) MAINTENANCE**
- PUBLIC / PRIVATE / BOTH / NA
  - ACTIVE / HISTORIC / BOTH / NA
  - YOUNG-SUCCESSION-OLD
  - SPRAY / SNAG / REMOVED
  - MODIFIED / DIPPED OUT / NA
  - LEVEED / ONE SIDED
  - RELOCATED / CUTOFFS
  - MOVING-BEDLOAD-STABLE
  - ARMOURED / SLUMPS
  - ISLANDS / SCOURED
  - IMPOUNDED / DESICCATED
  - FLOOD CONTROL / DRAINAGE

Circle some & COMMENT

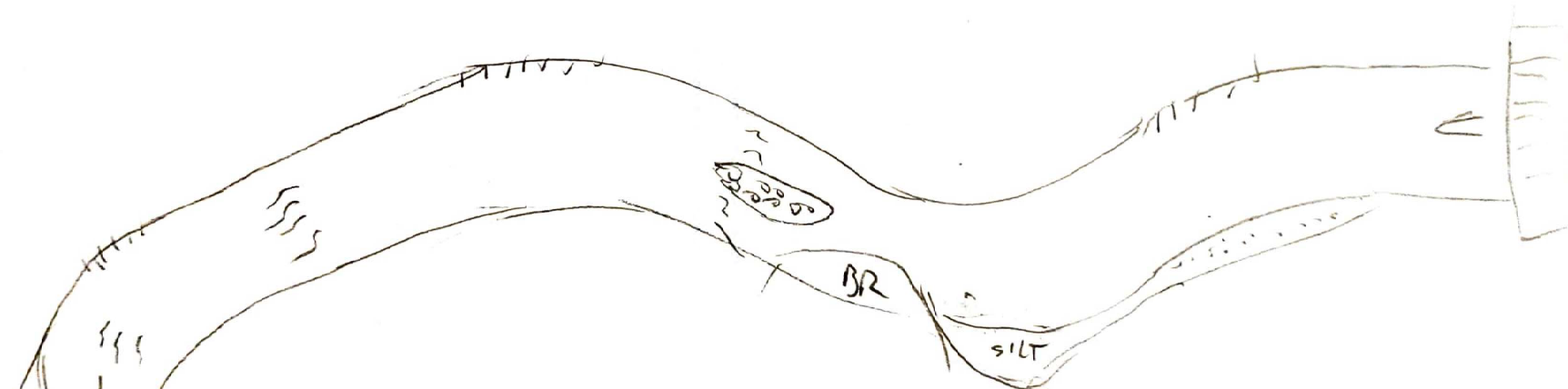
- E) ISSUES**
- WWTP / CSO / NPDES / INDUSTRY
  - HARDENED / URBAN / DIRT & GRIME
  - CONTAMINATED / LANDFILL
  - BMPs-CONSTRUCTION-SEDIMENT
  - LOGGING / IRRIGATION / COOLING
  - BANK / EROSION / SURFACE
  - FALSE BANK / MANURE / LAGOON
  - WASH H<sub>2</sub>O / TILE / H<sub>2</sub>O TABLE
  - ACID / MINE / QUARRY / FLOW
  - NATURAL / WETLAND / STAGNANT
  - PARK / GOLF / LAWN / HOME
  - ATMOSPHERE / DATA PAUCITY

**F) MEASUREMENTS**

- $\bar{x}$  width
- $\bar{x}$  depth
- max. depth
- $\bar{x}$  bankfull width
- bankfull  $\bar{x}$  depth
- W/D ratio
- bankfull max. depth
- floodprone  $x^2$  width
- entrench. ratio

Legacy Tree:

**Stream Drawing:**



Stream & Location: S-IJ43 11:40 RM:    Date: 1/15/21

River Code:    STORET #:    Scorers Full Name & Affiliation: LK Lat./Long.: 37.138636, -80.139715 Office verified location

**1] SUBSTRATE** Check ONLY Two substrate TYPE BOXES, estimate % or note every type present. Check ONE (Or 2 & average)

<p><b>BEST TYPES</b></p> <input type="checkbox"/> BLDR / SLABS [10] <input type="checkbox"/> BOULDER [9] <input type="checkbox"/> COBBLE [8] <input type="checkbox"/> GRAVEL [7] <input checked="" type="checkbox"/> SAND [6] <input type="checkbox"/> BEDROCK [5]	<p><b>POOL RIFFLE</b></p> <p>_____</p>	<p><b>OTHER TYPES</b></p> <input type="checkbox"/> HARDPAN [4] <input type="checkbox"/> DETRITUS [3] <input type="checkbox"/> MUCK [2] <input type="checkbox"/> SILT [2] <input type="checkbox"/> ARTIFICIAL [0]	<p><b>POOL RIFFLE</b></p> <p>_____</p>	<p><b>ORIGIN</b></p> <input type="checkbox"/> LIMESTONE [1] <input type="checkbox"/> TILLS [1] <input type="checkbox"/> WETLANDS [0] <input type="checkbox"/> HARDPAN [0] <input type="checkbox"/> SANDSTONE [0] <input type="checkbox"/> RIP/RAP [0] <input type="checkbox"/> LACUSTURINE [0] <input type="checkbox"/> SHALE [-1] <input type="checkbox"/> COAL FINES [-2]	<p><b>QUALITY</b></p> <input type="checkbox"/> HEAVY [-2] <input type="checkbox"/> MODERATE [-1] <input type="checkbox"/> NORMAL [0] <input type="checkbox"/> FREE [1] <input type="checkbox"/> EXTENSIVE [-2] <input type="checkbox"/> MODERATE [-1] <input type="checkbox"/> NORMAL [0] <input type="checkbox"/> NONE [1]	<p>SILT</p> <p>EMBEDDEDNESS</p>	<p>Substrate</p> <div style="border: 1px solid black; border-radius: 50%; width: 40px; height: 40px; display: flex; align-items: center; justify-content: center; margin: 10px auto;">13</div> <p>Maximum 20</p>
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NUMBER OF BEST TYPES:  4 or more [2]  3 or less [0]

Comments: \_\_\_\_\_

**2] INSTREAM COVER** Indicate presence 0 to 3: 0-Absent; 1-Very small amounts or if more common of marginal quality; 2-Moderate amounts, but not of highest quality or in small amounts of highest quality; 3-Highest quality in moderate or greater amounts (e.g., very large boulders in deep or fast water, large diameter log that is stable, well developed rootwad in deep / fast water, or deep, well-defined, functional pools. Check ONE (Or 2 & average)

<p>_____ UNDERCUT BANKS [1]                  _____ OVERHANGING VEGETATION [1]                  _____ SHALLOWS (IN SLOW WATER) [1]                  _____ ROOTMATS [1]</p>	<p>_____ POOLS &gt; 70cm [2]                  _____ ROOTWADS [1]                  _____ BOULDERS [1]</p>	<p>_____ OXBOWS, BACKWATERS [1]                  _____ AQUATIC MACROPHYTES [1]                  _____ LOGS OR WOODY DEBRIS [1]</p>	<p><b>AMOUNT</b></p> <input type="checkbox"/> EXTENSIVE >75% [11] <input type="checkbox"/> MODERATE 25-75% [7] <input type="checkbox"/> SPARSE 5-<25% [3] <input type="checkbox"/> NEARLY ABSENT <5% [1]	<p>Comments: _____</p> <p>Channel Maximum 20 <span style="border: 1px solid black; border-radius: 50%; padding: 5px;">  </span></p>
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**3] CHANNEL MORPHOLOGY** Check ONE in each category (Or 2 & average)

<p><b>SINUOSITY</b></p> <input type="checkbox"/> HIGH [4] <input checked="" type="checkbox"/> MODERATE [3] <input type="checkbox"/> LOW [2] <input type="checkbox"/> NONE [1]	<p><b>DEVELOPMENT</b></p> <input type="checkbox"/> EXCELLENT [7] <input type="checkbox"/> GOOD [5] <input checked="" type="checkbox"/> FAIR [3] <input type="checkbox"/> POOR [1]	<p><b>CHANNELIZATION</b></p> <input checked="" type="checkbox"/> NONE [6] <input type="checkbox"/> RECOVERED [4] <input type="checkbox"/> RECOVERING [3] <input type="checkbox"/> RECENT OR NO RECOVERY [1]	<p><b>STABILITY</b></p> <input type="checkbox"/> HIGH [3] <input checked="" type="checkbox"/> MODERATE [2] <input type="checkbox"/> LOW [1]	<p>Comments: _____</p> <p>Channel Maximum 20 <span style="border: 1px solid black; border-radius: 50%; padding: 5px;">14</span></p>
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**4] BANK EROSION AND RIPARIAN ZONE** Check ONE in each category for EACH BANK (Or 2 per bank & average)

<p><b>EROSION</b></p> <input type="checkbox"/> NONE / LITTLE [3] <input type="checkbox"/> MODERATE [2] <input type="checkbox"/> HEAVY / SEVERE [1]	<p><b>RIPARIAN WIDTH</b></p> <input type="checkbox"/> WIDE > 50m [4] <input type="checkbox"/> MODERATE 10-50m [3] <input type="checkbox"/> NARROW 5-10m [2] <input type="checkbox"/> VERY NARROW < 5m [1] <input type="checkbox"/> NONE [0]	<p><b>FLOOD PLAIN QUALITY</b></p> <input type="checkbox"/> FOREST, SWAMP [3] <input type="checkbox"/> SHRUB OR OLD FIELD [2] <input type="checkbox"/> RESIDENTIAL, PARK, NEW FIELD [1] <input type="checkbox"/> FENCED PASTURE [1] <input type="checkbox"/> OPEN PASTURE, ROWCROP [0]	<p><b>CONSERVATION TILLAGE [1]</b>  <b>URBAN OR INDUSTRIAL [0]</b>  <b>MINING / CONSTRUCTION [0]</b></p> <p>Indicate predominant land use(s) past 100m riparian. Riparian</p> <p>Comments: _____</p> <p>Channel Maximum 10 <span style="border: 1px solid black; border-radius: 50%; padding: 5px;">  </span></p>
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**5] POOL / GLIDE AND RIFFLE / RUN QUALITY**

<p><b>MAXIMUM DEPTH</b> Check ONE (ONLY)</p> <input type="checkbox"/> > 1m [6] <input type="checkbox"/> 0.7-1m [4] <input checked="" type="checkbox"/> 0.4-0.7m [2] <input type="checkbox"/> 0.2-0.4m [1] <input type="checkbox"/> < 0.2m [0]	<p><b>CHANNEL WIDTH</b> Check ONE (Or 2 &amp; average)</p> <input type="checkbox"/> POOL WIDTH > RIFFLE WIDTH [2] <input checked="" type="checkbox"/> POOL WIDTH = RIFFLE WIDTH [1] <input type="checkbox"/> POOL WIDTH < RIFFLE WIDTH [0]	<p><b>CURRENT VELOCITY</b> Check ALL that apply</p> <input type="checkbox"/> TORRENTIAL [-1] <input type="checkbox"/> VERY FAST [1] <input checked="" type="checkbox"/> FAST [1] <input type="checkbox"/> MODERATE [1]	<p><input type="checkbox"/> SLOW [1]  <input type="checkbox"/> INTERSTITIAL [-1]  <input type="checkbox"/> INTERMITTENT [-2]  <input type="checkbox"/> EDDIES [1]</p> <p>Indicate for reach - pools and riffles.</p>	<p><b>Recreation Potential</b></p> <p>Primary Contact</p> <p>Secondary Contact (circle one and comment on back)</p> <p>Pool / Current Maximum 12 <span style="border: 1px solid black; border-radius: 50%; padding: 5px;">4</span></p>
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Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species: Check ONE (Or 2 & average).  NO RIFFLE [metric=0]

<p><b>RIFFLE DEPTH</b></p> <input type="checkbox"/> BEST AREAS > 10cm [2] <input checked="" type="checkbox"/> BEST AREAS 5-10cm [1] <input type="checkbox"/> BEST AREAS < 5cm [metric=0]	<p><b>RUN DEPTH</b></p> <input type="checkbox"/> MAXIMUM > 50cm [2] <input checked="" type="checkbox"/> MAXIMUM < 50cm [1]	<p><b>RIFFLE / RUN SUBSTRATE</b></p> <input type="checkbox"/> STABLE (e.g., Cobble, Boulder) [2] <input type="checkbox"/> MOD. STABLE (e.g., Large Gravel) [1] <input checked="" type="checkbox"/> UNSTABLE (e.g., Fine Gravel, Sand) [0]	<p><b>RIFFLE / RUN EMBEDDEDNESS</b></p> <input type="checkbox"/> NONE [2] <input type="checkbox"/> LOW [1] <input checked="" type="checkbox"/> MODERATE [0] <input type="checkbox"/> EXTENSIVE [-1]	<p>Comments: _____</p> <p>Riffle / Run Maximum 8 <span style="border: 1px solid black; border-radius: 50%; padding: 5px;">2</span></p>
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**6] GRADIENT** (ft/mi)  VERY LOW - LOW [2-4]  MODERATE [6-10]  HIGH - VERY HIGH [10-8]

**DRAINAGE AREA** (mi<sup>2</sup>)

%POOL: 10 %GLIDE:   

%RUN: 70 %RIFFLE: 20

Gradient Maximum 10

**A) SAMPLED REACH**

Check ALL that apply

- METHOD**
- BOAT
  - WADE
  - L. LINE
  - OTHER
- DISTANCE**
- 0.5 Km
  - 0.2 Km
  - 0.15 Km
  - 0.12 Km
  - OTHER
- \_\_\_\_\_ meters
- CLARITY**
- 1st --sample pass-- 2nd
- HIGH
  - UP
  - NORMAL
  - LOW
  - DRY
- < 20 cm
- 20-<40 cm
- 40-70 cm
- > 70 cm/ CTB
- SECCHI DEPTH

- CANOPY**
- 1st \_\_\_\_\_ cm
- 2nd \_\_\_\_\_ cm
- > 85%- OPEN
  - 55%-<85%
  - 30%-<55%
  - 10%-<30%
  - <10%- CLOSED

**C) RECREATION** AREA DEPTH

POOL:  >100ft<sup>2</sup>  >3ft

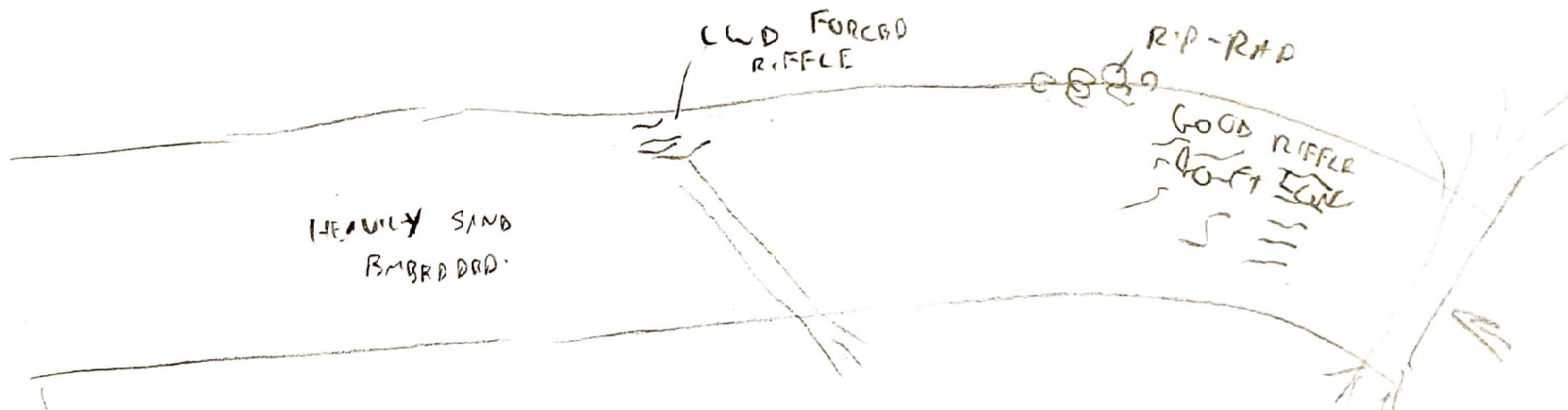
Comment RE: Reach consistency/ Is reach typical of stream?, Recreation/ Observed - Inferred, Other/ Sampling observations, Concerns, Access directions, etc.

S-IJ43  
HEAVILY BARBED. HIGH SAND LOAD.

PLAIN BRD.

