NS 2 FRESHWATER PEARL MUSSEL SUB-BASIN MANAGEMENT PLANS

REPORT ON MORPHOLOGICAL MONITORING AND CATCHMENT WALKOVER RISK ASSESSMENTS IN THE OWENCARROW CATCHMENT

September 2009

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1.0 INTRODUCTION

In order to assess the hydromorphological alterations within the Owencarrow catchment the EPA WFD classification tool called the River Hydromorphology Assessment Technique (RHAT) was utilised by RPS. This tool was developed through the North South Share project, to classify rivers in terms of their morphology. It is a field technique which assigns a channel typology. This influences the rivers physical attributes assessed in the field. The technique assigns a morphological classification directly related to that of the WFD – high, good, moderate, poor and bad.

RHAT surveys were carried out at high risk areas located within pearl mussel populations. The methodology classifies river hydromorphology based on a departure from naturalness, and assigns a morphological classification, based on semi-quantitative criteria. It is designed to be a rapid visual assessment based on information from desktop studies, using GIS data, aerial photography, historical data and data obtained from previous field surveys as well as observations in the field.

A catchment walkover risk assessment survey sheet was also designed by the project team in conjunction with NPWS in order to focus the collation of the pressure data in the field with respect to the Freshwater Pearl Mussel. The risk sheet was divided into eight categories designed to highlight the main pressures within the catchment. The eight categories are as follows:

- Source of erosion
- Diffuse Nutrient
- Diffuse Silt
- Current Riparian Zone
- Field Drainage
- Outfalls
- Abstractions
- Barriers to Migration

Each sub-pressure within the eight categories is analysed and an overall risk assessment of High, Medium or Low is assigned to that category. The “one out all out principle” is then used to assign the river stretch or point an overall risk category. A detailed description, together with a series of photographs outlining the pressures is also taken. The risk assessment sheets will assist the project team in focussing the specific freshwater pearl mussel measures within the catchment.

Location of survey stretches and points are shown in Figure 1

2.0 METHODOLOGY

Sampling was carried out on the 26th of May 2009.

2.1 RIVER HYDROMORPHOLOGY ASSESSMENT TECHNIQUE (RHAT)

Classification of hydromorphology can be used to contribute to the status classification of water bodies at high ecological status only. However, RHAT plays a vital role in identifying why a water body might be failing to achieve Good Ecological Status as it is based on the observed impact in the field. It can assist in deciding what indirect and direct efforts are needed to improve status and in helping to prevent further deterioration.

The eight criteria that are scored are:

1. Channel morphology and flow types
2. Channel vegetation
3. Substrate diversity and embeddedness
4. Channel flow status
5. Bank and bank top stability
6. Bank and bank top vegetation
7. Riparian land use
8. Floodplain connectivity

Sheet 1 of the RHAT form contains the Field Health and Safety sheet which is filled on arrival at the site. Before the field survey, a desk study is required this element of the survey was completed as part of the development of the draft sub-basin management plans. The reach identification and physical characterisation sections for each field site are recorded on Sheet 2 (see Appendix 1) with all information available from GIS and aerial photographs, including:

a. expected stream type and the description of various stream types
b. catchment and reach-scale pressures (these may help to identify, confirm or explain field observations);
c. expected riparian vegetation types (for high quality status);
d. the weather conditions on the day of the survey, and those immediately preceding the day of the survey. This information is important to interpret the effects of storm events on the survey results;
e. the estimated stream width and the reach length to be assessed (~ 40 x width).
f. any other notable issues (e.g. from previous surveys).

A score is allocated to each relevant attribute (the number of attributes to be assessed will depend on the stream type). Where the condition departs from the reference condition, note should be made if this condition results from a particular identifiable pressure. Where possible and where relevant, all attributes should be included in the assessment, using the assessment sheet (Sheet 3, see Appendix 1). If an attribute is not assessed, the score-summary table should be amended (cells shaded) and a note made as to why the assessment was not carried out. The WFD status can still be calculated on the basis of other attributes, but with a note that a particular attribute was omitted.

Transfer scores for individual attributes to the summary table on the survey Sheet 2. Finally the overall WFD category can be calculated using the following values:

> 0.8	= high
0.6 – 0.8	= good
0.4 – 0.6	= moderate
0.2 – 0.4	= poor
< 0.2	= bad

For the purposes of the assessment as part of the NS2 project, a high status for morphology is desirable for pearl mussel habitats. Through work carried out by the Shannon IRBD project on the Freshwater Morphology Programme of Measures Study, it was found that an observed relationship exists between biological data and a RHAT score. The study confirmed that morphological pressure can impact biology and therefore ecological status. In general, sites with RHAT scores less than 0.6 also have less than good Q scores. Similarly high levels of siltation affecting macrophyte populations are reflected by less than good RHAT scores.

Grid references were recorded at all sites using a GPS together with site photographs which were taken using a digital camera.

2.2 CATCHMENT WALKOVER RISK ASSESSMENT

During the development of the draft sub-basin management plans throughout 2008 a complete desk study was conducted of all relevant biological, water quality and pressure source data within the Owencarrow catchment. Best use was made of all available datasets such as the pressure source data collated by the River Basin District Projects for the Article V Characterisation and Programme of Measures Studies. This work allowed the NS 2 project team to assess the catchment through the combined availability of aerial imagery and digitised pressure information. Where gaps in this data existed together with areas that required ground truthing such as physical barriers to migration, catchment walkover risk assessments were focussed throughout the 2009 field survey season.

