BRITISH COLUMBIA Forest and Range Evaluation Program

Riparian Management Routine Effectiveness Evaluation

Sample No. _____ Date: Y Y Y Y / M M / D D Evaluator(s) _____

Stream/Opening Identification

District: _____ Opening ID: _____ Licensee: _____

Forest Licence: _____ Block: _____ Harvest Year: _____

Range Licence: _____ Range Unit: _____

Stream Name: _____ Stream Location: In block ☐ Beside block ☐

Stream Class on plans: _____ Stream Class in field: _____ Reach length (m): _____

Reach Location: _____ to _____ m US ☐ DS ☐ from _____

UTM at US ☐ DS ☐ end of reach: Zone: ____ East: _____ North: _____

Channel width (m): _____ Channel depth (m): _____ Channel Gradient (%): _____

Channel Morphology: Riffle/pool or Cascade/pool ☐ Step/pool ☐ Non-alluvial ☐

Riparian Retention Information in RMA

	Left Side	Right Side
Average distance (m) from stream edge to merchantable trees:		
Average distance (m) from stream edge to first signs of current harvesting (partial or complete, max. 100 m):		
Average distance (m) from stream edge to start of complete harvesting (i.e. a road or clearcut, max. 100 m):		

	Dominants & codominants on left side	Dominants & codominants on right side	Understory on left side	Understory on right side
% Retention in first 10 m of the RMA (all classes)				
% Retention in rest of the RRZ (for S1, S2, S3)				
% Retention in rest of the RMZ (all classes)				

Photo Section

Photo #	Photo Description

Sample No. _____

Field Data

Question Indicator	Point Indicators (Measure at 6 equidistant points or transects along the reach)							Total	Mean
	Transect No.	1	2	3	4	5	6		
Q7(a)	% Moss								
Q8 (a)	% Fines/sands								
Q9 (a)	No. sensitive invertebrate types								
Q9 (b)	No. major invertebrate groups								
Q9 (c)	No. insect types								
Q9 (d)	Total No. invertebrate types								
Q13 (b)	% Shade								
Q14 (a)	% Disturbance - increaser species								
Q14 (b)	% Noxious weeds/invasives								

Record the number of different types of invertebrates observed in each sub-group, at each transect sampled. The numbers recorded under each "transect number" are the numbers you use to complete the point indicators table above.

			Transect Number					
Major Group	Sub Group	Sensitivity	1	2	3	4	5	6
Insects	Mayflies 	Yes						
	Stoneflies 	Yes						
	Caddisflies 	Yes						
	Chironomids ('midges') 	No						
	Other Diptera 	No						
	Riffle beetle larvae 	Yes						
	Other beetle larvae, adults 	No						
Bivalves	Clams, mussels 	Yes						
Snails	Right side snails 	Yes						
	Left side snails 	No						
Flatworms	Flatworms (“Planaria”) 	No						
Nematodes	Nematodes 	No						
Worms	Segmented worms 	No						
Crustaceans	Crustaceans 	No						
Arachnids	Spiders, mites 	No						
	Others (Consult field guide in Appendix 2 of Protocol for identification of "other" invertebrates and their sensitivity)							

Sample No. _____

Field Data					
Question (Indicator) No.	**Stream Type**	**Continuous Indicators** (These are measured all along the reach to determine total length, numbers or areas present, as appropriate. Record the totals in the "Total" column, even if the total is an estimate. Calculate the percentage of the reach length, riparian area or number of trees represented by each total.)		**Total**	**%**
Q1(a)	RC	Mid-channel bars, wedges (m) measure all but no overlap			
Q1(c)	RC	Lateral bars (m) measure all but no overlap			
Q1(b,c)	RCS	Multiple or braided channels (m) measure all but no overlap			
Q1(a)	Non-alluvial	Moss along the channel bed (m) measure all but no overlap			
Q2	All	Non-erodible banks (m) only measure where naturally non-erodible on both sides			
Q2(a,a,b)	All	Recently disturbed bank (m) measure both sides, but no overlap			
Q2(c,c)	RCS	Stable undercut bank (m) measure both sides, but no overlap			
Q2(b,b,a)	All	Deep rooted bank (m) measure both sides, but no overlap			
Q2(d,d,c)	All	Upturned bank root wads (m) measure both sides, but no overlap			
Q4(a)	RC	Pool length (m)			
Q10	All	No. New windthrow			
Q10	All	No. Old windthrow			
Q10	All	No. Standing trees			NA
Q11(a)	All	Bare soil in first 10m (m^2)			
Q13(a)	All	Bare soil exposed to rain in first 10m (m^2)			
Q11(b)	All	Bare soil in first 10m, plus all bare soil hydrologically connected to first 10m (m^2)			
Q11(c)	All	Disturbed ground in first 10m (m^2)			
Q11(d)	All	Disturbed ground in first 10m, plus all disturbed ground hydrologically connected to first 10m (m^2)			

% New Windthrow = (# New Windthrow) / (# New Windthrow + # Standing Trees) X 100
% Old Windthrow = (# Old Windthrow) / (# Old Windthrow + # New Windthrow + # Standing Trees) X 100

