NS 2 FRESHWATER PEARL MUSSEL SUB-BASIN MANAGEMENT PLANS

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

September 2009

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INTRODUCTION

In order to assess the hydromorphological alterations within the Owenriff 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 5th 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 Owenriff 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 Owenriff RHAT assessments were carried out throughout the catchment.

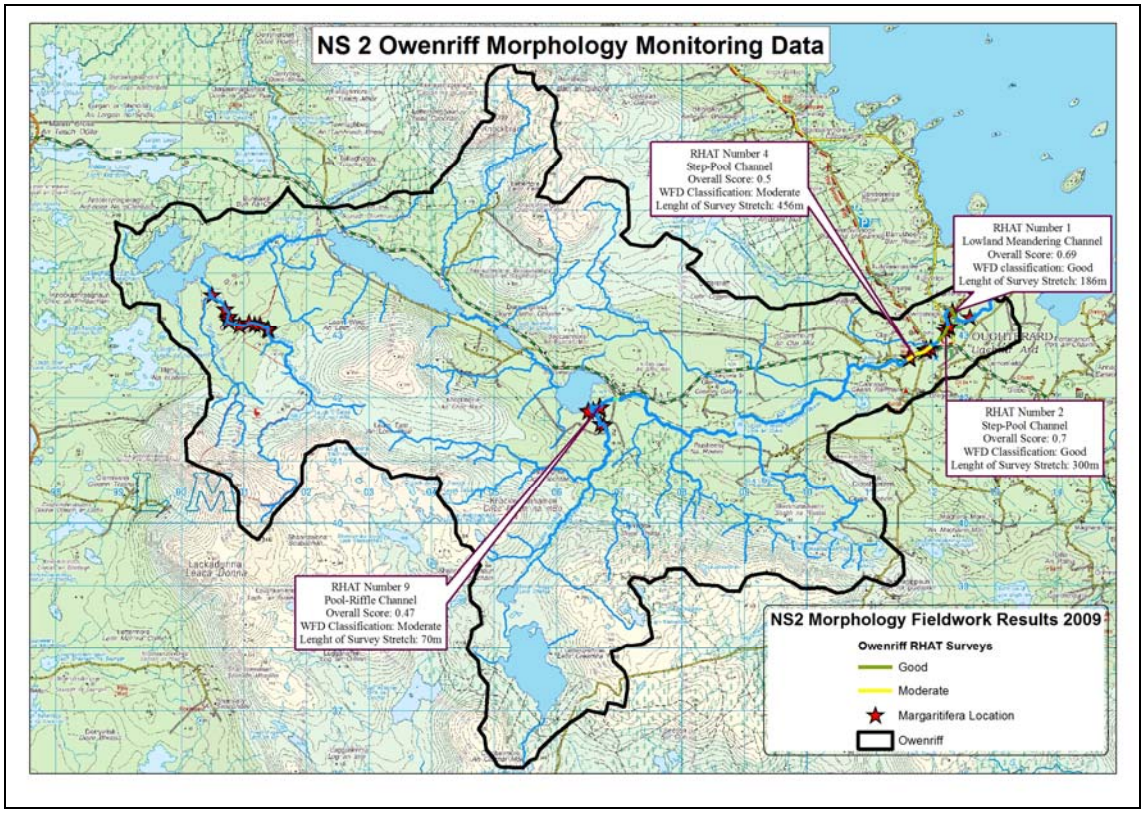

Figure 1 Morphology and Catchment Walkover Risk Assessment Locations

(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

Four RHAT surveys were carried out throughout the Owenriff catchment. Unfortunately, due to the adverse weather conditions during the period in which surveys were being carried out in the Owenriff catchment it was not possible to obtain access to the pearl mussel population on the Derrygauna River to the west of the catchment and therefore no RHAT or Catchment Walkover Risk Assessments were carried out in this area. The results of the four RHAT surveys can be found in the electronic appendix. Two were deemed to be at moderate status, one on the stretch of the river which runs from Sweeneys Bridge down through the village of Oughterard and the other near Agraffard Lough in the upper reaches of the catchment where as the survey stretch at the lower end of the catchment was at Good status. RHAT number 1 scored low on all

attributes except for those associated with the channel form and flow. This was due to the slightly altered banks along the stretch which appear to have been reinforced at some point. Also, artificial banks and concrete steps are evident where the angling centre is located. The substrate has some siltation however it is not excessive at this point. Some dead mussels were found near the foot bridge at the back of the cul de sac with dogs entering and wading about in the water also at this bridge.

RHAT number 2 was carried out farther upstream nearer to the town of Oughterad. This entire stretch is largely confined by development on both banks except for a short portion mid-way along the survey stretch. Therefore the riparian landcover scored very low for both the left and right bank. Overall however throughout the survey stretch the channel form and vegetation was as expected for a river of this type (Step-pool/cascade). The substrate condition was the main reason for the departure from high status scoring 2 out of a possible 4 due to the increased quantities of fine sediment throughout the survey stretch. Overall it scored good which is accurate for this stretch as the level of siltation is not leading to an increased macrophyte growth or causing obstruction to the flow.

