NS 2 FRESHWATER PEARL MUSSEL SUB-BASIN MANAGEMENT PLANS

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

September 2009

TABLE OF CONTENTS

APPE	NDIX 3	CATCHMENT WALKOVER RISK ASSESSMEN	IT SHEET
APPE	NDIX 2	FIELD SURVEY PHOTOGRAPHS	
APPE	NDIX 1	RHAT FIELD SHEET	
3.0	RESULTS		7
1.1 1.2		dromorphology Asessment Technique (RHAT) nt Walkover Risk assessment	
2.0	METHODO	DLOGY	4
1 II	NTRODUCT	TION	3

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.

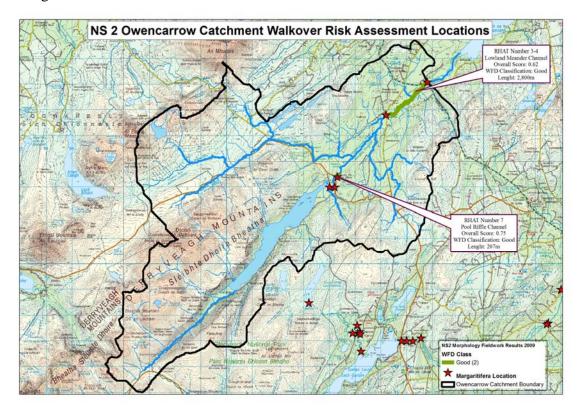


Figure 1 Morphology RHAT Assessment Locations

(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.

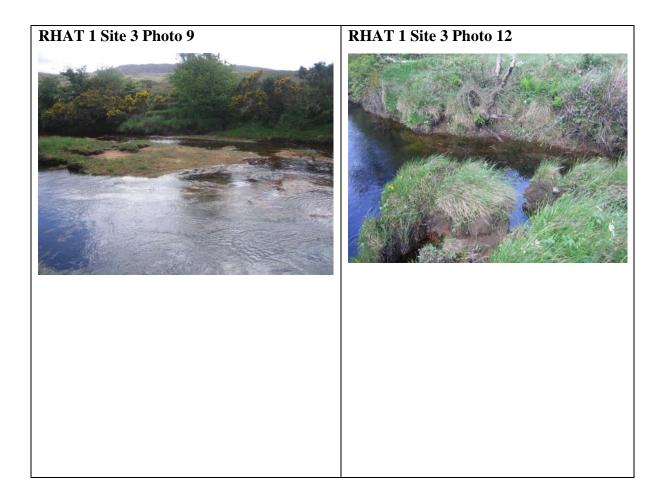


Plate 3.1 Representative photographs from reach:



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

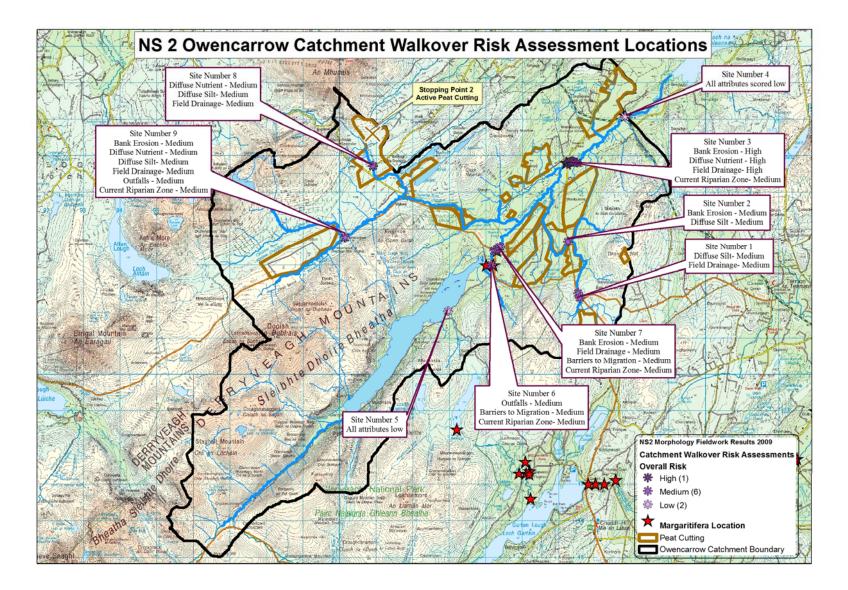
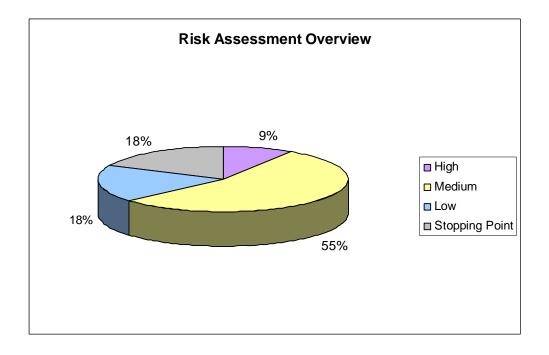


