NS 2 FRESHWATER PEARL MUSSEL SUB-BASIN MANAGEMENT PLANS

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

September 2009

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INTRODUCTION

In order to assess the hydromorphological alterations within the Caragh 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 20th 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 Caragh 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 1 indicates where the Caragh morphology RHAT assessments were carried out throughout the catchment.

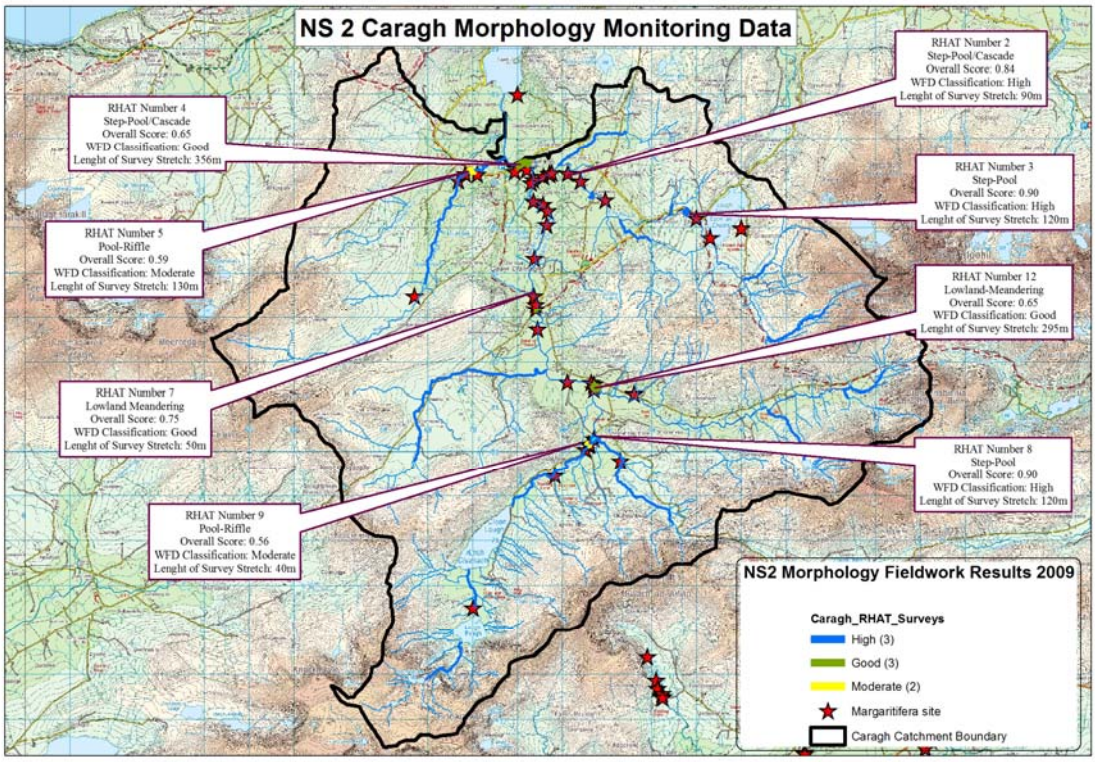

Figure 1 Morphology RHAT Assessment Locations

(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

Eight RHAT surveys were carried out throughout the Caragh catchment. The results of these surveys can be found in the electronic appendix. Three were deemed to be at High status, three at Good status and two at Moderate status. RHAT number 2 scored well on all attributes except for barriers to continuity and riparian land cover. However, the barriers to continuity were based on the natural river typology and overall this stretch was classified as being at high status.

RHAT number 3 was one of the highest scoring stretches within the catchment with all attributes scoring 4 out of 4 except for the riparian landcover which scored 2 and the floodplain connectivity which scored 3. Both these attributes scored low due to the presence of coniferous plantation along the step banks together with extensive evidence of dumping along the stretch. The river is highly confined within this valley due to its

step sides and therefore the floodplain connectivity was scored 3 out of 4. There is also some evidence to suggest this stretch was possible reinforced along the toe in the past which has led to an alteration of the bank side vegetation in some areas.

RHAT number 4 overall was classified as Good however, the channel vegetation, substrate condition, riparian landcover and floodplain connectivity all scored 2 or less. The left bank is maintained for fisheries with much of the bank vegetation cut on the day in which the survey took place. This bank may also have been artificially raised in the past forming an embankment along a significant stretch of the river which can cause problems in relation to the floodplain connectivity.

RHAT number 5 on the Meelagh River was scored 2 on all attributes except channel form and floodplain connectivity which scored 4 and 3 respectively. Overall the substrate condition was poor with above average macrophyte growth for a river of this typology in particular *ranunculus*. This is largely due to the presence of a fine layer of silt on the substrate. The banks have been trampled and are also eroding heavily on the meanders with slumping evident also. Within the survey stretch covered by RHAT number 7 the bank structure & stability, bank vegetation & riparian landcover scored lowest. Along the left bank in particular downstream of the bridge heavy poaching, trampling and siltation is evident. Along the right bank and towards the centre of the channel *ranunculus* is present in large plumes.

RHAT number 8 covered a stretch on the main channel of the Owenroe river. This stretch scored high in the classification process and overall scored well on all attributes. It is a fast flowing stretch with small mid channel Islands evident indicating it is a high energy system.

