ADEQ Number __ __ __ __ __ __

ADEQ Arizona Department of Environmental Quality

STREAM ECOSYSTEM MONITORING FIELD FORM (FY 2012)

1.1 CHEMISTRY SITE INFORMATION

Site Code	_ _ _ _ _ _ _ _ _ . _ _	Date	_ _ / _ _ / _ _ _ _	Sample Time	
Site Name				Field Crew	

1.2 FIELD DATA

E. coli		CFU	TDS (meters give g/L)		mg/L
Air Temp.		°C	Sp Cond.		µS/cm
Water Temp.		°C	Turbidity		NTU
D.O.		mg/L			
D.O. %		%	pH		SU

1.3 FIELD CALIBRATIONS

% D.O.	Barometric Pressure in mm Hg =	Post-cal. Reading =	%
Turbidity	Standard =	Standard solution reading =	% Diff =

1.4 SAMPLE COLLECTION INFORMATION

☐ Grab ☐ Equal Width Increment (EWI) ☐ Modified EWI ☐ Equal Discharge Increment

Circle where grab sample taken	LEW----- ¾ ----- ½ ----- ¼ -----REW	Run ☐, Riffle, ☐, Pool ☐

1.5 QUALITY CONTROL SAMPLE INFORMATION

Type of QC Sample (ie blank, dup, etc)	Your Identifying Code	Lab Tracking Number

1.6 FLOAT METHOD DISCHARGE MEASUREMENT

								Average Time	
Width, ft	X	Depth, ft	X	Velocity, ft/s	X	0.85	=		cfs

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1.7 SITE OBSERVATIONS (CHECK ALL THAT APPLY UNLESS INDICATED OTHERWISE)

General appearance in the channel	No refuse visible ☐; Small refuse visible ☐; Small volume refuse common ☐; Large volume refuse (tires, carts) rare ☐; Large volume refuse common ☐.
General appearance along the banks	No refuse visible ☐; Small refuse visible ☐; Small volume refuse common ☐; Large volume refuse (tires, carts) rare ☐; Large volume refuse common ☐.
Water Clarity	Clear ☐; Milky ☐; Light brown ☐; Dark brown ☐, Oily sheen ☐; Greenish ☐; Other_____
Water odor	None ☐; Sewage ☐; Chlorine ☐; Fishy ☐; Rotten eggs ☐; Other_____
Appearance at water's edge (check one)	No evidence of salt crusts ☐; White crusty deposits rare ☐; Numerous white crusty deposits ☐; Banks covered with white crusty deposits ☐.
Fish presence (check one)	Absent ☐; Rare ☐; Common ☐.
Crayfish presence	Absent ☐; Rare ☐; Common ☐.
Sunfish presence	Absent ☐; Rare ☐; Common ☐.
Bull frog presence	Not Observed ☐; Observed ☐
Leopard frog presence	Not Observed ☐; Number observed alive _____; Dead_____
Floating leaves or other organic matter (not algae) (check all that apply)	Absent ☐; Rare ☐; Common ☐.
Leaves or other organic matter on streambed	Absent ☐; Rare ☐; Common ☐.
% Algae cover in the wetted width of the stream 10 meters above and below sample point	%
% Macrophytes cover in the wetted width of the stream 10 m above and below sample point	%

1.8 E. COLI

Collection Time		Incubation Time		Enumeration Time	
Flag (Incubation/Holding Time Exceeded?)					

Holding time is 6 hours from collection. Incubation Period is 18 hours for Colilert technique

COLILERT RESULTS

Number Large Wells Positive	Number Small Wells Positive	Most Probable Number (from Table)

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1.9 EVENTS

THIS TABLE INCLUDES FIELD RELATED EVENT CODES YOU WILL ENTER INTO THE WQDB. CHECK THE BOX NEXT TO ALL APPLICABLE EVENTS. USE THE EVENT FLAGS (F1, F2, ETC.) IF YOU WANT TO INCLUDE A COMMENT FOR A PARTICULAR ITEM THAT YOU CIRCLED. INCLUDE FLAG COMMENTS IN SPACE PROVIDED BELOW. IT IS VERY IMPORTANT THAT RECENT OR CURRENT FLOODING BE FLAGGED.

*** = FILL OUT EVERY TIME. YOU MUST FLAG AND EXPLAIN IF THESE ARE NOT CHECKED.**

Check	Description	Flag
☐	*** Baseflow Conditions**	
☐	*** General – Precipitation at sample time.** **None ☐; Light ☐; Moderate ☐; Heavy ☐; Cloud Cover (%) =**	
☐	*** Weather – Significant rain during past 48 hours may affect results**	
☐	Flow – Low D.O. / high pH attributed to ponding or evaporation of stream	
☐	Flow – Stream dry at time of visit	
☐	Flow – Evidence of recent flooding. Fresh debris line in channel ☐, Grasses Laid Over ☐; Fresh debris line in bushes/trees ☐; Recent flood event greater than baseflow but less than bankfull ☐; Riparian vegetation scoured away ☐; •Flood Width_____ meters.	
☐	Flow – Flood event in progress at time of visit	
☐	Groundwater – DO value attributed to groundwater upwelling	
☐	Flow – Measurement from USGS gauge/records or 3rd party	
☐	Flow – Low flow conditions	
☐	Flow – No active flow, pools or ponded water only	
☐	Spring(s) influencing samples	
☐	Weather conditions may affect samples	
☐	Algal bloom	
☐	Fish kill observed	
☐	Fish kill attributed to low DO, high pH or algal toxicity	
☐	Indication of algal toxicity	
☐	Macrophytes – Abundant macrophytes	
☐	Waterfowl – Abundant waterfowl	
☐	SOP – Deviation(s) from standard operating procedures (indicate in 'Field Notes')	
☐	Equipment problems associated with visit (data associated with the equipment not entered)	
☐	Incomplete sampling event – Missing parameter(s) or reports	
☐	Limited sampling event – Selected parameters only	
☐	QC Equipment blank associated with visit	
☐	QA/QC or duplicate sample collected at time of visit	

Flag 1	
Flag 2	
Flag 3	

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1.10 FLOW MEASUREMENTS

Measurement from Run ☐, Riffle, ☐, Pool ☐; Comments:_____

Station	Distance from Initial Point	Depth, ft	Velocity, ft/s	Comments
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				

Attach separate sheet or the "Discharge" Excel spreadsheet to calculate discharge.

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2.1 STREAM TYPE IDENTIFICATION (OFFICE MEASUREMENTS)

Slope		Sinuosity	
Watershed Area (mi^2):		Stream Order	
Predicted Cross-section Area (ft^2)		Which Regional Curve Used?	☐ M Gila, Salt (lower), Santa Cruz, Verde, San Pedro ☐ U Gila, LCR, Salt (upper)

2.2 REACH LENGTH

REACH LENGTH = AVERAGE WETTED WIDTH * 40. MINIMUM REACH = 300 FT. MAXIMUM = 3,000 FT.