Sample No. _____

Other Indicators to Note (Answer Yes, No, or NA as appropriate for the Questions)				
Q01-04	**Boulder Line/Step Pool Characteristics - For Step-Pool Streams Only** (Use Table 1 to help answer the questions)	**Yes**	**No**	**NA**
Q1(a)	Do 50% or more of the boulder lines/steps span the channel?	☐	☐	☐
Q1(b)	Do 25% or more of the boulder lines/steps have moss?	☐	☐	☐
Q4(a)	Do 25% or more of the boulder lines/steps have plunge pools as deep as the largest rock in the line?	☐	☐	☐
Q4(b)	Do cascades lacking boulder lines/steps represent less than 25% of the reach?	☐	☐	☐
Q01	**Sediment and LWD Storage Characteristics - For Non-Alluvial Streams Only**			
Q1(b)	Do sediment and/or LWD deposits that completely fill the channel up to the top of the banks represent less than 5% of the reach length?	☐	☐	☐
Q1(c)	Are sediment deposits widely distributed in small pockets along the stream reach, not concentrated in a few relatively large compartments?	☐	☐	☐
Q03	**Wood Characteristics** (Use Table 2 to help answer the questions. Q3(b) is NA for non-alluvial streams)			
Q3(a)	Is the wood in the channel mainly old?	☐	☐	
Q3(b)	Do 1-12 accumulations of wood span the channel?	☐	☐	☐
Q3(c,c,b)	Do half or more of the wood accumulations present lack new wood?	☐	☐	
Q3(d,d,c)	Is the wood in the channel mainly across or diagonal to the main axis of the stream?	☐	☐	
Q3(e,e,d)	Is the wood in the channel intact; i.e., not recently lost or removed by hand, catastrophic floods, debris flows, debris torrents?	☐	☐	
Q04	**Surface Sediment Texture - For Riffle and Cascade Pool Streams Only**			
Q4(b)	Is the texture of the surface substrate mainly heterogenous?	☐	☐	☐
Q04	**Deep Pools - For Riffle, Cascade, and Step Pool Streams Only**			
Q4(b)	Are two or more deep pools present? (Tip: A deep pool is a pool whose depth from the deepest spot of the pool to the top of the bank is twice the same depth at riffle crests)	☐	☐	☐
Q05	**Connectivity**			
Q5(a)	Are temporary blockages to fish, sediment or debris absent?	☐	☐	
Q5(b)	Is down-cutting that blocks fish movements or isolates the channel from the adjacent floodplain absent?	☐	☐	
Q5(c)	Are sediment or debris buildups absent at or in all crossing structures?	☐	☐	☐
Q5(d)	Is down-cutting below any crossing structure that blocks fish movements upstream by any size fish at any time absent?	☐	☐	☐
Q5(e)	Are all crossing structures on fish bearing streams open-bottomed structures?	☐	☐	☐

Sample No. _____

Other Indicators to Note (Answer Yes, No, or NA as appropriate for the Questions)				
		Yes	**No**	**NA**
Q5(f)	Is dewatering absent?	☐	☐	
Q5(g)	Are trails, roads or levees that isolate off-channel areas or divert normal overland flow away from the reach absent?	☐	☐	
Q5(h)	Is all water in the stream still flowing in its original channel, not withdrawn or diverted elsewhere?	☐	☐	
Q06	**Fish Cover Diversity – For Fish-Bearing Streams Only** (To be considered present, each type of cover should cover 1% or more of the total channel area)			
Q6(a)	Are deep pools present?	☐	☐	☐
Q6(b)	Are unembedded boulders present?	☐	☐	☐
Q6(c)	Is woody debris or other organic debris present?	☐	☐	☐
Q6(d)	Are undercut banks present?	☐	☐	☐
Q6(e)	Is aquatic vegetation present?	☐	☐	☐
Q6(f)	Is overhanging vegetation present?	☐	☐	☐
Q6(g)	Are there stable gravels and cobbles present with spaces for fish to hide in?	☐	☐	☐
Q08	**Fine Inorganic Sediments**			
Q8(a)	Is the channel free of fine or sand/sized inorganic sediments that “blanket” the streambed anywhere?	☐	☐	
Q8(c)	Is the substrate mostly unembedded?	☐	☐	
Q8(b)	Is the channel free of “quick sand” or “quick gravel”?	☐	☐	
Q13	**Bank Microclimate**			
Q13(c)	Are moisture-loving plants present and in good condition?	☐	☐	
Q13(d)	Are the bank soils all moist and cool?	☐	☐	
Q15	**Riparian Structure** (Use Table 3 to help answer this question)			
Q15(a)	Does the distribution and relative abundance of the vegetation layers and forest components present collectively approach 75% of what the healthy unmanaged riparian plant community would normally have along the reach?	☐	☐	
Q15	**Riparian Form, Vigor, and Recruitment** (Use Table 4 to help answer this question)			
Q15(b)	Does the form, vigor and recruitment of the vegetation layers or forest components present collectively approach 75% of what the healthy unmanaged riparian plant community would normally be along the reach?	☐	☐	
Q15	**Browsing, Grazing**			
Q15(c)	Are all shrubs free of heavy browsing?	☐	☐	
Q15(d)	Is most (90%) of the available forage free of heavy grazing?	☐	☐	