Figure 3.2 Location of Stopping points and Catchment Walkover Risk Assessments

Figure 3.3 Risk Assessment Overview



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

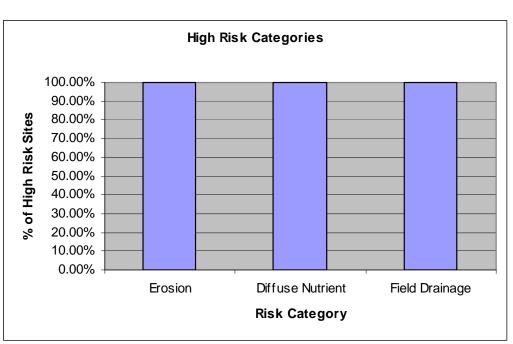


Figure 3.4 Break-down of High Risk categories

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

River Name	Site Code		Da		
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 - yea	ar 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-Cha	nnel ^s
Desk-study notes	Field Notes
ACTION TO TAKE PRIOR TO FIELDWORK	River type
General overall shape of river Check weirs, impoundments etc. on catchment	Date
Floodplain connectivity and land use	Time
Expected river type	Surveyors
Rain last week	Weather conditions now
Estimated river width	Estimated river width (m) (average 3 readings)
Estimated survey length	
Riparian land cover(s)	Estimated survey length (m) (40 X wetted width)
River Agency designated?	Estimated river depth (m)
Other comments including geology - limestone / siliceous / peat*	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

AL AL	pacts	en e de		D	
River Name		Site Code		Da	
Feature		Tick if pre	sent, recor	d as E if > 3	10%
Resectioning		None	Left ba	ank 🔲	Right bank
Reinforcement		None	Left ba	^{ank}	Right bank
Embankments	NO*	LB 🔲 I	RB S	et back LB	SB RB
Culverts**		Y	/ N	1	Unknown*
Over deepening		Y	/ N	/	Unknown*
Wver widened		Y	/ N	1	Unknown*
Narrowing		Y	/ N	1	Unknown*
Fords**			Y	/ N	ŧ.
		Major	/ Int	ermediate	/ Minor
Bridges**	NO*			and the second se	
Druges	NO-				
Weirs**	NO*				
Weirs** Fish Pass**	1.1.0	able. *			
Weirs** Fish Pass** Physical features of Deflectors / Jetties Navigation / Fishir Trashline present (h Other observation:	NO* NO*	e channels / Mid cl y/ Urban / Industi er / Buffer zone (LE rds - Pollution ind	ry / HEP 3m / RBm b licators - In	ack from w wertebrate	ater edge) s*
Weirs** Fish Pass** Physical features of Deflectors / Jetties / Navigation / Fishir Trashline present (h Other observations Rhododendron / Hi Laurel/ Gunnera	NO* NO* or resource use if applic / Arterial drainage / Side ng / Recreation / Forestr neight m) above wate s - Invasives - Trees - Bin	e channels / Mid cl y/ Urban / Industi er / Buffer zone (LE rds - Pollution ind nese Knotweed / G	ry / HEP Bm / RBm b licators - In iiant hogwe	oack from w nvertebrate eed / Snowl	ater edge) •s* berry / Cherry-
Weirs** Fish Pass** Physical features of Deflectors / Jetties / Navigation / Fishir Trashline present (h Other observation: Rhododendron / Hi Laurel/ Gunnera Sycamore / Beech / Holly	NO* NO* or resource use if applic / Arterial drainage / Side ng / Recreation / Forestr neight m) above wate s - Invasives - Trees - Bin imalayan Balsam / Japan	e channels / Mid cl y/ Urban / Industi er / Buffer zone (LE rds - Pollution ind nese Knotweed / G lder / Willow / Birc	ry / HEP Bm / RBm b licators - In iiant hogwe	oack from w nvertebrate eed / Snowl	ater edge) •s* berry / Cherry-
Weirs** Fish Pass** Physical features of Deflectors / Jetties Navigation / Fishir Trashline present (h Other observation: Rhododendron / Hi Laurel/ Gunnera Sycamore / Beech / Holly Heron / Sand martin	NO* NO* or resource use if applic / Arterial drainage / Side ng / Recreation / Forestr neight m) above wate s - Invasives - Trees - Bin imalayan Balsam / Japan	e channels / Mid cl y/ Urban / Industi er / Buffer zone (LE rds - Pollution ind nese Knotweed / G lder / Willow / Birc rs / Kingfishers /	ry / HEP 3m / RBm b ficators - In iiant hogwo h / Hazel / I	oack from w nvertebrate eed / Snowl Hawthorn /	ater edge) es* berry / Cherry- Blackthorn /

