Cyfoeth Naturiol Cymru
Natural Resources Wales

Rescue 3 EUROPE

NATURAL RESOURCES WALES / RESCUE 3 EUROPE WEIR ASSESSMENT SYSTEM

Name of assessor: _____

Date of assessment: _____

WEIR INFORMATION

Name of weir / site: _____

Other names weir known as: _____

Weir location and river: _____

Grid reference: _____

RIVER FLOW INFORMATION

Reference Gauge Location: _____

	River level (m)	Flow range (m^3/s)
Low		
Medium		
High		
Flood stage		

River level on day of assessment - level (m) & flow (m^3/s)

_____ L / M / H / VH

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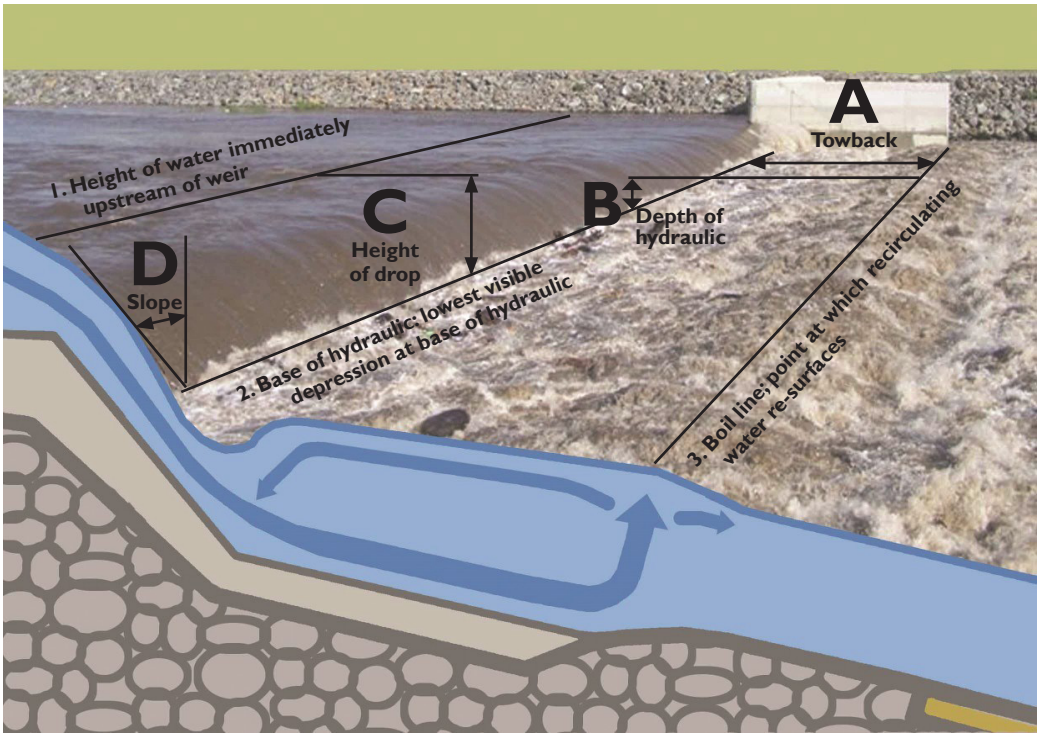
WEIR FEATURES AND HAZARDS



FEATURES/HAZARDS

A. Towback:
The distance from the base of the hydraulic/stopper (2) to the boil line (3)

B. Depth of hydraulic/stopper:
Vertical distance from top of boil line (3) to base of hydraulic (2)

C. Height of drop:
Vertical distance between water level immediately upstream of weir (1) and base of hydraulic/stopper (2)

D. Slope:
Angle of water flowing over face from vertical

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1. WEIR HAZARD

How to use this table:
For each hazard, select one description and circle the corresponding score. Add up the circled scores, write the total in the Weir Hazard Score box and assign the corresponding Weir Hazard Level.