Sample No. _____

Field Data Summary Tables

Table 1. Boulder-line/step characteristics of step-pool type reaches (Q1B, Q4B)

Number of boulder lines/ steps	Number of channel spanning boulder lines/steps	Number of boulder lines/ steps with moss	Number of boulder lines/steps with a deep plunge pool	Length of reach with no boulder steps and plunge pools

Table 2. Wood characteristics of sample reach (Q3)

Number of wood accumulations	Number of wood accumulations with new wood	Number of channel spanning wood accumulations	Main age of wood in each accumulation (Record "O" for old, "N" for new)	Main orientation of wood in each accumulation (Record "P" for parallel, "X" for across or diagonal)

Table 3. Riparian Structure (Q15a). Using the table below, estimate whether the distribution or relative abundance of the forest components present collectively approach 75% of what the healthy unmanaged riparian plant community would normally be along the reach.

Snags (%)	Gaps (%)	Over-story trees (%)	Under-story trees (%)	Tall shrubs (%)	Low shrubs (%)	Herbs (%)	Mosses (%)	Lichens (%)	CWD (%)	Total (Sum of %'s)	Average % (Answer to Q15a)

Table 4. Riparian Vegetation Form, Vigor, and Recruitment (Q15b). Using Yes or No answers for each table cell below, determine if 75% or more of the cells have Yes answers, indicating that, collectively, form, vigor and recruitment is satisfactory.

	Snags	Gaps	Over-story trees	Under-story trees	Tall shrubs	Low shrubs	Herbs	Mosses	Lichens	CWD	Total possible number of Yes answers	Actual number of Yes answers	% of cells with Yes answers (Answer to Q15b)
Form													
Vigor	NA	NA								NA			
Recruitment													

Sample No. _____

Riparian Effectiveness Routine Evaluation Checklist

Question 1. Is the channel bed undisturbed?	**Yes** ☐	**No** ☐
Note: For Questions 1-4, decide what the predominant channel morphology is and then complete the section for that morphology only (i.e., Part A, B or C).		
A) Riffle-pool or cascade-pool channels		
a) Less than 50% of the reach length is occupied by active sediment wedges or mid-channel bars.	☐	☐
b) Less than 50% of the reach has active multiple channels and/or braids.	☐	☐
c) More than 50% of the reach has lateral bars.	☐	☐
If answer "Yes" to 2 or more, mark Yes box in Question 1.		
B) Step-pool channels		
a) More than 50% of the steps present span the channel.	☐	☐
b) More than 25% of the steps have moss.	☐	☐
c) Less than 25% of the reach has active multiple channels and/or braids.	☐	☐
If answer "Yes" to 2 or more, mark Yes box in Question 1.		
C) Non-alluvial channels		
a) Over 25% of the channel bed length has some moss on the substrate.	☐	☐
b) The channel has space for storage of sediments and debris; i.e., sediment and/or LWD do not fill the channel volume or spill over the banks for any significant distance.	☐	☐
c) Sediments are widely distributed throughout the channel. Sediments are not stored in a few relatively large compartments (e.g., wedged behind an accumulation of immobile rocks or organic debris).	☐	☐
If answer "Yes" to 2 or more, mark Yes box in Question 1.		

Please refer to "What is Stream Channel Morphology" in the riparian protocol for descriptions, tables and figures on channel morphology. If you are using the summary table that describes the general features of each type of channel morphology, base your decision on all the characteristics listed. Take into account all of the features, i.e., try not to focus on just one or two characteristics.

Sample No. _____

Question 2. Are the channel banks intact?	Yes ☐	No ☐
A) Riffle-pool or cascade-pool channels		
a) Less than 15% of the total reach length has banks recently disturbed by stream flows, windthrow, infilling, animals (hoof shear, watering sites, crossings), roads, or harvest and silviculture activities.	☐	☐
b) More than 65% of the banks on naturally erodible sections of the reach have deeply rooted vegetation (e.g., deep rooting grass species, shrubs, and trees - not moss, shallow rooting grass species, small herbs or forbs).	☐	☐
c) More than 50% of the naturally erodible reach length has stable (usually vegetated) undercut banks.	☐	☐
d) Less than 10% of the total reach length has recently upturned (wind thrown) root wads along the banks.	☐	☐
If answer "Yes" to 3 or more, mark Yes box in Question 2.		
B) Step-pool channels		
a) Less than 10% of the total reach length has banks recently disturbed by stream flows, windthrow, infilling, animals (hoof shear, watering sites, crossings), roads, or harvest and silviculture activities.	☐	☐
b) More than 75% of the banks on naturally erodible sections of the reach have deeply rooted vegetation (e.g., deep rooting grass species, shrubs, and trees - not moss, shallow rooting grass species, small herbs or forbs).	☐	☐
c) More than 50% of the naturally erodible reach length has stable (usually vegetated) undercut banks.	☐	☐
d) Less than 25% of the total reach length has recently upturned (wind thrown) root wads along the banks.	☐	☐
If answer "Yes" to 3 or more, mark Yes box in Question 2.		
C) Non-alluvial channels		
a) More than 75% of the banks on naturally erodible sections of the reach have deeply rooted vegetation (e.g., deep rooting grass species, shrubs or trees - not moss, shallow rooting grass species, small herbs or forbs).	☐	☐
b) Less than 10% of the total reach length has banks recently disturbed by stream flows, windthrow, infilling, animals (hoof shear, watering sites, crossings), roads, or harvest and silviculture activities.	☐	☐
c) Less than 25% of the total reach length has recently upturned (wind thrown) root wads along the banks.	☐	☐
If answer "Yes" to 2 or more, mark Yes box in Question 2.		

