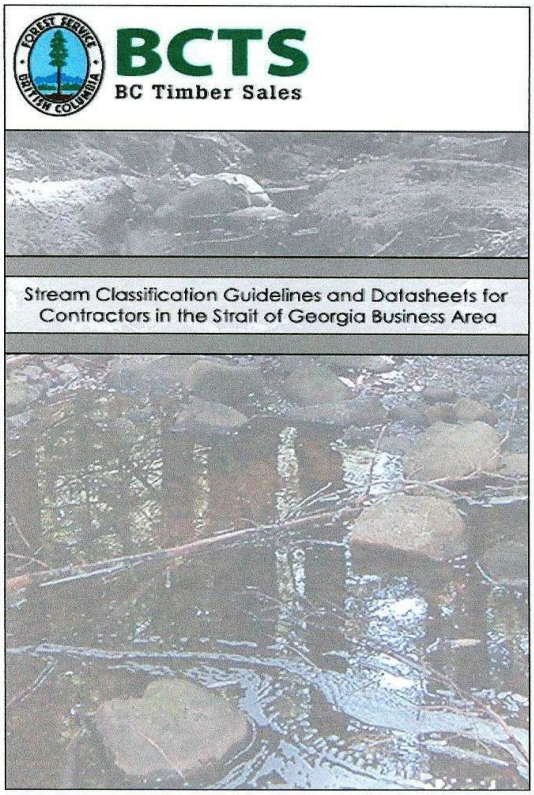

BCTS
BC Timber Sales
Stream Classification Guidelines and Datasheets for Contractors in the Strait of Georgia Business Area

1) Stream ID:_____
2) Tenure and Block ID: _____
3) Crew: _____ Date: _____
4) GPS file #_____Start time_____
5) Fish presence (yes/no/unknown) _____

Measurements:

Station (ID)	Width (m)	Gradient (%)	Station (ID)	Width (m)	Gradient (%)

Mean bankfull width = _____
Mean Gradient =_____
Note: Record gradients in spaces above, **or use gradient measurements used to create the channel profile.**

6) Stream Classification: _____

Reasons for the Classification:

Stream Name/ID:_____
Tenure and Block ID: _____
Crew: _____Date: _____

PHOTO - DOCUMENTATION

Station ID	Frame #	Azimuth	Type	Orientation

Frame #	Comments

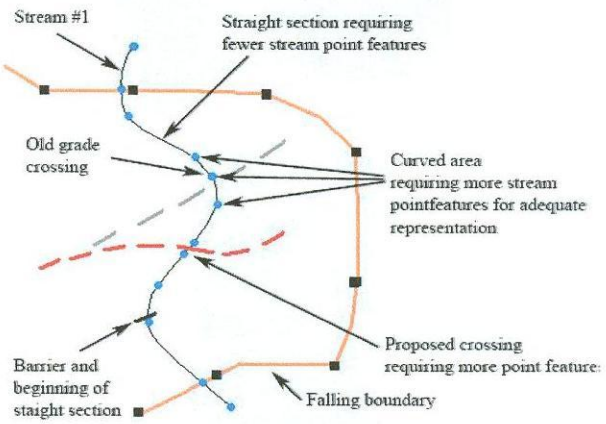
BARRIER MEASUREMENTS

Station ID	Max. Pool Depth (m)	Barrier Height (m)	Gradient (%)

Comments

GPS Stream points and lines

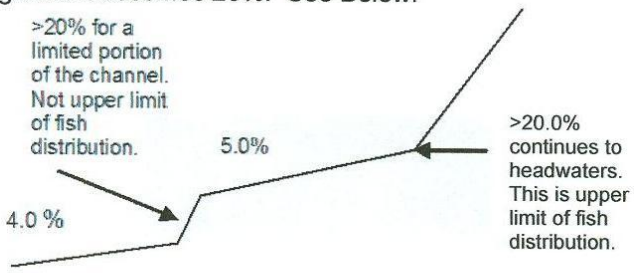
1. If a stream generally follows the same bearing and has no unique or significant features, fewer points are necessary
2. In areas where there are many bends in the stream or unique features are present more stream points are necessary
3. Unique features would be considered to be things such as barriers to fish migration, old grades, rail lines, slides, extreme bank confinement, gully features etc.
4. The stream line feature can be used to map the spaces between the stream point features.



Example of stream point and line requirements

Definitions

Gradient >20%:
A short channel segment (i.e. 50 m) of >20% **is not considered the upper limit of fish**. The upper limit is when gradient >20% **continues to increase** as you move upstream from the point where the channel gradient becomes 20%. See Below.



Stream Classification

Stream Width	Riparian Class
>20 m	S1
>5 – 20 m	S2
1.5 – 5 m	S3
<1.5 m	S4
>3 m with gradient >20%	S5
≤ 3 m with gradient > 20%	S6
See definition	FSZ
<100m long and is not a wetland	NCD

Bankfull width: A minimum of 10 measurements should be done within the section surveyed.