- |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                      |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>B) AESTHETICS</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> NUISANCE ALGAE</li> <li><input type="checkbox"/> INVASIVE MACROPHYTES</li> <li><input type="checkbox"/> EXCESS TURBIDITY</li> <li><input type="checkbox"/> DISCOLORATION</li> <li><input type="checkbox"/> FOAM / SCUM</li> <li><input type="checkbox"/> OIL SHEEN</li> <li><input type="checkbox"/> TRASH / LITTER</li> <li><input type="checkbox"/> NUISANCE ODOR</li> <li><input type="checkbox"/> SLUDGE DEPOSITS</li> <li><input type="checkbox"/> CSOs/SSOs/OUTFALLS</li> </ul> | <p><b>D) MAINTENANCE</b></p> <p>Circle some &amp; COMMENT</p> <ul style="list-style-type: none"> <li>PUBLIC / PRIVATE / BOTH / NA</li> <li>ACTIVE / HISTORIC / BOTH / NA</li> <li>YOUNG-SUCCESSION-OLD</li> <li>SPRAY / SNAG / REMOVED</li> <li>MODIFIED / DIPPED OUT / NA</li> <li>LEVEED / ONE SIDED</li> <li>RELOCATED / CUTOFFS</li> <li>MOVING-BEDLOAD-STABLE</li> <li>ARMORED / SLUMPS</li> <li>ISLANDS / SCOURED</li> <li>IMPOUNDED / DESICCATED</li> <li>FLOOD CONTROL / DRAINAGE</li> </ul> | <p><b>E) ISSUES</b></p> <ul style="list-style-type: none"> <li>WWTP / CSO / NPDES / INDUSTRY</li> <li>HARDENED / URBAN / DIRT&amp;GRIME</li> <li>CONTAMINATED / LANDFILL</li> <li>BMPs-CONSTRUCTION-SEDIMENT</li> <li>LOGGING / IRRIGATION / COOLING</li> <li>BANK / EROSION / SURFACE</li> <li>FALSE BANK / MANURE / LAGOON</li> <li>WASH H<sub>2</sub>O / TILE / H<sub>2</sub>O TABLE</li> <li>ACID / MINE / QUARRY / FLOW</li> <li>NATURAL / WETLAND / STAGNANT</li> <li>PARK / GOLF / LAWN / HOME</li> <li>ATMOSPHERE / DATA PAUCITY</li> </ul> | <p><b>F) MEASUREMENTS</b></p> <ul style="list-style-type: none"> <li><math>\bar{x}</math> width</li> <li><math>\bar{x}</math> depth</li> <li>max. depth</li> <li><math>\bar{x}</math> bankfull width</li> <li>bankfull <math>\bar{x}</math> depth</li> <li>W/D ratio</li> <li>bankfull max. depth</li> <li>floodprone <math>x^2</math> width</li> <li>entrench. ratio</li> </ul> <p>Legacy Tree:</p> |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

**Stream Drawing:**



Stream & Location: 0 5-RR13 13-45 RM:    Date: 11/16/21

River Code:    STORET #:    Scorers Full Name & Affiliation: LK Lat./Long.: 37.314504, -80.402613 Office verified location

**1] SUBSTRATE** Check ONLY Two substrate TYPE BOXES, estimate % or note every type present

<b>BEST TYPES</b>	<b>POOL RIFFLE</b>	<b>OTHER TYPES</b>	<b>POOL RIFFLE</b>	<b>ORIGIN</b>	<b>QUALITY</b>
<input type="checkbox"/> BLDR / SLABS [10]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> HARDPAN [4]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> LIMESTONE [1]	<input type="checkbox"/> HEAVY [-2]
<input type="checkbox"/> BOULDER [9]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> DETRITUS [3]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> TILLS [1]	<input type="checkbox"/> MODERATE [-1]
<input checked="" type="checkbox"/> COBBLE [8]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> MUCK [2]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> WETLANDS [0]	<input type="checkbox"/> NORMAL [0]
<input type="checkbox"/> GRAVEL [7]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> SILT [2]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> HARDPAN [0]	<input type="checkbox"/> FREE [1]
<input type="checkbox"/> SAND [6]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> ARTIFICIAL [0]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> SANDSTONE [0]	<input type="checkbox"/> EXTENSIVE [-2]
<input checked="" type="checkbox"/> BEDROCK [5]	<input type="checkbox"/> <input type="checkbox"/>			<input type="checkbox"/> RIP/RAP [0]	<input type="checkbox"/> MODERATE [-1]

NUMBER OF BEST TYPES:  4 or more [2]  3 or less [0]

Comments:   

Check ONE (Or 2 & average)

SILT  HEAVY [-2]

EMBEDDEDNESS  MODERATE [-1]

NORMAL [0]

FREE [1]

EXTENSIVE [-2]

MODERATE [-1]

NORMAL [0]

NONE [1]

Substrate 13 Maximum 20

**2] INSTREAM COVER** Indicate presence 0 to 3: 0-Absent; 1-Very small amounts or if more common of marginal quality; 2-Moderate amounts, but not of highest quality or in small amounts of highest quality; 3-Highest quality in moderate or greater amounts (e.g., very large boulders in deep or fast water, large diameter log that is stable, well developed rootwad in deep / fast water, or deep, well-defined, functional pools.

<input type="checkbox"/> UNDERCUT BANKS [1]	<input type="checkbox"/> POOLS > 70cm [2]	<input type="checkbox"/> OXBOWS, BACKWATERS [1]	<b>AMOUNT</b>
<input type="checkbox"/> OVERHANGING VEGETATION [1]	<input type="checkbox"/> ROOTWADS [1]	<input type="checkbox"/> AQUATIC MACROPHYTES [1]	Check ONE (Or 2 & average)
<input type="checkbox"/> SHALLOWS (IN SLOW WATER) [1]	<input type="checkbox"/> BOULDERS [1]	<input type="checkbox"/> LOGS OR WOODY DEBRIS [1]	<input type="checkbox"/> EXTENSIVE >75% [11]
<input type="checkbox"/> ROOTMATS [1]			<input type="checkbox"/> MODERATE 25-75% [7]
			<input type="checkbox"/> SPARSE 5-<25% [3]
			<input type="checkbox"/> NEARLY ABSENT <5% [1]

Comments:   

Cover    Maximum 20

**3] CHANNEL MORPHOLOGY** Check ONE in each category (Or 2 & average)

<b>SINUOSITY</b>	<b>DEVELOPMENT</b>	<b>CHANNELIZATION</b>	<b>STABILITY</b>
<input type="checkbox"/> HIGH [4]	<input type="checkbox"/> EXCELLENT [7]	<input checked="" type="checkbox"/> NONE [6]	<input checked="" type="checkbox"/> HIGH [3]
<input type="checkbox"/> MODERATE [3]	<input type="checkbox"/> GOOD [5]	<input type="checkbox"/> RECOVERED [4]	<input type="checkbox"/> MODERATE [2]
<input checked="" type="checkbox"/> LOW [2]	<input type="checkbox"/> FAIR [3]	<input type="checkbox"/> RECOVERING [3]	<input type="checkbox"/> LOW [1]
<input type="checkbox"/> NONE [1]	<input checked="" type="checkbox"/> POOR [1]	<input type="checkbox"/> RECENT OR NO RECOVERY [1]	

Comments:   

Channel 12 Maximum 20

**4] BANK EROSION AND RIPARIAN ZONE** Check ONE in each category for EACH BANK (Or 2 per bank & average)

<b>EROSION</b>	<b>RIPARIAN WIDTH</b>	<b>FLOOD PLAIN QUALITY</b>
<input type="checkbox"/> NONE / LITTLE [3]	<input type="checkbox"/> WIDE > 50m [4]	<input type="checkbox"/> FOREST, SWAMP [3]
<input type="checkbox"/> MODERATE [2]	<input type="checkbox"/> MODERATE 10-50m [3]	<input type="checkbox"/> SHRUB OR OLD FIELD [2]
<input type="checkbox"/> HEAVY / SEVERE [1]	<input type="checkbox"/> NARROW 5-10m [2]	<input type="checkbox"/> RESIDENTIAL, PARK, NEW FIELD [1]
	<input type="checkbox"/> VERY NARROW < 5m [1]	<input type="checkbox"/> FENCED PASTURE [1]
	<input type="checkbox"/> NONE [0]	<input type="checkbox"/> OPEN PASTURE, ROWCROP [0]
		<input type="checkbox"/> CONSERVATION TILLAGE [1]
		<input type="checkbox"/> URBAN OR INDUSTRIAL [0]
		<input type="checkbox"/> MINING / CONSTRUCTION [0]

Comments:   

Indicate predominant land use(s) past 100m riparian. Riparian    Maximum 10

**5] POOL / GLIDE AND RIFFLE / RUN QUALITY**

<b>MAXIMUM DEPTH</b>	<b>CHANNEL WIDTH</b>	<b>CURRENT VELOCITY</b>	<b>Recreation Potential</b>
Check ONE (ONLY)	Check ONE (Or 2 & average)	Check ALL that apply	Primary Contact
<input type="checkbox"/> > 1m [6]	<input checked="" type="checkbox"/> POOL WIDTH > RIFFLE WIDTH [2]	<input type="checkbox"/> TORRENTIAL [-1]	Secondary Contact
<input type="checkbox"/> 0.7-1m [4]	<input type="checkbox"/> POOL WIDTH = RIFFLE WIDTH [1]	<input type="checkbox"/> VERY FAST [1]	(circle one and comment on back)
<input checked="" type="checkbox"/> 0.4-0.7m [2]	<input type="checkbox"/> POOL WIDTH > RIFFLE WIDTH [0]	<input checked="" type="checkbox"/> FAST [1]	
<input type="checkbox"/> 0.2-0.4m [1]		<input type="checkbox"/> MODERATE [1]	
<input type="checkbox"/> < 0.2m [0]		<input type="checkbox"/> INTERSTITIAL [-1]	
		<input type="checkbox"/> INTERMITTENT [-2]	
		<input type="checkbox"/> EDDIES [1]	

Comments:   

Indicate for reach - pools and riffles.

Pool / Current 5 Maximum 12

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species: Check ONE (Or 2 & average).  NO RIFFLE [metric=0]

<b>RIFFLE DEPTH</b>	<b>RUN DEPTH</b>	<b>RIFFLE / RUN SUBSTRATE</b>	<b>RIFFLE / RUN EMBEDDEDNESS</b>
<input type="checkbox"/> BEST AREAS > 10cm [2]	<input type="checkbox"/> MAXIMUM > 50cm [2]	<input checked="" type="checkbox"/> STABLE (e.g., Cobble, Boulder) [2]	<input checked="" type="checkbox"/> NONE [2]
<input checked="" type="checkbox"/> BEST AREAS 5-10cm [1]	<input checked="" type="checkbox"/> MAXIMUM < 50cm [1]	<input type="checkbox"/> MOD. STABLE (e.g., Large Gravel) [1]	<input type="checkbox"/> LOW [1]
<input type="checkbox"/> BEST AREAS < 5cm [metric=0]		<input type="checkbox"/> UNSTABLE (e.g., Fine Gravel, Sand) [0]	<input type="checkbox"/> MODERATE [0]
			<input type="checkbox"/> EXTENSIVE [-1]

Comments:   

Riffle / Run 6 Maximum 8

**6] GRADIENT** (ft/ml)  VERY LOW - LOW [2-4]  MODERATE [6-10]  HIGH - VERY HIGH [10-6]

**DRAINAGE AREA** (mi<sup>2</sup>)

% POOL: 20 % GLIDE:   

% RUN: 50 % RIFFLE: 30

Gradient    Maximum 10

**A) SAMPLED REACH**

Check ALL that apply

**METHOD**

- BOAT
- WADE
- L. LINE
- OTHER

**DISTANCE**

- 0.5 Km
- 0.2 Km
- 0.15 Km
- 0.12 Km
- OTHER

meters

**CANOPY**

- > 85% - OPEN
- 55% - 85%
- 30% - 55%
- 10% - 30%
- < 10% - CLOSED

**STAGE**

1st -sample pass- 2nd

- HIGH
- UP
- NORMAL
- LOW
- DRY

**CLARITY**

1st -sample pass- 2nd

- < 20 cm
- 20 - 40 cm
- 40 - 70 cm
- > 70 cm / CTB
- SECCHI DEPTH

1st \_\_\_\_\_ cm

2nd \_\_\_\_\_ cm

**C) RECREATION AREA DEPTH**

POOL:  > 100ft<sup>2</sup>  > 3ft

Comment RE: Reach consistency/ Is reach typical of stream?, Recreation/ Observed - Inferred, Other/ Sampling observations, Concerns, Access directions, etc.

S-RR13

NOT BARBED WIRE, lots of EXPOSED BR. 4 STAIRS 50 FT APART, CHANNEL 15 FT WIDE

BR STAIR POOL

**B) AESTHETICS**

- NUISANCE ALGAE
- INVASIVE MACROPHYTES
- EXCESS TURBIDITY
- DISCOLORATION
- FOAM / SCUM
- OIL SHEEN
- TRASH / LITTER
- NUISANCE ODOR
- SLUDGE DEPOSITS
- CSOs/SSOs/OUTFALLS

**D) MAINTENANCE**

- PUBLIC / PRIVATE / BOTH / NA
- ACTIVE / HISTORIC / BOTH / NA
- YOUNG-SUCCESSION-OLD
- SPRAY / SNAG / REMOVED
- MODIFIED / DIPPED OUT / NA
- LEVEED / ONE SIDED
- RELOCATED / CUTOFFS
- MOVING-BEDLOAD-STABLE
- ARMoured / SLUMPS
- ISLANDS / SCOURED
- IMPOUNDED / DESICCATED
- FLOOD CONTROL / DRAINAGE

Circle some & COMMENT

**E) ISSUES**

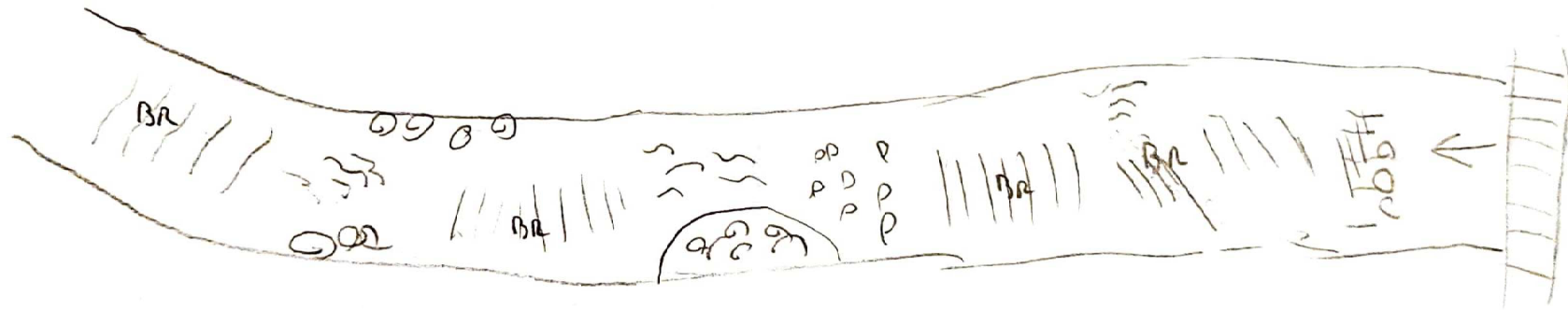
- WWTP / CSO / NPDES / INDUSTRY
- HARDENED / URBAN / DIRT & GRIME
- CONTAMINATED / LANDFILL
- BMPs-CONSTRUCTION-SEDIMENT
- LOGGING / IRRIGATION / COOLING
- BANK / EROSION / SURFACE
- FALSE BANK / MANURE / LAGOON
- WASH H<sub>2</sub>O / TILE / H<sub>2</sub>O TABLE
- ACID / MINE / QUARRY / FLOW
- NATURAL / WETLAND / STAGNANT
- PARK / GOLF / LAWN / HOME
- ATMOSPHERE / DATA PAUCITY

**F) MEASUREMENTS**

- $\bar{x}$  width
- $\bar{x}$  depth
- max. depth
- $\bar{x}$  bankfull width
- bankfull  $\bar{x}$  depth
- W/D ratio
- bankfull max. depth
- floodprone  $x^2$  width
- entrench. ratio

Legacy Tree:

**Stream Drawing:**



Stream & Location: SEEDS-C-2 18:15 RM:    Date: 11/15/21

River Code:    STORET #:    (NAD83 - decimal) Scorers Full Name & Affiliation: LK Office verified location

**1) SUBSTRATE** Check ONLY Two substrate TYPE BOXES; estimate % or note every type present

<b>BEST TYPES</b>	<b>POOL RIFFLE</b>	<b>OTHER TYPES</b>	<b>POOL RIFFLE</b>	<b>ORIGIN</b>	<b>QUALITY</b>
<input type="checkbox"/> BLDR /SLABS [10]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> HARDPAN [4]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> LIMESTONE [1]	<input type="checkbox"/> HEAVY [-2]
<input type="checkbox"/> BOULDER [9]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> DETRITUS [3]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> TILLS [1]	<input type="checkbox"/> MODERATE [-1]
<input checked="" type="checkbox"/> COBBLE [8]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> MUCK [2]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> WETLANDS [0]	<input type="checkbox"/> NORMAL [0]
<input type="checkbox"/> GRAVEL [7]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> SILT [2]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> HARDPAN [0]	<input type="checkbox"/> FREE [1]
<input type="checkbox"/> SAND [6]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> ARTIFICIAL [0]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> SANDSTONE [0]	<input type="checkbox"/> EXTENSIVE [-2]
<input type="checkbox"/> BEDROCK [5]	<input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> RIP/RAP [0]	<input type="checkbox"/> MODERATE [-1]

NUMBER OF BEST TYPES:  4 or more [2]  3 or less [0]

Comments:   

**2) INSTREAM COVER** Indicate presence 0 to 3: 0-Absent; 1-Very small amounts or if more common of marginal quality; 2-Moderate amounts, but not of highest quality or in small amounts of highest quality; 3-Highest quality in moderate or greater amounts (e.g., very large boulders in deep or fast water, large diameter log that is stable, well developed rootwad in deep / fast water, or deep, well-defined, functional pools.