Please refer to the Riparian Protocol for more descriptions of stable, vegetated undercut banks versus unstable, overhanging banks.

Sample No. _____

Question 3. Are channel LWD processes undisturbed?	Yes ☐	No ☐
Note: The words "recent" and "recently" refer to the age of the riparian management activity being assessed.		
A) Riffle-pool or cascade-pool channel		
a) Most wood is old and does not appear to have been recently deposited.	☐	☐
b) One to twelve accumulations of wood **span** the channel.	☐	☐
c) Half or more of all wood accumulations lack new wood (e.g., branches, treetops, bark, small logs with cut ends, recently crushed or shattered logs).	☐	☐
d) Wood oriented parallel to the channel banks (particularly small logs and limbs with lengths much less than the bankfull channel width) is not abundant, relative to the total amount of wood present.	☐	☐
e) There is no indication that natural wood was recently removed from the channel by hand, slides, torrents or catastrophic floods.	☐	☐
If answer "Yes" to 4 or more, mark Yes box in Question 3.		
B) Step-pool channel		
a) Most wood is old and does not appear to have been recently deposited.	☐	☐
b) One to twelve accumulations of wood are present in the channel.	☐	☐
c) Half or more of all wood accumulations lack new wood (e.g., branches, treetops, bark, small logs with cut ends, recently crushed or shattered logs).	☐	☐
d) Wood oriented parallel to the channel banks (particularly small logs and limbs with lengths much less than the bankfull channel width) is not abundant, relative to the total amount of wood present.	☐	☐
e) There is no indication that natural wood was recently removed from the channel by hand, slides, torrents or catastrophic floods.	☐	☐
If answer "Yes" to 4 or more, mark Yes box in Question 3.		
C) Non-alluvial channel		
a) Most wood is old and does not appear to have been recently deposited.	☐	☐
b) Half or more of all wood accumulations lack new wood (e.g., branches, treetops, bark, small logs with cut ends, recently crushed or shattered logs).	☐	☐
c) Wood oriented parallel to the channel banks (particularly small logs and limbs with lengths much less than the bankfull channel width) is not abundant, relative to the total amount of wood present.	☐	☐
d) There is no indication that natural wood was recently removed from the channel by hand, slides, torrents or catastrophic floods.	☐	☐
If answer "Yes" to 3 or more, mark Yes box in Question 3.		

TIP: "Old" wood is wood that was present before the treatment (i.e., the most recent harvesting or road building). "New" wood means wood that was deposited after road building and harvesting was started. This could include stems or branches that were blown off trees after harvesting started.

TIP: If half or more of the reach length is completely filled with wood, consider this to be more than 12 accumulations of wood.

Sample No. _____

Question 4.	**Is the channel morphology intact?** (Mark NA if the channel is non-alluvial, and therefore lacking a riffle-pool, cascade-pool or step-pool morphology)	**Yes** ☐	**No** ☐	**NA** ☐
A) Riffle-pool or cascade-pool channel				
a)	Pools are present along >25% of the reach.	☐	☐	
b)	Surface sediment texture is heterogeneous and well sorted; i.e., the number and range of main sediment classes present (fines and sands, gravels, small and large cobbles, small and large boulders) is large and non-randomly distributed.	☐	☐	
c)	At least two deep pools are present. (A deep pool is a pool with a channel depth twice the average channel depth at riffle crests).	☐	☐	
If answer "Yes" to 2 or more, mark Yes box in Question 4.				
B) Step-pool channel				
a)	Plunge pools are frequent (>25% of steps are associated with a plunge pool with depths similar to the size of the largest rock in the step).	☐	☐	
b)	The channel alternates almost exclusively between steps and pools (i.e. less than 25% of the channel consists of relatively long cascades).	☐	☐	
c)	At least two deep pools are present. (A deep pool is a pool with a channel depth twice the average channel depth at riffle crests).	☐	☐	
If answer "Yes" to 2 or more, mark Yes box in Question 4.				

TIP: A stream reach can have aspects of both a cascade-pool and a step-pool morphology. Use the predominant morphology to decide which set (A or B) of indicator statements to use.

TIP: Steep streams (with gradients between approximately 5-15%) that look like long cascades could be step-pool streams that are filled in with abundant sediment. Even steeper streams (with gradients much greater than 15%) are probably non-alluvial, especially small streams.