RHAT number 9 was carried out farther upstream from RHAT number 8. This stretch from a morphological point of view scored a lot lower than RHAT 8 due to the extremely poor condition of the channel. Excessive trampling and poaching was evident on the right bank which has led to heavy siltation within the channel. Numerous dead mussels were found along the survey stretch together with a foul smell from the river substrate. RHAT 12 scored low on many of the attributes in particular the bank structure and stability. Along most of this stretch both banks are highly eroded with landowners taking steps to reinforce the banks. There are areas where the fence line is now well within the channel as the river erodes the adjacent field. Bank vegetation is totally lacking along much of the stretch due to the high level of erosion. This is a lowland

meandering river with a high level of deposition; however the macrophyte growth is not too excessive for a river of this type.

Representative photographs from reach:

RHAT 2 	**RHAT 3** 
RHAT 4 	**RHAT 5** 
RHAT 7 	**RHAT 8** 

RHAT 9 	**RHAT 9** 
RHAT 12 	

Details in relation to photographs are tabulated in Appendix 2.

3.1 Catchment Walkover Risk Assessment Results

A total of 16 sites were surveyed in the Caragh Sub-basin catchment; with a risk assessment carried out at ten of theses sites (six stopping points). Figure 2 outlines the stopping point locations together with the High to Low Risk Assessment from the Catchment Walkover Risk Assessments. Three out of the ten sites were considered to be high risk with the remaining sites classified as medium risk, meaning no sites surveyed were determined to be low risk. Figure 3 outlines the percentage at high and medium risk together with the number of stopping points throughout the catchment.

The most common high risk category identified was:

- Erosion – evident at 100% of high risk sites.

The Current Riparian Zone category of the Catchment Walkover Risk Assessment slightly varies from the seven other categories or pressures. The Current Riparian Zone is not a pressure in itself; however the aspects listed in this category are the interceptors to the pressure and convey the extent or lack of buffer provided by the riparian zone. A high risk riparian zone indicates that the pressures acting on the river are more likely to have significant impact. For example the lack of fencing along a river stretch can lead to excessive trampling and/or poaching which in turn may lead to siltation within a pearl mussel habitat. The various categories and pressures listed in the Catchment Walkover Risk Assessment sheet were designed to assist the project in focussing the measures which will be needed to combat the pressure along its pathway, rather than removing a source which may not always be possible such as intensive agriculture. Recording the Riparian Zone in terms of its current performance as a buffer is important in this regard.

Current Riparian Zone has ten aspects as follows:

- Fencing
- Buffer
- Tree line at bank
- Tree line buffer
- Plantation with no buffer
- Urbanisation
- Flood Protection
- Marshy Land
- Landuse at bank
- Other Sources

Where one or any of these aspects is found to be the cause of significant impact to the riparian zone, or the channel along the stretch then this category may be assigned a high risk score. Figure 2 outlines the percentage number of sites at High, Medium or Low risk. Locations where pressures were evident in the field which were not highlighted through the desk based assessment were also noted as stopping points. These points

were not selected prior to fieldwork, they were opportunistic as the catchment drive through was taking place. The pie chart in Figure 3 indicates the percentage of stopping points also.

