

**Appendix 2: Rapid Stream-Riparian Assessment Score Sheet** revised April 2010

Reach \_\_\_\_\_ Stream \_\_\_\_\_ Watershed \_\_\_\_\_

Survey Date \_\_\_\_\_ Time \_\_\_\_\_ Background information available? (yes/no) \_\_\_\_\_

Observers \_\_\_\_\_ Email \_\_\_\_\_

Contact Info: Address \_\_\_\_\_ Phone \_\_\_\_\_

Reach (UTM) Upstream \_\_\_\_\_ E \_\_\_\_\_ N \_\_\_\_\_ Elevation \_\_\_\_\_

Photo identification \_\_\_\_\_ (Preferred datum - NAD 83)

NAD \_\_\_\_\_ Downstream \_\_\_\_\_ E \_\_\_\_\_ N \_\_\_\_\_ Elevation \_\_\_\_\_

Photo Identification: \_\_\_\_\_

Stream Transect Start \_\_\_\_\_ E \_\_\_\_\_ N Upstream or Down? \_\_\_\_\_

(optional) Stream Transect Photo Id: \_\_\_\_\_ USGS Quad Map Name: \_\_\_\_\_

Scores: WQ \_\_\_\_\_ HG \_\_\_\_\_ F/AH \_\_\_\_\_ RV \_\_\_\_\_ TWH \_\_\_\_\_ Overall Rating \_\_\_\_\_ Condition \_\_\_\_\_

Previous Ratings: DATE \_\_\_\_\_ Overall Rating \_\_\_\_\_ Current Trend \_\_\_\_\_

Individual Previous Scores WQ \_\_\_\_\_ HG \_\_\_\_\_ F/AH \_\_\_\_\_ RV \_\_\_\_\_ TWH \_\_\_\_\_

Score (1-5 or N/A)	Indicator Number	Indicator	Scoring Definitions and Directions Scores of 5 indicate that the indicator is close to the potential of the geologically and biologically similar reference reach, and/or what would be expected to be found in a healthy ecosystem. Scores of 1 indicate riparian or stream components that are not functioning properly. Use N/A if the indicator is not relevant or appropriate for this particular reach.	Notes on measurement methods
<b>WATER QUALITY</b>				
Score:  %=	<b>1</b>	<b>Algal Growth</b>	1 = >50% of stream bottom covered by filamentous algae 2 = 26-50% of bottom covered by filamentous algae 3 = 11-25% of bottom covered by filamentous algae 4 = 1-10% of bottom covered by filamentous algae 5 = no filamentous algae on stream bottom	Walking upstream, use ocular tube to score 1m from bank every 2m in 200m in-stream transect. Do not count single cell algae on the surface of rocks.
Score:  %=	<b>2</b>	<b>Channel Shading, Solar Exposure</b>	1 = stream channel completely unshaded (0%) 2 = slight shading (1-15%) 3 = moderate shading (16-30%) 4 = substantial shading (31-60%) 5 = Channel mostly shaded (>60%)	Look up and down stream in three different representative points in the overall stream reach. Average the three points.
<b>Water quality mean score:</b>		<b>Notes:</b>		