<input type="checkbox"/> UNDERCUT BANKS [1]	<input type="checkbox"/> POOLS > 70cm [2]	<input type="checkbox"/> OXBOWS, BACKWATERS [1]	<b>AMOUNT</b>
<input type="checkbox"/> OVERHANGING VEGETATION [1]	<input type="checkbox"/> ROOTWADS [1]	<input type="checkbox"/> AQUATIC MACROPHYTES [1]	Check ONE (Or 2 & average)
<input type="checkbox"/> SHALLOWS (IN SLOW WATER) [1]	<input type="checkbox"/> BOULDERS [1]	<input type="checkbox"/> LOGS OR WOODY DEBRIS [1]	<input type="checkbox"/> EXTENSIVE >75% [11]
<input type="checkbox"/> ROOTMATS [1]			<input type="checkbox"/> MODERATE 25-75% [7]
			<input type="checkbox"/> SPARSE 5-<25% [3]
			<input type="checkbox"/> NEARLY ABSENT <5% [1]

Comments:   

**3) CHANNEL MORPHOLOGY** Check ONE in each category (Or 2 & average)

<b>SINUOSITY</b>	<b>DEVELOPMENT</b>	<b>CHANNELIZATION</b>	<b>STABILITY</b>
<input checked="" type="checkbox"/> HIGH [4]	<input type="checkbox"/> EXCELLENT [7]	<input checked="" type="checkbox"/> NONE [6]	<input type="checkbox"/> HIGH [3]
<input type="checkbox"/> MODERATE [3]	<input type="checkbox"/> GOOD [5]	<input type="checkbox"/> RECOVERED [4]	<input type="checkbox"/> MODERATE [2]
<input type="checkbox"/> LOW [2]	<input type="checkbox"/> FAIR [3]	<input type="checkbox"/> RECOVERING [3]	<input checked="" type="checkbox"/> LOW [1]
<input type="checkbox"/> NONE [1]	<input checked="" type="checkbox"/> POOR [1]	<input type="checkbox"/> RECENT OR NO RECOVERY [1]	

Comments:   

**4) BANK EROSION AND RIPARIAN ZONE** Check ONE in each category for EACH BANK (Or 2 per bank & average)

<b>EROSION</b>	<b>RIPARIAN WIDTH</b>	<b>FLOOD PLAIN QUALITY</b>
<input type="checkbox"/> NONE / LITTLE [3]	<input type="checkbox"/> WIDE > 50m [4]	<input type="checkbox"/> FOREST, SWAMP [3]
<input type="checkbox"/> MODERATE [2]	<input type="checkbox"/> MODERATE 10-50m [3]	<input type="checkbox"/> SHRUB OR OLD FIELD [2]
<input type="checkbox"/> HEAVY / SEVERE [1]	<input type="checkbox"/> NARROW 5-10m [2]	<input type="checkbox"/> RESIDENTIAL, PARK, NEW FIELD [1]
	<input type="checkbox"/> VERY NARROW < 5m [1]	<input type="checkbox"/> FENCED PASTURE [1]
	<input type="checkbox"/> NONE [0]	<input type="checkbox"/> OPEN PASTURE, ROWCROP [0]

Comments:   

**5) POOL / GLIDE AND RIFFLE / RUN QUALITY**

<b>MAXIMUM DEPTH</b>	<b>CHANNEL WIDTH</b>	<b>CURRENT VELOCITY</b>	<b>Recreation Potential</b>
Check ONE (ONLY)	Check ONE (Or 2 & average)	Check ALL that apply	Primary Contact
<input type="checkbox"/> > 1m [6]	<input type="checkbox"/> POOL WIDTH > RIFFLE WIDTH [2]	<input type="checkbox"/> TORRENTIAL [-1]	Secondary Contact
<input type="checkbox"/> 0.7-<1m [4]	<input checked="" type="checkbox"/> POOL WIDTH = RIFFLE WIDTH [1]	<input checked="" type="checkbox"/> SLOW [1]	(circle one and comment on back)
<input type="checkbox"/> 0.4-<0.7m [2]	<input type="checkbox"/> POOL WIDTH > RIFFLE WIDTH [0]	<input type="checkbox"/> VERY FAST [1]	
<input checked="" type="checkbox"/> 0.2-<0.4m [1]		<input type="checkbox"/> INTERSTITIAL [-1]	
<input type="checkbox"/> < 0.2m [0]		<input type="checkbox"/> FAST [1]	
		<input type="checkbox"/> MODERATE [1]	
		<input type="checkbox"/> INTERMITTENT [-2]	
		<input type="checkbox"/> EDDIES [1]	

Comments:   

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species:  NO RIFFLE [metric=0]

<b>RIFFLE DEPTH</b>	<b>RUN DEPTH</b>	<b>RIFFLE / RUN SUBSTRATE</b>	<b>RIFFLE / RUN EMBEDDEDNESS</b>
Check ONE (Or 2 & average)	Check ONE (Or 2 & average)	Check ONE (Or 2 & average)	Check ONE (Or 2 & average)
<input type="checkbox"/> BEST AREAS > 10cm [2]	<input type="checkbox"/> MAXIMUM > 50cm [2]	<input type="checkbox"/> STABLE (e.g., Cobble, Boulder) [2]	<input type="checkbox"/> NONE [2]
<input checked="" type="checkbox"/> BEST AREAS 5-10cm [1]	<input checked="" type="checkbox"/> MAXIMUM < 50cm [1]	<input type="checkbox"/> MOD. STABLE (e.g., Large Gravel) [1]	<input type="checkbox"/> LOW [1]
<input type="checkbox"/> BEST AREAS < 5cm [metric=0]		<input checked="" type="checkbox"/> UNSTABLE (e.g., Fine Gravel, Sand) [0]	<input checked="" type="checkbox"/> MODERATE [0]
			<input type="checkbox"/> EXTENSIVE [-1]

Comments:   

**6) GRADIENT** (ft/ml)  VERY LOW - LOW [2-4]  MODERATE [6-10]  HIGH - VERY HIGH [10-6]

**DRAINAGE AREA** (mi<sup>2</sup>)

%POOL: 35 %GLIDE:   

%RUN: 60 %RIFFLE: 5

Comments:

**A) SAMPLED REACH**

Check ALL that apply

**METHOD**

BOAT  WADE  L. LINE  OTHER

**DISTANCE**

0.5 Km  0.2 Km  0.15 Km  0.12 Km  OTHER

**CLARITY**

1st --sample pass-- 2nd

< 20 cm  20-40 cm  40-70 cm  > 70 cm/ CTB

SECCHI DEPTH

**CANOPY**

1st pass \_\_\_\_\_ cm

2nd pass \_\_\_\_\_ cm

> 85%- OPEN  55%--<85%  30%--<55%  10%--<30%  <10%- CLOSED

**STAGE**

HIGH  UP  NORMAL  LOW  DRY

Comment RE: Reach consistency/ Is reach typical of stream?, Recreation/ Observed - Inferred, Other/ Sampling observations, Concerns, Access directions, etc.

S-C-2

POORLY FORMED POOL RIFFLER. HEAVY LEAF DEBRIS ON BED.

HEAD CUT. ACTIVELY INCISING. BOULDER STOPS RIP WITH GRAB CONTROL. PEAK BED

**B) AESTHETICS**

NUISANCE ALGAE  INVASIVE MACROPHYTES  EXCESS TURBIDITY  DISCOLORATION  FOAM / SCUM  OIL SHEEN  TRASH / LITTER  NUISANCE ODOR  SLUDGE DEPOSITS  CSOs/SSOs/OUTFALLS

**D) MAINTENANCE** Circle some & COMMENT

PUBLIC / PRIVATE / BOTH / NA  
ACTIVE / HISTORIC / BOTH / NA  
YOUNG-SUCCESSION-OLD  
SPRAY / SNAG / REMOVED  
MODIFIED / DIPPED OUT / NA  
LEVEED / ONE SIDED  
RELOCATED / CUTOFFS  
MOVING-BEDLOAD-STABLE  
ARMOURED / SLUMPS  
ISLANDS / SCOURED  
IMPOUNDED / DESICCATED  
FLOOD CONTROL / DRAINAGE

**E) ISSUES**

WWTP / CSO / NPDES / INDUSTRY  
HARDENED / URBAN / DIRT & GRIME  
CONTAMINATED / LANDFILL  
BMPs-CONSTRUCTION-SEDIMENT  
LOGGING / IRRIGATION / COOLING  
BANK / EROSION / SURFACE  
FALSE BANK / MANURE / LAGOON  
WASH H<sub>2</sub>O / TILE / H<sub>2</sub>O TABLE  
ACID / MINE / QUARRY / FLOW  
NATURAL / WETLAND / STAGNANT  
PARK / GOLF / LAWN / HOME  
ATMOSPHERE / DATA PAUCITY

**F) MEASUREMENTS**

$\bar{x}$  width  
 $\bar{x}$  depth  
max. depth  
 $\bar{x}$  bankfull width  
bankfull  $\bar{x}$  depth  
W/D ratio  
bankfull max. depth  
floodprone  $x^2$  width  
entrench. ratio

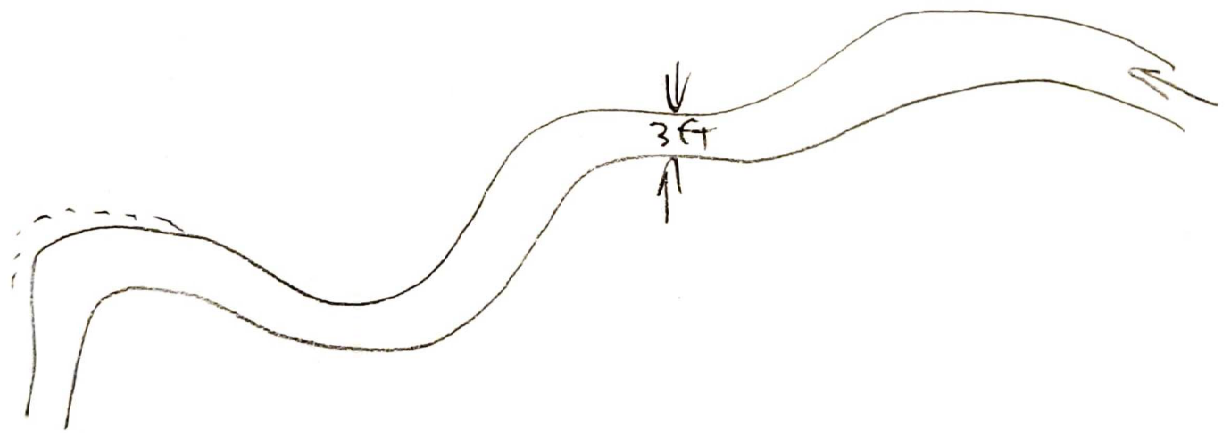
Legacy Tree.

**C) RECREATION** AREA DEPTH

POOL:  >100ft<sup>2</sup>  >3ft

**Stream Drawing:**

NO PROPER RIFFLER. A FBW STEP POOLS AT DS END.





Stream & Location: S-Q3 Highway RM:    Date: 11/15/21

Scorers Full Name & Affiliation: LK

River Code:    STORET #:    Lat./Long.: 36.884444, 79.42822 Office verified location

**1] SUBSTRATE** Check ONLY Two substrate TYPE BOXES; estimate % or note every type present. Check ONE (Or 2 & average)

<b>BEST TYPES</b>	<b>POOL RIFFLE</b>	<b>OTHER TYPES</b>	<b>POOL RIFFLE</b>	<b>ORIGIN</b>	<b>QUALITY</b>
<input type="checkbox"/> BLDR /SLABS [10]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> HARDPAN [4]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> LIMESTONE [1]	<input type="checkbox"/> HEAVY [-2]
<input type="checkbox"/> BOULDER [9]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> DETRITUS [3]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> TILLS [1]	<input type="checkbox"/> MODERATE [-1]
<input type="checkbox"/> COBBLE [8]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> MUCK [2]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> WETLANDS [0]	<input type="checkbox"/> NORMAL [0]
<input checked="" type="checkbox"/> GRAVEL [7]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> SILT [2]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> HARDPAN [0]	<input type="checkbox"/> FREE [1]
<input type="checkbox"/> SAND [6]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> ARTIFICIAL [0]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> SANDSTONE [0]	<input type="checkbox"/> EXTENSIVE [-2]
<input type="checkbox"/> BEDROCK [5]	<input type="checkbox"/> <input type="checkbox"/>			<input type="checkbox"/> RIP/RAP [0]	<input type="checkbox"/> MODERATE [-1]
(Score natural substrates; ignore sludge from point-sources)				<input type="checkbox"/> LACUSTURINE [0]	<input type="checkbox"/> NORMAL [0]
<b>NUMBER OF BEST TYPES:</b> <input type="checkbox"/> 4 or more [2] <input type="checkbox"/> 3 or less [0]			<input type="checkbox"/> SHALE [-1]	<input type="checkbox"/> COAL FINES [-2]	<input type="checkbox"/> NONE [1]

Comments:   

Substrate Maximum 20 13

**2] INSTREAM COVER** Indicate presence 0 to 3: 0-Absent; 1-Very small amounts or if more common of marginal quality; 2-Moderate amounts, but not of highest quality or in small amounts of highest quality; 3-Highest quality in moderate or greater amounts (e.g., very large boulders in deep or fast water, large diameter log that is stable, well developed rootwad in deep / fast water, or deep, well-defined, functional pools). Check ONE (Or 2 & average)

<input type="checkbox"/> UNDERCUT BANKS [1]	<input type="checkbox"/> POOLS > 70cm [2]	<input type="checkbox"/> OXBOWS, BACKWATERS [1]	<input type="checkbox"/> EXTENSIVE >75% [11]
<input type="checkbox"/> OVERHANGING VEGETATION [1]	<input type="checkbox"/> ROOTWADS [1]	<input type="checkbox"/> AQUATIC MACROPHYTES [1]	<input type="checkbox"/> MODERATE 25-75% [7]
<input type="checkbox"/> SHALLOWS (IN SLOW WATER) [1]	<input type="checkbox"/> BOULDERS [1]	<input type="checkbox"/> LOGS OR WOODY DEBRIS [1]	<input type="checkbox"/> SPARSE 5-<25% [5]
<input type="checkbox"/> ROOTMATS [1]			<input type="checkbox"/> NEARLY ABSENT <5% [1]

Comments:   

Cover Maximum 20  

**3] CHANNEL MORPHOLOGY** Check ONE in each category (Or 2 & average)

<b>SINUOSITY</b>	<b>DEVELOPMENT</b>	<b>CHANNELIZATION</b>	<b>STABILITY</b>
<input type="checkbox"/> HIGH [4]	<input type="checkbox"/> EXCELLENT [7]	<input type="checkbox"/> NONE [6]	<input type="checkbox"/> HIGH [3]
<input type="checkbox"/> MODERATE [3]	<input checked="" type="checkbox"/> GOOD [5]	<input checked="" type="checkbox"/> RECOVERED [4]	<input checked="" type="checkbox"/> MODERATE [2]
<input checked="" type="checkbox"/> LOW [2]	<input type="checkbox"/> FAIR [3]	<input type="checkbox"/> RECOVERING [3]	<input type="checkbox"/> LOW [1]
<input type="checkbox"/> NONE [1]	<input type="checkbox"/> POOR [1]	<input type="checkbox"/> RECENT OR NO RECOVERY [1]	

Comments:   

Channel Maximum 20 13

**4] BANK EROSION AND RIPARIAN ZONE** Check ONE in each category for EACH BANK (Or 2 per bank & average)

<b>EROSION</b>	<b>RIPARIAN WIDTH</b>	<b>FLOOD PLAIN QUALITY</b>
<input type="checkbox"/> NONE / LITTLE [3]	<input type="checkbox"/> WIDE > 50m [4]	<input type="checkbox"/> FOREST, SWAMP [3]
<input type="checkbox"/> MODERATE [2]	<input type="checkbox"/> MODERATE 10-50m [3]	<input type="checkbox"/> SHRUB OR OLD FIELD [2]
<input type="checkbox"/> HEAVY / SEVERE [1]	<input type="checkbox"/> NARROW 5-10m [2]	<input type="checkbox"/> RESIDENTIAL, PARK, NEW FIELD [1]
	<input type="checkbox"/> VERY NARROW < 5m [1]	<input type="checkbox"/> FENCED PASTURE [1]
	<input type="checkbox"/> NONE [0]	<input type="checkbox"/> OPEN PASTURE, ROWCROP [0]
		<input type="checkbox"/> CONSERVATION TILLAGE [1]
		<input type="checkbox"/> URBAN OR INDUSTRIAL [0]
		<input type="checkbox"/> MINING / CONSTRUCTION [0]

Comments:   