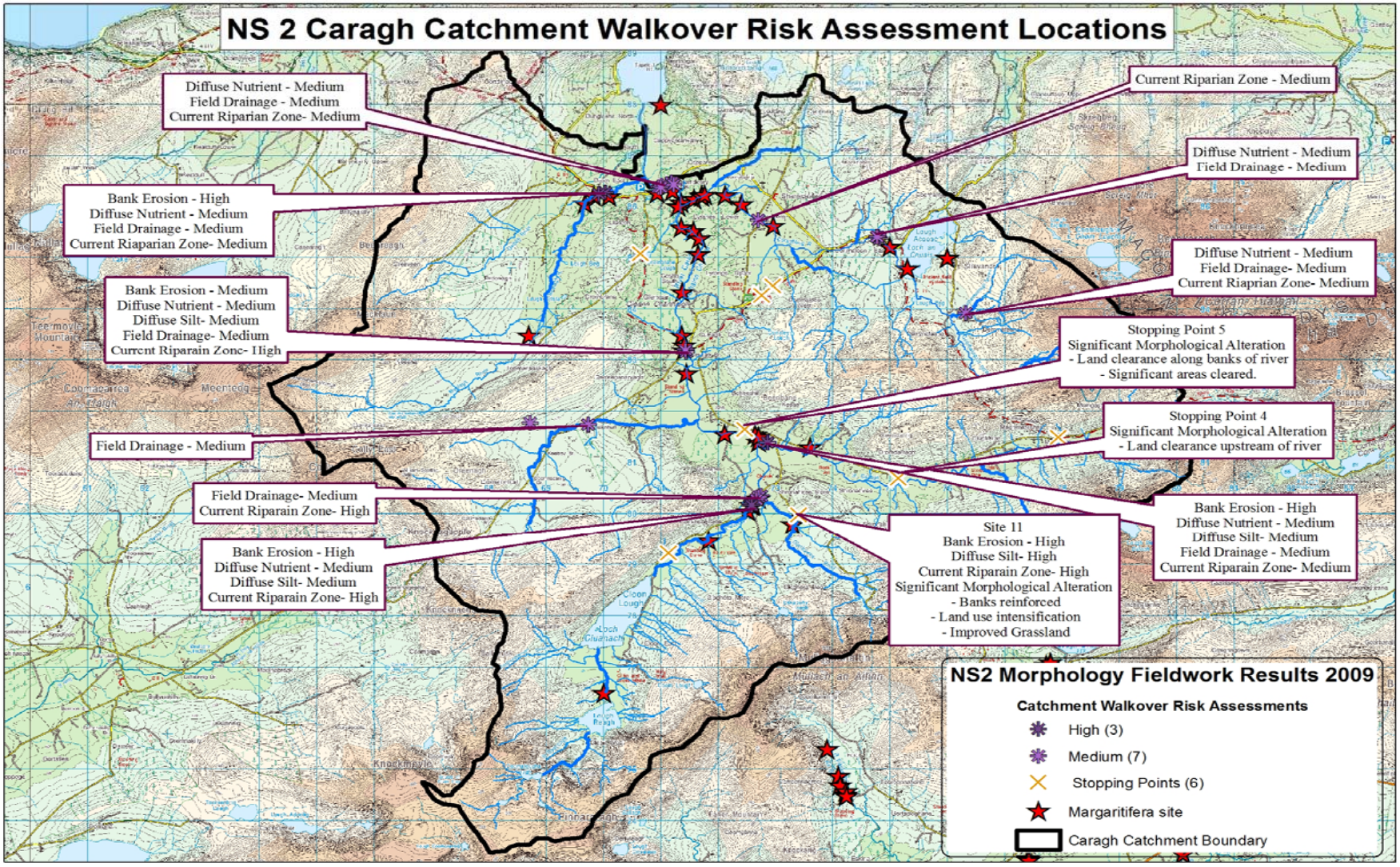

Figure 2 Location of Stopping points and Catchment Walkover Risk Assessments

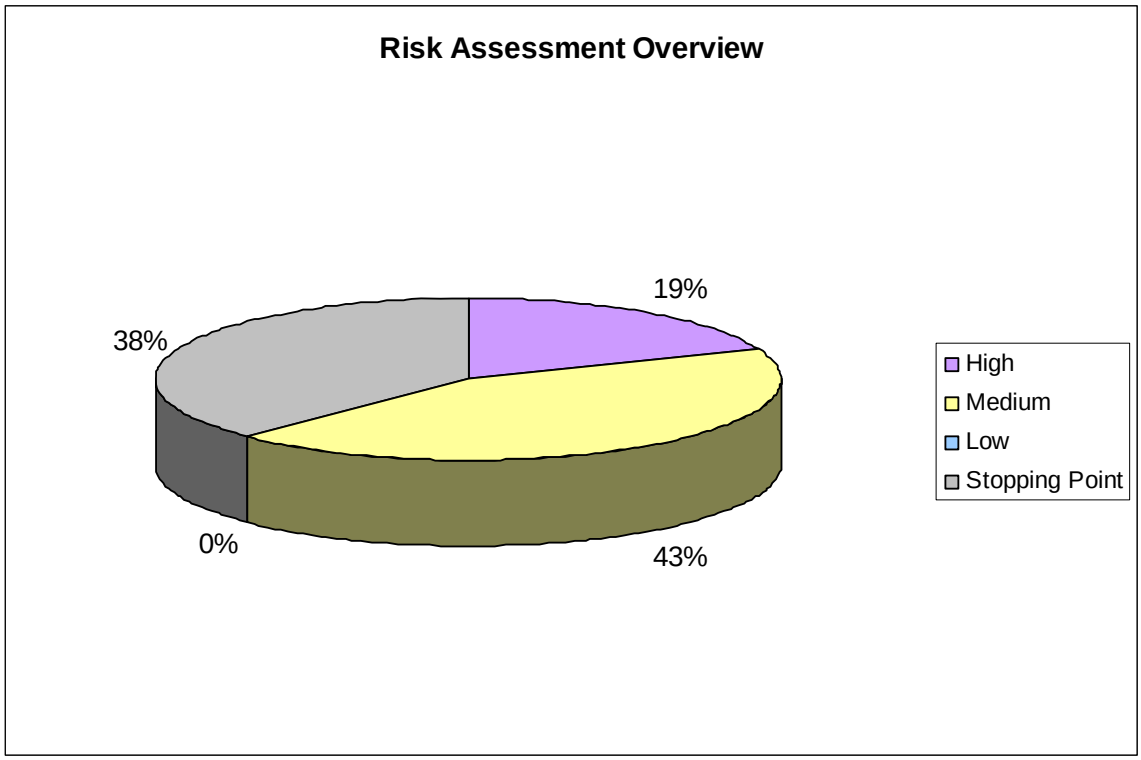

Figure 3. Risk Assessment Overview

The break-down of pressure categories identified as high risk are outlined in Figure 3