TIP: Only measure the lengths of the main pools present. These are the pools that extend from one side of the wetted channel to the other. Do not include the small pools that are often present behind boulders in riffles or cascades or the small backwater or back eddy pools that might be present along the margins of riffles and cascades.

Sample No. _____

Question 5.	Are all aspects of the aquatic habitat sufficiently connected to allow for normal, unimpeded movements of fish, organic debris, and sediments?	Yes ☐	No ☐	NA
a)	Temporary blockages to fish, debris or sediments because of accumulations of debris or sediments are absent.	☐	☐	
b)	Down cutting in the main channel that now isolates the floodplain from normal flooding or blocks access to tributary streams or off-channel areas is absent.	☐	☐	
c)	Build-ups of sediment or debris above or within any crossing structures are absent.	☐	☐	☐
d)	There is no down cutting present below any crossing structure that blocks fish movements upstream by any size fish at any time.	☐	☐	☐
e)	On fish bearing streams, all crossing structures are open bottom structures.	☐	☐	☐
f)	Dewatering over the entire channel width due to excessive new accumulations of sediment is absent.	☐	☐	
g)	Off-channel or overland flow areas have not been isolated or cut off by roads or levees.	☐	☐	
h)	Water in the stream has not been withdrawn or diverted elsewhere.	☐	☐	
If the answer is "No" to any statements, mark the "No" box for Question 5.				

TIP: For Question 5, part (a), consider a temporary blockage a "blockage" if more than 2/3 of the flow seeps through or spills over the blockage when the water level is close to the rooted edge. Note that active beaver dams will almost always be temporary blockages.

TIP: "Down cutting" refers to channel incisement; i.e., the vertical movement of the channel downwards into the floodplain.

Question 6.	Does the stream support a good diversity of fish cover attributes? To qualify as cover, each cover attribute should represent at least 1% of the total stream area observed. (Mark NA if the stream is non-fish bearing; i.e., classes S5 or S6)	Yes ☐	No ☐	NA ☐
a)	Deep pool habitat is available.	☐	☐	
b)	Stable, unembedded boulders are present.	☐	☐	
c)	Stable rootwads, woody debris or other organic material that fish can hide in is present. "Other" organic debris is made up mostly of uncompacted leaf and/or wood particles that small fish can hide in.	☐	☐	
d)	Stable, deep-rooted undercut banks are present.	☐	☐	
e)	Submerged or emergent aquatic vegetation is present.	☐	☐	
f)	Overhanging vegetation is present within 1 m of the top of the channel.	☐	☐	
g)	Stable unembedded gravels and cobbles with void spaces for fish to hide in are present.	☐	☐	
If the answer is "Yes" for five or more statements, mark the "Yes" box. Otherwise, mark the "No" box.				

TIP: Question 6 is "NA" if the stream is non-fish bearing. Also, if there are no deep pools, there is no deep pool habitat.

Sample No. _____

Question 7. Does the amount of moss present in shallow areas of the channel indicate a stable and productive system? (Mark "NA" if the streambed is mainly organic. "Mainly" is when 90% of the reach is organic or 5 of the 6 point stations are 100% organic.)	Yes ☐	No ☐	NA ☐
a) Moss patches are easily observed from almost any point along the margins, riffles or shallow pools of the stream. Average coverage on mineral substrates only is 1% or more of the channel bed, from the toe of one bank to the toe of the other bank.	☐	☐	
b) Half or more of the moss present, even uncommon, occasional or rare patches are generally intact, not embedded with sediments, buried or damaged by scouring. Mark "NA" if no moss is present.	☐	☐	☐
c) Moss not scoured, silted or buried in sediment is generally vigorous, not stressed or dead. Mark "NA" if no moss is present.	☐	☐	☐
If the answer is "No" for any statement, mark the No box for Question 7. Otherwise, mark the Yes box.			

Question 8. Has the introduction of fine inorganic sediments been minimized? (Mark "NA" if the streambed is mainly organic. "Mainly" is when 90% of the reach is organic, or 5 of the 6 point stations are 100% organic.)	Yes ☐	No ☐	NA ☐
a) Inorganic ("gritty" feeling) fine and sand-sized sediments on the substrate are best described as little or lacking. Average coverage at point sites is less than 10%, with no sites over 50%, and no areas equal to 1% or more of the channel area between sites that can be described as "blanketed".	☐	☐	
b) Individual wetted areas of gravel, sand or fine sized sediments that a foot can be easily pushed or wiggled into are all smaller than an area equal to 1% of the total channel area. Mark "NA" if the stream is dry.	☐	☐	☐
c) Gravels and cobbles are not embedded or buried in a matrix of sand or finer sized particles. The sides of individual gravel and cobble particles can generally be seen touching each other.	☐	☐	
d) An average of one or more sensitive invertebrate type(s) is present at invertebrate sample sites. Mark "NA" if no invertebrates are found at all or the stream is dry.	☐	☐	☐
If the answer is "No" to any statement, mark the "No" box for Question 8. Otherwise, mark the "Yes" box.			