Riparian Maximum 10  

**5] POOL / GLIDE AND RIFFLE / RUN QUALITY**

<b>MAXIMUM DEPTH</b> Check ONE (ONLY!)	<b>CHANNEL WIDTH</b> Check ONE (Or 2 & average)	<b>CURRENT VELOCITY</b> Check ALL that apply	<b>Recreation Potential</b> Primary Contact Secondary Contact (circle one and comment on back)
<input type="checkbox"/> > 1m [6]	<input checked="" type="checkbox"/> POOL WIDTH > RIFFLE WIDTH [2]	<input type="checkbox"/> TORRENTIAL [-1]	<span style="border: 1px solid black; border-radius: 50%; padding: 5px;">4</span>
<input type="checkbox"/> 0.7-<1m [4]	<input type="checkbox"/> POOL WIDTH = RIFFLE WIDTH [1]	<input type="checkbox"/> VERY FAST [1]	
<input type="checkbox"/> 0.4-<0.7m [2]	<input type="checkbox"/> POOL WIDTH > RIFFLE WIDTH [0]	<input checked="" type="checkbox"/> FAST [1]	
<input checked="" type="checkbox"/> 0.2-<0.4m [1]		<input type="checkbox"/> MODERATE [1]	
<input type="checkbox"/> < 0.2m [0]		<input type="checkbox"/> SLOW [1]	

Comments:   

Pool / Current Maximum 12

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species: Check ONE (Or 2 & average).  NO RIFFLE [metric=0]

<b>RIFFLE DEPTH</b>	<b>RUN DEPTH</b>	<b>RIFFLE / RUN SUBSTRATE</b>	<b>RIFFLE / RUN EMBEDDEDNESS</b>
<input type="checkbox"/> BEST AREAS > 10cm [2]	<input type="checkbox"/> MAXIMUM > 50cm [2]	<input checked="" type="checkbox"/> STABLE (e.g., Cobble, Boulder) [2]	<input type="checkbox"/> NONE [2]
<input checked="" type="checkbox"/> BEST AREAS 5-10cm [1]	<input checked="" type="checkbox"/> MAXIMUM < 50cm [1]	<input type="checkbox"/> MOD. STABLE (e.g., Large Gravel) [1]	<input checked="" type="checkbox"/> LOW [1]
<input type="checkbox"/> BEST AREAS < 5cm [metric=0]		<input type="checkbox"/> UNSTABLE (e.g., Fine Gravel, Sand) [0]	<input type="checkbox"/> MODERATE [0]
			<input type="checkbox"/> EXTENSIVE [-1]

Comments:   

Riffle / Run Maximum 8 5

**6] GRADIENT ( DRAINAGE AREA** ( ft/ml) ( m<sup>2</sup>)

<input type="checkbox"/> VERY LOW - LOW [2-4]	% POOL: <u>15</u>	% GLIDE: <u>  </u>	Gradient Maximum 10 <span style="border: 1px solid black; border-radius: 50%; padding: 5px;"> </span>
<input type="checkbox"/> MODERATE [6-10]	% RUN: <u>70</u>	% RIFFLE: <u>15</u>	
<input type="checkbox"/> HIGH - VERY HIGH [10-6]			

**A) SAMPLED REACH**

Check ALL that apply

- METHOD**
- BOAT
  - WADE
  - L. LINE
  - OTHER
- DISTANCE**
- 0.5 Km
  - 0.2 Km
  - 0.15 Km
  - 0.12 Km
  - OTHER

- STAGE**
- HIGH
  - UP
  - NORMAL
  - LOW
  - DRY

- CLARITY**
- 1st -sample pass-- 2nd
- < 20 cm
  - 20-40 cm
  - 40-70 cm
  - > 70 cm/CTB
  - SECCHI DEPTH

meters

**CANOPY**

- > 85% - OPEN
- 55% - 85%
- 30% - 55%
- 10% - 30%
- < 10% - CLOSED

- 1st pass \_\_\_\_\_ cm
- 2nd pass \_\_\_\_\_ cm

**C) RECREATION** AREA DEPTH  
 POOL:  >100ft<sup>2</sup>  >3ft

Comment RE: Reach consistency/ Is reach typical of stream?, Recreation/ Observed - Inferred, Other/ Sampling observations, Concerns, Access directions, etc.

S-93

MODERATELY WELL FORMED RIFFLE-POOL COMPLEX. 50% BAMBUSOID 1 TO 5 CM  
 GRAVEL. LONG RUNS. GOOD FEWS SHALLOW POOLS

(RIFFLE POOL - COMPLEX)

**B) AESTHETICS**

- NUISANCE ALGAE
- INVASIVE MACROPHYTES
- EXCESS TURBIDITY
- DISCOLORATION
- FOAM / SCUM
- OIL SHEEN
- TRASH / LITTER
- NUISANCE ODOR
- SLUDGE DEPOSITS
- CSOs/SSOs/OUTFALLS

**D) MAINTENANCE**

- PUBLIC / PRIVATE / BOTH / NA
- ACTIVE / HISTORIC / BOTH / NA
- YOUNG-SUCCESSION-OLD
- SPRAY / SNAG / REMOVED
- MODIFIED / DIPPED OUT / NA
- LEVEED / ONE SIDED
- RELOCATED / CUTOFFS
- MOVING-BEDLOAD-STABLE
- ARMoured / SLUMPS
- ISLANDS / SCOURED
- IMPOUNDED / DESICCATED
- FLOOD CONTROL / DRAINAGE

Circle some & COMMENT

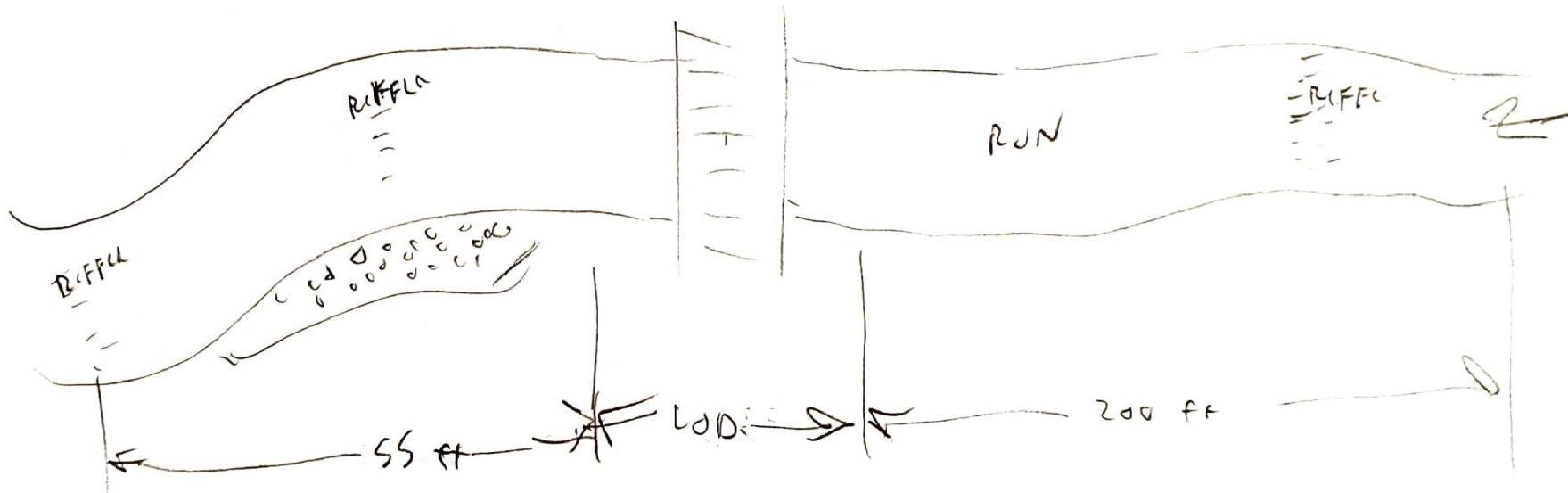
**E) ISSUES**

- WWTP / CSO / NPDES / INDUSTRY
- HARDENED / URBAN / DIRT&GRIME
- CONTAMINATED / LANDFILL
- BMPs-CONSTRUCTION-SEDIMENT
- LOGGING / IRRIGATION / COOLING
- BANK / EROSION / SURFACE
- FALSE BANK / MANURE / LAGOON
- WASH H<sub>2</sub>O / TILE / H<sub>2</sub>O TABLE
- ACID / MINE / QUARRY / FLOW
- NATURAL / WETLAND / STAGNANT
- PARK / GOLF / LAWN / HOME
- ATMOSPHERE / DATA PAUCITY

**F) MEASUREMENTS**

- $\bar{x}$  width
  - $\bar{x}$  depth
  - max. depth
  - $\bar{x}$  bankfull width
  - bankfull  $\bar{x}$  depth
  - W/D ratio
  - bankfull max. depth
  - floodprone  $x^2$  width
  - entrench. ratio
- Legacy Tree:

**Stream Drawing:**



Stream & Location: S BR 26 R: 30 100 RM:    Date: 11/15/21

River Code:    STORET #:    (NAD 83 - decimal) Lat./Long.: 36.828207, -79.349814 Office verified location

**1) SUBSTRATE** Check ONLY Two substrate TYPE BOXES: estimate % or note every type present

<b>BEST TYPES</b> <input type="checkbox"/> BLDR /SLABS [10] <input type="checkbox"/> BOULDER [9] <input type="checkbox"/> COBBLE [8] <input type="checkbox"/> GRAVEL [7] <input checked="" type="checkbox"/> SAND [6] <input type="checkbox"/> BEDROCK [5]		<b>POOL RIFFLE</b> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<b>OTHER TYPES</b> <input type="checkbox"/> HARDPAN [4] <input type="checkbox"/> DETRITUS [3] <input type="checkbox"/> MUCK [2] <input type="checkbox"/> SILT [2] <input type="checkbox"/> ARTIFICIAL [0]		<b>POOL RIFFLE</b> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<b>ORIGIN</b> <input type="checkbox"/> LIMESTONE [1] <input type="checkbox"/> TILLS [1] <input type="checkbox"/> WETLANDS [0] <input type="checkbox"/> HARDPAN [0] <input type="checkbox"/> SANDSTONE [0] <input type="checkbox"/> RIP/RAP [0] <input type="checkbox"/> LACUSTURINE [0] <input type="checkbox"/> SHALE [-1] <input type="checkbox"/> COAL FINES [-2]	<b>QUALITY</b> <input type="checkbox"/> HEAVY [-2] <input type="checkbox"/> MODERATE [-1] <input type="checkbox"/> NORMAL [0] <input type="checkbox"/> FREE [1] <input type="checkbox"/> EXTENSIVE [-2] <input type="checkbox"/> MODERATE [-1] <input type="checkbox"/> NORMAL [0] <input type="checkbox"/> NONE [1]	SILT <input type="checkbox"/> EMBEDDEDNESS <input type="checkbox"/>	Substrate <span style="border: 1px solid black; border-radius: 50%; padding: 5px;">12</span> Maximum 20
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NUMBER OF BEST TYPES:  4 or more [2]  3 or less [0] (Score natural substrates; ignore sludge from point-sources)

Comments:   

**2) INSTREAM COVER** Indicate presence 0 to 3: 0-Absent; 1-Very small amounts or if more common of marginal quality; 2-Moderate amounts, but not of highest quality or in small amounts of highest quality; 3-Highest quality in moderate or greater amounts (e.g., very large boulders in deep or fast water, large diameter log that is stable, well developed rootwad in deep / fast water, or deep, well-defined, functional pools.

<input type="checkbox"/> UNDERCUT BANKS [1] <input type="checkbox"/> OVERHANGING VEGETATION [1] <input type="checkbox"/> SHALLOWS (IN SLOW WATER) [1] <input type="checkbox"/> ROOTMATS [1]	<input type="checkbox"/> POOLS > 70cm [2] <input type="checkbox"/> ROOTWADS [1] <input type="checkbox"/> BOULDERS [1]	<input type="checkbox"/> OXBOWS, BACKWATERS [1] <input type="checkbox"/> AQUATIC MACROPHYTES [1] <input type="checkbox"/> LOGS OR WOODY DEBRIS [1]	<b>AMOUNT</b> Check ONE (Or 2 & average) <input type="checkbox"/> EXTENSIVE >75% [11] <input type="checkbox"/> MODERATE 25-75% [7] <input type="checkbox"/> SPARSE 5-<25% [3] <input type="checkbox"/> NEARLY ABSENT <5% [1]	Cover <span style="border: 1px solid black; border-radius: 50%; padding: 5px;">  </span> Maximum 20
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Comments:   

**3) CHANNEL MORPHOLOGY** Check ONE in each category (Or 2 & average)

<b>SINUOSITY</b> <input type="checkbox"/> HIGH [4] <input checked="" type="checkbox"/> MODERATE [3] <input type="checkbox"/> LOW [2] <input type="checkbox"/> NONE [1]	<b>DEVELOPMENT</b> <input type="checkbox"/> EXCELLENT [7] <input type="checkbox"/> GOOD [5] <input checked="" type="checkbox"/> FAIR [3] <input type="checkbox"/> POOR [1]	<b>CHANNELIZATION</b> <input checked="" type="checkbox"/> NONE [6] <input type="checkbox"/> RECOVERED [4] <input type="checkbox"/> RECOVERING [3] <input type="checkbox"/> RECENT OR NO RECOVERY [1]	<b>STABILITY</b> <input type="checkbox"/> HIGH [3] <input type="checkbox"/> MODERATE [2] <input type="checkbox"/> LOW [1]	Channel <span style="border: 1px solid black; border-radius: 50%; padding: 5px;">12</span> Maximum 20
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Comments:   

**4) BANK EROSION AND RIPARIAN ZONE** Check ONE in each category for EACH BANK (Or 2 per bank & average)

<b>EROSION</b> <input type="checkbox"/> NONE / LITTLE [3] <input type="checkbox"/> MODERATE [2] <input type="checkbox"/> HEAVY / SEVERE [1]	<b>RIPARIAN WIDTH</b> <input type="checkbox"/> WIDE > 50m [4] <input type="checkbox"/> MODERATE 10-50m [3] <input type="checkbox"/> NARROW 5-10m [2] <input type="checkbox"/> VERY NARROW < 5m [1] <input type="checkbox"/> NONE [0]	<b>FLOOD PLAIN QUALITY</b> <input type="checkbox"/> FOREST, SWAMP [3] <input type="checkbox"/> SHRUB OR OLD FIELD [2] <input type="checkbox"/> RESIDENTIAL, PARK, NEW FIELD [1] <input type="checkbox"/> FENCED PASTURE [1] <input type="checkbox"/> OPEN PASTURE, ROWCROP [0]	<input type="checkbox"/> CONSERVATION TILLAGE [1] <input type="checkbox"/> URBAN OR INDUSTRIAL [0] <input type="checkbox"/> MINING / CONSTRUCTION [0]	Indicate predominant land use(s) past 100m riparian. Riparian <span style="border: 1px solid black; border-radius: 50%; padding: 5px;">  </span> Maximum 10
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Comments:   

**5) POOL / GLIDE AND RIFFLE / RUN QUALITY**

<b>MAXIMUM DEPTH</b> Check ONE (ONLY!) <input type="checkbox"/> > 1m [6] <input checked="" type="checkbox"/> 0.7-<1m [4] <input type="checkbox"/> 0.4-<0.7m [2] <input type="checkbox"/> 0.2-<0.4m [1] <input type="checkbox"/> < 0.2m [0]	<b>CHANNEL WIDTH</b> Check ONE (Or 2 & average) <input type="checkbox"/> POOL WIDTH > RIFFLE WIDTH [2] <input type="checkbox"/> POOL WIDTH = RIFFLE WIDTH [1] <input checked="" type="checkbox"/> POOL WIDTH < RIFFLE WIDTH [0]	<b>CURRENT VELOCITY</b> Check ALL that apply <input type="checkbox"/> TORRENTIAL [-1] <input type="checkbox"/> VERY FAST [1] <input checked="" type="checkbox"/> FAST [1] <input type="checkbox"/> MODERATE [1]	<input type="checkbox"/> SLOW [1] <input type="checkbox"/> INTERSTITIAL [-1] <input type="checkbox"/> INTERMITTENT [-2] <input type="checkbox"/> EDDIES [1]	<b>Recreation Potential</b> Primary Contact Secondary Contact (circle one and comment on back)	Pool / Current <span style="border: 1px solid black; border-radius: 50%; padding: 5px;">5</span> Maximum 12
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Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species:  NO RIFFLE [metric=0]

<b>RIFFLE DEPTH</b> <input type="checkbox"/> BEST AREAS > 10cm [2] <input type="checkbox"/> BEST AREAS 5-10cm [1] <input checked="" type="checkbox"/> BEST AREAS < 5cm [metric=0]	<b>RUN DEPTH</b> <input type="checkbox"/> MAXIMUM > 50cm [2] <input checked="" type="checkbox"/> MAXIMUM < 50cm [1]	<b>RIFFLE / RUN SUBSTRATE</b> <input type="checkbox"/> STABLE (e.g., Cobble, Boulder) [2] <input type="checkbox"/> MOD. STABLE (e.g., Large Gravel) [1] <input checked="" type="checkbox"/> UNSTABLE (e.g., Fine Gravel, Sand) [0]	<b>RIFFLE / RUN EMBEDDEDNESS</b> <input type="checkbox"/> NONE [2] <input type="checkbox"/> LOW [1] <input type="checkbox"/> MODERATE [0] <input checked="" type="checkbox"/> EXTENSIVE [-1]	Riffle / Run <span style="border: 1px solid black; border-radius: 50%; padding: 5px;">0</span> Maximum 8
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Comments:   

**6) GRADIENT** (ft/mi)  VERY LOW - LOW [2-4]  MODERATE [6-10]  HIGH - VERY HIGH [10-6]

**DRAINAGE AREA** (mi<sup>2</sup>)

%POOL: 30 %GLIDE:     
 %RUN: 65 %RIFFLE: 5

Gradient     
 Maximum 10

**AJ SAMPLED REACH**  
Check ALL that apply

Comment RE: Reach consistency/ Is reach typical of stream?, Recreation/ Observed - Inferred, Other/ Sampling observations, Concerns, Access directions, etc.  
S-PF26

- METHOD**
- BOAT
  - WADE
  - L. LINE
  - OTHER
- DISTANCE**
- 0.5 Km
  - 0.2 Km
  - 0.15 Km
  - 0.12 Km
  - OTHER

- STAGE**
- 1st --sample pass-- 2nd
- HIGH
  - UP
  - NORMAL
  - LOW
  - DRY

~~BOAT~~ HEAVY SAND LOAD PERMANENT RIFFLES FROM FULLY FORMED. POOLS ARE SHALLOW. EXCESS ENERGY SCOUR TO HARDPAN: GRAY CLAY AND APPROPRIATE CHANNELS IN PLACES. SAND BARS 50% WIDTH OF CHANNEL.