The catchment walkover risk assessment sheet (See Appendix 3) covers eight main categories or pressures which are subsequently sub-divided into the various sources. Each source is ticked if present and an overall risk assessment for each pressure assigned from High to Medium to Low over the survey length or point. All eight pressures are combined to give an overall risk assessment to the catchment based on the “one out all out principle”.

3.0 RESULTS

Figure 3.1 indicates where the Owencarrow RHAT assessments were carried out throughout the catchment.

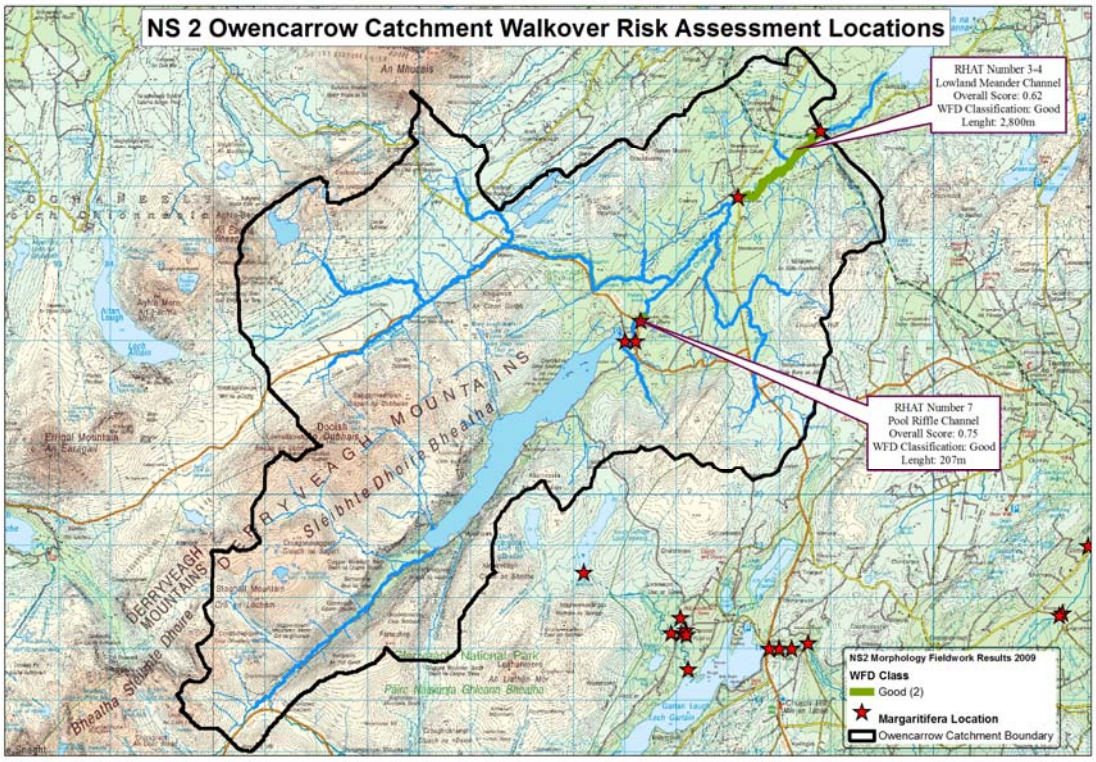


Figure 1 Morphology RHAT Assessment Locations

(The RHAT numbering system corresponds to the site code which may mean they are not sequential where a RHAT was not carried out at a particular site)

3.1 RHAT Survey Results

Two RHAT surveys were carried out throughout the Owencarrow catchment. The results of these surveys can be found in the electronic appendix. Both were classified as being at good status. RHAT number one was carried out from site 3 to 4 along a lowland meandering channel over a distance of 2,800m. Only the channel form and flow type together with the barriers to continuity scored well. All other attributes scored between 1.5 and 3 out of a possible four. In particular the bank structure and stability together with the bank vegetation scored low (1.5). This is due to the lack of buffer zone together with considerable slumping of the river banks. While the surrounding substrate of the catchment does appear to have a sandy nature high levels within the channel are allowing for excessive macrophyte growths including *potomagetan, ranunculus,*

myriophyllum, callitriche and filamenteous algae. All of which are unfavourable for pearl mussel growth. Overall this stretch was classified as being at good status.

RHAT number 2 was carried out at Site 7 over a 207m stretch on a pool-riffle-glide channel. This stretch of the river channel appear to have had some resectioning and reinforcement on both the left and right banks in the past. It also appears to have been overwidened in some parts. Three minor stone weirs were recorded along the survey stretch together with one major bridge. The lowest scoring attribute was channel vegetation as filamentous algae was recorded along the substrate of the entire stretch. Only barriers to continuity scored a maximum as this did not appear to be an issue all other attributes scored three out of four giving an overall classification of good status. Due to the surrounding landuse of peat there is no bank side vegetation except at the start of the survey stretch where willow, alder and oak are found, beyond this the bankside vegetation largely comprises of heather. This stretch does not contain the levels of fine sediments which are found further downstream at RHAT number one.

Plate 3.1 Representative photographs from reach:

RHAT 1 Site 3 Photo 9	**RHAT 1 Site 3 Photo 12**
	

RHAT 2 Site 7 Photo 8 	**RHAT 2 Site 7 Photo 9** 

Details in relation to photographs are tabulated in Appendix 2.