## HYDROGEOMORPHOLOGY (STREAM FORM)

Score:	<b>3</b>	<b>Floodplain Connection and Inundation</b>	1 = >1.7 bankfull / depth ratio average of 3 locations 2 = >1.5 - 1.7 bankfull / depth ratio 3 = >1.4 - 1.5 bankfull / depth ratio 4 = >1.3 - 1.4 bankfull / depth ratio 5 = 1.0 - 1.3 bankfull / depth ratio	Use field worksheet and measure ratios at three representative locations in the overall stream reach. Calculate the average of three ratios and score using Figure 3.
avg=				
	<b>4</b>	<b>Vertical Bank Stability</b>	1 = >90% of channel banks are vertically unstable (use the average of both banks) 2 = 61 - 90% of banks are unstable 3 = 31 - 60% of banks are unstable 4 = 5 - 30% of banks are unstable 5 = <5% of banks are unstable	Estimate along both banks of 200m in-stream transect. Do not include rock or cliff faces in calculating total length of unstable banks (use "N/A").
%=				
	<b>5</b>	<b>Hydraulic Habitat Diversity</b>	1 = no diversity (variability) of stream form features 2 = low diversity, 2 habitat types present, 3 = moderate diversity, 3 types present, 4 = moderately high diversity, 4 types present, 5 = high diversity, 5 or more present.	Check in overall walk through. Examples include runs, pools, cobble or boulder debris fans, running side channels, backwaters, sand-floored runs, etc.
	<b>6</b>	<b>Riparian Area Soil Integrity</b>	1 = >25% of riparian soil surface disturbed 2 = 16 - 25% disturbed 3 = 6 - 15% disturbed 4 = 1 - 5% disturbed 5 = <1% disturbed	Check in overall walk through. Look for unnatural surface disturbances in the riparian zone from such things as vehicles, foot travel, and ungulate activity.
%=				
	<b>7</b>	<b>Beaver Activity</b>	1 = beavers not now present but were historically 2 = no beaver dams, a few signs of activity but none within the last year 3 = activity in past year but no dams 4 = beaver dams on some of the stream 5 = beaver activity and dams control stream	Check in overall walk through. Beaver sign includes tracks, drags, digging marks, cut stems, burrows, dams, and caches active within past season.

<b>Hydrogeomorphology mean score:</b>	<b>Notes:</b>
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## FISH/AQUATIC HABITAT

**Qualifier:** If the stream is no longer perennial, but used to be a fishery, the mean score entered for this section is a "1." (It is no longer functioning as fish/aquatic habitat.)

	<b>8</b>	<b>Riffle-Pool Distribution</b>	1 = no riffle-pool habitat in stream transect 2 = one to several riffle-pool systems 3 = limited to moderate riffle-pool distribution in reach 4 = moderate to abundant riffle-pool distribution 5 = riffle-pools abundant (>50% of transect has pools connected by riffles)	Check along 200m in-stream transect. Look for geomorphic consistency (e.g. high gradient streams will have more pools than low gradient streams).
%=	<b>9</b>	<b>Underbank Cover</b>	1 = no underbank cover in 200m stream transect 2 = <10% transect has underbank cover 3 = 10 - 25% of transect has underbank cover 4 = 26 - 50% of transect has underbank cover 5 = >50% of transect has underbank cover	Check along both banks of 200m in-stream transect. Undercut must be at least 15cm (6 in) into the streambank. Average the measures on both banks to score.
%=	<b>10</b>	<b>Cobble Embeddedness</b>	1 = average of >50% of rock volume is imbedded in fine silt. (avg. of three sites) 2 = 41 - 50% of rock imbedded 3 = 26 - 40% of rock imbedded 4 = 20 - 25% of rock imbedded 5 = <20% of rock imbedded	Determine the percent embeddedness of a random sample of 6 rocks 3-8" in diameter from riffles in each of three different random points along the overall stream reach.
	<b>11</b>	<b>Aquatic Macroinvertebrate Diversity</b>	1 = no aquatic (benthic) macroinvertebrates found 2 = 1 macroinvertebrate order present 3 = 2 macroinvertebrate orders present 4 = 3 macroinvertebrate orders present 5 = 4 or more orders present	Examine 6 rocks 15cm (6") or larger at the same sites used for Indicator 10. Use Appendix 1 or other guide to identify macroinvertebrate orders.
	<b>12</b>	<b>Large Woody Debris</b>	1 = no large woody debris (LWD) in transect 2 = <3 LWD pieces in transect 3 = 3 - 5 LWD pieces in transect 4 = 6 - 10 LWD pieces in transect 5 = >10 LWD pieces in transect	Count woody debris pieces larger than 15cm (6") in diameter and 1m (3 ft) long or longer in the channel in the 200m in-stream transect
%=	<b>13</b>	<b>Overbank Cover and Terrestrial Invertebrate Habitat</b>	1 = no grass, shrubs, or trees overhang water 2 = <10% of banks have grass, shrubs, or trees that overhang the water 3 = 10 - 25% of banks have overhanging veg. 4 = 26 - 50% of banks have overhanging veg. 5 = >50% of banks have overhanging veg.	Check along both banks of 200m in-stream transect. Look for geomorphic consistency. Do not include rocks or cliff faces (use "N/A"). Average both banks when scoring.
<b>Fish/Aquatic Habitat mean score:</b>		<b>Notes:</b>		