MBANDRINE PLANT BED

- CLARITY**
- 1st --sample pass-- 2nd
- < 20 cm
  - 20-<40 cm
  - 40-70 cm
  - > 70 cm/ CTB
  - SECCHI DEPTH

- BJ AESTHETICS**
- NUISANCE ALGAE
  - INVASIVE MACROPHYTES
  - EXCESS TURBIDITY
  - DISCOLORATION
  - FOAM / SCUM
  - OIL SHEEN
  - TRASH / LITTER
  - NUISANCE ODOR
  - SLUDGE DEPOSITS
  - CSOs/SSOs/OUTFALLS

- DJ MAINTENANCE**
- PUBLIC / PRIVATE / BOTH / NA
  - ACTIVE / HISTORIC / BOTH / NA
  - YOUNG-SUCCESSION-OLD
  - SPRAY / SNAG / REMOVED
  - MODIFIED / DIPPED OUT / NA
  - LEVEED / ONE SIDED
  - RELOCATED / CUTOFFS
  - MOVING-BEDLOAD-STABLE
  - ARMoured / SLUMPS
  - ISLANDS / SCOURED
  - IMPOUNDED / DESICCATED
  - FLOOD CONTROL / DRAINAGE

Circle some & COMMENT

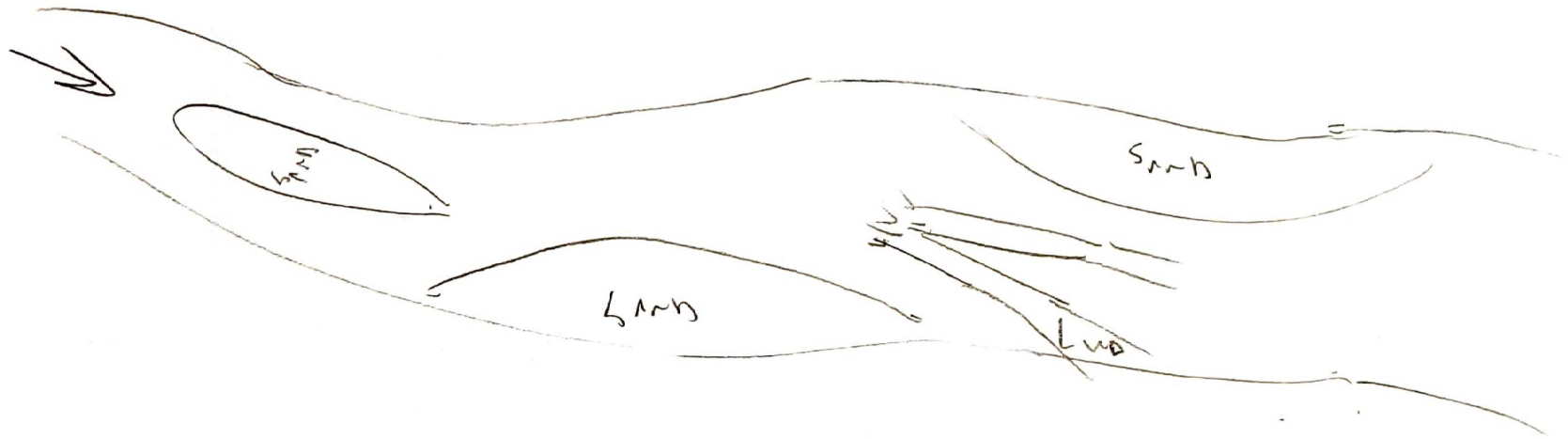
- EJ ISSUES**
- WWTP / CSO / NPDES / INDUSTRY
  - HARDENED / URBAN / DIRT&GRIME
  - CONTAMINATED / LANDFILL
  - BMPs-CONSTRUCTION-SEDIMENT
  - LOGGING / IRRIGATION / COOLING
  - BANK / EROSION / SURFACE
  - FALSE BANK / MANURE / LAGOON
  - WASH H<sub>2</sub>O / TILE / H<sub>2</sub>O TABLE
  - ACID / MINE / QUARRY / FLOW
  - NATURAL / WETLAND / STAGNANT
  - PARK / GOLF / LAWN / HOME
  - ATMOSPHERE / DATA PAUCITY

- FJ MEASUREMENTS**
- $\bar{x}$  width
  - $\bar{x}$  depth
  - max. depth
  - $\bar{x}$  bankfull width
  - bankfull  $\bar{x}$  depth
  - W/D ratio
  - bankfull max. depth
  - floodprone x<sup>2</sup> width
  - entrench. ratio
- Legacy Tree:

- CANOPY**
- 1st pass \_\_\_\_\_ cm
- 2nd pass \_\_\_\_\_ cm
- > 85%- OPEN
  - 55%-<85%
  - 30%-<55%
  - 10%-<30%
  - <10%- CLOSED

**CJ RECREATION** AREA DEPTH  
POOL:  >100ft<sup>2</sup>  >3ft

**Stream Drawing:**



Stream & Location: S4154 0:20 RM:      Date: 11/15/21

Scorers Full Name & Affiliation: LK

River Code:      STORET #:      Lat./Long.: 36.841112, -79.366848 Office verified location

1] **SUBSTRATE** Check ONLY two substrate TYPE BOXES; estimate % or note every type present

Check ONE (Or 2 & average)

BEST TYPES		POOL RIFFLE	OTHER TYPES		POOL RIFFLE	ORIGIN		QUALITY	
<input type="checkbox"/>	<input type="checkbox"/>	<u>    </u>	<input type="checkbox"/>	<input type="checkbox"/>	<u>    </u>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<u>    </u>	<input type="checkbox"/>	<input type="checkbox"/>	<u>    </u>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<u>    </u>	<input type="checkbox"/>	<input type="checkbox"/>	<u>    </u>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<u>    </u>	<input type="checkbox"/>	<input type="checkbox"/>	<u>    </u>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<u>    </u>	<input type="checkbox"/>	<input type="checkbox"/>	<u>    </u>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<u>    </u>	<input type="checkbox"/>	<input type="checkbox"/>	<u>    </u>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

NUMBER OF BEST TYPES:  4 or more  3 or less  2  1  0

Comments:     

Substrate Maximum 20 14

2] **INSTREAM COVER** Indicate presence 0 to 3: 0-Absent; 1-Very small amounts or if more common of marginal quality; 2-Moderate amounts, but not of highest quality or in small amounts of highest quality; 3-Highest quality in moderate or greater amounts (e.g., very large boulders in deep or fast water, large diameter log that is stable, well developed rootwad in deep / fast water, or deep, well-defined, functional pools.

Check ONE (Or 2 & average)

			AMOUNT	
<u>    </u>	<u>    </u>	<u>    </u>	<input type="checkbox"/>	<input type="checkbox"/>
<u>    </u>	<u>    </u>	<u>    </u>	<input type="checkbox"/>	<input type="checkbox"/>
<u>    </u>	<u>    </u>	<u>    </u>	<input type="checkbox"/>	<input type="checkbox"/>
<u>    </u>	<u>    </u>	<u>    </u>	<input type="checkbox"/>	<input type="checkbox"/>
<u>    </u>	<u>    </u>	<u>    </u>	<input type="checkbox"/>	<input type="checkbox"/>

Comments:     

Cover Maximum 20 0

3] **CHANNEL MORPHOLOGY** Check ONE in each category (Or 2 & average)

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY
<input type="checkbox"/> HIGH [4]	<input type="checkbox"/> EXCELLENT [7]	<input checked="" type="checkbox"/> NONE [6]	<input type="checkbox"/> HIGH [3]
<input checked="" type="checkbox"/> MODERATE [3]	<input checked="" type="checkbox"/> GOOD [5]	<input type="checkbox"/> RECOVERED [4]	<input checked="" type="checkbox"/> MODERATE [2]
<input type="checkbox"/> LOW [2]	<input type="checkbox"/> FAIR [3]	<input type="checkbox"/> RECOVERING [3]	<input type="checkbox"/> LOW [1]
<input type="checkbox"/> NONE [1]	<input type="checkbox"/> POOR [1]	<input type="checkbox"/> RECENT OR NO RECOVERY [1]	

Channel Maximum 20 16

4] **BANK EROSION AND RIPARIAN ZONE** Check ONE in each category for EACH BANK (Or 2 per bank & average)

EROSION		RIPARIAN WIDTH		FLOOD PLAIN QUALITY			
<input type="checkbox"/> NONE/LITTLE [3]	<input type="checkbox"/> MODERATE [2]	<input type="checkbox"/> WIDE > 50m [4]	<input type="checkbox"/> MODERATE 10-50m [3]	<input type="checkbox"/> FOREST, SWAMP [3]	<input type="checkbox"/> SHRUB OR OLD FIELD [2]	<input type="checkbox"/> CONSERVATION TILLAGE [1]	<input type="checkbox"/> URBAN OR INDUSTRIAL [0]
<input type="checkbox"/> MODERATE [2]	<input type="checkbox"/> HEAVY/SEVERE [1]	<input type="checkbox"/> NARROW 5-10m [2]	<input type="checkbox"/> VERY NARROW < 5m [1]	<input type="checkbox"/> RESIDENTIAL, PARK, NEW FIELD [1]	<input type="checkbox"/> FENCED PASTURE [1]	<input type="checkbox"/> MINING / CONSTRUCTION [0]	
		<input type="checkbox"/> NONE [0]		<input type="checkbox"/> OPEN PASTURE, ROWCROP [0]			

Indicate predominant land use(s) past 100m riparian. Riparian Maximum 10 0

5] **POOL / GLIDE AND RIFFLE / RUN QUALITY**

MAXIMUM DEPTH	CHANNEL WIDTH	CURRENT VELOCITY	
Check ONE (ONLY)	Check ONE (Or 2 & average)	Check ALL that apply	
<input type="checkbox"/> > 1m [6]	<input checked="" type="checkbox"/> POOL WIDTH > RIFFLE WIDTH [2]	<input type="checkbox"/> TORRENTIAL [-1]	<input type="checkbox"/> SLOW [1]
<input checked="" type="checkbox"/> 0.7-1m [4]	<input type="checkbox"/> POOL WIDTH = RIFFLE WIDTH [1]	<input type="checkbox"/> VERY FAST [1]	<input type="checkbox"/> INTERSTITIAL [-1]
<input type="checkbox"/> 0.4-0.7m [2]	<input type="checkbox"/> POOL WIDTH > RIFFLE WIDTH [0]	<input checked="" type="checkbox"/> FAST [1]	<input type="checkbox"/> INTERMITTENT [-2]
<input type="checkbox"/> 0.2-0.4m [1]		<input type="checkbox"/> MODERATE [1]	<input type="checkbox"/> EDDIES [1]
<input type="checkbox"/> < 0.2m [0]			

Recreation Potential Primary Contact Secondary Contact (circle one and comment on back)

Pool / Current Maximum 12 7

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species:

Check ONE (Or 2 & average).

NO RIFFLE [metric=0]

RIFFLE DEPTH	RUN DEPTH	RIFFLE / RUN SUBSTRATE	RIFFLE / RUN EMBEDDEDNESS
<input checked="" type="checkbox"/> BEST AREAS > 10cm [2]	<input type="checkbox"/> MAXIMUM > 50cm [2]	<input checked="" type="checkbox"/> STABLE (e.g., Cobble, Boulder) [2]	<input type="checkbox"/> NONE [2]
<input type="checkbox"/> BEST AREAS 5-10cm [1]	<input checked="" type="checkbox"/> MAXIMUM < 50cm [1]	<input type="checkbox"/> MOD. STABLE (e.g., Large Gravel) [1]	<input checked="" type="checkbox"/> LOW [1]
<input type="checkbox"/> BEST AREAS < 5cm [metric=0]		<input type="checkbox"/> UNSTABLE (e.g., Fine Gravel, Sand) [0]	<input type="checkbox"/> MODERATE [0]
			<input type="checkbox"/> EXTENSIVE [-1]

Riffle / Run Maximum 8 6

6] **GRADIENT** (ft/mi)  VERY LOW - LOW [2-4]  MODERATE [6-10]  HIGH - VERY HIGH [10-8]

**DRAINAGE AREA** (mi<sup>2</sup>)

%POOL: 20 %GLIDE: 0

%RUN: 60 %RIFFLE: 20

Gradient Maximum 10 0

**A) SAMPLED REACH**

Check ALL that apply

- METHOD**
- BOAT
  - WADE
  - L. LINE
  - OTHER
- DISTANCE**
- 0.5 Km
  - 0.2 Km
  - 0.15 Km
  - 0.12 Km
  - OTHER

- STAGE**
- 1st -sample pass- 2nd
- HIGH
  - UP
  - NORMAL
  - LOW
  - DRY

- CLARITY**
- 1st -sample pass- 2nd
- < 20 cm
  - 20-<40 cm
  - 40-70 cm
  - > 70 cm/ CTB
  - SECCHI DEPTH

- CANOPY**
- 1st pass \_\_\_\_\_ cm
- 2nd pass \_\_\_\_\_ cm
- > 85% - OPEN
  - 55% -<85%
  - 30% -<55%
  - 10% -<30%
  - <10% - CLOSED

- C) RECREATION** AREA DEPTH
- POOL:  >100ft<sup>2</sup>  >3ft

Comment RE: Reach consistency/ Is reach typical of stream?, Recreation/ Observed - Inferred, Other/ Sampling observations, Concerns, Access directions, etc.

5-H54

BOULDER / R/R STEP POOL. ~~COBBLE~~ BOULDER BARS. CRUSHED DIORITE?

SIMP-POOL VARY CLEAR STEP-POOL

**B) AESTHETICS**

- NUISANCE ALGAE
- INVASIVE MACROPHYTES
- EXCESS TURBIDITY
- DISCOLORATION
- FOAM / SCUM
- OIL SHEEN
- TRASH / LITTER
- NUISANCE ODOR
- SLUDGE DEPOSITS
- CSOs/SSOs/OUTFALLS

**D) MAINTENANCE**

- PUBLIC / PRIVATE / BOTH / NA
- ACTIVE / HISTORIC / BOTH / NA
- YOUNG-SUCCESSION-OLD
- SPRAY / SNAG / REMOVED
- MODIFIED / DIPPED OUT / NA
- LEVEED / ONE SIDED
- RELOCATED / CUTOFFS
- MOVING-BEDLOAD-STABLE
- ARMORED / SLUMPS
- ISLANDS / SCOURED
- IMPOUNDED / DESICCATED
- FLOOD CONTROL / DRAINAGE

Circle some & COMMENT

**E) ISSUES**

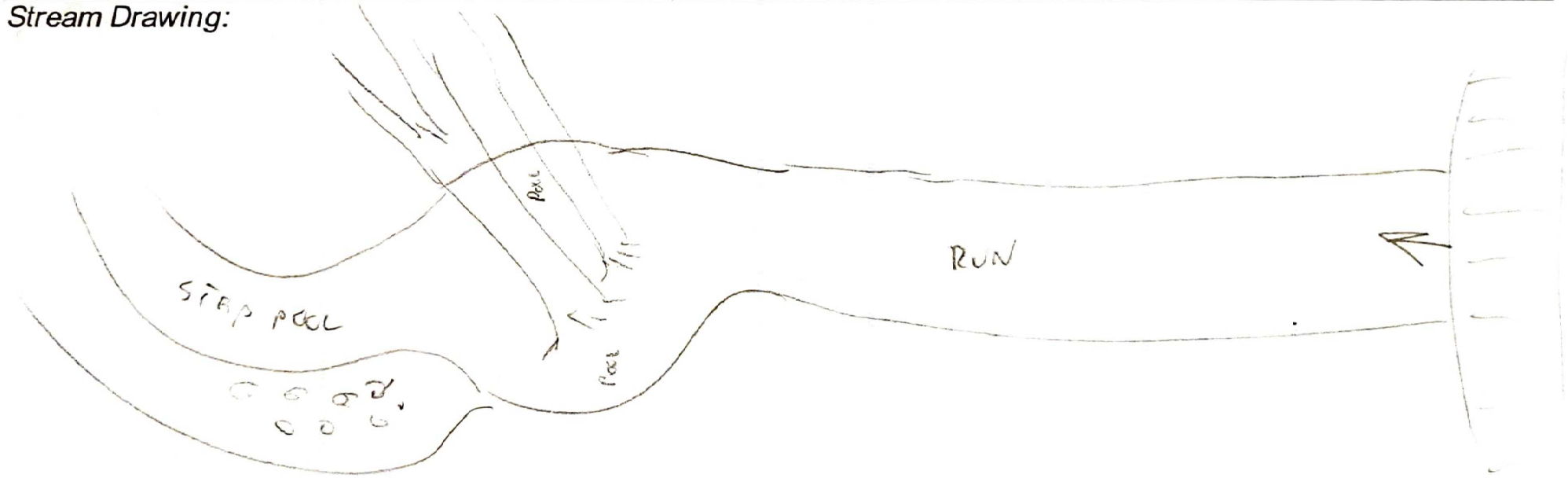
- WWTP / CSO / NPDES / INDUSTRY
- HARDENED / URBAN / DIRT&GRIME
- CONTAMINATED / LANDFILL
- BMPs-CONSTRUCTION-SEDIMENT
- LOGGING / IRRIGATION / COOLING
- BANK / EROSION / SURFACE
- FALSE BANK / MANURE / LAGOON
- WASH H<sub>2</sub>O / TILE / H<sub>2</sub>O TABLE
- ACID / MINE / QUARRY / FLOW
- NATURAL / WETLAND / STAGNANT
- PARK / GOLF / LAWN / HOME
- ATMOSPHERE / DATA PAUCITY