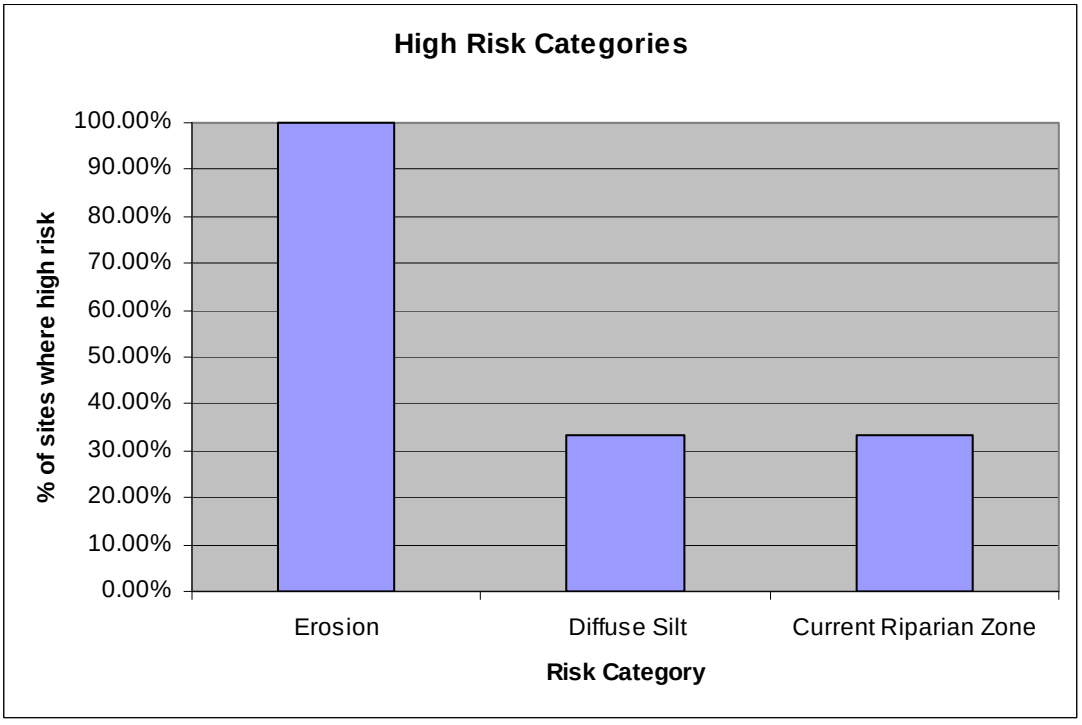

Figure 4 Breakdown of High Risk Categories

The most common source of erosion within the catchment was bank erosion which is evident at all three high risk sites. Animal trampling and hard bank protection measures are also issues identified at high risk sites within the catchment.

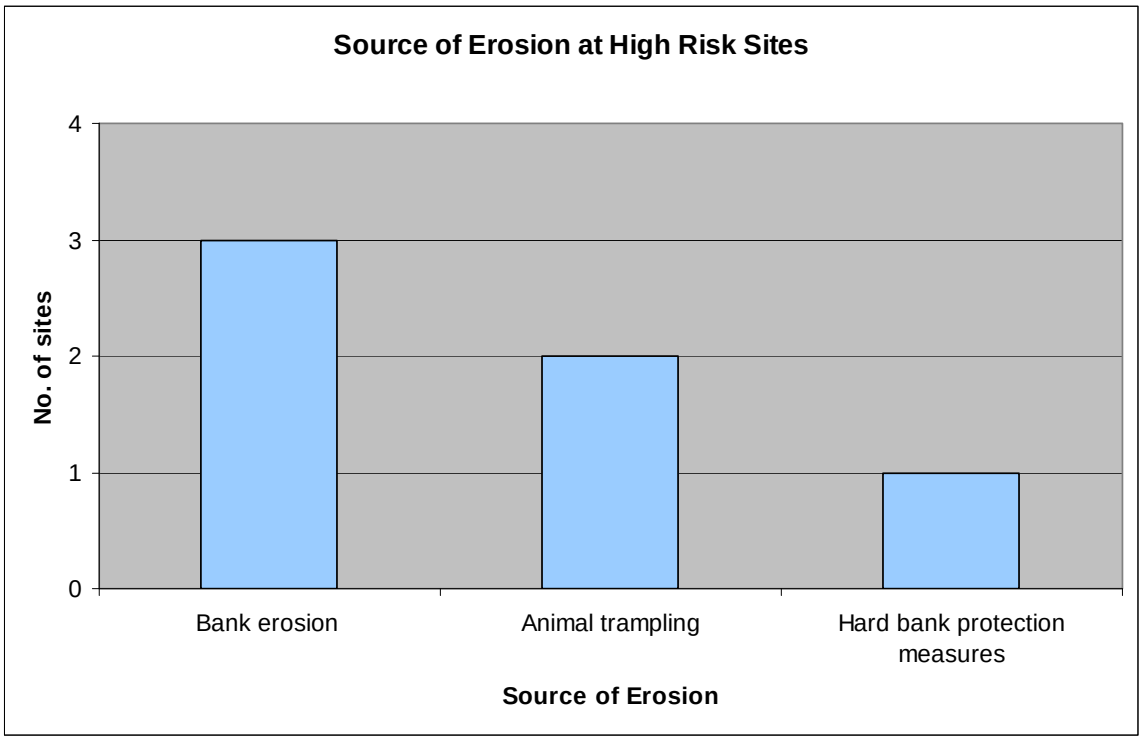

Figure 5 source of erosion pressure at high risk sites

The various stopping points which are also indicated in Figure 2 highlighted a number of areas where bank and site clearance works are also a significant pressure throughout the catchment. In particular on the Glashawee River (Site 11) near the recorded population of pearl mussels, significant bank and site clearance works were recorded. These site clearance works are recent with initial bank reinforcement and site clearance works for improved grassland recorded in February 2009 with subsequent photos taken in June 2009 as per the photographs below. Further site clearance (Stopping point 4 & 5), land improvement, small scale sand and gravel abstraction together with tree felling was also recorded at the remaining stopping points.