Question 9. Does the stream support a diversity of aquatic invertebrates? (Mark "NA" if no invertebrates at all are found or the stream is dry.)	Yes ☐	No ☐	NA ☐
a) An average of one sensitive invertebrate (e.g., a caddisfly, stonefly, mayfly or freshwater clam) is present at the sites sampled.	☐	☐	
b) An average of two different major invertebrate groups (e.g., insects, worms, crustaceans, etc.) is present at the sites sampled.	☐	☐	
c) An average of three recognizably different insects is present at the sites sampled.	☐	☐	
d) An average of four recognizably different invertebrates is present at the sites sampled.	☐	☐	
Mark the "Yes" box for Question 9 if two of the statements are "Yes". Otherwise, mark "No".			

Sample No. _____

Question 10. Has the vegetation retained in the RMA been sufficiently protected from windthrow?		Yes ☐	No ☐	NA
	a) The incidence of post-treatment windthrow in S1-S3 RRZs or S4-S6 RMZs with WTPs does not exceed 5% of the stems, over and above what occurs naturally in the area. Mark NA and answer 10 b) if there is no reserve zone, or management zone with wildlife trees or wildlife tree patches.	☐	☐	☐
	b) The incidence of post-treatment windthrow in S4-S6 RMZs that are not part of a WTP does not exceed 10% of the stems, over and above what occurs naturally in the area. Mark NA if there is a reserve zone or wildlife tree patch adjacent to the stream, and answer 10 a).	☐	☐	☐
	c) Designated wildlife trees are still standing, or if windthrown, still functional as wildlife trees (e.g., aboveground bear dens). Mark NA if there are no designated wildlife trees.	☐	☐	☐
	If the answer is "No" to any statement, mark the "No" box for Question 10. Otherwise, mark the "Yes" box.			

Calculating % Windthrow:

1. % Old Windthrow = $\frac{\text{(\# Old Windthrown Trees)}}{\text{(\# Standing Trees + \# Old Windthrown + \# New Windthrown)}}$ X 100

2. % New Windthrow = $\frac{\text{(\# New Windthrow)}}{\text{(\# Standing Trees + \# New Windthrow)}}$ X 100

To calculate % new windthrow over and above the natural pre-treatment windthrow, subtract (1) from (2).

Question 11. Has the amount of bare erodible ground or soil disturbance in the riparian area been minimized?		Yes ☐	No ☐
	a) Total bare erodible ground in the first 10 m of the riparian zone outside of active road areas is less than 1%.	☐	☐
	b) Total bare erodible ground present in the first 10 m of the riparian zone, plus all other bare erodible ground hydrologically linked to the first 10 m of riparian zone is less than 5%.	☐	☐
	c) Total area disturbed by animals or machinery in the first 10 m of the riparian zone is less than 10%.	☐	☐
	d) Total area disturbed by animals or machinery in the first 10 m of the riparian zone, plus all other disturbed areas hydrologically linked to the first 10 m of riparian zone is less than 15%.	☐	☐
	If the answer is "Yes" for all statements, mark the "Yes" box. Otherwise, mark the "No" box.		

TIP: Sediment deposited on the ground from upslope sources is considered bare ground for Question 11, but not if the sediment is deposited due to flooding (i.e., overbank deposits).

Sample No. _____

Question 12. Has sufficient vegetation been retained to maintain an adequate root network or LWD supply?		Yes ☐	No ☐	NA
a)	On all streams, nonmerchantable conifer trees, understory deciduous trees, shrubs, and herbaceous vegetation are present to the fullest extent possible within 5 m of the channel.	☐	☐	
b)	On S1 to S3 size streams, the first 10 m of the riparian reserve zone is intact (regardless of windthrow), thereby providing for 80% or more of the LWD normally supplied to streams with no additional inputs from upstream or the adjacent hillslopes.	☐	☐	☐
c)	On S4 streams, where the windthrow hazard was not assessed, or where windthrow hazard was assessed as not high, all windfirm trees with roots embedded in the bank, and 50% of all other trees (excluding dominant conifers) within 10 m of the stream bank are present.	☐	☐	☐
d)	On S4 streams, where the windthrow hazard was assessed as high, all conifers < 30 cm DBH are present within 10 m of the stream bank.	☐	☐	☐
e)	On valley bottom S5 streams with alluvial banks and a floodplain, 50% of dominant and codominant windfirm stems within 30 m of the stream bank are present.	☐	☐	☐
f)	On non-valley, LWD dependent S5 streams, all leaners within 10 m of the channel and all conifer stems < 30 cm DBH within 5 m of the stream bank are present.	☐	☐	☐
g)	On LWD dependent S6 streams, or S6 that flow directly into fish-bearing waters, at least 10 trees < 30 cm DBH per 100 m of streambank are present within 5 m of the stream bank.	☐	☐	☐
Mark the "No" box for Question 12 if there are any "No" answers. Otherwise, mark the "Yes" box.				

TIP: All streams require an answer to indicator statement 12 (a). At most, only one other indicator statement will be applicable.

TIP: Stream crossing right-of-ways should not be considered a factor for Question 12 unless the right-of-ways represent more than 25% of the riparian habitat.