3.1 Catchment Walkover Risk Assessment Results

A total of eleven sites were surveyed in the Owencarrow sub-basin catchment, with a risk assessment carried out at nine of these sites (two stopping points). **Figure 3.2** outlines the stopping point locations in addition to the High to Low Risk Assessment from the Catchment Walkover Risk Assessments. One high risk sites were recorded out of the nine that were assessed. Out of the remaining eight sites, six were recorded as medium risk and two as low risk. **Figure 3.3** outlines the percentage of sites classified at high, medium and low risk together with the number of stopping points throughout the catchment.

Only one high risk site was identified; the risk categories evident at this high risk site are outlined below:

- Erosion
- Field Drainage
- Diffuse Nutrient

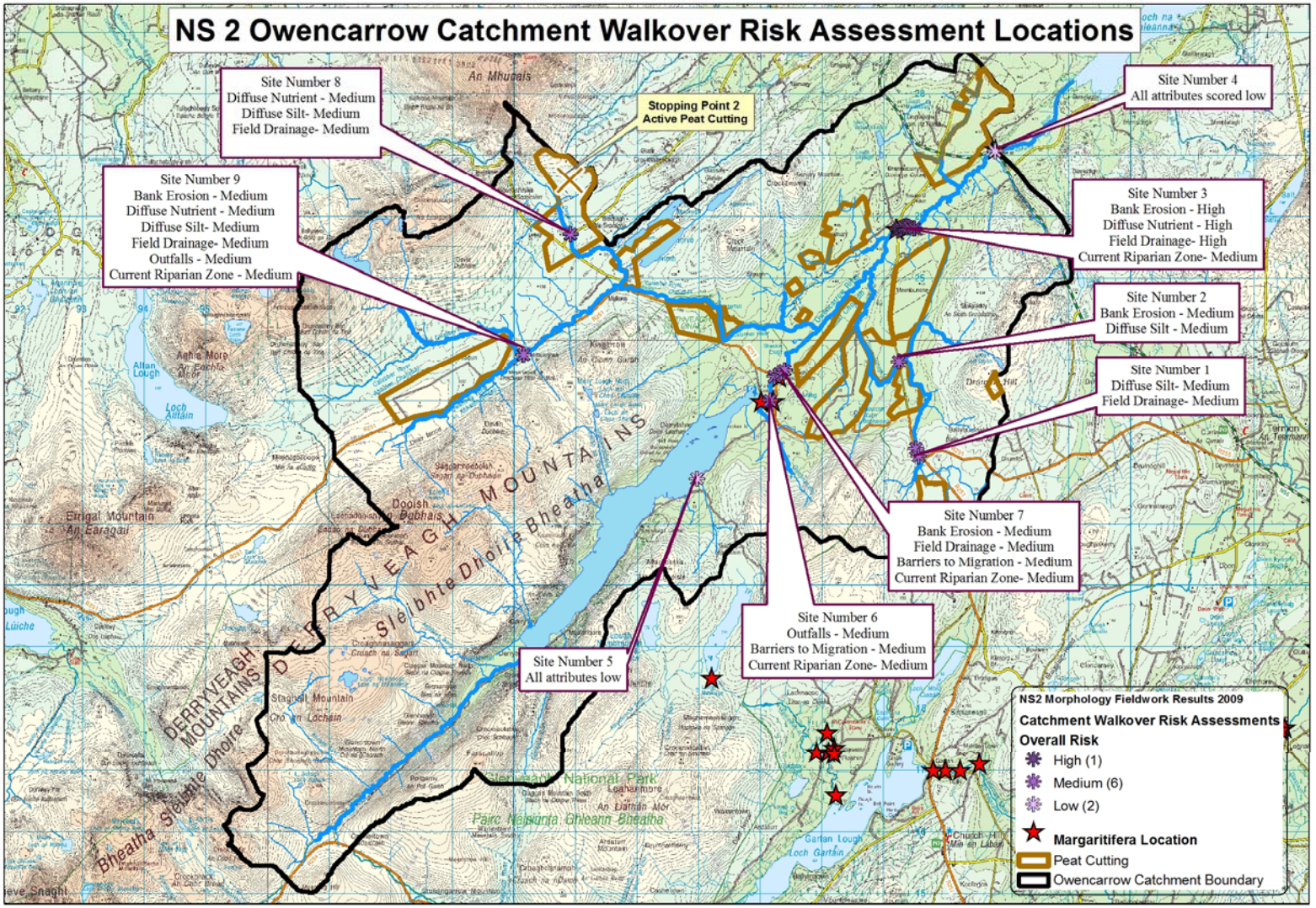
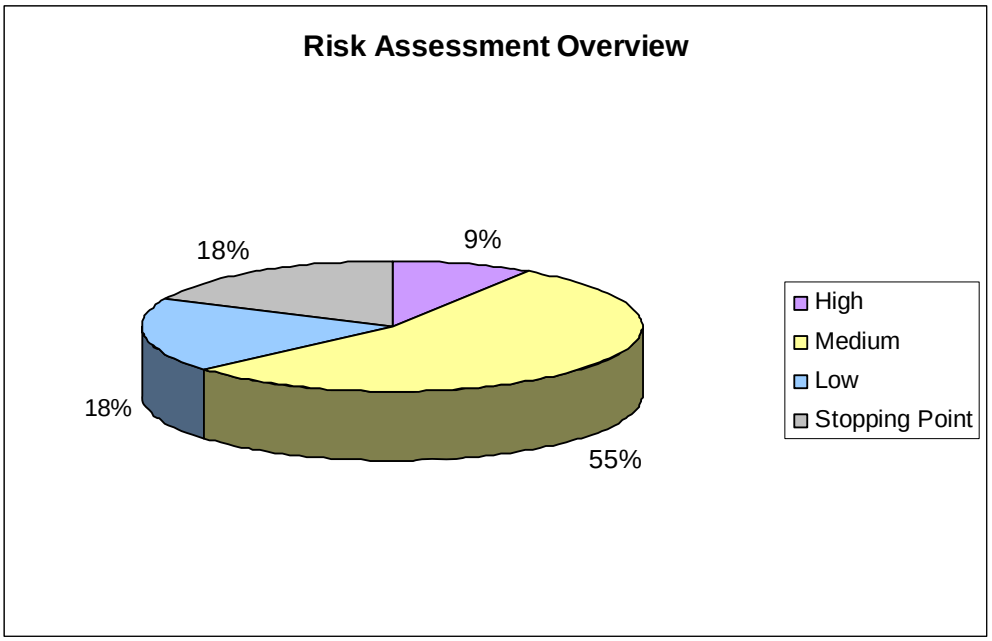