FSZ

An area does not meet the definition of a stream but is a swamp, pond, side or back channel, a seasonally flooded area, or an area exposed to periodic flooding,

that has any possibility of flowing into fish bearing habitat through flows or seepage.

Photographic Records:

Photograph Protocol (general):

Photographs should be taken at locations that are representative of the channel section surveyed. At each location a photographic view looking upstream and downstream is required. A minimum of 10 photographs should be taken from 5 separate locations.

NOTE:

1. **Make sure there is something in the photo to give scale** (ie. Another crew member, mini stadia, note book etc.)
2. **Check your photo's before you move to the next location.**
3. **When referring to left bank or right bank, the reference point is always facing downstream.**

Photograph Codes:

Orientation

US = Looking upstream
DS = Looking downstream
L = Looking right to left across the channel
R = Looking left to right across the channel

Photograph Type

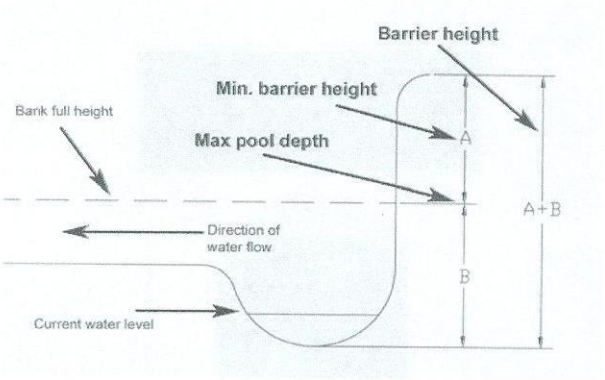
C = Channel
B = Barrier
FSZ = Fisheries Sensitive Zone
WL = Wetlands
NCD=Non-classified drainage

Comments: should contain all other observations, including, information on fish and wildlife. Barrier information is to be recorded here as well.

Barrier Measurements

Max pool depth is defined as the **maximum possible water depth** at the bottom of a barrier. This level is consistent as the bank full height at the outlet of the plunge pool.

Barrier height is defined as distance from the top of the barrier to the lowest point in the plunge pool below the barrier



Note: when a bedrock cascade/chute is suspected to be a barrier its length and slope should be recorded in the comments section. In addition, any side channels, steps, or resting places for fish on the suspected barrier should noted. Photo documentation of such areas are essential.

Photographic Examples

Barriers:

Plate 1. An example of a barrier that would require detailed measurements (fish sampling, height and gradient) to confirm if it was a permanent barrier to fish.

Bankfull width measurements:

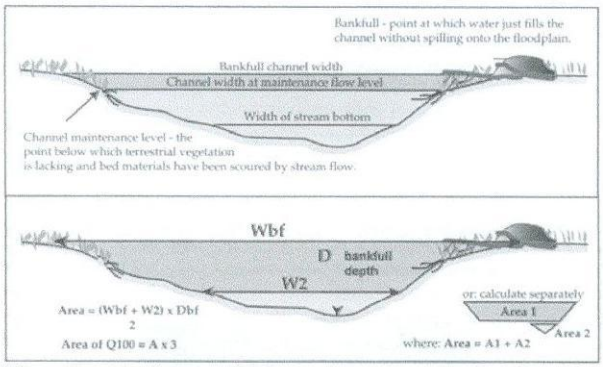


Plate 2. Various width measurements can be taken for engineering purposes as depicted above (bottom pane). With respect to stream classification **only the bankfull width is to be used** not the maintenance flow level. Bankfull widths are located at the rooted edge.

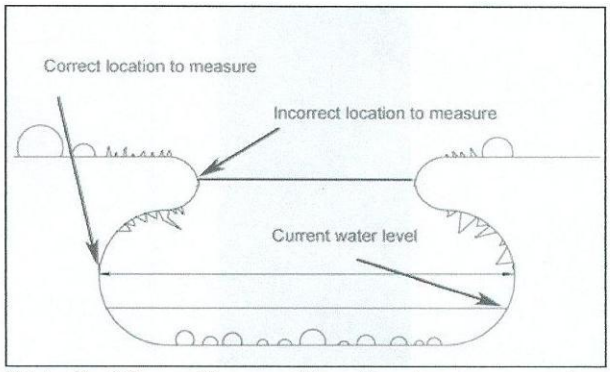


Plate 3. View of correct location to measure stream width when dealing with undercut banks.