Width 1		**Width 2**		**Width 3**		**Average**		*** 40 =**
						Reach Length		ft

2.3 REACH COMPLEXITY

Habitat	Number of ☐ Paces, ☐ feet, ☐ meters	Total
Pool		
Riffle		
Run		
	Riffle / Pool Ratio =	
	My Pace =	to a foot

2.4 FLOW REGIME (CHECK ONLY ONE)

☐	Perennial stream channel. Surface water persists all year long.
☐	Intermittent stream channel. One which flows only seasonally or occasionally. Surface source includes springs, snow melt, and flows that reappear along various locations of a reach, and then run subterranean (interrupted).
☐	Subterranean stream channel. Flows parallel to and near the surface for various seasons.
☐	Ephemeral stream channel. Flows only in response to precipitation.

2.5 FLOW REGIME CATEGORY (CHECK ONLY ONE)

☐	Seasonal variation in stream flow dominated primarily by snowmelt runoff.
☐	Seasonal variation in stream flow dominated primarily by storm flow runoff.
☐	Uniform stage and associated stream flow due to spring fed conditions.
☐	Regulated stream flow due to diversions, dam releases, dewatering, effluent dominated, etc.
☐	Altered flows due to development, such as urban streams, cut-over watersheds, vegetation conversions (e.g. forested to grassland) that changes flow response to precipitation events.

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2.6 STREAM TYPE MEASUREMENTS (FIELD MEASUREMENTS)

Measurement	Comment/Cal	X Section 1	X Section 2	Bankfull Indicators Used
Bankfull Width				☐ Top of point bars
Bankfull Max. Depth	At thalweg			☐ Change in particle size
Correction Factor	Determined by X-section type			☐ Slope break
Bankfull Mean Depth	= (BF Max Depth) * (Correction Factor)			☐ Vegetation line
Cross-sectional Area	= (BF Mean Depth) * (BF Width)			☐ Undercut banks
2 times BF Max Depth	= (2*BF Max Depth)			☐ Presence of a floodplain at the elevation of incipient flooding
Floodprone Width	Measure width at 2 * BF Max Depth (Note if estimated)			☐ Is flood debris above bankfull elevation? (if so, document cross-sectional area.)
Entrenchment Ratio	= (Floodprone width) / (BF Width)			Valley Type
Width / Depth Ratio	= (BF Width) / (BF Mean Depth)			☐ I ☐ II ☐ III ☐ IV ☐ VI ☐ VIII
STREAM TYPE =				

2.7 ORGANIC DEBRIS / CHANNEL BLOCKAGES

☐	1. No organic debris or channel blockages	☐	6. Extensive, large debris dams either continuous or influencing over 50% of channel area. Forces water onto floodplain even with moderate flows. Generally presents a fish migration blockage.
☐	2. Infrequent debris, what's present consists of small, floatable organic debris.	☐	7. Beaver dams. Few and/or infrequent. Spacing allows for normal stream/flow conditions between dams.
☐	3. Moderate frequency, mixture of small to medium size debris affects less than 10% of active channel area.	☐	8. Beaver dams - Frequent. Back water occurs between dams - stream flow velocities reduced between dams.
☐	4. Numerous debris mixture of medium to large sizes - affecting up to 30% of the area of the active channel.	☐	9 .Beaver dams - abandoned where numerous dams have filled in with sediment and are causing channel adjustments of lateral migration, evulsion, and degradation etc.
☐	5. Debris dams of predominantly large material affecting over 30% to 50% the channel area and often occupying the total width of the active channel.	☐	10. Man made structures - diversion dams, low dams, controlled by-pass channels, baffled bed configuration with gabions, etc.

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SHOULD I SAMPLE MACROINVERTEBRATES?

The target stream habitat for collecting macroinvertebrates must be wadeable, perennial, contain riffle or run habitat, must contain heterogeneous substrates, and must be sampled during the spring index period. Spring index period is April - May for warm water streams and May - June for cold water streams. Use the following specific decision criteria to determine whether to collect a macroinvertebrate sample.

Parameter	Condition	Action to Take (CHECK BOXES)
Hydrologic Conditions	Baseflow conditions are occurring and it is approximately 4 or more weeks after a bankfull flow event. *	☐ Collect macroinvertebrates
	A bankfull or greater magnitude flow event has occurred within 4 weeks of site visit. Or extreme high flow events have occurred resulting in deep scouring of the streambed and benthic community such that the macroinvertebrate community will not recover within the spring index period.	☐ Do not collect macroinvertebrates
	Extended drought conditions have reduced flow from previously perennial condition to pools only or stagnant wetland habitat.	☐ Do not collect macroinvertebrates
Substrate Type	A substrate consisting of a mixture of some of the following particle sizes is the target condition: boulder, cobble, gravel, sand, clay, silt, bedrock.	☐ Collect macroinvertebrates
	Streams which have substrates dominated (consisting of >50% of that substrate type) by bedrock or travertine are considered non-target conditions.	☐ Do not collect macroinvertebrates
Waterbody Type	The target waterbody type is a flowing stream with riffle or run (erosional) habitats present.	☐ Collect macroinvertebrates
	We do not have methods developed for the following waterbody types and are not sampling them at this time: Effluent dependent streams, wetlands, ephemeral streams, lakes, seasonally intermittent streams.	☐ Do not collect macroinvertebrates

* Identification of bankfull and high flow elevation in the field: Using known watershed area, use appropriate Regional Curve and field bankfull indicators to estimate bankfull elevation. Look for debris lines and other high flow markers as an indicator of the most recent high flow stage. See 2010 SOP Manual.

2.8 BOTTLE INFORMATION

Riffle ☐, _____#jars, Riffle field split_____% preserved; ADEQ 10 jab multihabitat ☐,_____#jars, Multihabitat field split_____% preserved; Edge ☐ ,_____# of jars

2.9 REACH HABITAT QUALITY

Reach length equals 2 meander lengths or 20-30 times bankfull width of the stream. Use a minimum 300-feet reach to identify habitat types for large streams or rivers.

Cobble	Absent ☐;	Rare ☐;	Common ☐;	Abundant ☐
Undercut banks	Absent ☐;	Rare ☐;	Common ☐;	Abundant ☐
Leaf packs	Absent ☐;	Rare ☐;	Common ☐;	Abundant ☐
Root masses	Absent ☐;	Rare ☐;	Common ☐;	Abundant ☐
Submerged logs / snares	Absent ☐;	Rare ☐;	Common ☐;	Abundant ☐
Sand dominated substrate	Absent ☐;	Rare ☐;	Common ☐;	Abundant ☐

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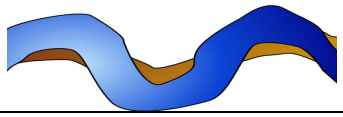
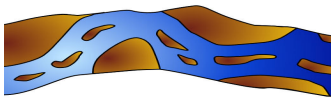
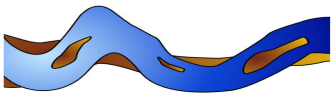
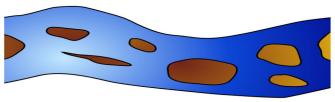
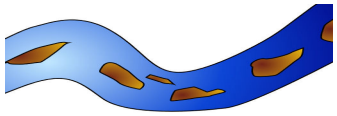
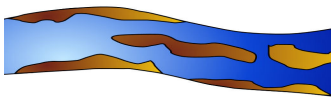
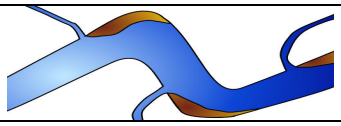
2.10 DEPOSITIONAL FEATURES (CHECK ONE)

☐ 1. Point Bars			☐ 5. Diagonal Bars
☐ 2. Point Bars with Few Mid-Channel Bars			☐ 6. Main Channel Branching with Numerous Mid-Bars and Islands
☐ 3. Numerous Mid-Channel Bars			☐ 7. Side Bars and Mid-Channel Bars with Length Exceeding 2 to 3 times Channel Width
☐ 4. Side Bars			☐ 8. Delta Bars ☐ 9. NO bars

Illustrations adapted from D. Rosgen, 1996. Applied River Morphology. Wildland Hydrology. Pagosa Springs, CO.