	SCORE
A. TOWBACK	
No visible towback	0
< 1m	1
1 - 2m	2
2 - 3m	3
3 - 4m	4
> 4m	5
B. DEPTH OF HYDRAULIC/STOPPER	
No visible hydraulic/stopper	0
< 0.3m	1
0.3 - 1m	2
> 1m	3
C. HEIGHT OF DROP OVER WEIR	
No visible drop	0
< 0.3m	1
0.3 - 1m	2
1 - 2.5m	3
> 2.5m	4
D. SLOPE OF WEIR FACE (see fig 1)	
Structure drowned out - no weir face present	0
> 60°	1
45° - 60°	2
30° - 45°	3
< 30°	4
E. FLOATING DEBRIS IN HYDRAULIC/STOPPER	
No floating debris	0
Up to 10% of hole contains debris	2
10 - 25% of hole contains debris	3
> 25% of hole contains debris	4
F. UNIFORMITY OF HYDRAULIC/STOPPER	
No visible hydraulic/stopper	0
Broken feature with multiple flush points or 1 main flush point	1
One or two small flush points in the hydraulic/stopper	2
Totally uniform with no breaks and flush points	5
G. SIDES OF HYDRAULIC/STOPPER	
Both open	0
One side open/one side closed	2
Both closed	4
H. ORIENTATION OF HYDRAULIC/STOPPER TO FLOW (see fig 2)	
No hydraulic/stopper present	0
< 30° to current	1
> 30 but < 90° to current	2
90° to current	3
I. ADDITIONAL HAZARDS IN OR DOWNSTREAM OF WEIR eg strainers, weirs or significant rapids	
No additional hazards	0
Hazard present but not in main flow	1
Hazard present in main flow	5
J. COMPOSITION OF RIVER BED AT THE BASE OF WEIR	
Structure drowned out/non-modular	0
Concrete	1
Sand or gravel	2
Rock or debris	3

Figure 1: Slope of weir face

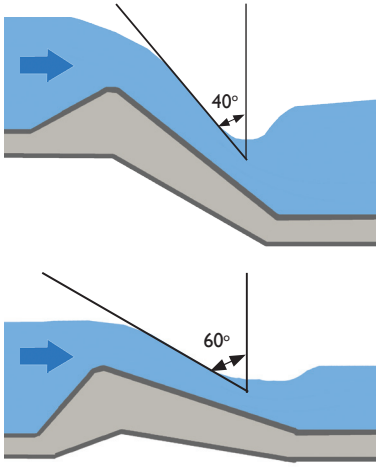
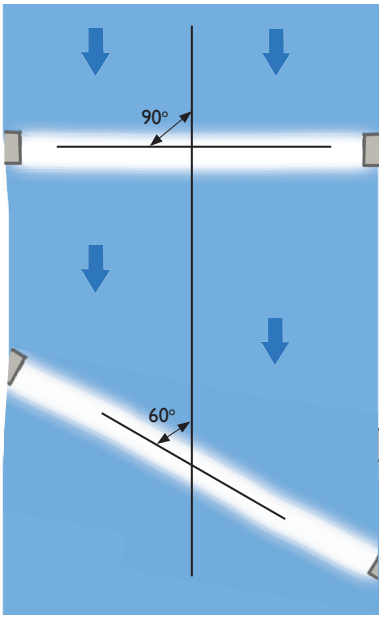


Figure 2: Orientation of hydraulic/stopper to flow



WEIR HAZARD SCORE:
Sum of scores selected for each hazard

WEIR HAZARD LEVEL:
Corresponding Hazard Level from table below

Weir Hazard Level:

Hazard Score	>0-10	11-15	16-20	21-30	31-40
Hazard Level	V Low (1)	Low (2)	Med (3)	High (4)	V High (5)

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2. LIKELIHOOD OF WEIR TO CAUSE HARM

How to use this table:
For each consideration, select one description and circle the corresponding score. Add up the circled scores and write the total in the Likelihood of Weir to Cause Harm box.

SCORE

PUBLIC ACCESS
Public access from land and water – is the structure in a publicly accessed location?

