

# **CLISBAKO RIVER FISH HABITAT RESTORATION PROJECT**

## **EFFECTIVENESS MONITORING**

### **Site Based Evaluation**

Submitted to:

Ministry of Environment, Lands and Parks  
400 – 460 Borland St.  
Williams Lake, BC  
V2G 4T1

by

Colin Lake

Erosion Control Inc.  
391 Johnston Ave.  
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October 2000

### SITE BASED EVALUATION FORM

Assessment Date:	Aug 3/00	Stream Order:	4th
System:	Clisbako	Subbasin:	Clisbako
Watershed:	Nazko	Site Identifier:	1
Months Since Installation:	12	Number of Ballast:	10
Structure Location:	Edge	Keyed Into Bank:	No
Structure Size:	Mod	Number of LWD:	3
Ballasted / Anchored:	Yes	Total LWD:	4
Structure Type:	MWD , DF	Flood Event:	1 mo.
Stability:	Shifted	Intended Functionality:	Impaired
Assoc. Erosion:	Low	Habitat Unit:	P
Intended Function:	BS	Current Function:	TP/DC
Associated Scour:	None	Residual Pool:	0.35

#### NOTES:

- upstream most log has rolled away from bank, resulting in some slack in the cable
- small pool habitat has formed in between logs and the bank, would provide refuge at high flows
- moderate amounts of small woody debris have accumulated among the roots of the log structure



View upstream from left bank.



Downstream view.  
Note that log has shifted  
slightly away from the bank.

### SITE BASED EVALUATION FORM

Assessment Date:	Aug 3/00	Stream Order:	4th
System:	Clisbako	Subbasin:	Clisbako
Watershed:	Nazko	Site Identifier:	2
Months Since Installation:	12	Number of Ballast:	10
Structure Location:	Edge	Keyed Into Bank:	Yes
Structure Size:	Mod.	Number of LWD:	4
Ballasted / Anchored:	Yes	Total LWD:	4
Structure Type:	MWD	Flood Event:	1 mo.
Stability:	In Place	Intended Functionality:	Successful
Assoc. Erosion:	Low	Habitat Unit:	P/G
Intended Function:	TP/C	Current Function:	IN/TP/C/DC
Associated Scour:	P	Residual Pool:	0.5

**NOTES:**

- large amounts of small woody debris accumulated, especially on downstream LWD
- good pool/glide habitat created, downstream of structure
- high numbers of juvenile salmonids observed here (feeding)



Downstream view.



Downstream from last log of site 2. Good accumulation of woody debris. Many juvenile salmonids observed here.



### SITE BASED EVALUATION FORM

Assessment Date:	Aug 3/00	Stream Order:	4th
System:	Clisbako	Subbasin:	Clisbako
Watershed:	Nazko	Site Identifier:	3
Months Since Installation:	12	Number of Ballast:	6
Structure Location:	Edge	Keyed Into Bank:	Yes
Structure Size:	Mod.	Number of LWD:	3
Ballasted / Anchored:	Yes	Total LWD:	4
Structure Type:	AWD	Flood Event:	1 mo.
Stability:	In Place	Intended Functionality:	Successful
Assoc. Erosion:	Low	Habitat Unit:	P
Intended Function:	PP/C/DC	Current Function:	IN/TP/DC
Associated Scour:	No	Residual Pool:	0.2

**NOTES:**

- 4th piece of LWD from a fallen tree which has landed more or less on this structure
- remainder of beaver dam at this site may serve as refuge at high water
- large amount of fines observed around site, next high water will likely clean it out



Downstream view to site 3.  
Note addition of blow down



Upstream view.