2.11 RIPARIAN ASSOCIATION

Place a check beside the most appropriate association using the riparian species list and elevation guide.

☐	Sonoran Riparian Deciduous Forest Cottonwood-Willow forest together with mesquite, desert willow and seep willow located at <3280' elevation	☐	Montane Riparian Deciduous Forest Mixed broadleaf species including big-tooth maple; narrowleaf cottonwood; quaking aspen boxelder; chokecherry; Arizona alder; and the willows pacific, coyote, Bebb, arroyo located at 5740' – 8200' elevation
☐	Interior Riparian Deciduous Forest Cottonwood-Willow & mixed broadleaf species such as sycamore, ash, walnut, alder, soapberry, peachleaf willow, and hackberry located at 3280' – 5740' elevation	☐	Arctic Boreal Forest Distinctive riparian communities are not present however there are some indicator species such as shrubby Scouler and Bebb willow, Az. willow, elderberry, cinquefoil, quaking aspen, goose-berry, raspberry, and thinleaf alder located along streams of subalpine forests and meadows at >8200' elevation.

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Instructions: Tally 100-pebbles in riffle habitat only. Measure particles at equal increments across 3 transects within the wetted width throughout the reach. A reachwide and transect/riffle pebble count is required for coldwater streams.

2.12 COLDWATER - TRANSECT PEBBLE COUNT

Size Class	Size (mm)	Tally	Count
Silt/Clay	<0.062		
Sand	0.063 – 2.0		
Very Fine Gravel	3 – 4		
Fine Gravel	5 – 8		
Medium Gravel	9 – 16		
Coarse Gravel	17 – 32		
Very Course Gravel	33 – 64		
Small Cobble	65 – 90		
Medium Cobble	91 – 128		
Large Cobble	129 – 180		
Very Large Cobble	181 – 256		
Small Boulder	257 – 512		
Medium Boulder	513 – 1024		
Large Boulder	1025 – 2048		
Very Large Boulder	2049 – 4096		
Bedrock	>4097		

Attach separate sheet or the "Pebble Count" Excel spreadsheet to summarize and calculate pebble count metrics.

2.13 EMBEDDEDNESS

Use a Visual Estimate Only for riffle embeddedness. The visual estimate is used to fill out the Habitat

Gravel, cobble and boulders are surrounded by how much fine sediment in the riffles? (Check One)

- ☐ 0 – 25 %
- ☐ 26 – 50 %
- ☐ 51-75 %
- ☐ 76-100 %

2.14 CANOPY DENSITY

Position	Upper Reach	Mid-Reach	Lower Reach
REW			
Middle – Looking Upstream			
Middle – Looking Downstream			
LEW			
Sum			

Mean Number of Points = Sum of three columns _____ / 3 =

If stream order <5	Percent Canopy Density = Mean Number of Points x 1.5 = %
If stream order ≥5	Percent Canopy Density = Mean Number of Points x 0.75 = %

Form Checked by _____

Instructions: Tally 100-pebbles in throughout the reach using the 5 point or 9 point method. Don't include bedrock in the 100 count tally. Sand/Silt = High Embeddedness. Bedrock = 0 A reachwide and transect/riffle pebble count is required for coldwater streams.

2.15 REACHWIDE - (WARM AND COLDWATER STREAMS)

Size Class	Size (mm)	Tally		Count
Silt/Clay	<0.062			
Sand	0.063 – 2.0			
Very Fine Gravel	3 – 4			
Fine Gravel	5 – 8			
Medium Gravel	9 – 16			
Coarse Gravel	17 – 32			
Very Course Gravel	33 – 64			
Small Cobble	65 – 90			
Medium Cobble	91 – 128			
Large Cobble	129 – 180			
Very Large Cobble	181 – 256			
Small Boulder	257 – 512			
Medium Boulder	513 – 1024			
Large Boulder	1025 – 2048			
Very Large Boulder	2049 – 4096			
Bedrock	>4097			

Attach separate sheet or the "Pebble Count" Excel spreadsheet to summarize and calculate pebble count metrics.

2.16 EMBEDDEDNESS

Category	Low	Med	High
Range	0 – 33 Mid-pt. = 17	34 – 66 Mid-pt. = 52	67 100 Mid-pt = 83
Tally			
A = Tally Sum by Class			
B = Class Mid-pt * A	17 * A	52 * A	83 * A
C = Sum of A across classes			
D = Sum of B across classes			
Average Embeddedness = D/C			

2.17 PLANT ID (USE CODES IN 2.18)

1	2	3	4	5	6	7	8
9	10	11	12	13	14	15	16
17	18	19	20	21	22	23	24
25	26	27	28	29	30	31	32
33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48
49	50	51	52	53	54	55	56
57	58	59	60	61	62	63	64
65	66	67	68	69	70	71	72
73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88
89	90	91	92	93	94	95	96
97	98	99	100				

Algae Points		% Algae	
Plant Points		% Plant	
(a) # of runs		(b) Total Points	
(a/b) diversity			

☐ 0-0.3 = Poor;
☐ 0.3-0.6 = Fair;
☐ 0.6-1.0 = Good

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2.18 PLANT DIVERSITY (TALLY ACROSS REACH)

Check which algae and macrophytes are present in the wetted width. Record the tally in the space below using the codes provided next to each organism. A = Algae M = Macrophyte.

☐ A	(aCl) - *Cladophora* (hair like feel, long beards)	☐ M	(mW) - Watercress (*Rorippa*)
☐ A	(aSg) - *Spirogyra* (slimy to touch, bright green)	☐ M	(mMF) - Monkey flower (*Mimulus*, yellow flower)
☐ A	(aN) - *Nostoc* (looks like jelly beans or round black to blue colored nodules)	☐ M	(mPW) - Pondweed (*Potomogeton*, submerged water grass)
☐ A	(aBG) - Blue-greens (blue-green to black in color, e.g. *Oscillatoria*, *Anabena*)	☐ M	(mCb) Columbine (yellow flower)
☐ A	(aV) - *Vaucheria* (dark green felt-like mats)	☐ M	(mB) - Buttercup (*Ranunculus*)
☐ A	(aSt) - Stonewort's (feels gritty, looks like a vascular plant, found in upwelling zones)	☐ M	(mMf) - Eurasian water milfoil (*Myriophyllum*) INVASIVE
☐ A	(aH) - *Hydrodictyon* (bright green, net forming algae)	☐ M	(mHy) - Hydrilla INVASIVE
☐ A	(aP) - *Praesiola* (cold water algae, looks like sea lettuce)	☐ M	(mR) - Rush
☐ M	(mL) - *Lemna* / Duckweed	☐ M	(mMs) - Moss
☐ M	(mSp) - Speedwell	☐ M	(mSe) - Sedge
☐		☐	
☐		☐	