**F) MEASUREMENTS**

- $\bar{x}$  width
- $\bar{x}$  depth
- max. depth
- $\bar{x}$  bankfull width
- bankfull  $\bar{x}$  depth
- W/D ratio
- bankfull max. depth
- floodprone  $x^2$  width
- entrench. ratio

Legacy Tree:

**Stream Drawing:**



Stream & Location: S-64 11:55 RM:    Date: 1/1/21

Scorers Full Name & Affiliation: LK

River Code:    STORET #:    (NAD 83 - decimal) Lat./Long.: 36.916463, -79.492669 Office verified location

1) SUBSTRATE Check ONLY Two substrate TYPE BOXES, estimate % or note every type present

Check ONE (Or 2 & average)

<b>BEST TYPES</b>		<b>POOL RIFFLE</b>	<b>OTHER TYPES</b>		<b>POOL RIFFLE</b>	<b>ORIGIN</b>	<b>QUALITY</b>	15
<input type="checkbox"/> BLDR/SLABS [10]	<input type="checkbox"/> BOULDER [9]	<input type="checkbox"/> COBBLE [8]	<input checked="" type="checkbox"/> GRAVEL [7]	<input type="checkbox"/> SAND [6]	<input type="checkbox"/> BEDROCK [5]	<input type="checkbox"/> LIMESTONE [1]	<input type="checkbox"/> SILT	
<input type="checkbox"/> HARDPAN [4]	<input type="checkbox"/> DETRITUS [3]	<input type="checkbox"/> MUCK [2]	<input type="checkbox"/> SILT [2]	<input type="checkbox"/> ARTIFICIAL [0]	<input type="checkbox"/> LACUSTURINE [0]	<input type="checkbox"/> TILLS [1]	<input type="checkbox"/> WETLANDS [0]	<input type="checkbox"/> MODERATE [-1]
(Score natural substrates; ignore sludge from point-sources)					<input type="checkbox"/> SHALE [-1]	<input type="checkbox"/> COAL FINES [-2]	<input type="checkbox"/> NORMAL [0]	<input type="checkbox"/> FREE [1]
					<input type="checkbox"/> EXTENSIVE [-2]	<input type="checkbox"/> MODERATE [-1]	<input type="checkbox"/> NORMAL [0]	<input type="checkbox"/> NONE [1]

NUMBER OF BEST TYPES:  4 or more [2]  3 or less [0]

2) INSTREAM COVER Indicate presence 0 to 3: 0-Absent; 1-Very small amounts or if more common of marginal quality; 2-Moderate amounts, but not of highest quality or in small amounts of highest quality; 3-Highest quality in moderate or greater amounts (e.g., very large boulders in deep or fast water, large diameter log that is stable, well developed rootwad in deep / fast water, or deep, well-defined, functional pools.)

<input type="checkbox"/> UNDERCUT BANKS [1]	<input type="checkbox"/> POOLS > 70cm [2]	<input type="checkbox"/> OXBOWS, BACKWATERS [1]	
<input type="checkbox"/> OVERHANGING VEGETATION [1]	<input type="checkbox"/> ROOTWADS [1]	<input type="checkbox"/> AQUATIC MACROPHYTES [1]	
<input type="checkbox"/> SHALLOWS (IN SLOW WATER) [1]	<input type="checkbox"/> BOULDERS [1]	<input type="checkbox"/> LOGS OR WOODY DEBRIS [1]	
<input type="checkbox"/> ROOTMATS [1]			

AMOUNT Check ONE (Or 2 & average)

EXTENSIVE >75% [11]

MODERATE 25-75% [7]

SPARSE 5-<25% [3]

NEARLY ABSENT <5% [1]

Cover Maximum 20

3) CHANNEL MORPHOLOGY Check ONE in each category (Or 2 & average)

<input checked="" type="checkbox"/> HIGH [4]	<input checked="" type="checkbox"/> EXCELLENT [7]	<input checked="" type="checkbox"/> NONE [6]	<input type="checkbox"/> HIGH [3]	19
<input type="checkbox"/> MODERATE [3]	<input type="checkbox"/> GOOD [5]	<input type="checkbox"/> RECOVERED [4]	<input checked="" type="checkbox"/> MODERATE [2]	
<input type="checkbox"/> LOW [2]	<input type="checkbox"/> FAIR [3]	<input type="checkbox"/> RECOVERING [3]	<input type="checkbox"/> LOW [1]	
<input type="checkbox"/> NONE [1]	<input type="checkbox"/> POOR [1]	<input type="checkbox"/> RECENT OR NO RECOVERY [1]		

Channel Maximum 20

4) BANK EROSION AND RIPARIAN ZONE Check ONE in each category for EACH BANK (Or 2 per bank & average)

<b>EROSION</b>		<b>RIPARIAN WIDTH</b>		<b>FLOOD PLAIN QUALITY</b>			
<input type="checkbox"/> NONE / LITTLE [3]	<input type="checkbox"/> MODERATE [2]	<input type="checkbox"/> HEAVY / SEVERE [1]	<input type="checkbox"/> WIDE > 50m [4]	<input type="checkbox"/> MODERATE 10-50m [3]	<input type="checkbox"/> NARROW 5-10m [2]		<input type="checkbox"/> VERY NARROW < 5m [1]
<input type="checkbox"/> NONE [0]	<input type="checkbox"/> NONE [0]	<input type="checkbox"/> FOREST, SWAMP [3]	<input type="checkbox"/> SHRUB OR OLD FIELD [2]	<input type="checkbox"/> RESIDENTIAL, PARK, NEW FIELD [1]	<input type="checkbox"/> FENCED PASTURE [1]		<input type="checkbox"/> OPEN PASTURE, ROWCROP [0]
<input type="checkbox"/> CONSERVATION TILLAGE [1]	<input type="checkbox"/> URBAN OR INDUSTRIAL [0]	<input type="checkbox"/> MINING / CONSTRUCTION [0]	Indicate predominant land use(s) past 100m riparian.				

Comments

Riparian Maximum 10

5) POOL / GLIDE AND RIFFLE / RUN QUALITY

<b>MAXIMUM DEPTH</b>	<b>CHANNEL WIDTH</b>	<b>CURRENT VELOCITY</b>	7
Check ONE (ONLY!)	Check ONE (Or 2 & average)	Check ALL that apply	
<input type="checkbox"/> > 1m [6]	<input checked="" type="checkbox"/> POOL WIDTH > RIFFLE WIDTH [2]	<input type="checkbox"/> TORRENTIAL [-1]	
<input checked="" type="checkbox"/> 0.7-<1m [4]	<input type="checkbox"/> POOL WIDTH = RIFFLE WIDTH [1]	<input type="checkbox"/> SLOW [1]	

Comments

Indicate for reach - pools and riffles.

Recreation Potential  
Primary Contact  
Secondary Contact  
(circle one and comment on back)

Pool / Current Maximum 12

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species:

<b>RIFFLE DEPTH</b>	<b>RUN DEPTH</b>	<b>RIFFLE / RUN SUBSTRATE</b>	<b>RIFFLE / RUN EMBEDDEDNESS</b>	4
<input type="checkbox"/> BEST AREAS > 10cm [2]	<input type="checkbox"/> MAXIMUM > 50cm [2]	<input type="checkbox"/> STABLE (e.g., Cobble, Boulder) [2]	<input type="checkbox"/> NONE [2]	
<input checked="" type="checkbox"/> BEST AREAS 5-10cm [1]	<input checked="" type="checkbox"/> MAXIMUM < 50cm [1]	<input checked="" type="checkbox"/> MOD. STABLE (e.g., Large Gravel) [1]	<input checked="" type="checkbox"/> LOW [1]	
<input type="checkbox"/> BEST AREAS < 5cm [metric=0]		<input type="checkbox"/> UNSTABLE (e.g., Fine Gravel, Sand) [0]	<input type="checkbox"/> MODERATE [0]	

Comments

Riffle / Run Maximum 8

6) GRADIENT (ft/ml)	<input type="checkbox"/> VERY LOW - LOW [2-4]	%POOL: <span style="border: 1px solid black; border-radius: 15px; padding: 2px 10px;">30</span>	%GLIDE: <span style="border: 1px solid black; border-radius: 15px; padding: 2px 10px;">  </span>	
DRAINAGE AREA (ml <sup>2</sup> )	<input type="checkbox"/> MODERATE [6-10]	%RUN: <span style="border: 1px solid black; border-radius: 15px; padding: 2px 10px;">60</span>	%RIFFLE: <span style="border: 1px solid black; border-radius: 15px; padding: 2px 10px;">20</span>	

Gradient Maximum 10

**A] SAMPLED REACH**  
Check ALL that apply

Comment RE: Reach consistency/ Is reach typical of stream?, Recreation/ Observed - Inferred, Other/ Sampling observations, Concerns, Access directions, etc.

S-64

- METHOD**
- BOAT
  - WADE
  - L. LINE
  - OTHER
- DISTANCE**
- 0.5 Km
  - 0.2 Km
  - 0.15 Km
  - 0.12 Km
  - OTHER
- STAGE**
- HIGH
  - UP
  - NORMAL
  - LOW
  - DRY

WELL FORMED RIPPLES, DEEP POOLS, FREQUENT RIPPLING

RIPPLE-POOL COMPLEX

- CLARITY**
- 1st --sample pass-- 2nd
- < 20 cm
  - 20-<40 cm
  - 40-70 cm
  - > 70 cm/ CTB
  - SECCHI DEPTH

**B] AESTHETICS**

- NUISANCE ALGAE
- INVASIVE MACROPHYTES
- EXCESS TURBIDITY
- DISCOLORATION
- FOAM / SCUM
- OIL SHEEN
- TRASH / LITTER
- NUISANCE ODOR
- SLUDGE DEPOSITS
- CSOs/SSOs/OUTFALLS

**D] MAINTENANCE**

- PUBLIC / PRIVATE / BOTH / NA
- ACTIVE / HISTORIC / BOTH / NA
- YOUNG-SUCCESSION-OLD
- SPRAY / SNAG / REMOVED
- MODIFIED / DIPPED OUT / NA
- LEVEED / ONE SIDED
- RELOCATED / CUTOFFS
- MOVING-BEDLOAD-STABLE
- ARMoured / SLUMPS
- ISLANDS / SCOURED
- IMPOUNDED / DESICCATED
- FLOOD CONTROL / DRAINAGE

Circle some & COMMENT

**E] ISSUES**

- WWTP / CSO / NPDES / INDUSTRY
- HARDENED / URBAN / DIRT&GRIME
- CONTAMINATED / LANDFILL
- BMPs-CONSTRUCTION-SEDIMENT
- LOGGING / IRRIGATION / COOLING
- BANK / EROSION / SURFACE
- FALSE BANK / MANURE / LAGOON
- WASH H<sub>2</sub>O / TILE / H<sub>2</sub>O TABLE
- ACID / MINE / QUARRY / FLOW
- NATURAL / WETLAND / STAGNANT
- PARK / GOLF / LAWN / HOME
- ATMOSPHERE / DATA PAUCITY

**F] MEASUREMENTS**

- $\bar{x}$  width
- $\bar{x}$  depth
- max. depth
- $\bar{x}$  bankfull width
- bankfull  $\bar{x}$  depth
- W/D ratio
- bankfull max. depth
- floodprone  $x^2$  width
- entrench. ratio

**C] RECREATION** AREA DEPTH  
POOL:  >100ft<sup>2</sup>  >3ft

- CANOPY**
- 1st \_\_\_\_\_ cm
- 2nd \_\_\_\_\_ cm
- > 85%- OPEN
  - 55%-<85%
  - 30%-<55%
  - 10%-<30%
  - <10%- CLOSED

**Stream Drawing:**





Stream & Location: S-413 12:55 PM RM:    Date: 11/15/21

Scorers Full Name & Affiliation: LK  
River Code:    STORET #:    Lat./Long.: 36.925105, -79.51735 Office verified location

**1) SUBSTRATE** Check ONLY Two substrate TYPE BOXES; estimate % or note every type present

<b>BEST TYPES</b>	<b>POOL RIFFLE</b>	<b>OTHER TYPES</b>	<b>POOL RIFFLE</b>	<b>ORIGIN</b>	<b>QUALITY</b>
<input type="checkbox"/> BLDR /SLABS [10]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> HARDPAN [4]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> LIMESTONE [1]	<input type="checkbox"/> HEAVY [-2]
<input type="checkbox"/> BOULDER [9]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> DETRITUS [3]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> TILLS [1]	<input type="checkbox"/> MODERATE [-1]
<input type="checkbox"/> COBBLE [8]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> MUCK [2]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> WETLANDS [0]	<input type="checkbox"/> NORMAL [0]
<input checked="" type="checkbox"/> GRAVEL [7]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> SILT [2]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> HARDPAN [0]	<input type="checkbox"/> FREE [1]
<input type="checkbox"/> SAND [6]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> ARTIFICIAL [0]	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> SANDSTONE [0]	<input type="checkbox"/> EXTENSIVE [-2]
<input type="checkbox"/> BEDROCK [5]	<input type="checkbox"/> <input type="checkbox"/>			<input type="checkbox"/> RIP/RAP [0]	<input type="checkbox"/> MODERATE [-1]

NUMBER OF BEST TYPES:  4 or more [2]  3 or less [0]

Comments:   

**2) INSTREAM COVER** Indicate presence 0 to 3: 0-Absent; 1-Very small amounts or if more common of marginal quality; 2-Moderate amounts, but not of highest quality or in small amounts of highest quality; 3-Highest quality in moderate or greater amounts (e.g., very large boulders in deep or fast water, large diameter log that is stable, well developed rootwad in deep / fast water, or deep, well-defined, functional pools.