### SITE BASED EVALUATION FORM

Assessment Date:	Aug 3/00	Stream Order:	4th
System:	Clisbako	Subbasin:	Clisbako
Watershed:	Nazko	Site Identifier:	5B
Months Since Installation:		Number of Ballast:	@ 15-20
Structure Location:	Cross channel	Keyed Into Bank:	NA
Structure Size:	Hi	Number of LWD:	NA
Ballasted / Anchored	NA	Total LWD:	NA
Structure Type:	RR	Flood Event:	1 mo.
Stability:	In place	Intended Functionality:	Successful
Assoc. Erosion:	Low	Habitat Unit:	R
Intended Function:	O	Current Function:	IN
Associated Scour:	P	Residual Pool:	-----

#### NOTES:

- prominent hydraulic head at the upstream face of the riffle
- good hydraulic complexity, upstream movement will likely be facilitated



Upstream view of site 5B.

### SITE BASED EVALUATION FORM

Assessment Date:	Aug 3/00	Stream Order:	4th
System:	Clisbako	Subbasin:	Clisbako
Watershed:	Nazko	Site Identifier:	6B
Months Since Installation:	12	Number of Ballast:	10
Structure Location:	Edge	Keyed Into Bank:	No
Structure Size:	Low	Number of LWD:	3
Ballasted / Anchored:	Yes	Total LWD:	3
Structure Type:	MWD/DF	Flood Event:	1mo.
Stability:	In Place	Intended Functionality:	Impaired
Assoc. Erosion:	Low	Habitat Unit:	P/G
Intended Function:	BS/C	Current Function:	IN/TP
Associated Scour:	T	Residual Pool:	0.2

#### NOTES:

- good glide habitat along LWD
- small pool contained between LWD and bank



Downstream view of site 6B.



Note glide habitat along edge of structure.



### SITE BASED EVALUATION FORM

Assessment Date:	Aug 3/00	Stream Order:	4th
System:	Clisbako	Subbasin:	Clisbako
Watershed:	Nazko	Site Identifier:	6
Months Since Installation:	12	Number of Ballast:	12
Structure Location:	Edge	Keyed Into Bank:	No
Structure Size:	Low	Number of LWD:	3
Ballasted / Anchored	Yes	Total LWD:	5
Structure Type:	MWD/DF	Flood Event:	1 mo.
Stability:	In Place	Intended Functionality:	Successful
Assoc. Erosion:	Low	Habitat Unit:	P/G
Intended Function:	BS/DC	Current Function:	IN/TP/DC
Associated Scour:	No	Residual Pool:	-----

#### NOTES:

- small, tertiary pools in behind LWD
- small woody debris captured in rootwads
- has been effectively lengthened, by 2 additional LWD captured after installation



Downstream view of site 6.  
Additional LWD (natural) had  
accumulated at the upstream  
end of the structure.



Downstream view of site 6.

### SITE BASED EVALUATION FORM

Assessment Date:	Aug 3/00	Stream Order:	4th
System:	Clisbako	Subbasin:	Clisbako
Watershed:	Nazko	Site Identifier:	7
Months Since Installation:	12	Number of Ballast:	8
Structure Location:	Edge	Keyed Into Bank:	No
Structure Size:	Low	Number of LWD:	3
Ballasted / Anchored	Yes	Total LWD:	3
Structure Type:	MWD	Flood Event:	1 mo.
Stability:	In Place	Intended Functionality:	Successful
Assoc. Erosion:	Low	Habitat Unit:	G
Intended Function:	BS/DC	Current Function:	IN/TP/C
Associated Scour:	T	Residual Pool:	-----

#### NOTES:

- many fish observed utilizing this structure - appear to dart out and capture prey, then return to cover
- good accumulation of small woody debris



Downstream view of site 7.



### SITE BASED EVALUATION FORM

Assessment Date:	Aug 3/00	Stream Order:	4th
System:	Clisbako	Subbasin:	Clisbako
Watershed:	Nazko	Site Identifier:	8
Months Since Installation:	12	Number of Ballast:	14
Structure Location:	Edge	Keyed Into Bank:	Yes
Structure Size:	Mod	Number of LWD:	5
Ballasted / Anchored	Yes	Total LWD:	5
Structure Type:	RR/MWD	Flood Event:	1 mo.
Stability:	In Place	Intended Functionality:	Successful
Assoc. Erosion:	Low	Habitat Unit:	P
Intended Function:	TP/C/DC	Current Function:	IN/TP/C/DC/CN
Associated Scour:	T	Residual Pool:	0.3

#### NOTES:

- good accumulation of small woody debris - this structure is "naturalizing" well
- good deepwater habitat at this site - the slight bend in the river here, combined with the structure location, has resulted in a very hydraulically complex site
- one salmon observed up this far, rainbow trout up to 20 cm observed here



Downstream view of site 8. Good pool habitat identified by arrow.