2.19 BIOLOGICAL OBSERVATIONS (GET FROM SECTION 2.17)

Filamentous Algae Covering Streambed throughout the reach (circle range)	1) <1% 2) 1-25% 3) 26-50% 4) 51-75% 5) 76-100%
Floating algae (detached clumps/mats) floating downstream (circle range)	1) <1% 2) 1-25% 3) 26-50% 4) 51-75% 5) 76-100%
Algal slime on rocks, wood, etc. (not filamentous)	Absent ☐; rare-thin coating ☐; common thick coating ☐
Macrophytes covering streambed throughout the reach (circle range)	1) <1% 2) 1-25% 3) 26-50% 4) 51-75% 5) 76-100%

2.20 RIFFLE GEOMETRY (USE RIFFLES WHERE BUGS COLLECTED)

Riffle #	Length	Width	Riparian Width (left bank)	Riparian Width (right bank)	Length / Width Ratio
1					
2					
3					
			Average length / Width Ratio		

☐ **Paces,** ☐ **feet, or** ☐ **meters**

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2.21 DEPOSITIONAL AREA CONDITIONS (RECORD AS P/A FOR PRESENT/ABSENT)

Depositional Area #1	Dead, black organic matter overlying bottom sediment	Anoxic/black sediment & sulfur smell	Bloodworms	Comments(record depositional type=pool, edge, backwater, eddy, macrophyte bed)
A				
B				
C				
Depositional Area #2				
A				
B				
C				
Depositional Area #3				
A				
B				
C				

2.22 OTHER INDICATORS OF EXCESS NUTRIENTS (RECORD AS P/A FOR PRESENT/ABSENT)

NOTED BECAUSE THERE CAN BE NATURAL SOURCES OF NUTRIENTS VERSUS ANTHROPOGENIC SOURCES.

Present?	Parameter	Comments	Present?	Parameter	Comments
General			Natural Nutrient Sources		
☐	General odor – Does it smell like rotten eggs, feces (cattle or human) ammonia?		☐	Landscape patterns – Is there an alluvium to bedrock transition, or open basin to canyon transition?	
☐	Health of fish- Are fish lethargic, swimming erratically, odd-colored or blotchy?		☐	Natural springs or seeps - Are there areas of perched water, *Fissidens* moss, "butterscotch pudding bacteria, wet canyon walls, red monkey flowers, change in temperature/pH/ conductivity?	
☐	Point/nonpoint discharges in reach– agricultural, industrial, sewage treatment, septic or other facilities?		☐	Tributaries - Are there any tributaries (wet or dry) or are there any "perched channels" entering onto the floodplain?	
☐			☐	Downwelling – Is the water moving into the sediments and "drying up"? Is organic matter "heaped up" at the bottom of the wetted reach as if by wave action?	

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2.23 RIPARIAN & INVASIVE SPECIES

USE THE ADEQ GUIDE TO ALGAE AND PLANTS TO IDENTIFY RIPARIAN AND INVASIVE SPECIES.

Macrophytes		Grasses & Shrubs				Trees				Invasive	
☐	Buttercup	☐	Bamboo	☐	Spikerush	☐	Alder, Arizona	☐	Walnut, Arizona	☐	Russian knapweed
☐	Checkered Mallow, NM	☐	Bulrush, Hardstemed	☐	Vine Mequite	☐	Alder, Thinleaf	☐	Willow, Arroyo	☐	Russian olive
☐	Columbine	☐	Cattail	☐	Arrowweed	☐	Ash, Velvet	☐	Willow, Bebb	☐	Water hyacinth
☐	Monkey Flower	☐	Deer Grass	☐	Desert Broom	☐	Boxelder	☐	Willow, Bonpland's	☐	Salt ceder
☐	Primrose, Floating	☐	Desert Saltgrass	☐	Willow, Arizona	☐	Cottonwood, Fremont	☐	Willow, Coyote	☐	Parrot's feather
☐	Gooseberry	☐	Horsetail	☐	Willow, Seep	☐	Cottonwood, Narrowleaf	☐	Willow, Pacific	☐	
☐	Spearmint	☐	Muhly, Alkaki	☐		☐	Maple, Big Toothed	☐	Willow, Goodding	☐	
☐	Speedwell	☐	Reed, Giant	☐		☐	Maple, Rocky Mountain	☐	Willow, Scouler	☐	
☐	Watercress	☐	Sacaton	☐		☐	Sycamore, Arizona	☐		☐	
☐	Buttercup	☐	Sedge	☐		☐	Tree tobacco	☐		☐	

2.24 REGENERATION POTENTIAL OF RIPARIAN TREES

Species in order of dominance	Mature Trees >16" @ 5 ft height	Young Trees <16" >1¼" @ 5 ft. height	Saplings < 1 ¼"	Seedlings New growth
1				
2				
3				
4				
5				

Age Classes of Riparian Tree Species
(Classify according to species present, not just the dominant tree type of that plant association)

☐	Species abundant in 3 age classes	☐	Abundant in 2 age classes	☐	One age class present	☐	No regeneration evident, few mature trees present, no saplings or seedlings, or if present, they are heavily grazed

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HOW DO I ESTIMATE PERCENT RIPARIAN VEGETATION COVER?

The following figure gives you a visual range of percentages. You may use this to help you determine percent vegetation cover.

2.25 RIPARIAN VEGETATION COVER

Record the percent cover of each vegetation type within the floodplain. Consider each vegetative layer separately with a score of 0 – 100% for each (See above figure). The object is to identify what vegetation type is holding the banks and floodplain together.

Riparian Vegetation Cover	Estimated Percent Cover
Canopy of riparian trees > 15 feet high	
Understory of woody shrubs, saplings, herbs, grasses and forbs – 1.5 to 15 feet high	
Ground cover of woody shrubs, seedlings, herbs, and forbs - < 1.5 feet high	
Barren or bare dirt	

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2.26 NON-POINT SOURCE CODES

Source Group is bolded, Category Code is italicized, and Sub-category Code is regular style font.
Note direct sources by circling them. Note Sources located in the watershed by using an asterisk.