Question 13. Has sufficient vegetation been retained to provide shade and reduce bank microclimate change?		Yes ☐	No ☐
a)	With the exception of active roads at stream crossings, bare erodible ground directly exposed to rain is less than 1% of the riparian habitat in plan view.	☐	☐
b)	Shade (the average amount of sky not visible due to vegetation) averages more than 60%, as estimated visually for any two of the east, south and west aspects at 60° above the horizontal.	☐	☐
c)	Moisture loving macrophytes, mosses, ferns or other bryophytes are present and in vigorous condition, with no indication of stress due to sunburn, drought or desiccation.	☐	☐
d)	Soil in the riparian habitat is moist and cool to the touch.	☐	☐
Mark the "Yes" box for Question 13 if 3 or more answers are "Yes". Otherwise, mark the "No" box.			

Sample No. _____

Question 14. Have the number of disturbance-increaser species, noxious weeds, and/or invasive plant species present been limited to a satisfactory level?	Yes ☐	No ☐
a) Disturbance-increaser plants (domestic grasses, dandelions, pineapple weed, buttercups, etc.) occupy less than 25% of total area in the first 10 m of the riparian zone.	☐	☐
b) Noxious weeds and/or other invasive plant species occupy less than 5% of total area in the first 10 m of the riparian area.	☐	☐
Mark the "Yes" box for Question 14 if all statements are "Yes". Otherwise, mark "No".		

TIP: To estimate coverage by disturbance-increaser plants or weeds and other invasive plants at a sample site, try estimating the percentage of a 10 m long line transect that is occupied by these plants. Start the line transects at the edge of the stream and go 10 m at right angles to the main axis of the stream reach.

Question 15. Is the riparian vegetation and forest structure within the first 10 m from the edge of the stream generally characteristic of what the healthy unmanaged riparian plant community would normally be along the reach?	Yes ☐	No ☐
a) All the major vegetation layers and structural components of the expected healthy unmanaged riparian plant community (e.g., snags, CWD, gaps, tall trees, understory, tall shrubs, low shrubs, herbaceous plants, mosses and lichens) are adequately represented. Adequate representation is 1) the presence of all expected layers and components over 75% of the reach, 2) 75% of the expected layers or components over all of the reach, or 3), any combination of 1) and 2) that collectively averages 75% or more.	☐	☐
b) The major vegetation layers and structural components of a healthy unmanaged riparian plant community should exhibit good vigor, normal growth form, and satisfactory recruitment. Vigor or growth form is poor if plants are discolored, defoliated, brittle, burned, broken, heavily browsed, "mushroomed", wind thrown, harvested or dead. Mark "No" if collectively less than 75% of all the plants and structural components expected show good vigor, form, and recruitment.	☐	☐
c) Heavy browse is absent on a preferred browse species in the shrub layer. Heavy browse on a plant is browse down to second year wood over most (>50% of the branches) of the plant.	☐	☐
d) Heavy grazing occupies <10% of the available grazing area. Heavy grazing is defined as less than the recommended target stubble height for the dominant forage species present.	☐	☐
Mark the "Yes" box for Question 15 if 3 or more answers are "Yes". Otherwise, mark the "No" box.		

TIP: All four statements can always be answered "Yes" or "No". There are no NA statements.

TIP: If more than 25% of the total reach length is more or less bare of vegetation, as could be the case at road crossings, then 15(a) and 15(b) should probably be marked "No". If more than 25% of all the vegetation along both sides of the total reach length is removed, as would be the case for a complete clearcut along the reach, then 15(a) and 15(b) would again be marked "No".

Please refer to the Riparian Protocol for a description of "heavy browse".

Sample No. _____

Summary

QUESTION		Yes	No	NA
Question 1.	Is the channel bed undisturbed?	☐	☐	
Question 2.	Are the channel banks intact?	☐	☐	
Question 3.	Are channel LWD processes intact?	☐	☐	
Question 4.	Is the channel morphology intact?	☐	☐	☐
Question 5.	Are all aspects of the aquatic habitat sufficiently connected to allow for normal, unimpeded movements of fish, organic debris, and sediments?	☐	☐	
Question 6.	Does the stream support a good diversity of fish cover attributes?	☐	☐	☐
Question 7.	Does the amount of moss present on the substrates indicate a stable and productive system?	☐	☐	☐
Question 8.	Has the introduction of fine sediments been minimized?	☐	☐	☐
Question 9.	Does the stream support a diversity of aquatic invertebrates?	☐	☐	☐
Question 10.	Has the vegetation retained in the RMA been sufficiently protected from windthrow?	☐	☐	
Question 11.	Has the amount of bare erodible ground or soil disturbance in the riparian area been minimized?	☐	☐	
Question 12.	Has sufficient vegetation been retained to maintain an adequate root network or LWD supply?	☐	☐	
Question 13.	Has sufficient vegetation been retained to provide shade and reduce bank microclimate change?	☐	☐	
Question 14.	Have the number of disturbance-increaser plants, noxious weeds and/or invasive plant species present been limited to a satisfactory level?	☐	☐	
Question 15.	Is the riparian vegetation within the first 10m from the edge of the stream generally characteristic of what the healthy unmanaged riparian plant community would normally be along the reach?	☐	☐	

of "Yes" answers: ____ + # of "No" answers: ____ + # of "NA" answers: ____ = Total # of answers: _____