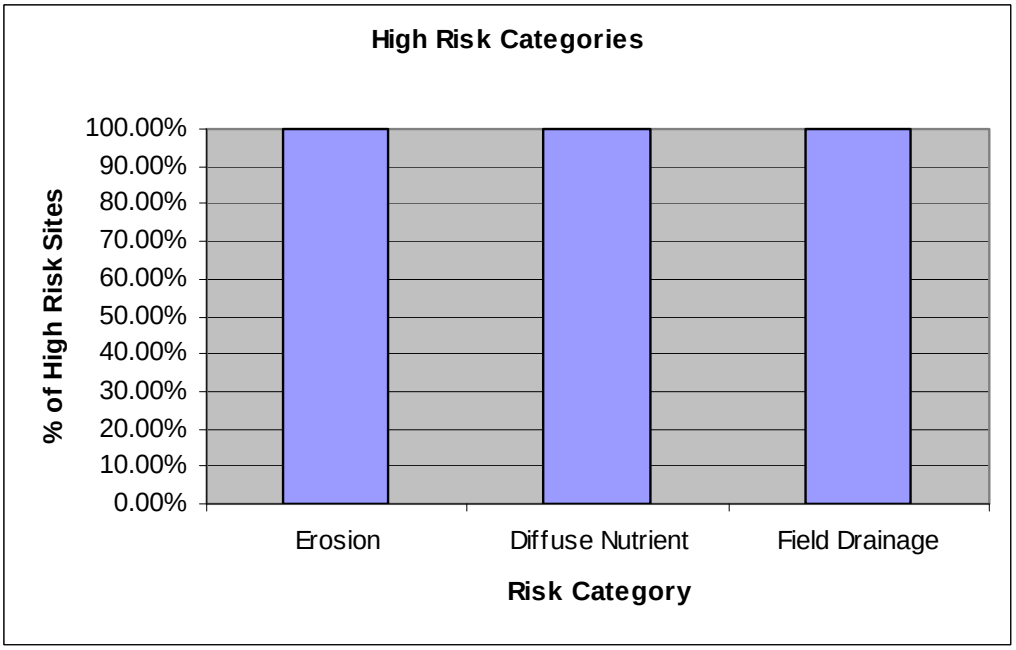
Figure 3.2 Location of Stopping points and Catchment Walkover Risk Assessments

Figure 3.3 Risk Assessment Overview



The break-down of pressure categories identified as high risk are outlined in **Figure 3.4**

Figure 3.4 Break-down of High Risk categories



The sources of bank erosion at the single high risk site were bank erosion, channel manipulation and hard bank protection measures. Field drainage was specified for high risk due to the presence of a managed ditch on a low slope which was observed entering the channel and contained significant macrophyte growth. Diffuse Nutrient was recorded as high risk due to the Improved Grassland on the river banks and the observed high growth rate of macrophytes.

3.2 Point Discharges

Point sources discharging nutrients, such as wastewater treatment plants, can contribute very significant nutrient and organic loads to rivers. Quarry dust and effluent can cause problems with silt pollution and, in some cases, lime pollution. Landfills and landfill leachate can be sources of surface and groundwater contamination that can find pathways to the river. Storm water drainage can be a source of silt and pollutants.

3.2.1 Waste Water Treatment Plants

A review was undertaken of the available information on municipal and industrial discharges by the South Western River Basin District Project (SWRBD) and an assessment carried out as to whether any river water bodies were considered to be at risk from point sources under a number of circumstances. Within the Owencarrow catchment we then assessed all monitoring information together with pearl mussel status above and below any WWTP and prioritised those which we deemed to have a significant adverse effect on the pearl mussel population or its habitat. Following this prioritisation process no WWTPs within the Owencarrow catchment were deemed to have a significant adverse affect on the pearl mussel or its habitat.

The pressures outlined above all have the ability to negatively affect the status of the freshwater pearl mussel. In some cases, a single pressure alone may be enough to cause a kill or ongoing chronic effects, but in most cases it is the combination of the negative effects of a number of pressures that are acting together to leave the freshwater pearl mussel habitat in unfavourable condition. It is unlikely that the effect of every diffuse source of pollution can be totally removed. Therefore, it is not possible to choose a subset of pressures to act on; steps must be taken to reduce every pressure, until the cumulative effect of all the reductions is a sustainable habitat for the freshwater pearl

mussel and all the other species that it protects thanks to its umbrella and keystone status in its habitat. This is the essence of the precautionary principle under which the Habitats Directive must be implemented.