Code	Source Category	Code	Source Category	Code	Source Category
1000	**Agriculture** *(Agriculture)*	7350	Upstream impoundment	6600	Hazardous waste storage/disposal
1050	Crop-related sources	7400	Flow regulation/Diversions	8000	Highway salt storage/use
1100	Non-irrigated crop production	7550	Habitat Modification	8200	Storage tank leaks
1200	Irrigated crop production	7555	Erosion materials from tributaries	8250	Underground storage tank leaks
1300	Specialty crop production	7600	Removal of riparian vegetation	8275	Above ground storage tank leaks
1350	Grazing-related sources	7700	Stream bank modification or destabilization	**0100**	**Wastewater** *(Industrial Point Source)*
1400	Pasture grazing - riparian and/or upland	7750	Highway/Road/Bridge-erosion or aggradation	0110	Major industrial point source
1410	Pasture grazing - riparian	7800	Drainage/Filling of wetlands	0120	Minor industrial point source
1420	Pasture grazing - upland	*7900*	*Marinas and recreational boating*	0200	Municipal point source
1500	Range grazing - riparian and/or upland	7910	Boating with in-water releases	0210	Major municipal point source
1510	Range grazing - riparian	7920	Boating with on-land releases	0220	Minor municipal point source
1520	Range grazing - upland	**5000**	**Mining** *(Resource extraction)*	0230	Package plants (small flows)
1600	*Intensive Animal feeding Operations*	5075	Active Mining operation	*0300*	*Other Wastewater*
1620	Concentrated Animal Feeding Operations point source/permitted)	5100	Surface Mining	0400	Combined system (sewage and stormwater)
1640	Confined animal feeding operations (non-point source	5150	Sand and gravel operations	0500	Collection system failure
1700	*Aquiculture/Fish Hatchery*	5200	Subsurface mining	0900	Sewage Lagoons
2000	**Forestry** *(Silviculture)*	5300	Placer mining	0975	Reuse (Effluent to lakes, golf courses)
2100	Harvesting, restoration (residue management)	5400	Dredge mining	6500	Septic systems
2200	Forest management (fertilization, pesticide use)	5500	Petroleum activities	6700	Septage disposal (e.g. from septic tank trucks)
2300	Logging roads	5600	Mill tailings	**8100**	**Other** *(Atmospheric deposition)*
2500	Clear cutting	5650	Mill or mine tailings	8400	Spills
8610	Wildfires or controlled burns	5700	Mine tailings	8500	Contaminated sediments
3000	**Hydro/Habitat Modification/Runoff** *(Construction)*	5800	Acid mine drainage	8510	
3100	Highway/Road/Bridge construction	5900	Abandoned mining operation	8530	
3200	Land development/Land clearing	5950	Inactive mining operation	8540	
4000	*Urban runoff/Stormwater sewers*	**8700**	**Recreation** *(non-boating)*	8600	
4100	Non-industrial (NPDES) stormwater runoff	8710	Golf courses	8910	
4200	Industrial (NPDES) stormwater runoff	8720	Camping/Campground recreation	**Other Non-point Source Observations at the site or within the reach**	
4300	Other urban runoff	8730	All terrain vehicles/Off road vehicles/Biking		
4400	Illicit connections to stormwater sewers (dry weather flows)	**6000**	**Storage and Disposal** *(Land disposal/Storage)*		
4500	Urban Highway/Road/Bridge runoff	6100	Sludge disposal/storage		
4600	*Non-urban runoff/Erosion and sedimentation*	6300	Landfills		
8300	Non-urban (highway/Road/Bridge Runoff/Maintenance)	6350	Inappropriate waste disposal/Wildcat dumping		
7000	*Hydrological modifications*	6400	Industrial land treatment		

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3.1 MODIFIED PFANKUCH CHANNEL STABILITY EVALUATION (LEVEL III)

THE PFANKUCH EVALUATION IS SEGREGATED INTO THREE CATEGORIES; UPPER BANKS, LOWER BANKS, AND CHANNEL BOTTOM. EACH CATEGORY HAS FOUR RATINGS TO BE SCORED. THE LOW SCORE IS THE IDEAL CONDITION. YOU MAY CHOOSE A SCORE BETWEEN THE ONES GIVEN IF THERE IS UNCERTAINTY ABOUT WHICH RATING CATEGORY IS MOST FITTING FOR THE CONDITION.
THE PFANKUCH WORKSHEET SHOULD BE FILLED OUT LAST AND AS A GROUP.

Description	Rating
A. "Upper Banks", or first terrace, is the floodplain area and is above bankfull. This landform comes into play only during floods. This category is designed to aid in rating the relative resistance to detachment and transport of particles (large and small, organic and inorganic) by floods.	
1. "Landform Slope" is the angle of slope of the floodplain. This can be estimated or measured with an Abney level (or similar device). Always choose the worst condition for the rating. If you have one floodplain at 30% and the other at >60%, rate the steeper slope because that is the area where erosion will be occurring at flood. Score A and B type channels as a 2 or excellent..	
a. Excellent: Side slopes to the channel are generally less than 30% on both banks	2
b. Good: Side slopes up to 40% on one or occasionally both banks	4
c. Fair: Side slopes to 60% common on one or both banks	6
d. Poor: Steep slopes, over 60%, provide larger volumes of soil for downstream sedimentation from lateral bank cutting.	8
2. "Mass Wasting" involves existing or potential detachment of relatively large pieces of earth. Mass movement of banks by slumping or sliding introduces large volumes of soil and debris into the channel. This condition is common at meanders or on incised channels where high banks exist at great angles, especially over 60%.	
a. Excellent: There is no evidence of mass wasting that has or could reach the stream channel in recent times.	3
b. Good: There is evidence of infrequent and / or very small slumps. Those that exist may occasionally be "raw" but predominantly the areas are revegetated and relatively stable.	6
c. Fair: Frequency and / or magnitude of the mass wasting situation increases to the point where normal high water (bankfull or a little less) aggravates the problem of channel changes and subsequent undercutting or unstable areas with increased sedimentation.	9
d. Poor: Mass wasting is not difficult to detect.	12
3. "Debris Jam" includes those floatable objects that have been deposited on stream banks, in the floodplain, by man or by natural processes. It usually consists of tree trunks, limbs, twigs, and leaves. It forms obstructions, flow deflectors, and sediment traps. This inventory item assesses the potential for increasing these impediments to the natural direction and force of flow where they now lay. The Pfankuch evaluation considers debris jams to be a negative influence on the stream channel except when it is protecting the floodplain banks (see 'Organic Debris Form' for percentages).	
a. Excellent: Some small debris may be present on the floodplain banks, but is essentially absent (< 10%).	2
b. Good: Some debris present but it is small enough to be floated away in time. Only small jams could be formed with this material alone (10 – 30%).	4
c. Fair: There is a noticeable accumulation of all sizes and the stream is large enough to float it away (31 – 50%).	6
d. Poor: Moderate to heavy accumulations are present due to fires, insect damage to trees, disease mortality, windthrow, and logging slash. High flows will float some debris away and the remainder will cause channel changes (> 50%).	8

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3.1 MODIFIED PFANKUCH CHANNEL STABILITY EVALUATION (LEVEL III)

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THE PFANKUCH WORKSHEET SHOULD BE FILLED OUT LAST AND AS A GROUP.