## RIPARIAN VEGETATION

G= ____% S= ____% MC= ____% UC= ____%	Score:  avg=    %	<b>14</b>  <b>Riparian Zone Plant Community Structure and Cover</b>	1 = <5% average plant cover in riparian zone 2 = 5 - 25% average plant cover 3 = 26 - 50% average plant cover 4 = 51 - 80% average plant cover 5 = >80% average plant cover	Use the field worksheet and ocular tube to determine the cover for the ground, shrub, midcanopy and upper canopy layers along 200m transect in the riparian zone. Look for geomorphic consistency.
	Score:	<b>15</b>  <b>Shrub Demography and Recruitment</b>	1 = no native shrubs present in study reach 2 = one age class present 3 = two classes present, one class with seedlings or saplings 4 = three age classes present 5 = all age classes present	Determine during the overall walk through the number of age classes (seedlings, saplings, mature, standing dead) for the dominant (most cover) native shrub species.
		<b>16</b>  <b>Tree Demography and Recruitment</b>	1 = no native trees present in study reach 2 = one age class present 3 = two classes present, one class with seedlings or saplings 4 = three age classes present 5 = all age classes present	Determine during the overall walk through the number of age classes (seedlings, saplings, mature, standing dead) for the dominant (most cover) deciduous native tree species.
		<b>17</b>  <b>Non-native Herbaceous Plant Species</b>	1 = >50% of herbaceous plant cover are not native species 2 = 26 - 50% herbaceous not native 3 = 11 - 25% herbaceous not native 4 = 5 - 10% herbaceous not native 5 = <5% of herbaceous cover not native	Estimate on the overall walk through.
		<b>18</b>  <b>Non-native Woody Plant Species</b>	1 = >50% of woody plant cover are not native species 2 = 26 - 50% of woody cover not native 3 = 11 - 25% of woody cover not native 4 = 5 - 10% of woody cover not native 5 = <5% of woody cover not native	Estimate on the overall walk through.
	%=	<b>19</b>  <b>Mammalian Herbivory (Grazing) Impacts on Ground Cover</b>	1 = >50% of plants impacted by grazing 2 = 26 - 50% of plants impacted 3 = 11 - 25% of plants impacted 4 = 5 - 10% of plants impacted 5 = <5% of plants impacted	Use the field worksheet and ocular tube to determine the number of "hits" showing herbivory on the ground covering plants (grasses and forbs) on the 200m riparian zone transect.