Stopping Point 11 Glashawee River Photo taken in February 2009

Stopping Point 11 Glashawee River Photo taken in June 2009

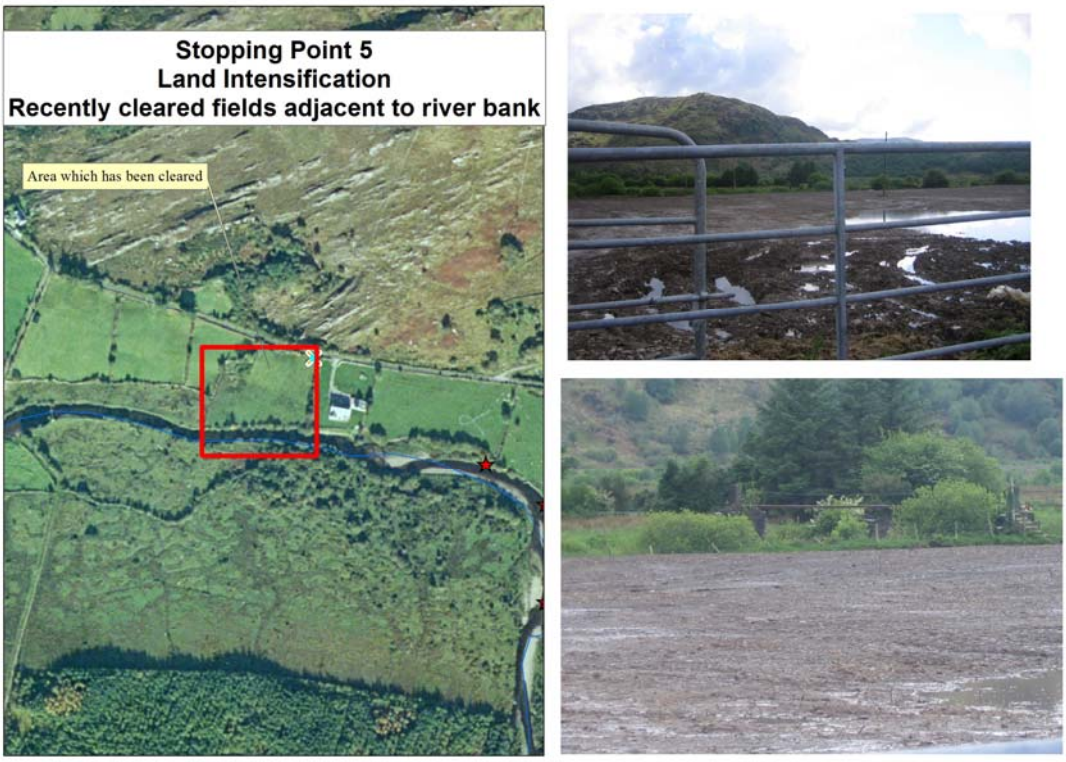

Figure 6 Location of stopping point 5 where significant land clearance has been undertaken adjacent to a river stretch containing pearl mussel records and habitat.

4.0 CONCLUSIONS

The Caragh sub-basin catchment appears to be in an over all poor condition from a morphological point. Throughout the catchment there is extensive evidence that site clearance and land improvement works are a significant pressure. These works appear to be undertaken along large stretches of the river channel together with large expanses of the riparian landcover. Improved grassland was noted along much of the Glashawee in the vicinity of the pearl mussel population. Seven of the risk assessments were carried out within the vicinity of the pearl mussel populations with three of them scoring high risk.

Animal trampling and poaching is also a significant pressure within this catchment with a totally lack of fencing along many stretches. The Caragh is a high energy system with significant natural bank erosion taking place which is evident throughout the main channel. Bank stabilisation measures will be needed throughout this catchment to combat this issue.