Description	Rating
4. "Vegetative Bank Protection" concerns the vegetative component in the floodplain. Factors to consider for this rating are the density of plant stems, varieties of vegetation, plant vigor, and recruitment.	
a. Excellent: Trees, shrubs, grass and forbs combined cover is more than 90% of the ground. Openings in the ground covers are small and evenly dispersed. A variety of age classes and species are represented. Growth is vigorous and reproduction of species in both the under- and over-story is proceeding at a rate to insure continued ground cover conditions. A deep dense root mat is inferred.	3
b. Good: Plants cover 70 to 90 percent of the ground. Shrub species may be more prevalent than trees. Openings in the tree canopy are large. While the growth vigor is generally good for all species, recruitment of new individuals may be sparse or lacking entirely. A deep root mat is not continuous and more serious erosive incursions are possible in the openings.	6
c. Fair: Plant cover ranges from 50 to 70 percent. Lack of vigor is evident in some individuals and / or species. Seedling reproduction is nil. Most of the floodplain does not have a deep root mat.	9
d. Poor: Less than 50 percent of the ground is covered. Trees are essentially absent. Shrubs largely exist in scattered clumps. Growth and reproduction vigor is generally poor. Root mats discontinuous and shallow.	12
UPPER BANK TOTAL	
B. "Lower Banks" is the area between bankfull and base flow. Aquatic, semi-aquatic, and terrestrial plants may grow here.	
1. "Stream Balance". Stream is in balance with its watershed, neither aggrading nor degrading. Rosgen channel type, including sinuosity and stream gradient should be appropriate for the valley type, with no major indicators of erosion or deposition. Indicators of unstable channels are excessive/manipulated straightness (G or F), entrenched channel (F or G), excessive sediment (D or F) or sediment deposits/bar features. Record as poor if channel has been straightened/canalized, there is excess bank erosion or sediment deposits or where D,G or F channel types occur where they shouldn't.	
a. Excellent: Channel is stable, with well vegetated banks, obvious bankfull features, no incision or excess sediment features = reference channel	1
b. Good: Channel is slightly disturbed mostly by natural causes. small amountof aggrading or entrenchment occurring, but overall channel is functional.	2
c. Fair: Channel is very disturbed, with eroding banks/incision or widening and becoming shallower and sediment laden. Channel type may be changing from its stable form to a G or F or D stream type.	3
d. Poor: Channel is non-functional with deep incision on both banks, a conversion to G or F stream type , or has aggraded and contains many excess bar/sediment features.	4
2. "Surface Protection" refers to the composition of bank materials which prevent erosion due to freeze/thaw activity and the near bank stress of bankfull or high flows. Look at root density and cobble armoring for this evaluation (See → Section 2.9).	
a. Excellent: Greater than 75% of bank surface area is protected by dense root mats or cobble armoring.	2
b. Good: Between 50-75% of bank surface area is protected by dense root mats or cobble armoring.	4
c. Fair: Between 25-50% of bank surface area is protected by dense root mats or cobble armoring.	6
d. Poor: Less than 25% of bank surface area is protected by dense root mats or cobble armoring.	8

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3.1 MODIFIED PFANKUCH CHANNEL STABILITY EVALUATION (LEVEL III)

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THE PFANKUCH WORKSHEET SHOULD BE FILLED OUT LAST AND AS A GROUP.

Description	Rating
3. "Obstructions to Flow" is an inventory of objects within the stream channel, like rocks, embedded logs, bridge pilings, etc., that change the flow and sometimes the velocity. Obstructions may produce adverse stability effects when they increase the velocity and deflect the flow into unstable and unprotected banks and across unstable bottom materials. They also may produce favorable impacts when velocity is decreased by turbulence and pools are formed (See → Section 2.9).	
a. Excellent: Logs, rocks, and other obstructions to flow are firmly embedded and produce a pattern of flow which does not erode the banks and bottom or cause sediment buildup. Pool/riffle relationship stable.	2
b. Good: Obstructions to flow and sediment traps are present, causing cross currents which create some minor bank and bottom erosion. Some of the obstructions are newer, not firmly embedded and move to new locations during high flows. Some sediment is trapped in pools decreasing their capacity.	4
c. Fair: Moderately frequent and quite often unstable obstructions, cause noticeable seasonal erosion of the channel. Considerable sediment accumulations behind obstructions.	6
d. Poor: Obstructions and traps are common, are often unstable to movement and cause a continual shift of sediments at all seasons. Since traps are filled as soon as formed, the channel migrates and widens.	8
4. "Cutting" or downcutting of the channel is preempted first by scouring, uprooting, and loss of vegetation. In channels devoid naturally of vegetation, the first stages would be an increase in the steepness of the channel banks. If plant roots bind the surface horizon of the adjacent upper bank into a cohesive mass, undercutting will follow. Eventually the weight of the overhang will slump into the channel. Unconsolidated banks with or without vegetation will be nibbled away and never develop an overhang. See → Section 2.9.	LB RB
Notice that you must evaluate both the left bank and the right bank of the rated reach.	2 2
a. Excellent: Very little or no cutting is evident. Overall <5% of bank length is erosional.	
b. Good: Some intermittent cutting along channel outcurves and at prominent constrictions. Banks moderately stable with 5-30% of bank length erosional.	3 3
c. Fair: Significant bank cutting occurs frequently in the reach. Banks moderately unstable with 30-60% of bank length eroding.	6 6
d. Poor: Nearly continuous bank cutting. Banks unstable; 60-100% of bank length is eroding.	8 8
LOWER BANK TOTAL	
C. Channel "Bottom" condition is the evaluation of sediment deposition within the bankfull channel.	
1. Bottom Deposits" is the evaluation of how well the channel is moving its sediment downstream. Ideally, there should be a defined thalweg, riffles, and pools. However, you have to be the judge whether or not this is the naturally occurring condition for that ecosystem. Some low gradient desert streams may be the exception. Calculate the percentage of silt & sand particles (< 2mm) from →Section 2.15.	
a. Excellent: A stream channel that is in balance with its watershed. Less than 20% of the stream bed is affected by sediment deposition.	6
b. Good: Some deposition occurring in the pools. For the whole reach, 20-50% of the bottom is experiencing some deposition.	12
c. Fair: Deposition is quite noticeable. 50-80% of the channel is affected. Sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools and riffles, and stream braiding may be occurring.	18
d. Poor: Very noticeable deposition occurring over more than 80% of the reach. Pools and riffles mostly or entirely absent.	24

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THE PFANKUCH WORKSHEET SHOULD BE FILLED OUT LAST AND AS A GROUP.

Description	Rating
2. "Bar Development and Deposition" plays a vital role in alluvial C, D, and F stream types. Not applicable to A, B, E, G type streams and geologically constrained streams (score as 4). The appearance of sand and gravel bars where they did not previously exist may be one of the first signs of upstream erosion.	
a. Excellent: Little or no enlargement of point bars; sand bars are stable and completely vegetated.	4
b. Good: Some new increase in bar formation, mostly from gravel, sand or fine sediment; sand bars stable but not completely vegetated.	8
c. Fair: Moderate deposition on new gravel, sand or fine sediment on old and new bars; sand bars unstable with sparse vegetation.	12
d. Poor: Heavy deposits of fine material; increased bar development; sand bars unstable with no vegetation; transverse bars may be present.	16
3. "Reachwide Embeddedness" is an inventory of the degree of sedimentation in riffles and pools. (see →Section 2.16)	
a. Excellent: Gravel and cobble particles are 0 - 25% surrounded by fine sediment.	2
b. Good: Gravel and cobble particles are 25 - 50% surrounded by fine sediment.	4
c. Fair: Gravel and cobble particles are 50 - 75% surrounded by fine sediment.	6
d. Poor: Gravel and cobble particles are more than 75% surrounded by fine sediment, or there is an absence of riffles and pools.	8
CHANNEL BOTTOM TOTAL	
Sum of "Upper Banks", "Lower Banks", and "Channel Bottom"	
Final Pfankuch Score (Sum of all categories X 1.226)	
Rosgen Stream Type	
Pfankuch Rating category (Good, Fair, Poor)	