### SITE BASED EVALUATION FORM

Assessment Date:	Aug 3/00	Stream Order:	4th
System:	Clisbako	Subbasin:	Clisbako
Watershed:	Nazko	Site Identifier:	9
Months Since Installation:	12	Number of Ballast:	30
Structure Location:	In-Channel	Keyed Into Bank:	NA
Structure Size:	Hi	Number of LWD:	NA
Ballasted / Anchored	NA	Total LWD:	NA
Structure Type:	RR	Flood Event:	1 mo.
Stability:	In Place	Intended Functionality:	Successful
Assoc. Erosion:	Low	Habitat Unit:	R
Intended Function:	O	Current Function:	IN
Associated Scour:	P	Residual Pool:	_____

#### NOTES:

- good holding habitat, offers refuge from high velocity flows
- many of the boulders have scoured into place, and are currently very stable



Downstream view of site 9.

### SITE BASED EVALUATION FORM

Assessment Date:	Aug 3/00	Stream Order:	4th
System:	Clisbako	Subbasin:	Clisbako
Watershed:	Nazko	Site Identifier:	10 B
Months Since Installation:	12	Number of Ballast:	14
Structure Location:	Edge	Keyed Into Bank:	Yes
Structure Size:	Mod	Number of LWD:	5
Ballasted / Anchored	Yes	Total LWD:	5
Structure Type:	MWD	Flood Event:	1 mo.
Stability:	In Place	Intended Functionality:	Successful
Assoc. Erosion:	Low	Habitat Unit:	G
Intended Function:	PP/DC	Current Function:	IN
Associated Scour:	No	Residual Pool:	_____

#### NOTES:

- large amounts of small woody debris accumulated
- many small tertiary pools created in between LWD and bank, may offer seasonal habitat.



Downstream view.



Upstream view showing small refuge habitats in between root wads.



### SITE BASED EVALUATION FORM

Assessment Date:	Aug 3/00	Stream Order:	4th
System:	Clisbako	Subbasin:	Clisbako
Watershed:	Nazko	Site Identifier:	11
Months Since Installation:	12	Number of Ballast:	14
Structure Location:	Edge	Keyed Into Bank:	Yes
Structure Size:	Mod	Number of LWD:	5
Ballasted / Anchored:	Yes	Total LWD:	6
Structure Type:	MWD	Flood Event:	1 mo.
Stability:	In Place	Intended Functionality:	Impaired
Assoc. Erosion:	Low	Habitat Unit:	G
Intended Function:	DC	Current Function:	IN
Associated Scour:	No	Residual Pool:	_____

#### NOTES:

-likely that a pool will eventually scour here, but currently full of fines. Next high water event may clean the fines out.

-the thalweg appears to be located some distance from this structure, so it likely functions better at high flows. At low flow, the structure may not have adequate levels of water to fully function.



Downstream view

### SITE BASED EVALUATION FORM

Assessment Date:	Aug 3/00	Stream Order:	4th
System:	Clisbako	Subbasin:	Clisbako
Watershed:	Nazko	Site Identifier:	13 B
Months Since Installation:	12	Number of Ballast:	8
Structure Location:	Edge	Keyed Into Bank:	No
Structure Size:	Low	Number of LWD:	3
Ballasted / Anchored:	Yes	Total LWD:	3
Structure Type:	MWD	Flood Event:	1 mo.
Stability:	In Place	Intended Functionality:	Successful
Assoc. Erosion:	Low	Habitat Unit:	G
Intended Function:	BS/C	Current Function:	IN/TP
Associated Scour:	No	Residual Pool:	0.35

#### NOTES:

- good glide habitat along edge of LWD
- still water habitat available between the structure and the bank (small pools)



Downstream view.