Land upstream river right	no public access from land/bank	0
	public access from land/bank	0.25
Land upstream river left	no public access from land/bank	0
	public access from land/bank	0.25
Land downstream river right	no public access from land/bank	0
	public access from land/bank	0.25
Land downstream river left	no public access from land/bank	0
	public access from land/bank	0.25
Water upstream	no access to weir from upstream	0
	access to weir from upstream	0.5
Water downstream	no access to weir from downstream	0
	access to weir from downstream	0.5

CONTROL MEASURES
Are there control measures in place, eg fences or booms, to prevent people from entering the weir?

Land:

Upstream river left	adequate control measures in place	0
	inadequate control measures in place	0.25
Upstream river right	adequate control measures in place	0
	inadequate control measures in place	0.25
Downstream river left	adequate control measures in place	0
	inadequate control measures in place	0.25
Downstream river right	adequate control measures in place	0
	inadequate control measures in place	0.25

Water:

Upstream	Structure not in main channel/boom present	0
	Structure in main channel/no boom present	0.5
Downstream	Controlled by boom or by high speed of water	0
	No downstream control measures	0.5

ABILITY TO SELF-RESCUE
Taking into account the existing control measures, if a person were to fall into the water above/beyond/outside the existing control measures can they self rescue before entering the weir?

Upstream river left	can self-rescue	0
	can't self rescue	0.25
Upstream river right	can self-rescue	0
	can't self rescue	0.25
Downstream river left	can self-rescue	0
	can't self rescue	0.25
Downstream river right	can self-rescue	0
	can't self rescue	0.25

LIKELIHOOD OF WEIR TO CAUSE HARM ____
Sum of scores selected for each consideration

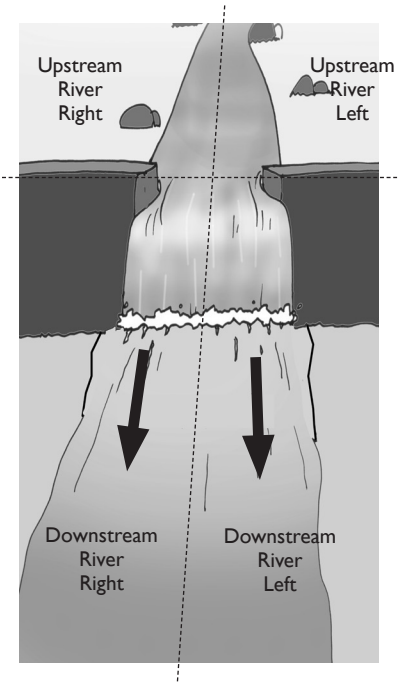
LIKELIHOOD OF WEIR TO CAUSE HARM LEVEL: ( )
Corresponding Likelihood Level from table below

Likelihood Level:

Likelihood Score	0-1	>1-2	>2-3	>3-4	>4-5
Likelihood Level	V Unlikely (1)	Unlikely (2)	Likely (3)	V Likely (4)	Almost certain (5)

SECTIONS OF A RIVER

The river/waterway can be divided into four sections for ease of identification: upstream and downstream of the weir/hazard and river left and river right. This is always done from the perspective of looking downstream.



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3. WEIR RISK RATING

Risk = Hazard x Likelihood

The Hazard and the Likelihood have been calculated in the previous tables.

Using these results, the Weir Risk Rating Score can be calculated:

WEIR HAZARD LEVEL:
Level of 1-5 taken from Table 1 (page 3)

LIKELIHOOD OF WEIR TO CAUSE HARM LEVEL:
Level of 1-5 taken from Table 2 (opposite)

WEIR RISK RATING SCORE:
Multiply Hazard Level by Likelihood Level (from above)

WEIR RISK RATING LEVEL:
Corresponding description from table below i.e. Low

Likelihood \ Hazard	1 Very Low	2 Low	3 Medium	4 High	5 Very High
1 Very Unlikely	1	2	3	4	5
2 Unlikely	2	4	6	8	10
3 Likely	3	6	9	12	15
4 Very Likely	4	8	12	16	20
5 Almost Certain	5	10	15	20	25

Score	Risk Level	Action
1 - 5	LOW	Action required to reduce the risk, although low priority. Time, effort and cost should be proportional to the risk.
6 - 10	MEDIUM	Action required soon to control. Interim measures may be necessary in the short term.
12 - 25	HIGH	Action required urgently to control the risks. Further resources may be needed.