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Sediment Supply Condition (use Bottom Deposits & Bar Deposition parameters to evaluate)	Stream Bed Stability	Width Depth Ratio
☐ Extreme – Substrate is nearly all runs, few if any riffles and/or mid, side-channel or delta bars are present throughout the reach ☐ Very High – Loss of pool & riffle habitat due to sedimentation and/or excess bar features are present ☐ High – Stream bottom is moderately affected by sedimentation and/or excess bar features are present ☐ Low – Stream bottom is not affected by sedimentation and there are no excess bar features	☐ Aggrading – Excess bottom deposits and/or bar features are present indicating increased sedimentation, channel is likely wide and shallow ☐ Degrading – Lack of fine sand & gravel compared to bar feature materials; vertical raw banks are usually present ☐ Stable – No excess bar features or excess sediment in pools	☐ Very High - Substrate is nearly all runs with no defined thalweg, and/or mid, side-channel or delta bars are present throughout the reach; probably wide and shallow ☐ High – Some loss of riffle or pool habitat, some excess bar features ☐ Normal – riffle & pool habitat is maintained for that channel type

CONVERSION OF STABILITY RATING TO REACH CONDITION BY STREAM TYPE (ROSGEN, 1996)

Stream Type	A1	A2	A3	A4	A5	A6	B1	B2	B3	B4	B5	B6
GOOD	38-43	38-43	54-90	60-95	60-95	50-80	38-45	38-45	40-60	40-64	48-68	40-60
FAIR	44-47	44-47	91-129	96-132	96-132	81-110	46-58	46-58	61-78	65-84	69-88	61-78
POOR	48+	48+	130+	133+	133+	111+	59+	59+	79+	85+	89+	79+
Stream Type	**C1**	**C2**	**C3**	**C4**	**C5**	**C6**	**D3**	**D4**	**D5**	**D6**		
GOOD	38-35	38-35	60-85	70-90	70-90	60-85	85-107	85-107	85-107	67-98		
FAIR	51-61	51-61	86-105	91-110	91-110	86-105	108-132	108-132	108-132	99-125		
POOR	62+	62+	106+	111+	111+	106+	133+	133+	133+	126+		
Stream Type	**DA3**	**DA4**	**DA5**	**DA6**	**E3**	**E4**	**E5**	**E6**				
GOOD	40-63	40-63	40-63	40-63	40-63	50-75	50-75	40-63				
FAIR	64-86	64-86	64-86	64-86	64-86	76-96	76-96	64-86				
POOR	87+	87+	87+	87+	87+	97+	97+	87+				
Stream Type	**F1**	**F2**	**F3**	**F4**	**F5**	**F6**	**G1**	**G2**	**G3**	**G4**	**G5**	**G6**
GOOD	60-85	60-85	85-110	85-110	90-115	80-95	40-60	40-60	85-107	85-107	90-112	85-107
FAIR	86-105	86-105	111-125	111-125	116-130	96-110	61-78	61-78	108-120	108-120	113-125	108-120
POOR	106+	106+	126+	126+	131+	111+	79+	79+	121+	121+	126+	121+

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3.2 PROPER FUNCTIONING CONDITION WORKSHEET

INSTRUCTIONS: IF 75% OR MORE OF STREAM REACH IS PFC, CLASSIFY ENTIRE REACH AS PFC. "NO" ANSWERS MUST HAVE COMMENTS IN THE "PFC COMMENTS" SECTION. ANSWERS CAN GO ON THE LINE BETWEEN "YES" AND "NO", BUT CONSIDER IT A "NO" AND COMMENT IN NOTES SECTION. FILL OUT LAST AND AS A GROUP.

Yes	No	N/A	Description
			1) Floodplain is inundated in "relatively frequent" events (1-3 years)? Bankfull indicators present. Bankfull events occur regularly can be identified from top of the point bars, changes in vegetation, topographic break in slope, change in size of bank materials, evidence of an inundation feature such as small benches, exposed root hairs below an intact soil layer indicating exposure to erosive flow, and bank undercuts. "NO" if channelization or entrenchment. "N/A" if a "V"-canyon without floodplain development (A & B stream types).
			2) Active/stable beaver dams present? Usually "N/A", but beaver have been documented in many places including the San Pedro River and at high altitude sites; also, consider the present environment (could they be present).
			3) Sinuosity, width/depth ratio, and gradient are in balance with the landscape setting (i.e., valley type)? Based on the stream type expected within the current valley type (See SOP Section 7.4.1.1). All three features must indicate stability for a "YES". "NO" if straightness (G or F), excessive sediment (D), or entrenched channel (F)(eg. If there is a straightened "G" channel where there should be a "C" type channel in an alluvial basin valley type).
			4) Riparian zone is widening or has achieved its potential extent? Widening can mean woody or herbaceous plants encroaching on the channel as well as moving toward the terraces. The age of the vegetation is an indicator. "NO" if upland species encroaching on the floodplain or Kentucky bluegrass present. "YES" if recruitment of wetland/riparian species (seedlings or saplings). "N/A" if an A stream type or some B type channels with little woody riparian vegetation.
			5) The upland watershed is not contributing to riparian degradation? "YES" if no excess sediment (e.g. plants on pedestals, debris dams around plants, rills, gullies). "NO" if signs of excess sediment or erosion present (such as side channel and mid-channel bars, gullies, fan shaped deposits from tributaries, braided channels, overloading of point bars, or cementing of streambed).
			6) Diverse (3) age structure of vegetation (Recruitment for maintenance/recovery)? "YES" if 3 age classes (mature, young, saplings) present for a single species, or young and sapling classes if recruitment & replacement is occurring, or dense matting of herbaceous riparian/wetland plants in alpine meadow streams. "NO" if individual plants. "N/A" if A1 Stream Type. Refer to → Section 2.23 'Regeneration Potential of Riparian Trees'.
			7) Diverse composition of vegetation (For recruitment/recovery)? This is a presence/absence indicator. Maintenance means recruitment. Is it occurring? "YES" if several different species present (e.g. willows, rushes, sedges). However, it depends on the elevation and the potential natural community that might be present if all human stresses are removed. In some environments such as alpine meadow streams, 2 herbacious species could be a "YES". Usually "NO" if 1 species present, the exceptions are sometimes high meadow streams. Refer to → Section 2.24, 'Regeneration Potential of Riparian Trees'.
			8) Species present indicate maintenance of riparian soil moisture characteristics? Don't consider quantity. "YES" if sedges, rushes, willows, seep willows, alders, cottonwoods, etc. See 'Riparian Species' → Section 2.23.
			9) Stream bank vegetation is comprised of those plants or plant communities that have root masses capable of withstanding high stream flow events? Look for sufficient vegetation and root masses to protect banks from eroding during high flow events greater than bankfull. Q9 is similar to Q8, but you are now looking for quantity. "NO" if upland species are present within the bankfull channel. "YES" if willows, alder, aspen, birch, cottonwood, sedge, rush, bulrush, and wetland grasses.