4.0 CONCLUSIONS

The Owencarrow sub-basin catchment is in a relatively better condition than some other Freshwater Pearl Mussel sub-basin catchments in Ireland with only 11% of sites, where a risk assessment was undertaken, recorded as high risk. However there are certain issues that must be addressed within the catchment as a further 67% of assessed sites were recorded as medium risk. Four risk assessments were carried out in locations where known populations of Freshwater Pearl Mussel exist, out of the four:

- One site was recorded as high risk (the single high risk site within this catchment)
- Two sites were medium risk, and;
- One site was recorded as low risk located at the most downstream site in the catchment at the catchment boundary near Glen Lough.

Of the remaining sites four were considered medium risk and a single further low risk site was recorded.

APPENDIX A

RHAT Field Sheet

Field Health and Safety sheet

River Name_____ Site Code_____ Date_____

1 = Low risk 5 = High risk

Please circle applicable number

PARKING	1	2	3	4	5
FENCES/BARRIERS	1	2	3	4	5
GROUND STABILITY	1	2	3	4	5
DENSE VEGETATION	1	2	3	4	5
BANK STEEPNESS OR STABILITY	1	2	3	4	5
RISK FROM ANIMALS	1	2	3	4	5
PHONE COVERAGE	1	2	3	4	5

Previous RHS/RAT/RHAT surveys - year and code _____

Details of access _____

RHAT (VERSION 2)

TRIBUTARY / MAIN CHANNEL*

Site Identification

River Name _____ Site Code _____

Nearest WFD site FF10 _____

Water Body ID _____ Start U / S or D / S*

First IGR _____ Last IGR _____

Bank surveyed from L / R / Both / in-Channel*

Desk-study notes		Field Notes
ACTION TO TAKE PRIOR TO FIELDWORK General overall shape of river Check weirs, impoundments etc. on catchment		River type Date
Floodplain connectivity and land use Expected river type Rain last week Estimated river width Estimated survey length Riparian land cover(s) River Agency designated? Other comments including geology - limestone / siliceous / peat*		Time Surveyors Weather conditions now Estimated river width (m) (average 3 readings) Estimated survey length (m) (40 X wetted width) Estimated river depth (m) Channel characteristics (e.g. different stream types on the reach)
RESULTS		Pressures
Hydromorph score WFD class		*Circle as appropriate

Photograph details include IGR or approximate location

_____

_____

_____

_____

N.B. The survey length should be 40x the wetted width with a minimal stretch of 160m but not exceeding 1km.

NS RHAT

Anthropogenic Impacts

River Name _____ Site Code _____ Date _____

Feature		Tick if present, record as E if > 30%		
Resectioning		None ☐	Left bank ☐	Right bank ☐
Reinforcement		None ☐	Left bank ☐	Right bank ☐
Embankments	NO*	LB ☐	RB ☐	Set back LB ☐ SB RB ☐
Culverts**		Y / N / Unknown*		
Over deepening		Y / N / Unknown*		
Wver widened		Y / N / Unknown*		
Narrowing		Y / N / Unknown*		
Fords**		Y / N*		
		Major	Intermediate	Minor
Bridges**	NO*			
Weirs**	NO*			
Fish Pass**	NO*			

Physical features or resource use if applicable. *

Deflectors / Jetties / Arterial drainage / Side channels / Mid channel bar / Field Drains / Mill Race

Navigation / Fishing / Recreation / Forestry/ Urban / Industry / HEP

Trashline present (height __ m) above water / Buffer zone (LBm / RBm back from water edge)

Other observations - Invasives - Trees - Birds - Pollution indicators - Invertebrates*

Rhododendron / Himalayan Balsam / Japanese Knotweed / Giant hogweed / Snowberry / Cherry-Laurel/ Gunnera

Sycamore / Beech / Conifers / Oak / Ash / Alder / Willow / Birch / Hazel / Hawthorn / Blackthorn / Holly

Heron / Sand martin / Grey wagtail / Dippers / Kingfishers /

Sewage fungus / Diatomaceous algae / Oil / Cladophora / Vaucheria / Dumping / Silt on Substrate

Other comments:

_____

** Circle as appropriate E - extensive. ** Tally as appropriate. LB - left bank / RB - right bank*

RHAT RIVER HYDROMORPHOLOGY ASSESSMENT TECHNIQUE

Field Assessment of Morphological Condition

River Name _____ Site Code _____ Date _____

If river in spate ignore 3 and 4 but deduct individual scores from overall if either feature not visible. Greyed boxes may be scored but note why in Comments/Notes.

	Bedrock	Cascade / Step-pool	Pool-riffle-glide	Lowland Meandering
1. Channel form and flow types	4	4	4	4
2. Channel vegetation	4	4	4	4
3. Substrate condition	4	4	4	4
4. Barriers to continuity	4	4	4	4
5. Bank structure & stability L+R	4	4	4	4
6. Bank vegetation L+R	4	4	4	4
7. Riparian land cover L+R	4	4	4	4
8. Floodplain connectivity L+R	4	4	4	4
TOTAL	32	32	32	32
Hydromorph Score *				
WFD class **				

* Hydromorph score - Assessment score = Maximum Possible score

** WFD Class
> 0.8 = high
>0.6 – 0.8 = good
>0.4 – 0.6 = moderate
>0.2 - 0.4 = poor
< 0.2 = bad.

SHEET 5

NOTES

APPENDIX 2

PHOTOGRAPHS

Photographs of site locations and catchment pressures on the Owencarrow River and tributaries 2009. All field work photographs can be found in the accompanying electronic appendix.