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 Caragh 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	Abstractions	Barriers to Migration	Current Riparian Zone	Overall Risk*	Pressure/Photo Details
1	Caragh	Stream Inflowing to L. Acoose: Glasheenoultagh St	76320	83923	1	Low	Medium	Low	Medium	Low	Low	Low	Medium	Medium	Looking upstream from bridge
1	Caragh	Stream Inflowing to L. Acoose: Glasheenoultagh St	76320	83923	2	Low	Medium	Low	Medium	Low	Low	Low	Medium	Medium	Looking downstream from bridge
1	Caragh	Stream Inflowing to L. Acoose: Glasheenoultagh St	76320	83923	3	Low	Medium	Low	Medium	Low	Low	Low	Medium	Medium	Intact forestry downstream from bridge on right bank set back approx 10m
1	Caragh	Stream Inflowing to L. Acoose: Glasheenoultagh St	76320	83923	4	Low	Medium	Low	Medium	Low	Low	Low	Medium	Medium	Fencing on left bank in need of repair
1	Caragh	Stream Inflowing to L. Acoose: Glasheenoultagh St	76320	83923	5	Low	Medium	Low	Medium	Low	Low	Low	Medium	Medium	Bridge structure
Stopping Point 1	Caragh	Caraghbeg River: West of Gortmaloon West	72954	84453	0										Quarry not in use
2	Caragh	Caraghbeg Bridge	72700	85740	1	Low	Low	Low	Low	Low	Low	Low	Medium	Medium	Looking downstream from bridge
2	Caragh	Caraghbeg Bridge	72700	85740	2	Low	Low	Low	Low	Low	Low	Low	Medium	Medium	Looking upstream from bridge
2	Caragh	Caraghbeg Bridge	72700	85740	3	Low	Low	Low	Low	Low	Low	Low	Medium	Medium	Very wide bridge structure
2	Caragh	Caraghbeg Bridge	72700	85740	4	Low	Low	Low	Low	Low	Low	Low	Medium	Medium	Landuse on left bank upstream planted with alder
3	Caragh	Caraghbeg River At Gortmaloon East	74822	85376	1	Low	Medium	Low	Medium	Low	Low	Low	Low	Medium	Start point from right bank step, pool, cascade
3	Caragh	Caraghbeg River At Gortmaloon East	74822	85376	2	Low	Medium	Low	Medium	Low	Low	Low	Low	Medium	Looking downstream

3	Caragh	Caraghbeg River At Gortmaloon East	74795	85409	3	Low	Medium	Low	Medium	Low	Low	Low	Low	Medium	Culverted land drain under road entering stream
3	Caragh	Caraghbeg River At Gortmaloon East	74780	85411	4	Low	Medium	Low	Medium	Low	Low	Low	Low	Medium	Looking downstream from end point
3	Caragh	Caraghbeg River At Gortmaloon East	74780	85411	5	Low	Medium	Low	Medium	Low	Low	Low	Low	Medium	Looking upstream from end point
3	Caragh	Caraghbeg River At Gortmaloon East	74780	85411	6	Low	Medium	Low	Medium	Low	Low	Low	Low	Medium	Set back forestry approx 8m
3	Caragh	Caraghbeg River At Gortmaloon East	74780	85411	7	Low	Medium	Low	Medium	Low	Low	Low	Low	Medium	Some toe line re-inforcement
3	Caragh	Caraghbeg River At Gortmaloon East	74780	85411	8	Low	Medium	Low	Medium	Low	Low	Low	Low	Medium	Reinforced toe on left bank possibly for forestry
3	Caragh	Caraghbeg River At Gortmaloon East	74780	85411	9	Low	Medium	Low	Medium	Low	Low	Low	Low	Medium	Dumping on right bank
4	Caragh	Main Channel: Blackstones Bridge	70970	86365	1	Low	Medium	Low	Medium	Low	Low	Low	Medium	Medium	Caragh fisheries board
4	Caragh	Main Channel: Blackstones Bridge	70970	86365	2	Low	Medium	Low	Medium	Low	Low	Low	Medium	Medium	Looking upstream from blackstones bridge
4	Caragh	Main Channel: Blackstones Bridge	70970	86365	3	Low	Medium	Low	Medium	Low	Low	Low	Medium	Medium	Looking downstream from blackstones bridge
4	Caragh	Main Channel: Blackstones Bridge	70970	86365	4	Low	Medium	Low	Medium	Low	Low	Low	Medium	Medium	Bridge structure is major
4	Caragh	Main Channel: Blackstones Bridge	70970	86365	5	Low	Medium	Low	Medium	Low	Low	Low	Medium	Medium	Embankment along entire stretch of left bank
4	Caragh	Main Channel: Blackstones Bridge	71109	86429	6	Low	Medium	Low	Medium	Low	Low	Low	Medium	Medium	Mid-side channel island with mature trees
4	Caragh	Main Channel: Blackstones Bridge	71109	86429	7	Low	Medium	Low	Medium	Low	Low	Low	Medium	Medium	Mid-side channel island with mature trees
4	Caragh	Main Channel: Blackstones Bridge	71109	86429	8	Low	Medium	Low	Medium	Low	Low	Low	Medium	Medium	Strong and fast flowing
4	Caragh	Main Channel: Blackstones Bridge	71193	86457	9	Low	Medium	Low	Medium	Low	Low	Low	Medium	Medium	Artifical slipway on left bank