<input type="checkbox"/> UNDERCUT BANKS [1]	<input type="checkbox"/> POOLS > 70cm [2]	<input type="checkbox"/> OXBOWS, BACKWATERS [1]	<b>AMOUNT</b>
<input type="checkbox"/> OVERHANGING VEGETATION [1]	<input type="checkbox"/> ROOTWADS [1]	<input type="checkbox"/> AQUATIC MACROPHYTES [1]	Check ONE (Or 2 & average)
<input type="checkbox"/> SHALLOWS (IN SLOW WATER) [1]	<input type="checkbox"/> BOULDERS [1]	<input type="checkbox"/> LOGS OR WOODY DEBRIS [1]	<input type="checkbox"/> EXTENSIVE >75% [11]
<input type="checkbox"/> ROOTMATS [1]			<input type="checkbox"/> MODERATE 25-75% [7]
			<input type="checkbox"/> SPARSE 5-<25% [3]
			<input type="checkbox"/> NEARLY ABSENT <5% [1]

Comments:   

**3) CHANNEL MORPHOLOGY** Check ONE in each category (Or 2 & average)

<b>SINUOSITY</b>	<b>DEVELOPMENT</b>	<b>CHANNELIZATION</b>	<b>STABILITY</b>
<input type="checkbox"/> HIGH [4]	<input checked="" type="checkbox"/> EXCELLENT [7]	<input checked="" type="checkbox"/> NONE [6]	<input type="checkbox"/> HIGH [3]
<input checked="" type="checkbox"/> MODERATE [3]	<input type="checkbox"/> GOOD [5]	<input type="checkbox"/> RECOVERED [4]	<input checked="" type="checkbox"/> MODERATE [2]
<input type="checkbox"/> LOW [2]	<input type="checkbox"/> FAIR [3]	<input type="checkbox"/> RECOVERING [3]	<input type="checkbox"/> LOW [1]
<input type="checkbox"/> NONE [1]	<input type="checkbox"/> POOR [1]	<input type="checkbox"/> RECENT OR NO RECOVERY [1]	

Comments:   

**4) BANK EROSION AND RIPARIAN ZONE** Check ONE in each category for EACH BANK (Or 2 per bank & average)

<b>EROSION</b>	<b>RIPARIAN WIDTH</b>	<b>FLOOD PLAIN QUALITY</b>
<input type="checkbox"/> NONE / LITTLE [3]	<input type="checkbox"/> WIDE > 50m [4]	<input type="checkbox"/> FOREST, SWAMP [3]
<input type="checkbox"/> MODERATE [2]	<input type="checkbox"/> MODERATE 10-50m [3]	<input type="checkbox"/> SHRUB OR OLD FIELD [2]
<input type="checkbox"/> HEAVY / SEVERE [1]	<input type="checkbox"/> NARROW 5-10m [2]	<input type="checkbox"/> RESIDENTIAL, PARK, NEW FIELD [1]
	<input type="checkbox"/> VERY NARROW < 5m [1]	<input type="checkbox"/> FENCED PASTURE [1]
	<input type="checkbox"/> NONE [0]	<input type="checkbox"/> OPEN PASTURE, ROWCROP [0]

Comments:   

**5) POOL / GLIDE AND RIFFLE / RUN QUALITY**

<b>MAXIMUM DEPTH</b>	<b>CHANNEL WIDTH</b>	<b>CURRENT VELOCITY</b>	<b>Recreation Potential</b>
Check ONE (ONLY)	Check ONE (Or 2 & average)	Check ALL that apply	Primary Contact
<input type="checkbox"/> > 1m [6]	<input type="checkbox"/> POOL WIDTH > RIFFLE WIDTH [2]	<input type="checkbox"/> TORRENTIAL [-1]	Secondary Contact
<input type="checkbox"/> 0.7-1m [4]	<input checked="" type="checkbox"/> POOL WIDTH = RIFFLE WIDTH [1]	<input type="checkbox"/> SLOW [1]	(circle one and comment on back)
<input checked="" type="checkbox"/> 0.4-0.7m [2]	<input type="checkbox"/> POOL WIDTH > RIFFLE WIDTH [0]	<input type="checkbox"/> VERY FAST [1]	
<input type="checkbox"/> 0.2-0.4m [1]		<input checked="" type="checkbox"/> FAST [1]	
<input type="checkbox"/> < 0.2m [0]		<input type="checkbox"/> MODERATE [1]	

Comments:   

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species:

<b>RIFFLE DEPTH</b>	<b>RUN DEPTH</b>	<b>RIFFLE / RUN SUBSTRATE</b>	<b>RIFFLE / RUN EMBEDDEDNESS</b>
<input checked="" type="checkbox"/> BEST AREAS > 10cm [2]	<input type="checkbox"/> MAXIMUM > 50cm [2]	<input checked="" type="checkbox"/> STABLE (e.g., Cobble, Boulder) [2]	<input type="checkbox"/> NONE [2]
<input type="checkbox"/> BEST AREAS 5-10cm [1]	<input checked="" type="checkbox"/> MAXIMUM < 50cm [1]	<input type="checkbox"/> MOD. STABLE (e.g., Large Gravel) [1]	<input checked="" type="checkbox"/> LOW [1]
<input type="checkbox"/> BEST AREAS < 5cm [metric=0]		<input type="checkbox"/> UNSTABLE (e.g., Fine Gravel, Sand) [0]	<input type="checkbox"/> MODERATE [0]

Comments:   

**6) GRADIENT (** ft/ml)  VERY LOW - LOW [2-4] **%POOL:** 10 **%GLIDE:**   **Gradient**

**DRAINAGE AREA** ( m<sup>2</sup>)  MODERATE [6-10] **%RUN:** 75 **%RIFFLE:** 15 **Maximum**

HIGH - VERY HIGH [10-6]

**A) SAMPLED REACH**

Check ALL that apply

- METHOD**
- BOAT
  - WADE
  - L. LINE
  - OTHER
- DISTANCE**
- 0.5 Km
  - 0.2 Km
  - 0.15 Km
  - 0.12 Km
  - OTHER
- meters \_\_\_\_\_
- CLARITY**
- 1st --sample pass-- 2nd
- < 20 cm
  - 20-40 cm
  - 40-70 cm
  - > 70 cm/ CTB
  - SECCHI DEPTH
- CANOPY**
- 1st pass \_\_\_\_\_ cm
- 2nd pass \_\_\_\_\_ cm
- > 85% - OPEN
  - 55% - 85%
  - 30% - 55%
  - 10% - 30%
  - < 10% - CLOSED

- STAGE**
- HIGH
  - UP
  - NORMAL
  - LOW
  - DRY

Comment RE: Reach consistency/ Is reach typical of stream?, Recreation/ Observed - Inferred, Other/ Sampling observations, Concerns, Access directions, etc.

S-1713

Pool-Riffle 4-Riffles / 100 m. Good riparian plants, classic form for pool-riffle

Pool-Riffle - Pool

**C) RECREATION** AREA DEPTH  
 POOL:  >100ft<sup>2</sup>  >3ft

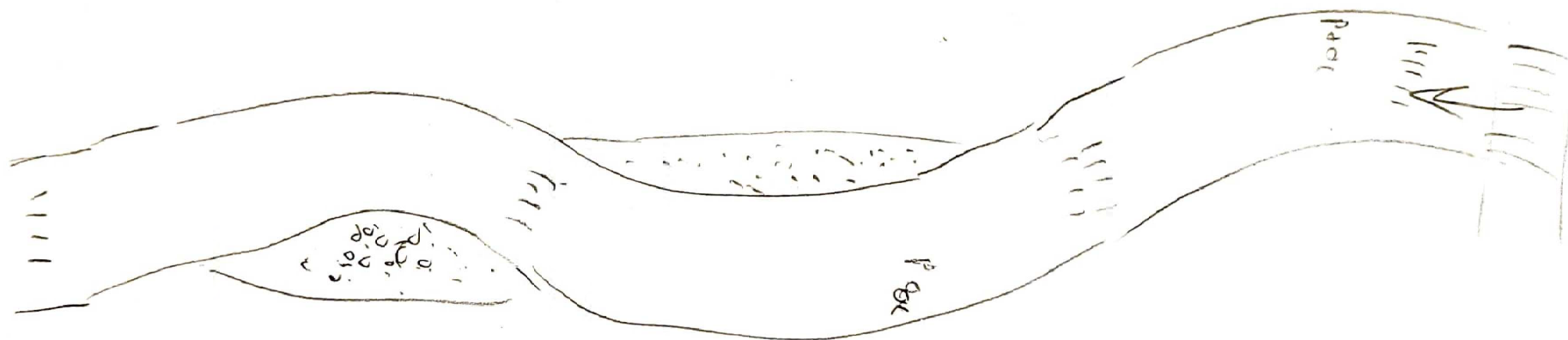
- B) AESTHETICS**
- NUISANCE ALGAE
  - INVASIVE MACROPHYTES
  - EXCESS TURBIDITY
  - DISCOLORATION
  - FOAM / SCUM
  - OIL SHEEN
  - TRASH / LITTER
  - NUISANCE ODOR
  - SLUDGE DEPOSITS
  - CSOs/SSOs/OUTFALLS

- D) MAINTENANCE** Circle some & COMMENT
- PUBLIC / PRIVATE / BOTH / NA
  - ACTIVE / HISTORIC / BOTH / NA
  - YOUNG-SUCCESSION-OLD
  - SPRAY / SNAG / REMOVED
  - MODIFIED / DIPPED OUT / NA
  - LEVEED / ONE SIDED
  - RELOCATED / CUTOFFS
  - MOVING-BEDLOAD-STABLE
  - ARMOURED / SLUMPS
  - ISLANDS / SCOURED
  - IMPOUNDED / DESICCATED
  - FLOOD CONTROL / DRAINAGE

- E) ISSUES**
- WWTP / CSO / NPDES / INDUSTRY
  - HARDENED / URBAN / DIRT&GRIME
  - CONTAMINATED / LANDFILL
  - BMPs-CONSTRUCTION-SEDIMENT
  - LOGGING / IRRIGATION / COOLING
  - BANK / EROSION / SURFACE
  - FALSE BANK / MANURE / LAGOON
  - WASH H<sub>2</sub>O / TILE / H<sub>2</sub>O TABLE
  - ACID / MINE / QUARRY / FLOW
  - NATURAL / WETLAND / STAGNANT
  - PARK / GOLF / LAWN / HOME
  - ATMOSPHERE / DATA PAUCITY

- F) MEASUREMENTS**
- $\bar{x}$  width
  - $\bar{x}$  depth
  - max. depth
  - $\bar{x}$  bankfull width
  - bankfull  $\bar{x}$  depth
  - W/D ratio
  - bankfull max. depth
  - floodprone  $x^2$  width
  - entrench. ratio
- Legacy Tree:

Stream Drawing:



Stream & Location: S-C3 13:25 RM: --- Date: 11/15/21

Scorers Full Name & Affiliation: LK  
River Code: - - STORET #: --- Lat./ Long.: 36.929762, -79.526109 Office verified location

1) **SUBSTRATE** Check ONLY Two substrate TYPE BOXES, estimate % or note every type present

<b>BEST TYPES</b>	<b>POOL RIFFLE</b>	<b>OTHER TYPES</b>	<b>POOL RIFFLE</b>	<b>ORIGIN</b>	<b>QUALITY</b>
<input type="checkbox"/> BLDR/SLABS [10]	<input type="checkbox"/>	<input type="checkbox"/> HARDPAN [4]	<input type="checkbox"/>	<input type="checkbox"/> LIMESTONE [1]	<input type="checkbox"/> HEAVY [-2]
<input type="checkbox"/> BOULDER [9]	<input type="checkbox"/>	<input type="checkbox"/> DETRITUS [3]	<input type="checkbox"/>	<input type="checkbox"/> TILLS [1]	<input type="checkbox"/> MODERATE [-1]
<input type="checkbox"/> COBBLE [8]	<input type="checkbox"/>	<input type="checkbox"/> MUCK [2]	<input type="checkbox"/>	<input type="checkbox"/> WETLANDS [0]	<input type="checkbox"/> NORMAL [0]
<input checked="" type="checkbox"/> GRAVEL [7]	<input type="checkbox"/>	<input type="checkbox"/> SILT [2]	<input type="checkbox"/>	<input type="checkbox"/> HARDPAN [0]	<input type="checkbox"/> FREE [1]
<input type="checkbox"/> SAND [6]	<input type="checkbox"/>	<input type="checkbox"/> ARTIFICIAL [0]	<input type="checkbox"/>	<input type="checkbox"/> SANDSTONE [0]	<input type="checkbox"/> EXTENSIVE [-2]
<input type="checkbox"/> BEDROCK [5]	<input type="checkbox"/>			<input type="checkbox"/> RIP/RAP [0]	<input type="checkbox"/> MODERATE [-1]
				<input type="checkbox"/> LACUSTURINE [0]	<input type="checkbox"/> NORMAL [0]
				<input type="checkbox"/> SHALE [-1]	<input type="checkbox"/> NONE [1]
				<input type="checkbox"/> COAL FINES [-2]	

Check ONE (Or 2 & average)

NUMBER OF BEST TYPES:  4 or more [2]  3 or less [0]

Comments: ---

Substrate 13 Maximum 20

2) **INSTREAM COVER** Indicate presence 0 to 3: 0-Absent; 1-Very small amounts or if more common of marginal quality; 2-Moderate amounts, but not of highest quality or in small amounts of highest quality; 3-Highest quality in moderate or greater amounts (e.g., very large boulders in deep or fast water, large diameter log that is stable, well developed rootwad in deep / fast water, or deep, well-defined, functional pools.

<input type="checkbox"/> UNDERCUT BANKS [1]	<input type="checkbox"/> POOLS > 70cm [2]	<input type="checkbox"/> OXBOWS, BACKWATERS [1]	<b>AMOUNT</b>
<input type="checkbox"/> OVERHANGING VEGETATION [1]	<input type="checkbox"/> ROOTWADS [1]	<input type="checkbox"/> AQUATIC MACROPHYTES [1]	Check ONE (Or 2 & average)
<input type="checkbox"/> SHALLOWS (IN SLOW WATER) [1]	<input type="checkbox"/> BOULDERS [1]	<input type="checkbox"/> LOGS OR WOODY DEBRIS [1]	<input type="checkbox"/> EXTENSIVE >75% [11]
<input type="checkbox"/> ROOTMATS [1]			<input type="checkbox"/> MODERATE 25-75% [7]
			<input type="checkbox"/> SPARSE 5-<25% [3]
			<input type="checkbox"/> NEARLY ABSENT <5% [1]

Comments: ---

Cover 0 Maximum 20

3) **CHANNEL MORPHOLOGY** Check ONE in each category (Or 2 & average)

<b>SINUOSITY</b>	<b>DEVELOPMENT</b>	<b>CHANNELIZATION</b>	<b>STABILITY</b>
<input checked="" type="checkbox"/> HIGH [4]	<input checked="" type="checkbox"/> EXCELLENT [7]	<input checked="" type="checkbox"/> NONE [6]	<input type="checkbox"/> HIGH [3]
<input type="checkbox"/> MODERATE [3]	<input type="checkbox"/> GOOD [5]	<input type="checkbox"/> RECOVERED [4]	<input checked="" type="checkbox"/> MODERATE [2]
<input type="checkbox"/> LOW [2]	<input type="checkbox"/> FAIR [3]	<input type="checkbox"/> RECOVERING [3]	<input type="checkbox"/> LOW [1]
<input type="checkbox"/> NONE [1]	<input type="checkbox"/> POOR [1]	<input type="checkbox"/> RECENT OR NO RECOVERY [1]	

Comments: ---

Channel 19 Maximum 20

4) **BANK EROSION AND RIPARIAN ZONE** Check ONE in each category for EACH BANK (Or 2 per bank & average)

<b>EROSION</b>	<b> RIPARIAN WIDTH</b>	<b> FLOOD PLAIN QUALITY</b>
<input type="checkbox"/> NONE / LITTLE [3]	<input type="checkbox"/> WIDE > 50m [4]	<input type="checkbox"/> FOREST, SWAMP [3]
<input type="checkbox"/> MODERATE [2]	<input type="checkbox"/> MODERATE 10-50m [3]	<input type="checkbox"/> SHRUB OR OLD FIELD [2]
<input type="checkbox"/> HEAVY / SEVERE [1]	<input type="checkbox"/> NARROW 5-10m [2]	<input type="checkbox"/> RESIDENTIAL, PARK, NEW FIELD [1]
	<input type="checkbox"/> VERY NARROW < 5m [1]	<input type="checkbox"/> FENCED PASTURE [1]
	<input type="checkbox"/> NONE [0]	<input type="checkbox"/> OPEN PASTURE, ROWCROP [0]
		<input type="checkbox"/> CONSERVATION TILLAGE [1]
		<input type="checkbox"/> URBAN OR INDUSTRIAL [0]
		<input type="checkbox"/> MINING / CONSTRUCTION [0]

Comments: ---

Riparian 0 Maximum 10

5) **POOL / GLIDE AND RIFFLE / RUN QUALITY**

<b>MAXIMUM DEPTH</b>	<b>CHANNEL WIDTH</b>	<b>CURRENT VELOCITY</b>	<b>Recreation Potential</b>
Check ONE (ONLY!)	Check ONE (Or 2 & average)	Check ALL that apply	Primary Contact
<input type="checkbox"/> > 1m [6]	<input checked="" type="checkbox"/> POOL WIDTH > RIFFLE WIDTH [2]	<input type="checkbox"/> TORRENTIAL [-1]	Secondary Contact
<input type="checkbox"/> 0.7-<1m [4]	<input type="checkbox"/> POOL WIDTH = RIFFLE WIDTH [1]	<input type="checkbox"/> SLOW [1]	(circle one and comment on back)
<input type="checkbox"/> 0.4-<0.7m [2]	<input type="checkbox"/> POOL WIDTH > RIFFLE WIDTH [0]	<input type="checkbox"/> VERY FAST [1]	
<input type="checkbox"/> 0.2-<0.4m [1]		<input checked="" type="checkbox"/> FAST [1]	
<input type="checkbox"/> < 0.2m [0]		<input type="checkbox"/> INTERSTITIAL [-1]	
		<input type="checkbox"/> INTERMITTENT [-2]	
		<input type="checkbox"/> MODERATE [1]	
		<input type="checkbox"/> EDDIES [1]	

Comments: VIEWED FROM BRIDGE

Pool / Current 0 Maximum 12

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species:

<b>RIFFLE DEPTH</b>	<b>RUN DEPTH</b>	<b>RIFFLE / RUN SUBSTRATE</b>	<b>RIFFLE / RUN EMBEDDEDNESS</b>
Check ONE (Or 2 & average)	Check ONE (Or 2 & average)	Check ONE (Or 2 & average)	Check ONE (Or 2 & average)
<input type="checkbox"/> BEST AREAS > 10cm [2]	<input type="checkbox"/> MAXIMUM > 50cm [2]	<input type="checkbox"/> STABLE (e.g., Cobble, Boulder) [2]	<input type="checkbox"/> NONE [2]
<input type="checkbox"/> BEST AREAS 5-10cm [1]	<input type="checkbox"/> MAXIMUM < 50cm [1]	<input type="checkbox"/> MOD. STABLE (e.g., Large Gravel) [1]	<input type="checkbox"/> LOW [1]
<input type="checkbox"/> BEST AREAS < 5cm [metric=0]		<input type="checkbox"/> UNSTABLE (e.g., Fine Gravel, Sand) [0]	<input type="checkbox"/> MODERATE [0]
			<input type="checkbox"/> EXTENSIVE [-1]

Comments: VIEWED FROM BRIDGE

Riffle / Run 0 Maximum 8

6) **GRADIENT** (ft/ml)  VERY LOW - LOW [2-4]  MODERATE [6-10]  HIGH - VERY HIGH [10-6]

**DRAINAGE AREA** (ml<sup>2</sup>)

%POOL: 30 %GLIDE: 0

%RUN: 40 %RIFFLE: 30

Gradient 0 Maximum 10

**A) SAMPLED REACH**

Check ALL that apply

- METHOD**
- BOAT  STAGE
- WADE  HIGH
- L. LINE  UP
- OTHER  NORMAL
- LOW
- DRY

**DISTANCE**

- 0.5 Km
- 0.2 Km
- 0.15 Km
- 0.12 Km
- OTHER

**CLARITY**

- 1st --sample pass-- 2nd
- < 20 cm
- 20-40 cm
- 40-70 cm
- > 70 cm/ CTB
- SECCHI DEPTH

**CANOPY**

- 1st \_\_\_\_\_ cm
- 2nd \_\_\_\_\_ cm
- > 85%- OPEN
- 55%-<85%
- 30%-<55%
- 10%-<30%
- <10%-CLOSED

**C) RECREATION** AREA DEPTH

POOL:  >100ft<sup>2</sup>  >3ft

Comment RE: Reach consistency/ Is reach typical of stream?, Recreation/ Observed - Inferred, Other/ Sampling observations, Concerns, Access directions, etc.