Overall Risk * uses the “one out all out” principle

Site No.	Catchment Name	Location	X	Y	Photo No.	Bank Erosion	Diffuse Nutrient	Diffuse Silt	Field Drainage	Outfalls	Abstraction	Barriers to Migration	Current Riparian Zone	Overall Risk*	Pressure/Photo Details
1	Owencarrow	Glasnaseeragh River: South West of Ballybuninabber	206519	422235	1	Low	Low	Medium	Medium	Low	Low	Low	Low	Medium	Looking upstream from bridge
1	Owencarrow	Glasnaseeragh River: South West of Ballybuninabber	206519	422235	2	Low	Low	Medium	Medium	Low	Low	Low	Low	Medium	Bridge structure looking downstream
1	Owencarrow	Glasnaseeragh River: South West of Ballybuninabber	206519	422235	3	Low	Low	Medium	Medium	Low	Low	Low	Low	Medium	Bridge structure looking downstream
1	Owencarrow	Glasnaseeragh River: South West of Ballybuninabber	206519	422235	4	Low	Low	Medium	Medium	Low	Low	Low	Low	Medium	Looking upstream from bridge
1	Owencarrow	Glasnaseeragh River: South West of Ballybuninabber	206519	422235	5	Low	Low	Medium	Medium	Low	Low	Low	Low	Medium	Japanese Knotweed on left bank of bridge
1	Owencarrow	Glasnaseeragh River: South West of Ballybuninabber	206567	422105	6	Low	Low	Medium	Medium	Low	Low	Low	Low	Medium	Culverted under road, peat stained
1	Owencarrow	Glasnaseeragh River: South West of Ballybuninabber	206567	422105	7	Low	Low	Medium	Medium	Low	Low	Low	Low	Medium	Managed drain under road
2	Owencarrow	Glasnaseeragh River: North East of L. Nadourcon	206242	423653	1	Medium	Low	Medium	Low	Low	Low	Low	Low	Medium	Looking downstream from road bridge
2	Owencarrow	Glasnaseeragh River: North East of L. Nadourcon	206242	423653	2	Medium	Low	Medium	Low	Low	Low	Low	Low	Medium	Looking upstream from road bridge
2	Owencarrow	Glasnaseeragh River: North East of L. Nadourcon	206242	423653	3	Medium	Low	Medium	Low	Low	Low	Low	Low	Medium	Downstream channel
2	Owencarrow	Glasnaseeragh River: North East of L. Nadourcon	206239	423647	4	Medium	Low	Medium	Low	Low	Low	Low	Low	Medium	Dumping on left bank downstream of bridge

2	Owencarrow	Glasnaseeragh River: North East of L. Nadourcon	206239	423647	5	Medium	Low	Medium	Low	Low	Low	Low	Low	Medium	Bridge structure
2	Owencarrow	Glasnaseeragh River: North East of L. Nadourcon	206239	423647	6	Medium	Low	Medium	Low	Low	Low	Low	Low	Medium	Drainage from road contains algae & macrophytes
3	Owencarrow	Main Channel: Owencarrow Bridge	206222	425779	1	High	High	Low	High	Low	Low	Low	Medium	High	Looking downstream from bridge
3	Owencarrow	Main Channel: Owencarrow Bridge	206222	425779	2	High	High	Low	High	Low	Low	Low	Medium	High	Looking upstream from bridge
3	Owencarrow	Main Channel: Owencarrow Bridge	206222	425779	3	High	High	Low	High	Low	Low	Low	Medium	High	Siltation near mid-channel island
3	Owencarrow	Main Channel: Owencarrow Bridge	206222	425779	4	High	High	Low	High	Low	Low	Low	Medium	High	Upstream on right bank from bridge
3	Owencarrow	Main Channel: Owencarrow Bridge	206248	425797	5	High	High	Low	High	Low	Low	Low	Medium	High	Unmanaged land drain heavily silted
3	Owencarrow	Main Channel: Owencarrow Bridge	206248	425797	6	High	High	Low	High	Low	Low	Low	Medium	High	Macrophyte growth at entrance
3	Owencarrow	Main Channel: Owencarrow Bridge	206275	425809	7	High	High	Low	High	Low	Low	Low	Medium	High	Bridge from downstream
3	Owencarrow	Main Channel: Owencarrow Bridge	206275	425809	8	High	High	Low	High	Low	Low	Low	Medium	High	Dead mussels on left bank
3	Owencarrow	Main Channel: Owencarrow Bridge	206319	425827	9	High	High	Low	High	Low	Low	Low	Medium	High	Mid channel bar
3	Owencarrow	Main Channel: Owencarrow Bridge	206324	425833	10	High	High	Low	High	Low	Low	Low	Medium	High	Bank erosion high trash line
3	Owencarrow	Main Channel: Owencarrow Bridge	206364	425843	11	High	High	Low	High	Low	Low	Low	Medium	High	Second unmanaged land drain with diatoms
3	Owencarrow	Main Channel: Owencarrow Bridge	206401	425834	12	High	High	Low	High	Low	Low	Low	Medium	High	Right bank erosion / slump
3	Owencarrow	Main Channel: Owencarrow Bridge	206493	425808	13	High	High	Low	High	Low	Low	Low	Medium	High	Looks overdeepened
3	Owencarrow	Main Channel: Owencarrow	206493	425808	14	High	High	Low	High	Low	Low	Low	Medium	High	Right bank unimproved