4	Caragh	Main Channel: Blackstones Bridge	71223	86426	10	Low	Medium	Low	Medium	Low	Low	Low	Medium	Medium	Inflowing trib/drain appears to have a lot of algae growing on it
4	Caragh	Main Channel: Blackstones Bridge	71235	86419	11	Low	Medium	Low	Medium	Low	Low	Low	Medium	Medium	Are these placed weirs? Perhaps not boulders too large
4	Caragh	Main Channel: Blackstones Bridge	71009	86368	12	Low	Medium	Low	Medium	Low	Low	Low	Medium	Medium	Shrimp and silt
4	Caragh	Main Channel: Blackstones Bridge	71009	86368	13	Low	Medium	Low	Medium	Low	Low	Low	Medium	Medium	Shrimp and silt
Stopping Point 2	Caragh	Meelagh River: North of Toornaneaskagh	70651	85083	1										Very poor substrate in river
Stopping Point 2	Caragh	Meelagh River: North of Toornaneaskagh	70651	85083	2										Very poor substrate in river
Stopping Point 2	Caragh	Meelagh River: North of Toornaneaskagh	70651	85083	3										View of river with road drains which are adjacent are silty and have algae
5	Caragh	Meelagh River: Drom East	70036	86271	1	High	Medium	Low	Medium	Low	Low	Low	Medium	High	Looking upstream from bridge
5	Caragh	Meelagh River: Drom East	70036	86271	2	High	Medium	Low	Medium	Low	Low	Low	Medium	High	Looking downstream from bridge
5	Caragh	Meelagh River: Drom East	70036	86271	3	High	Medium	Low	Medium	Low	Low	Low	Medium	High	Bridge structure
5	Caragh	Meelagh River: Drom East	70036	86271	4	High	Medium	Low	Medium	Low	Low	Low	Medium	High	Poaching on right bank at bridge
5	Caragh	Meelagh River: Drom East	70036	86271	5	High	Medium	Low	Medium	Low	Low	Low	Medium	High	Bridge structure
5	Caragh	Meelagh River: Drom East	70036	86271	6	High	Medium	Low	Medium	Low	Low	Low	Medium	High	Adjoining tribs with Potamogeton
5	Caragh	Meelagh River: Drom East	70036	86271	7	High	Medium	Low	Medium	Low	Low	Low	Medium	High	Adjoining tribs with Potamogeton
5	Caragh	Meelagh River: Drom East	69919	86235	8	High	Medium	Low	Medium	Low	Low	Low	Medium	High	End point of survey
5	Caragh	Meelagh River: Drom East	69919	86235	9	High	Medium	Low	Medium	Low	Low	Low	Medium	High	End point of survey

6	Caragh	Main Channel: Dromalonhurt Bridge	69734	81742	1	Low	Low	Low	Medium	Low	Low	Low	Low	Medium	Planning permission application
6	Caragh	Main Channel: Dromalonhurt Bridge	69734	81742	2	Low	Low	Low	Medium	Low	Low	Low	Low	Medium	Looking upstream from bridge
6	Caragh	Main Channel: Dromalonhurt Bridge	69734	81742	3	Low	Low	Low	Medium	Low	Low	Low	Low	Medium	Looking downstream from bridge
6	Caragh	Main Channel: Dromalonhurt Bridge	69734	81742	4	Low	Low	Low	Medium	Low	Low	Low	Low	Medium	Land use on left bank, unimproved grassland
6	Caragh	Main Channel: Dromalonhurt Bridge	68727	81766	5	Low	Low	Low	Medium	Low	Low	Low	Low	Medium	Unmanaged land drain entering on left bank upstream of bridge
7	Caragh	Main Channel: Bealalaw Bridge	71445	83157	1	Medium	Medium	Medium	Medium	Low	Low	Low	High	Medium	Looking upstream from bridge
7	Caragh	Main Channel: Bealalaw Bridge	71445	83157	2	Medium	Medium	Medium	Medium	Low	Low	Low	High	Medium	Looking downstream from bridge
7	Caragh	Main Channel: Bealalaw Bridge	71445	83157	3	Medium	Medium	Medium	Medium	Low	Low	Low	High	Medium	Silt build up between bank rock
7	Caragh	Main Channel: Bealalaw Bridge	71438	83203	4	Medium	Medium	Medium	Medium	Low	Low	Low	High	Medium	Sheep poaching on left bank
7	Caragh	Main Channel: Bealalaw Bridge	71445	83157	5	Medium	Medium	Medium	Medium	Low	Low	Low	High	Medium	Bridge structure
7	Caragh	Main Channel: Bealalaw Bridge	71438	83203	6	Medium	Medium	Medium	Medium	Low	Low	Low	High	Medium	Fenced off for kerry way but sheep have access underneath which has lead to poaching
7	Caragh	Main Channel: Bealalaw Bridge	71438	83203	7	Medium	Medium	Medium	Medium	Low	Low	Low	High	Medium	Heavy poaching 100m along the right bank
7	Caragh	Main Channel: Bealalaw Bridge	71438	83203	8	Medium	Medium	Medium	Medium	Low	Low	Low	High	Medium	Change in river morphology, tree lines right bank, grazing on left bank
7	Caragh	Main Channel: Bealalaw Bridge	71438	83203	9	Medium	Medium	Medium	Medium	Low	Low	Low	High	Medium	Heavy sheep poaching
7	Caragh	Main Channel: Bealalaw Bridge	71438	83203	10	Medium	Medium	Medium	Medium	Low	Low	Low	High	Medium	Excessive macrophyte coverage across entire channel