S-C3

3 GOOD RIFPLES VIEWED FROM LOD CROSSING

RIFFLER - POOL COMPLEX

**B) AESTHETICS**

- NUISANCE ALGAE
- INVASIVE MACROPHYTES
- EXCESS TURBIDITY
- DISCOLORATION
- FOAM / SCUM
- OIL SHEEN
- TRASH / LITTER
- NUISANCE ODOR
- SLUDGE DEPOSITS
- CSOs/SSOs/OUTFALLS

**D) MAINTENANCE**

- PUBLIC / PRIVATE / BOTH / NA
- ACTIVE / HISTORIC / BOTH / NA
- YOUNG-SUCCESSION-OLD
- SPRAY / SNAG / REMOVED
- MODIFIED / DIPPED OUT / NA
- LEVEED / ONE SIDED
- RELOCATED / CUTOFFS
- MOVING-BEDLOAD-STABLE
- ARMORED / SLUMPS
- ISLANDS / SCOURED
- IMPOUNDED / DESICCATED
- FLOOD CONTROL / DRAINAGE

Circle some & COMMENT

**E) ISSUES**

- WWTP / CSO / NPDES / INDUSTRY
- HARDENED / URBAN / DIRT&GRIME
- CONTAMINATED / LANDFILL
- BMPs-CONSTRUCTION-SEDIMENT
- LOGGING / IRRIGATION / COOLING
- BANK / EROSION / SURFACE
- FALSE BANK / MANURE / LAGOON
- WASH H<sub>2</sub>O / TILE / H<sub>2</sub>O TABLE
- ACID / MINE / QUARRY / FLOW
- NATURAL / WETLAND / STAGNANT
- PARK / GOLF / LAWN / HOME
- ATMOSPHERE / DATA PAUCITY

**F) MEASUREMENTS**

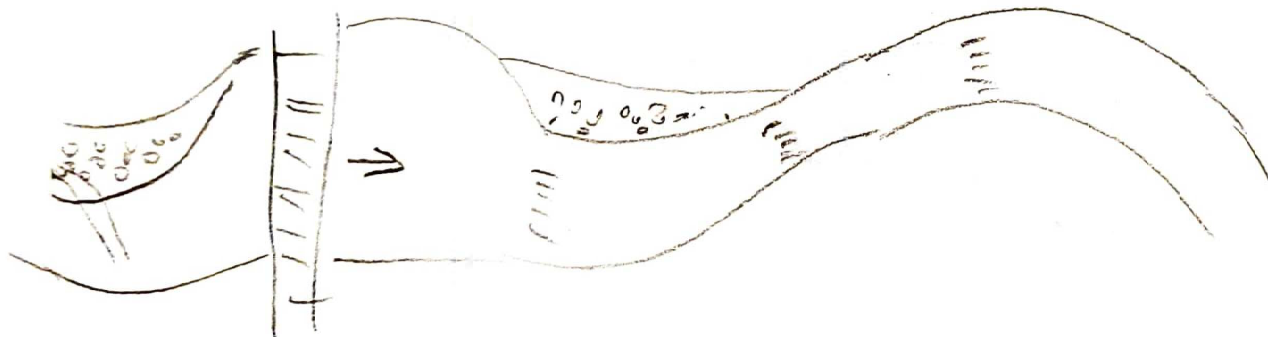
- $\bar{x}$  width
- $\bar{x}$  depth
- max. depth
- $\bar{x}$  bankfull width
- bankfull  $\bar{x}$  depth
- W/D ratio
- bankfull max. depth
- floodprone  $x^2$  width
- entrench. ratio

Legacy Tree:

**Stream Drawing:**

STREAM

VIEWED FROM LOD CROSSING



Stream & Location: S-C7 14:05 RM:    Date: 11/15/21

Scorers Full Name & Affiliation: LK

River Code:    STORET #:    Lat./Long.: 36.944016, -79.571517 Office verified location

1] **SUBSTRATE** Check ONLY Two substrate TYPE BOXES, estimate % or note every type present

BEST TYPES		OTHER TYPES		ORIGIN		QUALITY	
<input type="checkbox"/> BLDR /SLABS [10]	<input type="checkbox"/> POOL RIFFLE	<input type="checkbox"/> HARDPAN [4]	<input type="checkbox"/> POOL RIFFLE	<input type="checkbox"/> LIMESTONE [1]	<input type="checkbox"/> SILT	<input type="checkbox"/> HEAVY [-2]	8
<input type="checkbox"/> BOULDER [9]	<input type="checkbox"/> COBBLE [8]	<input type="checkbox"/> DETRITUS [3]	<input type="checkbox"/> MUCK [2]	<input type="checkbox"/> TILLS [1]	<input type="checkbox"/> WETLANDS [0]	<input type="checkbox"/> MODERATE [-1]	
<input type="checkbox"/> GRAVEL [7]	<input type="checkbox"/> SAND [6]	<input type="checkbox"/> SILT [2]	<input type="checkbox"/> ARTIFICIAL [0]	<input type="checkbox"/> HARDPAN [0]	<input type="checkbox"/> SANDSTONE [0]	<input type="checkbox"/> FREE [1]	
<input type="checkbox"/> BEDROCK [5]	(Score natural substrates; ignore sludge from point-sources)		<input type="checkbox"/> RIP/RAP [0]	<input type="checkbox"/> LACUSTURINE [0]	<input type="checkbox"/> SHALE [-1]	<input type="checkbox"/> EXTENSIVE [-2]	
NUMBER OF BEST TYPES: <input type="checkbox"/> 4 or more [2] <input type="checkbox"/> 3 or less [0]		<input type="checkbox"/> COAL FINES [-2]	<input type="checkbox"/> MODERATE [-1]	<input type="checkbox"/> NORMAL [0]	<input type="checkbox"/> NONE [1]	Substrate	
Comments		EMBEDDEDNESS				Maximum 20	

2] **INSTREAM COVER** Indicate presence 0 to 3: 0-Absent; 1-Very small amounts or if more common of marginal quality; 2-Moderate amounts, but not of highest quality or in small amounts of highest quality; 3-Highest quality in moderate or greater amounts (e.g., very large boulders in deep or fast water, large diameter log that is stable, well developed rootwad in deep / fast water, or deep, well-defined, functional pools.)

<input type="checkbox"/> UNDERCUT BANKS [1]	<input type="checkbox"/> POOLS > 70cm [2]	<input type="checkbox"/> OXBOWS, BACKWATERS [1]	
<input type="checkbox"/> OVERHANGING VEGETATION [1]	<input type="checkbox"/> ROOTWADS [1]	<input type="checkbox"/> AQUATIC MACROPHYTES [1]	
<input type="checkbox"/> SHALLOWS (IN SLOW WATER) [1]	<input type="checkbox"/> BOULDERS [1]	<input type="checkbox"/> LOGS OR WOODY DEBRIS [1]	
<input type="checkbox"/> ROOTMATS [1]			

AMOUNT Check ONE (Or 2 & average)

EXTENSIVE >75% [11]  MODERATE 25-75% [7]  SPARSE 5-<25% [3]  NEARLY ABSENT <5% [1]

Comments Cover Maximum 20

3] **CHANNEL MORPHOLOGY** Check ONE in each category (Or 2 & average)

<input type="checkbox"/> HIGH [4]	<input type="checkbox"/> EXCELLENT [7]	<input checked="" type="checkbox"/> NONE [6]	<input type="checkbox"/> HIGH [3]
<input type="checkbox"/> MODERATE [3]	<input type="checkbox"/> GOOD [5]	<input type="checkbox"/> RECOVERED [4]	<input type="checkbox"/> MODERATE [2]
<input checked="" type="checkbox"/> LOW [2]	<input checked="" type="checkbox"/> FAIR [3]	<input type="checkbox"/> RECOVERING [3]	<input checked="" type="checkbox"/> LOW [1]
<input type="checkbox"/> NONE [1]	<input type="checkbox"/> POOR [1]	<input type="checkbox"/> RECENT OR NO RECOVERY [1]	

Comments Channel Maximum 20

4] **BANK EROSION AND RIPARIAN ZONE** Check ONE in each category for EACH BANK (Or 2 per bank & average)

EROSION		RIPARIAN WIDTH		FLOOD PLAIN QUALITY			
<input type="checkbox"/> NONE / LITTLE [3]	<input type="checkbox"/> MODERATE [2]	<input type="checkbox"/> HEAVY / SEVERE [1]	<input type="checkbox"/> WIDE > 50m [4]	<input type="checkbox"/> MODERATE 10-50m [3]	<input type="checkbox"/> NARROW 5-10m [2]		<input type="checkbox"/> VERY NARROW < 5m [1]
<input type="checkbox"/> NONE [0]	<input type="checkbox"/> FOREST, SWAMP [3]	<input type="checkbox"/> SHRUB OR OLD FIELD [2]	<input type="checkbox"/> RESIDENTIAL, PARK, NEW FIELD [1]	<input type="checkbox"/> FENCED PASTURE [1]	<input type="checkbox"/> OPEN PASTURE, ROWCROP [0]		<input type="checkbox"/> CONSERVATION TILLAGE [1]
<input type="checkbox"/> URBAN OR INDUSTRIAL [0]	<input type="checkbox"/> MINING / CONSTRUCTION [0]	Indicate predominant land use(s) past 100m riparian.					

Comments Riparian Maximum 10

5] **POOL / GLIDE AND RIFFLE / RUN QUALITY**

<input checked="" type="checkbox"/> > 1m [6]	<input type="checkbox"/> POOL WIDTH > RIFFLE WIDTH [2]	<input type="checkbox"/> TORRENTIAL [-1]	<input type="checkbox"/> SLOW [1]	5
<input checked="" type="checkbox"/> 0.7-1m [4]	<input type="checkbox"/> POOL WIDTH = RIFFLE WIDTH [1]	<input type="checkbox"/> VERY FAST [1]	<input type="checkbox"/> INTERSTITIAL [-1]	
<input type="checkbox"/> 0.4-0.7m [2]	<input checked="" type="checkbox"/> POOL WIDTH > RIFFLE WIDTH [0]	<input type="checkbox"/> FAST [1]	<input type="checkbox"/> INTERMITTENT [-2]	
<input type="checkbox"/> 0.2-0.4m [1]		<input checked="" type="checkbox"/> MODERATE [1]	<input type="checkbox"/> EDDIES [1]	
<input type="checkbox"/> < 0.2m [0]		Indicate for reach - pools and riffles.		

Comments Pool / Current Maximum 12

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species: Check ONE (Or 2 & average)

<input type="checkbox"/> BEST AREAS > 10cm [2]	<input type="checkbox"/> MAXIMUM > 50cm [2]	<input checked="" type="checkbox"/> STABLE (e.g., Cobble, Boulder) [2]	<input type="checkbox"/> NONE [2]
<input checked="" type="checkbox"/> BEST AREAS 5-10cm [1]	<input checked="" type="checkbox"/> MAXIMUM < 50cm [1]	<input type="checkbox"/> MOD. STABLE (e.g., Large Gravel) [1]	<input checked="" type="checkbox"/> LOW [1]
<input type="checkbox"/> BEST AREAS < 5cm [metric=0]		<input type="checkbox"/> UNSTABLE (e.g., Fine Gravel, Sand) [0]	<input type="checkbox"/> MODERATE [0]
			<input type="checkbox"/> EXTENSIVE [-1]

Comments Riffle / Run Maximum 8

6] **GRADIENT** (ft/ml)  VERY LOW - LOW [2-4]  MODERATE [6-10]  HIGH - VERY HIGH [10-6]

**DRAINAGE AREA** (mi<sup>2</sup>)

%POOL:    %GLIDE:   

%RUN:    %RIFFLE:   

Comments Gradient Maximum 10

**A] SAMPLED REACH**

Check ALL that apply

- METHOD**
- BOAT
  - WADE
  - L. LINE
  - OTHER
- DISTANCE**
- 0.5 Km
  - 0.2 Km
  - 0.15 Km
  - 0.12 Km
  - OTHER

- STAGE**
- 1st-sample pass-- 2nd
- HIGH
  - UP
  - NORMAL
  - LOW
  - DRY

- CLARITY**
- 1st --sample pass-- 2nd
- < 20 cm
  - 20-<40 cm
  - 40-70 cm
  - > 70 cm/ CTB
  - SECCHI DEPTH

- CANOPY**
- 1st \_\_\_\_\_ cm
- 2nd \_\_\_\_\_ cm
- > 85%- OPEN
  - 55%-<85%
  - 30%-<55%
  - 10%-<30%
  - <10%- CLOSED

**C] RECREATION** AREA DEPTH  
 POOL:  >100ft<sup>2</sup>  >3ft

Comment RE: Reach consistency/ Is reach typical of stream?, Recreation/ Observed - Inferred, Other/ Sampling observations, Concerns, Access directions, etc.

S-C7

CORNER RIFFLES. DEEP POOLS. LONG RUNS.

PLAIN BED

- |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                      |
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| <p><b>B] AESTHETICS</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> NUISANCE ALGAE</li> <li><input type="checkbox"/> INVASIVE MACROPHYTES</li> <li><input type="checkbox"/> EXCESS TURBIDITY</li> <li><input type="checkbox"/> DISCOLORATION</li> <li><input type="checkbox"/> FOAM / SCUM</li> <li><input type="checkbox"/> OIL SHEEN</li> <li><input type="checkbox"/> TRASH / LITTER</li> <li><input type="checkbox"/> NUISANCE ODOR</li> <li><input type="checkbox"/> SLUDGE DEPOSITS</li> <li><input type="checkbox"/> CSOs/SSOs/OUTFALLS</li> </ul> | <p><b>D] MAINTENANCE</b></p> <p>Circle some &amp; COMMENT</p> <ul style="list-style-type: none"> <li>PUBLIC / PRIVATE / BOTH / NA</li> <li>ACTIVE / HISTORIC / BOTH / NA</li> <li>YOUNG-SUCCESSION-OLD</li> <li>SPRAY / SNAG / REMOVED</li> <li>MODIFIED / DIPPED OUT / NA</li> <li>LEVEED / ONE SIDED</li> <li>RELOCATED / CUTOFFS</li> <li>MOVING-BEDLOAD-STABLE</li> <li>ARMOURED / SLUMPS</li> <li>ISLANDS / SCOURED</li> <li>IMPOUNDED / DESICCATED</li> <li>FLOOD CONTROL / DRAINAGE</li> </ul> | <p><b>E] ISSUES</b></p> <ul style="list-style-type: none"> <li>WWTP / CSO / NPDES / INDUSTRY</li> <li>HARDENED / URBAN / DIRT&amp;GRIME</li> <li>CONTAMINATED / LANDFILL</li> <li>BMPs-CONSTRUCTION-SEDIMENT</li> <li>LOGGING / IRRIGATION / COOLING</li> <li>BANK / EROSION / SURFACE</li> <li>FALSE BANK / MANURE / LAGOON</li> <li>WASH H<sub>2</sub>O / TILE / H<sub>2</sub>O TABLE</li> <li>ACID / MINE / QUARRY / FLOW</li> <li>NATURAL / WETLAND / STAGNANT</li> <li>PARK / GOLF / LAWN / HOME</li> <li>ATMOSPHERE / DATA PAUCITY</li> </ul> | <p><b>F] MEASUREMENTS</b></p> <ul style="list-style-type: none"> <li><math>\bar{x}</math> width</li> <li><math>\bar{x}</math> depth</li> <li>max. depth</li> <li><math>\bar{x}</math> bankfull width</li> <li>bankfull <math>\bar{x}</math> depth</li> <li>W/D ratio</li> <li>bankfull max. depth</li> <li>floodprone <math>x^2</math> width</li> <li>entrench. ratio</li> </ul> <p>Legacy Tree:</p> |
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**Stream Drawing:**