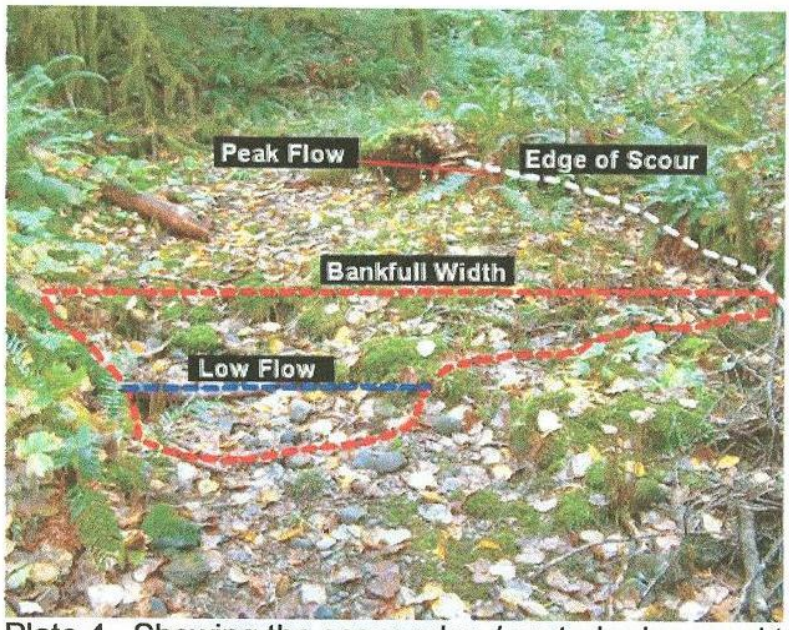


Plate 4. Showing the scour edge / rooted edge used to determine the bankfull width. The low flow scour mark is indicated by the blue is an incorrect location for width measurement.

Plate 5. The red line in the photograph indicates the correct location to measure bankfull channel width.

Plate 6. This photograph shows both the correct location to measure bank full width (red line), and the incorrect location to measure bank full width (white line).

Plate 7. Shows the correct location to measure the Bank Full width.

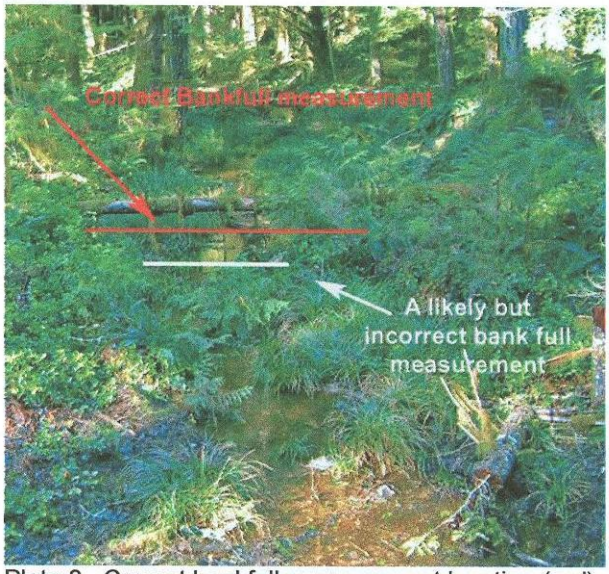


Plate 8. Correct bankfull measurement location (red) and incorrect bankfull measurement location (white).

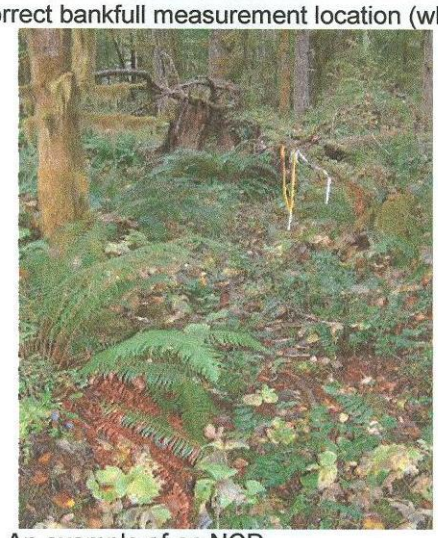


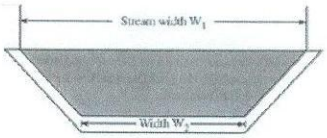
Plate 9. An example of an NCD

Stream Crossing Calculations

Location	
Road Name	
Stream Name	
Chainage	
Block Accessed	
Date of Measurements	
Field Crew	

$A_c = \left(\frac{W_1 + W_2}{2}\right) \times D \times 3.0$

{all measurements in metres}



W_1 (high water)	W_2 (channel bottom)	D (depth= w1 to w2)	A_c (cross-section)

Circle the appropriate size culvert

A_c (m^2)	.13	.20	.28	.50	.64
Culvert Diameter (mm)	400	500	600	800	900
A_c (m^2)	.79	1.13	1.54	2.01	2.54
Culvert Diameter (mm)	1000	1200	1400	1600	1800

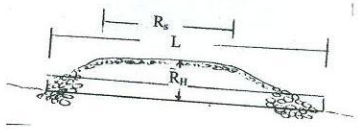
(Culverts over 2000mm must be prescribed by an engineer)

Culvert Length Calculation $L = R_s + (R_H \times 3)$

R_H = estimated final running surface height above the creek bottom

R_s = road running surface width

This culvert length calculation assumes a skew of $\leq 5^\circ$ and a stream slope of $\leq 5\%$. Where the design calls for a skew and/or slope that exceeds these limits calculations will be required to determine the appropriate length.



R_s	R_H	L	Diameter