		Bridge													rough pasture with improved grassland above it
3	Owencarrow	Main Channel: Owencarrow Bridge	206493	425808	15	High	High	Low	High	Low	Low	Low	Medium	High	Rough pasture
3	Owencarrow	Main Channel: Owencarrow Bridge	206493	425808	16	High	High	Low	High	Low	Low	Low	Medium	High	Viaduct end point
3	Owencarrow	Main Channel: Owencarrow Bridge	206493	425808	17	High	High	Low	High	Low	Low	Low	Medium	High	Myriophyllum with algae
4	Owencarrow	Main Channel: On N56	207805	427069	1	Low	Low	Low	Low	Low	Low	Low	Low	Low	Looking upstream from bridge
4	Owencarrow	Main Channel: On N57	207805	427069	2	Low	Low	Low	Low	Low	Low	Low	Low	Low	Looking downstream from bridge
4	Owencarrow	Main Channel: On N58	207805	427069	3	Low	Low	Low	Low	Low	Low	Low	Low	Low	Macrophyte / Potamogeton on right bank at bridge
4	Owencarrow	Main Channel: On N59	207805	427069	4	Low	Low	Low	Low	Low	Low	Low	Low	Low	Bridge structure
Stopping point 1	Owencarrow	Glenveagh National Park: L. Beagh			1										Mountainous area
Stopping point 1	Owencarrow	Glenveagh National Park: L. Beagh			2										Some trees fallen over
5	Owencarrow	Inflowing Tributary to L. Beagh	202970	421742	1	Low	Low	Low	Low	Low	Low	Low	Low	Low	Looking upstream from right bank
5	Owencarrow	Inflowing Tributary to L. Beagh	202970	421742	2	Low	Low	Low	Low	Low	Low	Low	Low	Low	Substrate condition
5	Owencarrow	Inflowing Tributary to L. Beagh	202970	421742	3	Low	Low	Low	Low	Low	Low	Low	Low	Low	Filamentous green algae
5	Owencarrow	Inflowing Tributary to L. Beagh	202970	421742	4	Low	Low	Low	Low	Low	Low	Low	Low	Low	Filamentous green algae
6	Owencarrow	Main Channel: Near Glenveagh National Park Vistor's Centre	204150	423007	1	Low	Low	Low	Low	Medium	Low	Medium	Medium	Medium	Outfall pipe possibly from centre
6	Owencarrow	Main Channel: Near	204150	423007	2	Low	Low	Low	Low	Medium	Low	Medium	Medium	Medium	Bridge structure

		Glenveagh National Park Vistor's Centre													
6	Owencarrow	Main Channel: Near Glenveagh National Park Vistor's Centre	204150	423007	3	Low	Low	Low	Low	Medium	Low	Medium	Medium	Medium	Barrier to migratiom
6	Owencarrow	Main Channel: Near Glenveagh National Park Vistor's Centre	204150	423007	4	Low	Low	Low	Low	Medium	Low	Medium	Medium	Medium	Barrier to migratiom
6	Owencarrow	Main Channel: Near Glenveagh National Park Vistor's Centre	204150	423007	5	Low	Low	Low	Low	Medium	Low	Medium	Medium	Medium	Barrier to migratiom with filamentous green algae
6	Owencarrow	Main Channel: Near Glenveagh National Park Vistor's Centre	204150	423007	6	Low	Low	Low	Low	Medium	Low	Medium	Medium	Medium	Looking upstream
6	Owencarrow	Main Channel: Near Glenveagh National Park Vistor's Centre	204150	423007	7	Low	Low	Low	Low	Medium	Low	Medium	Medium	Medium	Macrophyte growth upstream
6	Owencarrow	Main Channel: Near Glenveagh National Park Vistor's Centre	204150	423007	8	Low	Low	Low	Low	Medium	Low	Medium	Medium	Medium	Treatment system
7	Owencarrow	Main Channel: Glenveagh Bridge	204223	423400	1	Medium	Low	Low	Medium	Low	Low	Medium	Medium	Medium	Looking downstream from bridge
7	Owencarrow	Main Channel: Glenveagh Bridge	204223	423400	2	Medium	Low	Low	Medium	Low	Low	Medium	Medium	Medium	Looking upstream from bridge
7	Owencarrow	Main Channel: Glenveagh Bridge	204223	423400	3	Medium	Low	Low	Medium	Low	Low	Medium	Medium	Medium	Under bridge
7	Owencarrow	Main Channel: Glenveagh Bridge	204223	423400	4	Medium	Low	Low	Medium	Low	Low	Medium	Medium	Medium	Excessive macrophyte growth
7	Owencarrow	Main Channel: Glenveagh Bridge	204305	423436	5	Medium	Low	Low	Medium	Low	Low	Medium	Medium	Medium	Riffle downstream of bridge
7	Owencarrow	Main Channel: Glenveagh	204333	423461	6	Medium	Low	Low	Medium	Low	Low	Medium	Medium	Medium	Excessive filamentous