## RIPARIAN VEGETATION, CONTINUED

20	<b>Mammalian Herbivory (Browsing) Impacts on Shrubs and Small Trees</b>	<p>1 = &gt;50% of plants (shrubs and trees) impacted                  2 = 26 - 50% of plants impacted                  3 = 11 - 25% of plants impacted                  4 = 5 - 10% of plants impacted                  5 = &lt;5% of plants impacted</p>	<p>Estimate the percentage of shrubs and small trees that have branch tips that have been clipped or eaten by large mammals.</p>
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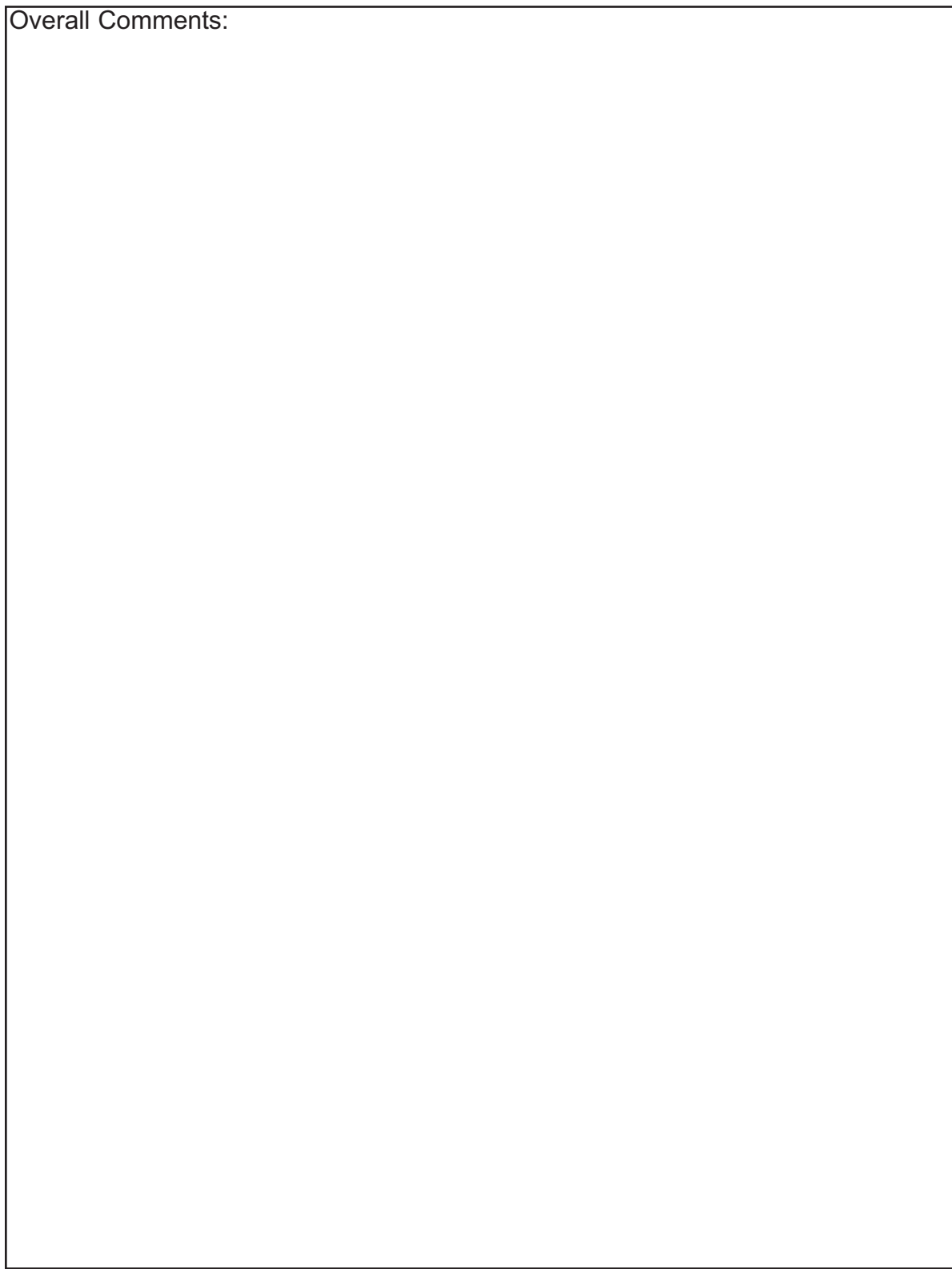
<b>Riparian Vegetation, mean score:</b>	Notes:
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## TERRESTRIAL WILDLIFE HABITAT

21	<b>Shrub Patch Density</b>	<p>1 = no shrub patches in stream reach                  2 = few, isolated small shrub patches                  3 = more patches but still isolated                  4 = few large open areas between large patches                  5 = almost continuous dense shrub cover</p>	<p>In overall walk through, examine patches and clusters of shrubs (&lt;4m tall) and openings between those clusters. Look for geomorphic consistency.</p>
22	<b>Mid-Canopy Patch Density</b>	<p>1 = no mid-canopy shrub or tree patches in reach                  2 = few isolated small patches in mid canopy                  3 = more patches but still isolated                  4 = few large open areas between large patches                  5 = almost continuous dense mid-canopy cover</p>	<p>In overall walkthrough, examine clusters of mid-canopy large shrubs and trees (4-10m tall) and openings between those clusters. Look for geomorphic consistency.</p>
23	<b>Upper Canopy Patch Density</b>	<p>1 = no upper-canopy trees present in reach                  2 = few isolated small patches in upper canopy                  3 = more patches but still isolated                  4 = few large open areas between large patches                  5 = almost continuous dense upper-canopy cover</p>	<p>In overall walk through, examine clusters of upper canopy trees (&gt;10m tall) and openings between those clusters. Look for geomorphic consistency.</p>
24	<b>Fluvial Habitat Diversity</b>	<p>1 = no other fluvial habitat besides the stream channel                  2 = one other type of fluvial habitat present                  3 = two other types present                  4 = three other types present                  5 = four or more other types present</p>	<p>Examine during overall walk through. Fluvial habitat types include flood-plain ponds, oxbows, sand bars, wet meadows, beaver ponds, and stable cutbanks.</p>