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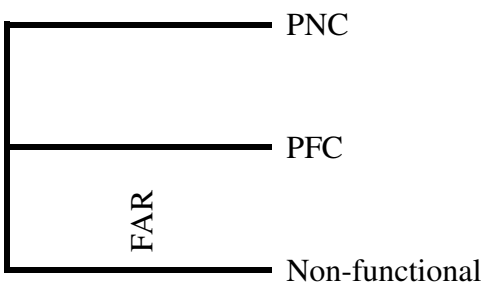
Yes	No	N/A	Description
			10) Riparian plants exhibit high vigor? Are the plants healthy and dense? "NO" if yellow leaves, stunted plants, many dead stems and branches, a thin crown, infested with insects, diseased, or grazed down by browsers.
			11) Adequate vegetative cover (>80%) present to protect banks and dissipate energy during high flows? This is a quantity question. Use 80% cover as a guide. Look for riparian plants, herbaceous cover, salt cedar (tamarisk), seep willows, etc. "NO" if "NO" on Q9. If Q6-Q10 is "NO", this is probably a "NO".
			12) Plant communities in the riparian area are an adequate source of coarse and/or large woody debris? "YES" if any large woody vegetation or fallen trees present. Usually "N/A" for meadows, desert streams, and probably intermediate elevation streams, or sedge/grass community streams. "
			13) Floodplain and channel characteristics (i.e., rocks, coarse and/or large woody debris) adequate to dissipate energy? "YES" if large boulders, roughness of the floodplain, large trees and dense vegetation along stream banks. "NO" if incision and no access of stream to floodplain.
			14) Point bars are revegetating? Applies mainly to "C" channel types. "YES" if sedge/rush components are present. Consider potential, height and newness of the point bar. Sandy soils don't hold water well and there may be no potential for revegetation. A Stream Type is "N/A". Recent drought or flood = between yes and no.
			15) Lateral stream movement is associated with natural sinuosity? "YES" if single channel, stable banks (especially on straight segments), and natural deposition. "NO" if straight channel, not confined geologically, and if there is channel movement with every high flow event.
			16) System is vertically stable? "NO" if incised banks, entrenchment, excessive aggradation (excess bar features, excess sand and fine particle sizes), unstable vertical banks. "YES" if streambed is armored with large rock, bedrock, large gravel. Don't consider old down cutting. If a bedrock stream then "N/A".
			17) Stream is in balance with the water and sediment being supplied by the watershed (i.e., no excessive erosion or deposition)? "NO" if excessive sediment from side drainages, excessive aggradation, mid-channel bars, braiding, or unstable banks. "NO" if Q5 is "NO".

Functional Rating		Circle where you think the Functional Rating Is
☐	Proper Natural Condition	
☐	Proper Functioning Condition	
☐	Functional at risk, downward trend	
☐	Functional at risk, upward trend	
☐	Functional at risk, no apparent trend	
☐	Non-Functional	
	Percent of Ideal Condition (= number of yes's / number of parameters used)	

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3.2 PROPER FUNCTIONING CONDITION COMMENTS

Provide justification for any "NO's" in the PFC Worksheet and any other comments below.

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3.3 HABITAT ASSESSMENT

Habitat Parameter	Optimal	Sub-optimal	Marginal	Poor
Habitat Quality (use reach habitat quality table, →Section 2.9)	Large variety of habitats available for colonization which may include cobble, undercut banks, snags, submerged logs, leaf packs, root masses, macrophyte beds or other organic material.	Moderate variety of habitats which may include cobble, leaf packs, root masses, macrophyte beds or other organic material.	Habitat has minimal variety, substrate dominated by one particle size, may have some cobble, macrophyte beds, or algae beds.	Homogeneous substrate dominated by sand, shallow with uniform velocity, no shade on riffles, may have extensive filamentous algae beds.
Score	**4**	**3**	**2**	**1**
Extent of Riffle Habitat (use riffle geometry table, →Section 2.20)	Well developed riffle that is as wide as stream and its length extends 2x the wetted width of the stream.	Riffle is as wide as stream, but is less than 2x stream width; abundance of cobble; boulders and gravel are common.	Reduced riffle area does not extend across entire cross-section and is less than 2x width; gravel or large boulders and bedrock prevalent; cobble present.	Riffles virtually non-existent; sand, gravel, large boulders or bedrock prevalent; cobble lacking.
Score	**4**	**3**	**2**	**1**
Embeddedness of Riffles (use visual based embeddedness, in → Section 2.13)	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment (bedrock is 0% embedded).	Gravel, cobble, and boulder particles are 26-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 51-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment (sand is 100% embedded).
Score	**4**	**3**	**2**	**1**
Reach Sediment Deposition (use reach pebble count →Section 2.15)	Point bars in C type channel maintained, no mid-channel or side bars. No bimodal particle size distribution. No excess sediment in riffles and pools of A, B, or C type channels.	Point bars with few mid-channel bars or side bars in C type channels. No bimodal particle size distribution. Some filling in of pools in A, B, and C type channels.	Numerous mid-channel or diagonal bars in C type channels. Some loss of pool and riffle habitat in A, B, and C type channels. Bimodal distribution may be present with excess fines in the substrate.	Branched or braided C channel with numerous mid-channel bars and islands, some exceeding 2-3x channel width in length. Heavy deposits of fine material evident with bimodal particle distribution. Pools and riffles filled in, with run habitat dominating.
Score	**4**	**3**	**2**	**1**
Bank Stability within the active bankfull channel (score each bank)	Banks stable; no evidence of erosion or bank failure; <5% of bank length affected.	Banks moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank length in reach has areas of erosion.	Banks moderately unstable; 30-60% of bank length in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; 60-100% of bank length has erosional scars.
Score Left Bank	**2**	**1.5**	**1**	**0.5**
Score Right Bank	**2**	**1.5**	**1**	**0.5**

Sum of Habitat Scores		Rating Category		
		0 – 7	8 – 14	15 - 20
		☐ Very Impaired	☐ Impaired	☐ Good Condition

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3.4 SITE SKETCH

Instructions: Draw the sampling reach. Include the items in the upper right corner. Check boxes to verify that each item has been included. Also include items of interest such as snags, submerged logs, undercut banks, areas of stable cobble habitat, type of bar formations, and areas with cut or eroding banks. A GPS, topo map or areal photo will help get your bearings and make a better map.

☐	North Arrow
☐	Riffles
☐	Pools (Nutrient Deposition Areas)
☐	Water Sample Location
☐	Bug Sampling Locations
☐	Riparian Zone
☐	Riparian Plants
☐	Floodplain width
☐	Direction of flow

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3.5 FIELD NOTES

NOTE ANY DEVIATIONS FROM STANDARD OPERATING PROCEDURES, CHANGE IN SAMPLE LOCATION, CHANGE IN FLOW CONDITIONS, HABITAT CONDITION FOR BUGS, FISH AND ALGAE, FLAGGED OR QUALIFIED INFORMATION, EXCESS SEDIMENT, AND ANY OTHER USEFUL INFORMATION REGARDING DATA COLLECTED AT THIS SITE.

3.6 PHOTO DOCUMENTATION

Upstream		**Downstream**		**Other**	

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