Stopping Point 3	Caragh	South of Lyranes Upper	72763	84274	1										Recently felled trees
Stopping Point 3	Caragh	South of Lyranes Upper	72763	84274	2										Recently felled trees
Stopping Point 3	Caragh	South of Lyranes Upper	72763	84274	3										Recently felled trees
8	Caragh	Owenroe River: North of Canknoogheda	72752	80346	1	Low	Low	Low	Medium	Low	Low	Low	Medium	Medium	Looking upstream from starting point
8	Caragh	Owenroe River: North of Canknoogheda	72752	80346	2	Low	Low	Low	Medium	Low	Low	Low	Medium	Medium	Mid-channel island
8	Caragh	Owenroe River: North of Canknoogheda	72717	80323	3	Low	Low	Low	Medium	Low	Low	Low	Medium	Medium	Land drain
8	Caragh	Owenroe River: North of Canknoogheda	72717	80323	4	Low	Low	Low	Medium	Low	Low	Low	Medium	Medium	Part of mid-channel island
8	Caragh	Owenroe River: North of Canknoogheda	72717	80323	5	Low	Low	Low	Medium	Low	Low	Low	Medium	Medium	Land drain
8	Caragh	Owenroe River: North of Canknoogheda	72669	80272	6	Low	Low	Low	Medium	Low	Low	Low	Medium	Medium	Fast flowing current with boulder bedrock substrate
8	Caragh	Owenroe River: North of Canknoogheda	72669	80272	7	Low	Low	Low	Medium	Low	Low	Low	Medium	Medium	Second mid-channel island
9	Caragh	Owenroe River: South of Canknoogheda	72560	80160	1	High	Medium	High	Low	Low	Low	Low	High	High	Dead adult mussel found under bridge
9	Caragh	Owenroe River: South of Canknoogheda	72560	80160	2	High	Medium	High	Low	Low	Low	Low	High	High	Dead adult mussel found under bridge
9	Caragh	Owenroe River: South of Canknoogheda	72560	80160	3	High	Medium	High	Low	Low	Low	Low	High	High	Bridge structure
9	Caragh	Owenroe River: South of Canknoogheda	72560	80160	4	High	Medium	High	Low	Low	Low	Low	High	High	Trampling on right bank at bridge
9	Caragh	Owenroe River: South of Canknoogheda	72560	80160	5	High	Medium	High	Low	Low	Low	Low	High	High	Extreme poaching along entire survey stretch on right bank
9	Caragh	Owenroe River: South of Canknoogheda	72594	80171	6	High	Medium	High	Low	Low	Low	Low	High	High	Five dead adult mussels

9	Caragh	Owenroe River: South of Canknoogheda	72587	80167	7	High	Medium	High	Low	Low	Low	Low	High	High	Adult mussel dead
11	Caragh	Glashwee River: South West of Shronahiree	73406	79979	1										Improved grassland on left and right banks, landowner has totally re-inforced banks of river right where mussels
11	Caragh	Glashwee River: South West of Shronahiree	73406	79979	2										Improved grassland
11	Caragh	Glashwee River: South West of Shronahiree	73406	79979	3										Drainage works
Stopping Point 4	Caragh	North East of Shronahiree Along Main Channel	75149	80695	1										Rock/ Stone abstraction
Stopping Point 4	Caragh	North East of Shronahiree Along Main Channel	75149	80695	2										Site clearance
Stopping Point 5	Caragh	Main Channel: North West of Beenbane	72463	81651	1										Field cleared nearby river
Stopping Point 5	Caragh	Main Channel: North West of Beenbane	72463	81651	2										Field cleared nearby river
12	Caragh	Main Channel: South of Beenbane	72868	81395	1	High	Medium	Medium	Medium	Low	Low	Low	Medium	High	Starting point
12	Caragh	Main Channel: South of Beenbane	72868	81395	2	High	Medium	Medium	Medium	Low	Low	Low	Medium	High	Improved grassland / grazing sheep on right bank
12	Caragh	Main Channel: South of Beenbane	72868	81395	3	High	Medium	Medium	Medium	Low	Low	Low	Medium	High	Macrophyte growth
12	Caragh	Main Channel: South of Beenbane	72868	81395	4	High	Medium	Medium	Medium	Low	Low	Low	Medium	High	Eroded left bank
12	Caragh	Main Channel: South of Beenbane	72868	81395	5	High	Medium	Medium	Medium	Low	Low	Low	Medium	High	Eroding right bank, fenced across channel
12	Caragh	Main Channel: South of Beenbane	72868	81395	6	High	Medium	Medium	Medium	Low	Low	Low	Medium	High	Mid-channel bar

12	Caragh	Main Channel: South of Beenbane	72868	81395	7	High	Medium	Medium	Medium	Low	Low	Low	Medium	High	Meander on river
12	Caragh	Main Channel: South of Beenbane	72868	81395	8	High	Medium	Medium	Medium	Low	Low	Low	Medium	High	Re-inforced right bank
12	Caragh	Main Channel: South of Beenbane	72868	81395	9	High	Medium	Medium	Medium	Low	Low	Low	Medium	High	Scouring of right bank
12	Caragh	Main Channel: South of Beenbane	72868	81395	10	High	Medium	Medium	Medium	Low	Low	Low	Medium	High	Poaching of tributary
12	Caragh	Main Channel: South of Beenbane	72868	81395	11	High	Medium	Medium	Medium	Low	Low	Low	Medium	High	Silt build up in tributary
12	Caragh	Main Channel: South of Beenbane	72868	81395	12	High	Medium	Medium	Medium	Low	Low	Low	Medium	High	Silt build up in tributary
Stopping Point 6	Caragh	Main Channel: At Maghanlawaun	77943	81492	1										Bank dredged or eroded
Stopping Point 6	Caragh	South of Canknogheda Along Owenroe River	71135	79224	1										Bank erosion

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			