<b>Terrestrial Wildlife Habitat, mean score:</b>	Notes:
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Overall Comments:



Attach field worksheets (including the human impact worksheet) to this score sheet

### **Appendix 3: Rapid Stream Riparian Assessment Field Worksheet**

The worksheet that follows is used in the field to collect the data that are then used to calculate the scores for the indicators in the Rapid Stream Riparian Assessment. This completed worksheet should be attached to the RSRA Score Sheet and kept as part of the permanent record.

The worksheet is organized into physical areas of observation (study reach or individual transects). A GPS unit should be used to record the ends of the stream reach, individual transects, and other sample locations. This will allow other observers to return to the exact same location in future years and collect the same data. This will allow anyone to determine whether there have been any changes in the indicators over the intervening period (positive or negative).

The record for photographs also should include information that will allow others in the future to revisit the same site and take a similar photograph. This information includes the GPS location and the direction that the photograph was taken. Try to frame your picture to show both the ground and surrounding topography.

In some cases, the indicator assessment method calls for the user to count the number of observations that, for example, show the presence of filamentous algae. An efficient way to tally the data for these indicators is the “five strike” method where each count gets a vertical mark and the fifth then crosses through the other four to make five. This is continued in groups of five, and makes totaling the count easier.

Some of the indicators call for the calculation of averages of measures recorded on the field worksheet. On the score sheet, we ask that you record the score for each indicator and, where needed, the average measure for that indicator. This will aid us in developing a computer based data base of these data.

# Rapid Stream Riparian Assessment Field Worksheet

revised March 30, 2010

Stream reach identification: \_\_\_\_\_ Date: \_\_\_\_\_

## Whole Study Reach

Begin by recording the GPS locations of the ends of the study reach on the Score Sheet, and take reference photos at both ends of the study stream reach. Data for the following indicators are gathered on the whole reach walk through:

**Indicator 5** (Hydraulic Habitat diversity), **Indicator 6** (Riparian Area Soil Integrity)  
**Indicator 7** (Beaver, Signs of activity), **Indicator 15** (Native Shrub Demography),  
**Indicator 16** (Native Tree Demography), **Indicator 17** (Non-Native Herbaceous species),  
**Indicator 18** (Non-Native Woody Plant Species), **Indicator 21** (Shrub Patch Density),  
**Indicator 22** (Mid-Canopy Patch Density), **Indicator 23** (Upper Canopy Patch Density), and  
**Indicator 24** (Fluvial Habitat Diversity).

**Indicator 5:** Hydraulic Habitat Diversity (number of different in stream below-water features).

Check each type of hydraulic (stream) features providing important aquatic habitats.

- edge water
- lateral pool
- high velocity or gradient riffle (high velocity run)
- low velocity or gradient riffle (low velocity run)
- scour pool
- cobble/boulder debris fans
- active, flowing side channels
- backwaters
- sand-floored runs
- other (type \_\_\_\_\_)

Total number of different feature types: \_\_\_\_\_

**Indicator 6:** Riparian Area Soil Integrity.

Notes \_\_\_\_\_ Percent soil area disturbed \_\_\_\_\_

**Indicator 7:** Beaver Activity.

Signs of beaver activity include tracks, drags, digging marks, cut stems, burrows, dams, and caches.

Signs observed \_\_\_\_\_

**Indicator 15:** Native Shrub Demography and recruitment.

Circle age classes present: seedling, immature, mature, old dead clumps.