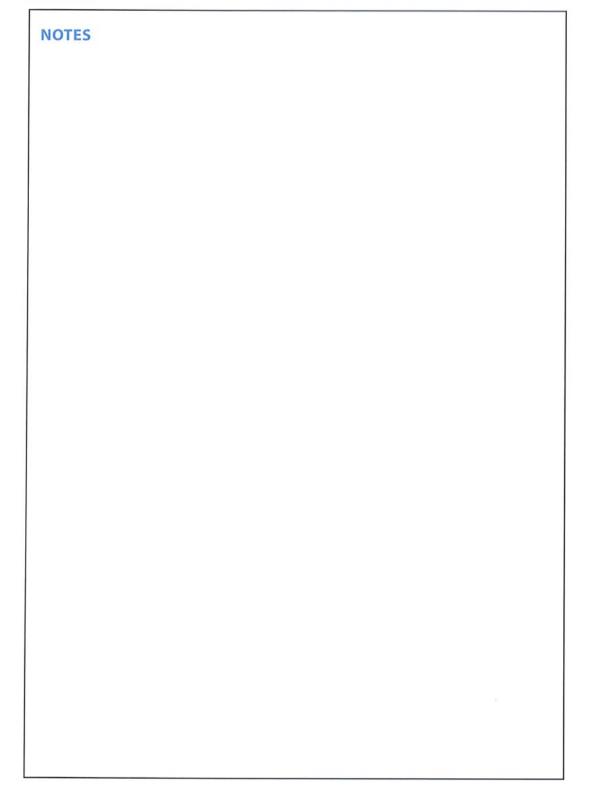
RHAT RIVER HYDROMORPHOLOGY ASSESSMENT TECHNIQUE

River Name		Site Code	D	ate
f river in spate ignore 3 and not visible. Greyed boxes m				ature
	Bedrock	Cascade / Step-pool	Pool-riffle-glide	Lowland Meandering
1. Channel form and flow types	4		4	
2. Channel vegetation	4	4	4	
3. Substrate condition	4	4	4	
4. Barriers to continuity	4	4	4	
5. Bank structure & stability L+R	4	4	4	
6. Bank vegetation L+R	4	4	4	
7. Riparian land cover L+R	4	4	4	
8. Floodplain connectivity L+R	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



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
		Glasnaseeragh River: South West of		422103	7										Managed drain
1	Owencarrow	Ballybuninabber Glasnaseeragh River: North East of L.	206567			Low	Low	Medium	Medium	Low	Low	Low	Low	Medium	under road Looking downstream
2	Owencarrow	Nadourcon Glasnaseeragh River: North East of L.	206242	423653	1	Medium	Low	Medium	Low	Low	Low	Low	Low	Medium	from road bridge Looking upstream from
2	Owencarrow	Nadourcon Glasnaseeragh River: North East of L.	206242	423653	2	Medium	Low	Medium	Low	Low	Low	Low	Low	Medium	road bridge Downstream
2	Owencarrow	Nadourcon Glasnaseeragh River: North East of L. Nadourcon	206242	423653	3	Medium	Low	Medium	Low	Low	Low	Low	Low	Medium	channel Dumping on left bank downstream of bridge