Conclusion on Functioning Condition (check one):

- ☐ Properly Functioning (0-2 "No's")
- ☐ Properly Functioning but at Risk (3-4 "No's")
- ☐ Properly Functioning but at High Risk (5-6 "No's")
- ☐ Not Properly Functioning (>6 "No's")

List the questions that had a "No" answer below, and check what you believe was the **main reason(s)** for the problem. A "No" answer due to natural causes would include any natural events such as insects, fires, floods, slides, diseases etc. that were clearly unrelated to man's activities in the stream or adjacent riparian area. Check Logging, Livestock, Roads or Other Manmade as a cause if these factors directly affected the stream or riparian area assessed in this evaluation. Check Upstream Factors if the No answer was the result of some event or condition that occurred upstream, regardless if it was manmade or natural.

"No" answer questions	Cause of "No" Answers					
	Logging	Livestock	Roads	Other Manmade	Natural Events	Upstream Factors
	☐	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐	☐

Sample No. _____

Checklist of Specific Impacts for All "NO" Answers. Use this table to elaborate on the causes of the main impacts identified on Page 16. Please record the Question numbers that had "No' answers in the space provided beside the specific impacts.

	Select Impacts that Apply	
LOGGING RELATED IMPACTS	Within Stream Reach	Above Stream Reach
Falling and yarding (slash/cut logs in channel)		
Machine disturbance during harvesting		
Machine disturbance during site preparation		
Windthrow		
Low retention		
Old logging		
Slides/sloughs		
Torrenting		
Water courses diverted		
ROADS, CROSSINGS		
Running surface eroding into stream		
Ditches eroding into stream		
Fill or cut slopes eroding into stream		
Road prism failing/collapsing		
Cross ditching inadequate		
Ditch blocks inadequate		
Cross drains inadequate		
Sediment traps inadequate		
Berms/ruts trap water on road		
Crossing leaks fines into stream		
Water courses diverted		
Crossing opening too small		
Crossing misaligned		
Crossing not open-bottomed		
Culvert evert too high		
Culvert damaged		
Culvert plugged		
ANIMAL DISTURBANCE		
Excessive grazing/browsing (livestock)		
Excessive grazing/browsing (other ungulates)		
Excessive browsing (beavers)		
Trampling (livestock)		
Trampling (other animals)		
Stream dammed (beavers)		
Excessive manure		
NATURAL IMPACTS		
High natural background sediment levels		
Organic stream bed		
Fire		
Beetle kills		
Other diseases, epidemics		
Wind		
Slides/sloughs		
Torrents		
Floods		
Unknown		
OTHER IMPACTS (list)		

Sample No. _____

Final Comments

Does the conclusion on functioning condition generally agree with your personal opinion on the functioning condition of this stream reach? If not, please describe why not. **Yes** ☐ **No** ☐

_____

_____

_____

All No answers are weighted equally. Were any specific problems identified that affected the assessment more than others? **Yes** ☐ **No** ☐

_____

_____

_____

Do you have any recommendations for improving the Riparian Effectiveness Routine Evaluation Checklist or Protocol? **Yes** ☐ **No** ☐

_____

_____

_____

Have you marked the stream reach assessed on a map in a way that will be legible when photocopied? **Yes** ☐ **No** ☐

Were any invasive plants observed? Remember to complete an Invasive Plant field card if the answer is "Yes". **Yes** ☐ **No** ☐

Additional Riparian Information Requested

Does the retention information on Page 1 accurately describe the conditions present along the stream reach? (If you feel the answer is "No", please describe the retention further by completing statements (A) to (H) below. Or attach a sketch showing a typical cross section of the two riparian areas, showing the widths and retention levels of the riparian area from the edges of the stream to the edge of a road or clearcut (maximum distance 500 m).) **Yes** ☐ **No** ☐

	Left Side	**Right Side**
(A) Average distance from stream edge to merchantable trees (m, max. 100)	_____	_____
(B) Average distance from stream edge to first signs of most recent harvesting (partial or complete, m, max. 100)	_____	_____
(C) Average distance from stream edge to start of most recent complete harvesting (i.e. a road or clearcut, m, max 100. Note that the riparian area between "B" and "C" is the partly harvested riparian area referred to in "E" to "H")	_____	_____
(D) Approximate age (yrs) of most recent harvesting in first 100m. Mark NA if there has not been any harvesting	_____	_____
(E) % of riparian area that was partly harvested that were merchantable coniferous trees (% merchantable X % coniferous). Mark NA if there is no partly harvested area	_____	_____
(F) % of riparian area that was partly harvested that were merchantable deciduous trees (% merchantable X % deciduous). Mark NA if there is no partly harvested area	_____	_____
(G) % of merchantable coniferous trees retained in the partly harvested area. Mark NA if there is no partly harvested area	_____	_____
(H) % of merchantable deciduous trees retained in the partly harvested area. Mark NA if there is no partly harvested area	_____	_____