Dominant native species: \_\_\_\_\_ Other notes: \_\_\_\_\_

\_\_\_\_\_

**Indicator 16: Native Tree Demography and Recruitment.**

Circle age classes present: seedling, immature, mature, snags.

Dominant native species \_\_\_\_\_

Notes \_\_\_\_\_

**Indicator 17: Non-Native Herbaceous Plant Species Cover.**

Grasses and forbs, as percentage of total grass and forb cover.

Percent of non-native herbaceous plants \_\_\_\_\_

Notes \_\_\_\_\_

**Indicator 18: Non-Native Woody Plant Cover.**

Shrubs and trees, as percentage of total shrub and tree cover.

Percent of non-native woody plant cover \_\_\_\_\_

Notes \_\_\_\_\_

**Indicator 21: Shrub Patch Density.**

Notes \_\_\_\_\_

**Indicator 22: Mid-canopy Patch Density.**

Notes \_\_\_\_\_

**Indicator 23: Upper Canopy Patch Density.**

Notes \_\_\_\_\_

Score sheet notes for Indicators 21, 22, 23

- 1 no patches in stream reach
- 2 few, isolated shrub patches
- 3 more patches but still isolated from each other
- 4 few large open areas between large patches
- 5 almost continuous dense cover for the layer

**Indicator 24: Fluvial Habitat Diversity.**

Check each type of geophysical feature within the riparian zone that provides a unique habitat for plants and animals:

- flood-plain ponds
- oxbows
- large and isolated sand or gravel bars
- wet meadows
- marsh
- stable cutbanks
- beaver pond
- others (name \_\_\_\_\_)

Total number of fluvial habitat types \_\_\_\_\_

### Three Representative Reach Sites

Data for the following indicators are collected at three different and representative sites along the study reach. The locations used for each indicator may be the same or different as appropriate, and they do not need to be located in the 200m transect.

#### Indicator 2: Channel Shading and Solar Exposure.

Percent of stream surface shaded at mid-day.

Time observed \_\_\_\_\_ (if not mid-day, estimate what shading at noon would be like)

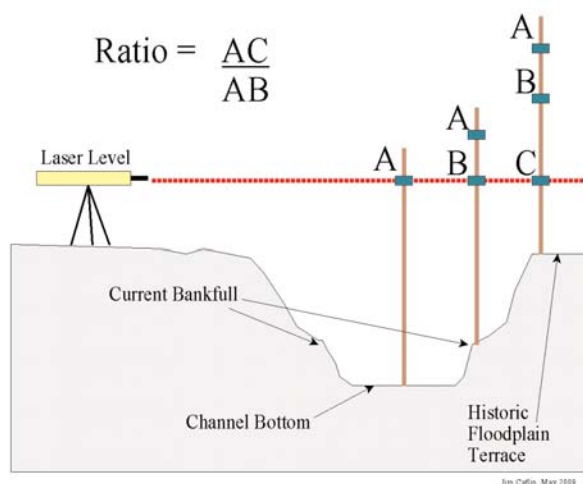
Observation Site 1: Percent stream shaded \_\_\_\_\_ %  
 (Optional) UTM E \_\_\_\_\_ N \_\_\_\_\_

Observation Site 2: Percent stream shaded \_\_\_\_\_ %  
 (Optional) UTM E \_\_\_\_\_ N \_\_\_\_\_

Observation site 3: Percent stream shaded \_\_\_\_\_ %  
 (Optional) UTM E \_\_\_\_\_ N \_\_\_\_\_

Average of three observation sites  
 \_\_\_\_\_ %

$$\text{Ratio} = \frac{AC}{AB}$$



#### Indicator 3: Floodplain Connection and Inundation.

Data are taken at three representative sites.