		Glasnaseeragh River: North East of L.													
2	Owencarrow	Nadourcon	206239	423647	5	Medium	Low	Medium	Low	Low	Low	Low	Low	Medium	Bridge structure
		Glasnaseeragh River: North East of L.													Drainage from road contains algae &
2	Owencarrow	Nadourcon	206239	423647	6	Medium	Low	Medium	Low	Low	Low	Low	Low	Medium	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
5	Owencarrow	Main Channel:	200222	423779	3	riigii	riigii	LOW	Tilgh	LOW	LOW	LOW	Medium	riigii	Upstream on
3	Owencarrow	Owencarrow Bridge	206222	425779	4	High	High	Low	High	Low	Low	Low	Medium	High	right bank from bridge
	0	Main Channel: Owencarrow	000040	405707	-	Llink	Lint		Link		1	1.41	MacProve	Link	Unmanaged land drain
3	Owencarrow	Bridge Main Channala	206248	425797	5	High	High	Low	High	Low	Low	Low	Medium	High	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		Main Channel: Owencarrow	206275	425809	8	High	0								Dead mussels
3	Owencarrow	Bridge Main Channel:	200275	420809	0	nign	High	Low	High	Low	Low	Low	Medium	High	on left bank
		Owencarrow													
3	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	Hiah	High	Low	High	Low	Low	Low	Medium	High	Bank erosion high trash line
3	Owencariow	Blidge	200324	420000	10	riigii	riigii	LOW	riigii	LOW	LOW	LOW	Medium	riigii	Second
3	Owencarrow	Main Channel: Owencarrow Bridge	206364	425843	11	High	High	Low	High	Low	Low	Low	Medium	High	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
		Main Channel:													
3	Owencarrow	Owencarrow Bridge	206493	425808	15	High	High	Low	High	Low	Low	Low	Medium	High	Rough pasture
		Main Channel:	200100	120000	10	- ngn	- ingli	2011	- ingri	2011	2011	2011	Wiedlah	- ngn	Rough public
3	0	Owencarrow Bridge	206493	425808	16	Lliab	High	Low	High	Low	Low	Low	Medium	High	Viaduct end point
	Owencarrow	Main Channel:	200493	420000	10	High	nign	Low	nign	LOW	Low	Low	weaturn	nign	point
3	Owencarrow	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
	Owerleanow		207000	421005	<u> </u>	LOW	LOW	LOW	LOW	LOW	LOW	LOW	LOW	2011	Looking
4	Owencarrow	Main Channel: On N57	207805	427069	2	Low	Low	Low	Low	Low	Low	Low	Low	Low	downstream from bridge
	Owencarrow	011107	207003	427003	2	LOW	LOW	LOW	LOW	LOW	LOW	LOW	LOW	LOW	Macrophyte /
		Main Channel:													Potamogeton on right bank at
4	Owencarrow	On N58	207805	427069	3	Low	Low	Low	Low	Low	Low	Low	Low	Low	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		Glenveagh National Park:													Some trees
point 1	Owencarrow	L. Beagh Inflowing			2										fallen over Looking
	-	Tributary to L.													upstream from
5	Owencarrow	Beagh Inflowing	202970	421742	1	Low	Low	Low	Low	Low	Low	Low	Low	Low	right bank
		Tributary to L.													Substrate
5	Owencarrow	Beagh	202970	421742	2	Low	Low	Low	Low	Low	Low	Low	Low	Low	condition
5	Owencarrow	Inflowing Tributary to L. Beagh	202970	421742	3	Low	Low	Low	Low	Low	Low	Low	Low	Low	Filamentous green algae
5	Owchicanow	Inflowing	202310	721/92	5	LOW		LOW	2000						groon aigae
5	Owencarrow	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