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4. WEIR RESCUE

How to use this table:
For each rescue consideration, select one description and circle the corresponding score.
Add up the circled scores and write the total in the Weir Rescue Difficulty box.

A. DISTANCE ACROSS WEIR/RIVER	SCORE
< 10m	1
10 - 20m	2
21 - 50m	3
51 - 75m	4
> 75m	5
B. ACCESS TO BOTH BANKS	
Easy access to both banks for people & vehicles	0
Easy access to both banks for people only	1
Easy access to only 1 bank for vehicles & people	2
Easy access to only one bank for people	3
Difficult / restricted access to both banks for people & vehicles	4
No access to either bank	5
C. SHAPE OF WEIR	
Straight	1
Curved/multi-directional/compound structure	3
D. TOWBACK	
No visible towback	0
< 1m	1
1 - 2m	2
2 - 3m	3
3 - 4m	4
> 4m	5
E. REMOTENESS	
Urban	1
Rural/semi-urban	2
Remote	4
F. NATURE OF RIVER DOWNSTREAM OF WEIR (see opposite)	
Up to Class I	1
Class II	2
Class III	3
> Class III	4
Additional downstream weirs	5
G. WORKING AREA ON BANKS	
Good working areas on both banks	1
Good working areas on one bank only	2
Limited or restricted working areas on both banks	3
No working areas on either bank	4
H. ANCHORS FOR ROPE SYSTEM	
Good anchor points on both banks	1
Good anchor points on one bank only	2
Limited anchor points on both banks	3
I. AVAILABLE RESCUE TECHNIQUES	
Full range of single and twin bank methods with easy ability to cross channel with ropes, eg bridge, short throw or shallow crossing	0
Full range of single and twin bank methods but difficult to cross channel with ropes, eg bridge, short throw or shallow crossing	1
Limited to single bank methods or use of paddle boat	2
Limited to single bank methods or use of motorised boat	3
No bank-based options available	4
Helicopter only	5
Helicopter not possible (overhead wires etc)	6
J. HEIGHT OF BANKS ABOVE BASE OF HYDRAULIC/STOPPER	
< 1m	1
1 - 3m	2
> 3m	3

WEIR RESCUE DIFFICULTY SCORE:
Sum of scores selected for each rescue

WEIR RESCUE DIFFICULTY LEVEL: ( )
Corresponding Difficulty Level from table below

Weir Rescue Difficulty Level:

Difficulty Score	*< 20*	*20-25*	*> 25*
Difficulty Level	*Low (1)*	*Medium (2)*	*High (3)*

International River Grading System

Class I
Clear section of moving water or simple rapid which may contain low waves and few or no obstructions. Clear route through section of river.

Class II
Medium rapid which may contain irregular waves, small stoppers and simple obstructions. Clear route through section of river.

Class III
Larger rapid which may contain medium, irregular waves, medium stoppers and multiple obstructions. Recognisable route between obstructions/features.

> Class III
Heavy rapid which may contain high, irregular waves, large stoppers and numerous obstructions. No easily recognisable route between obstructions/features.

NOTES

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RESULTS

Complete the tables within this workbook and transfer the results to this page

	Score *(from completed tables)*	**Level** *(from completed tables)*
Weir Hazard *(Table 1, page 3)*		( )
Likelihood of Weir to Cause Harm *(Table 2, page 4)*		( )
Weir Risk Rating *(Table 3, page 5)*		( )
Weir Rescue Difficulty *(Table 4, page 6)*		( )

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