### SITE BASED EVALUATION FORM

Assessment Date:	Aug 3/00	Stream Order:	4th
System:	Clisbako	Subbasin:	Clisbako
Watershed:	Nazko	Site Identifier:	13
Months Since Installation:	12	Number of Ballast:	6
Structure Location:	Edge	Keyed Into Bank:	Yes
Structure Size:	Hi	Number of LWD:	3
Ballasted / Anchored:	Yes	Total LWD:	4
Structure Type:	AWD	Flood Event:	1 mo.
Stability: In Place	In Place	Intended Functionality:	Successful
Assoc. Erosion:	Low	Habitat Unit:	P
Intended Function:	C/DC	Current Function:	IN
Associated Scour:	P	Residual Pool:	_____

#### NOTES:

- forms upstream end of a good pool- between this site and site 14 (riffle)
- good scour downstream of structure



View from right bank.



### SITE BASED EVALUATION FORM

Assessment Date:	Aug 3/00	Stream Order:	4th
System:	Clisbako	Subbasin:	Clisbako
Watershed:	Nazko	Site Identifier:	14
Months Since Installation:	12	Number of Ballast:	30
Structure Location:	Cross Channel	Keyed Into Bank:	NA
Structure Size:	Hi	Number of LWD:	NA
Ballasted / Anchored	NA	Total LWD:	NA
Structure Type:	RR	Flood Event:	1 mo.
Stability: In Place	In Place	Intended Functionality:	NA
Assoc. Erosion:	Low	Habitat Unit:	R
Intended Function:	O	Current Function:	IN
Associated Scour:	P	Residual Pool:	0.5

**NOTES:**

- good hydraulic head at upstream end of riffle - @ 0.50 m deep
- excellent scour at tailout of riffle - likely that large pool will develop downstream
- many routes available for upstream movement of fish



Good pool created  
upstream of the head of the riffle



Upstream view  
(Site 13 visible at the top of  
the photo)

### SITE BASED EVALUATION FORM

Assessment Date:	Aug 3/00	Stream Order:	4th
System:	Clisbako	Subbasin:	Clisbako
Watershed:	Nazko	Site Identifier:	15
Months Since Installation:	12	Number of Ballast:	8
Structure Location:	Edge	Keyed Into Bank:	No
Structure Size:	Low	Number of LWD:	3
Ballasted / Anchored	Yes	Total LWD:	3
Structure Type:	MWD	Flood Event:	1 mo.
Stability: In Place	In Place	Intended Functionality:	Impaired
Assoc. Erosion:	Hi	Habitat Unit:	G
Intended Function:	BS/DC	Current Function:	TP
Associated Scour:	No	Residual Pool:	

**NOTES:**

- appears to direct water towards the bank at high flow. Bank is scoured and undercut downstream from the last piece of LWD
- good glide and tertiary pool habitat



Downstream view.



Downstream view.  
Note scour at downstream  
end of structure.



### SITE BASED EVALUATION FORM

Assessment Date:	Aug 3/00	Stream Order:	4th
System:	Clisbako	Subbasin:	Clisbako
Watershed:	Nazko	Site Identifier:	16
Months Since Installation:	12	Number of Ballast:	12
Structure Location:	Edge	Keyed Into Bank:	Yes
Structure Size:	Mod	Number of LWD:	5
Ballasted / Anchored	Yes	Total LWD:	5
Structure Type:	MWD	Flood Event:	1 mo.
Stability:	In Place	Intended Functionality:	Successful
Assoc. Erosion:	Low	Habitat Unit:	P
Intended Function:	BS/PP	Current Function:	BS/TP/DC
Associated Scour:	P	Residual Pool:	0.3

#### NOTES:

- good maintenance of pool depth - active scour promoted by structure
- good juvenile habitat available between the structure and the bank (tertiary pools)
- large accumulation of small woody debris on the rootwads of the structure



Downstream view.



Downstream of the site, well-used cattle crossing (right at the downstream end of the riffle).