1		Glenveagh						1	1	1			1		
		National Park													
		Vistor's Centre													
		Main Channel:													
		Near Glenveagh													
		National Park													Barrier to
6	Owencarrow	Vistor's Centre	204150	423007	3	Low	Low	Low	Low	Medium	Low	Medium	Medium	Medium	migratiom
		Main Channel:			-										
		Near													
		Glenveagh													
		National Park													Barrier to
6	Owencarrow	Vistor's Centre	204150	423007	4	Low	Low	Low	Low	Medium	Low	Medium	Medium	Medium	migratiom
		Main Channel:													
		Near													Barrier to
		Glenveagh National Park													migratiom with filamentous
6	Owencarrow	Vistor's Centre	204150	423007	5	Low	Low	Low	Low	Medium	Low	Medium	Medium	Medium	green algae
	Chonoanow	Main Channel:	204100	120001	5	2011	2011	2011	2011	Modiaili	2011	modium	modum	moulum	groon algao
		Near													
		Glenveagh													
		National Park													Looking
6	Owencarrow	Vistor's Centre	204150	423007	6	Low	Low	Low	Low	Medium	Low	Medium	Medium	Medium	upstream
		Main Channel:													
		Near													Maanahuta
		Glenveagh National Park													Macrophyte
6	Owencarrow	Vistor's Centre	204150	423007	7	Low	Low	Low	Low	Medium	Low	Medium	Medium	Medium	growth upstream
0	Owencarrow	Main Channel:	204130	420007	1	LOW	LOW	LOW	LOW	Wealdin	LOW	Weddini	Wealdin	Wicdiam	upstream
		Near													
		Glenveagh													
		National Park													Treatment
6	Owencarrow	Vistor's Centre	204150	423007	8	Low	Low	Low	Low	Medium	Low	Medium	Medium	Medium	system
		Main Channel:													Looking
-	0	Glenveagh	004000	400.400		Marthurs	1		N 4 a dia ma		1	Marthum	Marthurs	Mark	downstream
7	Owencarrow	Bridge Main Channel:	204223	423400	1	Medium	Low	Low	Medium	Low	Low	Medium	Medium	Medium	from bridge Looking
		Glenveagh													upstream from
7	Owencarrow	Bridge	204223	423400	2	Medium	Low	Low	Medium	Low	Low	Medium	Medium	Medium	bridge
		Main Channel:			_										
		Glenveagh										1			
7	Owencarrow	Bridge	204223	423400	3	Medium	Low	Low	Medium	Low	Low	Medium	Medium	Medium	Under bridge
		Main Channel:													Excessive
_		Glenveagh	004000	100.100											macrophyte
7	Owencarrow	Bridge	204223	423400	4	Medium	Low	Low	Medium	Low	Low	Medium	Medium	Medium	growth
		Main Channel: Glenveagh													Riffle downstream of
7	Owencarrow	Bridge	204305	423436	5	Medium	Low	Low	Medium	Low	Low	Medium	Medium	Medium	bridge
· · ·	CWCHCarlow		204000	720700	5	MCUIUIII	2000	LOW	Medium	2000	2000		Medium	wiculum	
_	0	Main Channel:	204222	400404	~	Madium	Low	Low	Madium	Low	Low	Madium	Madium	Madhum	Excessive
7	Owencarrow	Glenveagh	204333	423461	6	Medium	Low	Low	Medium	Low	Low	Medium	Medium	Medium	filamentous

		Bridge								1					algae growth
		Main Channel: Glenveagh													Excessive filamentous
7	Owencarrow	Bridge	204333	423461	7	Medium	Low	Low	Medium	Low	Low	Medium	Medium	Medium	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
	2	Main Channel:				meanann			meanann					meanant	Looking
8	Owencarrow	East of Larkagh	200911	425714	1	Low	Medium	Medium	Medium	Low	Low	Low	Low	Medium	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 Confluence of	200149	423765	1	Medium	Medium	Medium	Medium	Medium	Low	Low	Medium	Medium	Looking downstream from confluence
9	Owencarrow	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
	0	Confluence of R. Calabber & R. Owenbeg at Allacloghan	200455	400700	4	Madium	Madium	Madium	Madium	Modium	Low	L eu:	Madium	Machiner	
9	Owencarrow	Bridge	200155	423766	4	Medium	Medium	Medium	Medium	Medium	Low	Low	Medium	Medium	Near end point

0	0	Confluence of R. Calabber & R. Owenbeg at Allacloghan	200455	400766	5	Madium	Madium	Madium	Madium	Madium		Low	Madium	Madium	Left bank siltation covers this bank when
9	Owencarrow	Bridge	200155	423766	5	Medium	Medium	Medium	Medium	Medium	Low	Low	Medium	Medium	in flood
		Confluence of R. Calabber &													
		R. Owenbeg at													Clear felled area
		0													
		Allacloghan													upstream of
9	Owencarrow	Bridge	200155	423766	6	Medium	Medium	Medium	Medium	Medium	Low	Low	Medium	Medium	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*	
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* Output an annualista	

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