Site 1: Current bankfull depth (AB) \_\_\_\_\_

Historic floodplain height (AC) \_\_\_\_\_

Floodplain/bankfull ratio \_\_\_\_\_

$$\text{Ratio} = (AC)/(AB)$$

(Optional) UTM E \_\_\_\_\_ N \_\_\_\_\_

(Optional) Photo ID \_\_\_\_\_ Direction \_\_\_\_\_

Site 2: Current bankfull depth (AB) \_\_\_\_\_

Historic floodplain height (AC) \_\_\_\_\_

Floodplain/bankfull ratio =(AC)/(AB) \_\_\_\_\_

(Optional) UTM E \_\_\_\_\_ N \_\_\_\_\_

(Optional) Photo ID \_\_\_\_\_ Direction \_\_\_\_\_

(continued on next page)

**Indicator 3 (Continued)**

Site 3: Current bankfull depth (AB) \_\_\_\_\_ Historic floodplain height (AC) \_\_\_\_\_

Floodplain/bankfull ratio =(AB)/(AC) \_\_\_\_\_

(Optional) UTM E \_\_\_\_\_ N \_\_\_\_\_

(Optional) Photo ID \_\_\_\_\_ Direction \_\_\_\_\_

**Indicator 3**, average of the three ratios for three sites \_\_\_\_\_

**Three Representative Instream Riffle Sites**

**Collect the data for Indicators 10 and 11 at the same representative stream riffle locations** (these sites may be different than those used for the other indicators. Make sure that these sites represent typical riffles in your reach.)

**Indicator 10:** Cobble Embeddedness (three representative riffles, examine six samples 3-8” in diameter per site).

Riffle site 1: Rock embedded \_\_\_\_\_ Average \_\_\_\_\_

(Optional) UTM E. \_\_\_\_\_ N \_\_\_\_\_

Riffle site 2: Rock embedded \_\_\_\_\_ Average \_\_\_\_\_

(Optional) UTM E. \_\_\_\_\_ N \_\_\_\_\_

Riffle site 3: Rock embedded \_\_\_\_\_ Average \_\_\_\_\_

(Optional) UTM E. \_\_\_\_\_ N \_\_\_\_\_

Overall average of averages of embeddedness: \_\_\_\_\_

**Indicator 11: Aquatic Invertebrates**

Examine at least six rocks at least six inches in diameter at each of the sites used to measure embeddedness. Use the key in Appendix 1 for identification. List the invertebrate orders found below and record which are most common or rare. Note the presence of crawfish, but for this protocol, do not include them in the final tally of the total number of orders found in the samples to determine the final score.

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### In-stream 200 meter transect

Data for the following assessment indicators are collected on this transect:

- Indicator 1** (Algal Growth),
- Indicator 4** (Vertical Bank Stability),
- Indicator 8** (Riffle-Pool Distribution),
- Indicator 9** (Underbank Cover),
- Indicator 12** (Large Woody Debris), and
- Indicator 13** (Overbank Cover and Terrestrial Invertebrate Habitat).

Location: UTM E \_\_\_\_\_ N \_\_\_\_\_

(Optional Photo) Identification \_\_\_\_\_ Photo direction \_\_\_\_\_

#### **Indicator 1: Algal Growth.**

Beginning from the downstream end of the transect, record the presence of filamentous algae taken every 2 meters looking straight down with the ocular tube one meter into the stream from the bank. If the stream is less than 2 m wide, walk up the center of the channel.

Yes \_\_\_\_\_

No \_\_\_\_\_

Percent of total stops on transect that are "hits" for algae \_\_\_\_\_

#### **Indicator 4: Vertical Stability of Stream Banks.**

Meters of unstable bank (include both sides) \_\_\_\_\_

Meters of stable bank (include both sides) \_\_\_\_\_

Total \_\_\_\_\_ Percent of transect \_\_\_\_\_

#### **Indicator 8: Riffle-Pool Distribution.**

Number of riffle-pool units in transect \_\_\_\_\_

Approximate amount of total transect with riffle/pool habitat \_\_\_\_\_

#### **Indicator 9: Underbank Cover.**

Meters of underbank cover (include both sides) \_\_\_\_\_

Meters lacking underbank cover (include both sides) \_\_\_\_\_

Total \_\_\_\_\_ Percent of transect \_\_\_\_\_

#### **Indicator 12: Large Woody Debris.**

6 inches or more in diameter and three feet or longer with some portion submerged in water.