		Bridge													algae growth
7	Owencarrow	Main Channel: Glenveagh Bridge	204333	423461	7	Medium	Low	Low	Medium	Low	Low	Medium	Medium	Medium	Excessive filamentous algae growth
7	Owencarrow	Main Channel: Glenveagh Bridge	204394	423507	8	Medium	Low	Low	Medium	Low	Low	Medium	Medium	Medium	Possible stone fish weirs x2
7	Owencarrow	Main Channel: Glenveagh Bridge	204394	423507	9	Medium	Low	Low	Medium	Low	Low	Medium	Medium	Medium	Possible stone fish weirs x3
7	Owencarrow	Main Channel: Glenveagh Bridge	204390	423504	10	Medium	Low	Low	Medium	Low	Low	Medium	Medium	Medium	General end point photos
7	Owencarrow	Main Channel: Glenveagh Bridge	204390	423504	11	Medium	Low	Low	Medium	Low	Low	Medium	Medium	Medium	General end point photos
8	Owencarrow	Main Channel: East of Larkagh	200911	425714	1	Low	Medium	Medium	Medium	Low	Low	Low	Low	Medium	Looking upstream
8	Owencarrow	Main Channel: East of Larkagh	200911	425714	2	Low	Medium	Medium	Medium	Low	Low	Low	Low	Medium	Looking downstream
8	Owencarrow	Main Channel: East of Larkagh	200911	425714	3	Low	Medium	Medium	Medium	Low	Low	Low	Low	Medium	Forestry, felled & replanted upstream
8	Owencarrow	Main Channel: East of Larkagh	200911	425723	4	Low	Medium	Medium	Medium	Low	Low	Low	Low	Medium	Unmanaged land drain on left bank
8	Owencarrow	Main Channel: East of Larkagh	200911	425723	5	Low	Medium	Medium	Medium	Low	Low	Low	Low	Medium	Filamentous green algae at bridge
9	Owencarrow	Confluence of R. Calabber & R. Owenbeg at Allacloghan Bridge	200149	423765	1	Medium	Medium	Medium	Medium	Medium	Low	Low	Medium	Medium	Looking downstream from confluence
9	Owencarrow	Confluence of R. Calabber & R. Owenbeg at Allacloghan Bridge	200149	423765	2	Medium	Medium	Medium	Medium	Medium	Low	Low	Medium	Medium	Looking upstream from confluence
9	Owencarrow	Confluence of R. Calabber & R. Owenbeg at Allacloghan Bridge	200155	423766	3	Medium	Medium	Medium	Medium	Medium	Low	Low	Medium	Medium	Siltation downstream of confluence
9	Owencarrow	Confluence of R. Calabber & R. Owenbeg at Allacloghan Bridge	200155	423766	4	Medium	Medium	Medium	Medium	Medium	Low	Low	Medium	Medium	Near end point

9	Owencarrow	Confluence of R. Calabber & R. Owenbeg at Allacloghan Bridge	200155	423766	5	Medium	Medium	Medium	Medium	Medium	Low	Low	Medium	Medium	Left bank siltation covers this bank when in flood
9	Owencarrow	Confluence of R. Calabber & R. Owenbeg at Allacloghan Bridge	200155	423766	6	Medium	Medium	Medium	Medium	Medium	Low	Low	Medium	Medium	Clear felled area upstream of Calabber

Appendix 3 – Catchment Walkover Risk Assessment Survey Sheet

Sheet 1: Catchment Walkovers	Version 1. 07/04/2009
Tributary/Main Channel*	
Site Identification	
River Name	Site Code
Water Body ID	Start U/S or D/S*
First site IGR	Last site IGR
Bank surveyed from L/R/In-channel*	
Photograph details include IGR or approximate location.	

* Select as appropriate

	Present?					
	Yes	No		Grid Reference of specific pressure	No.of Photographs	Comments
Source of Erosion						
Bank erosion						
Land clearance						
In river clearance						
Arable ploughing						
Animal trampling						
Fords						
Channel manipulation						
Hard bank protection measures						
Other sources						
Overall Risk	High	Medium	Low			
Diffuse Nutrient						
Arable						
Grazing						
Improved grassland						
Silage						
Forestry						
Housing						
Industry and associated works						
Other sources						
Overall Risk	High	Medium	Low			
Diffuse Silt						
Arable						
Grazing						
Over-grazing						
Improved grassland (Re-seeding)						
Forest						
Silage						
Industry						
Construction stages						
Housing						
Infilling						
Peat cutting						
Quarries						
Other sources						
Overall Risk	High	Medium	Low			

	Present?					
	Yes	No		Grid Reference of specific pressure	No.of Photographs	Comments
Current Riparian Zone						
Fencing						
Buffer						
Tree line at bank						
Tree line buffer						
Plantation with no buffer						
Urbanisation						
Flood protection						
Marshy land						
Landuse at bank						
Other sources						
Overall Risk	High	Medium	Low			
Field Drainage						
Ditch managed						
Ditch unmanaged						
Drainage on high slope						
Drainage on low slope						
Land drainage (perforated pipes)						
Other sources						
Overall Risk	High	Medium	Low			
Outfalls						
Industrial discharges						
Storm drains						
Culvert outfalls						
Other sources						
Overall Risk	High	Medium	Low			
Abstractions						
Small						
Large						
Overall Risk	High	Medium	Low			
Barriers to migration						
Culverts						
Bridge aprons						
Weirs						
Stone weirs						
Other sources						
Overall Risk	High	Medium	Low			