Pieces of large woody debris \_\_\_\_\_ Total \_\_\_\_\_

#### **Indicator 13: Overbank Cover and Terrestrial Invertebrate Habitat.**

Do not include rocks or cliff faces.

Meters of vegetation hanging over bank (include both sides) \_\_\_\_\_

Meters lacking hanging vegetation (include both sides) \_\_\_\_\_

Total \_\_\_\_\_ Percent of stream transect \_\_\_\_\_

**Riparian Zone 200 meter transect**

Data for the following indicators are collected on this transect:

**Indicator 14** (Riparian Zone Plant Community Structure),

**Indicator 19** (Mammalian [wild and domestic livestock] Grazing of Ground Cover), and

**Indicator 20** (Mammal Browse of Shrubs).

**Indicator 14: Riparian Zone Plant Community Structure.**

Every 2m observe directly up and down for groundcover, shrub, middle and upper canopy layers.

*Ground layer count (0-1 meter above ground):*

Yes \_\_\_\_\_

No \_\_\_\_\_

NA \_\_\_\_\_

Total ground layer positive hits \_\_\_\_\_ Percentage positive hits \_\_\_\_\_

*Shrub layer count (1-4 meters above ground):*

Yes \_\_\_\_\_

No \_\_\_\_\_

NA \_\_\_\_\_

Total shrub count positive hits \_\_\_\_\_ Percentage positive hits \_\_\_\_\_

*Middle layer canopy (4-10 meters above ground):*

Yes \_\_\_\_\_

No \_\_\_\_\_

NA \_\_\_\_\_

Total middle canopy positive hits \_\_\_\_\_ Percentage positive hits \_\_\_\_\_

*Upper canopy layer (more than 10 meters above ground):*

Yes \_\_\_\_\_

No \_\_\_\_\_

NA \_\_\_\_\_

Total upper canopy positive hits \_\_\_\_\_ Percentage positive hits \_\_\_\_\_

Average percent cover in upper riparian zone (all four layers) \_\_\_\_\_

**Indicator 19: Ungulate Grazing in Riparian Zone, Groundcover grazed.**

Count grass and forb cover that show signs of grazing when performing observations for Indicator 14, Plant Community Structure and Cover.

No \_\_\_\_\_

Yes \_\_\_\_\_

NA \_\_\_\_\_

Total positive hits \_\_\_\_\_ Percentage positive hits \_\_\_\_\_

**Indicator 20: Mammalian Browsing of Shrubs and Small Trees in Riparian Zone.**

Percent of trees and shrubs showing clipped branches in the Riparian Zone:

Browsed \_\_\_\_\_

Not browsed \_\_\_\_\_

Total not browsed \_\_\_\_\_ Total browsed \_\_\_\_\_

Percentage of woody plants browsed \_\_\_\_\_

**[NOTE: OPTIONAL SECOND RIPARIAN ZONE TRANSECT IN CASE OF VERY WIDE (>100m) FLOODPLAIN. Indicator 14b: Riparian Zone Plant Community Structure.**

Every 2m observe directly up and down for groundcover, shrub, middle and upper canopy layers.

*Ground layer count (0-1 meter above ground) :*

Yes \_\_\_\_\_

No \_\_\_\_\_

NA \_\_\_\_\_

Total ground layer positive hits \_\_\_\_\_ Percentage positive hits \_\_\_\_\_

*Shrub layer count (1-4 meters above ground):*

Yes \_\_\_\_\_

No \_\_\_\_\_

NA \_\_\_\_\_

Total shrub count positive hits \_\_\_\_\_ Percentage positive hits \_\_\_\_\_

*Middle layer canopy (4-10 meters above ground):*

Yes \_\_\_\_\_

No \_\_\_\_\_

NA \_\_\_\_\_

Total middle canopy positive hits \_\_\_\_\_ Percentage positive hits \_\_\_\_\_

*Upper canopy layer (more than 10 meters above ground):*

Yes \_\_\_\_\_

No \_\_\_\_\_

NA \_\_\_\_\_

Total upper canopy positive hits \_\_\_\_\_ Percentage positive hits \_\_\_\_\_  
Average percent cover in upper riparian zone (all four layers) \_\_\_\_\_