RHAT number 4 commenced from the point on the river at Sweeney's bridge and continued downstream as the Owenriff flows along by Oughterad. Nearly 500m of the river was surveyed along this stretch with urbanisation highlighted as the main pressures along its banks and in the riparian zone. One major bridge and 7 minor weirs were recorded along this stretch. The bed of the Owenriff River was lowered by the O.P.W in the context of the Corrib drainage scheme during the 1960's and in order to offset the impact of this on fish populations, fishery personnel later installed a series of low level weirs in the affected channel. Over time and due to the impact of flood events, the weirs deteriorated and are now in need of repair. (WRFB, January 2008). The presence of these weirs led to a low score for barriers to continuity together with a low score for the riparian landcover due to the pressure from the town the reach overall scored a moderate classification. RHAT number 9 as carried out just upstream of Agraffard Lough. One of the main morphological alterations along this stretch is the presence of the dismantled railway line which runs down the centre of the channel. This is acting as a mid channel deflector and causing a considerable obstruction which is altering the channel form and flow type. Overall, from a morphological point of view this survey stretch is in poor condition. There is slumping and bank erosion evident with

an overall poor bank structure and stability. The stretch scored 0.46 which is just inside the moderate category however it is bordering on poor.

Representative photographs from reach:

RHAT 1

RHAT 2

RHAT 4

RHAT 4 Weirs

RHAT 4 Location of weirs

RHAT 9

Details in relation to photographs are tabulated in Appendix 2.

3.1 Catchment Walkover Risk Assessment Results

A total of fourteen sites were surveyed in the Owenriff sub-basin catchment, with a risk assessment carried out at ten of these sites (four stopping points). **Figure 2** outlines the stopping point locations in addition to the High to Low Risk Assessment from the Catchment Walkover Risk Assessments. Six high risk sites were recorded out of the ten that were assessed. The remaining four were all recorded as medium risk; meaning no low risk sites were recorded within this catchment.

- Current Riparian Zone – evident at 83% of high risk sites.
- Diffuse Nutrient – evident at 50% 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 3** 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.

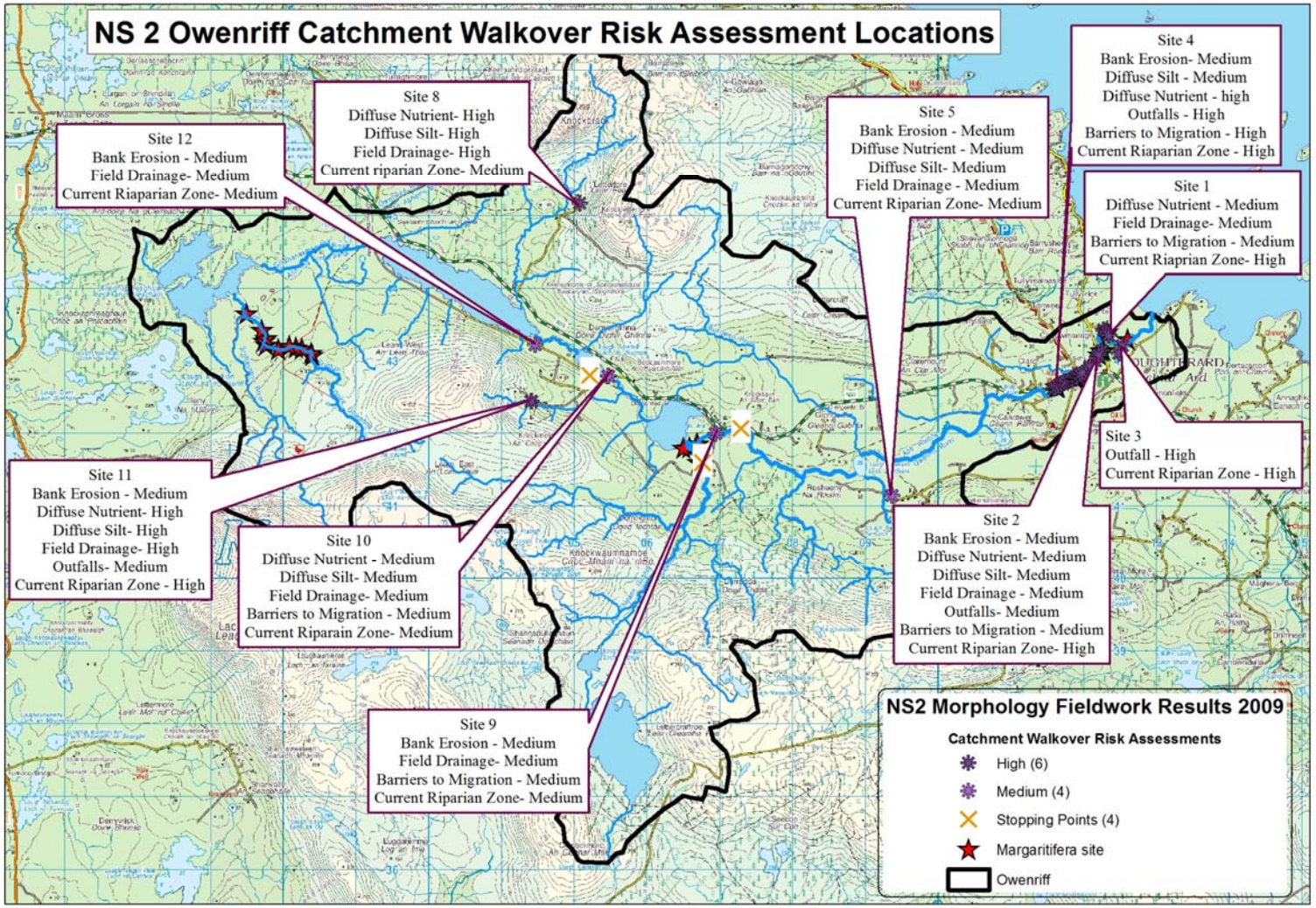

Figure 2 Location of Stopping points and Catchment Walkover Risk Assessments

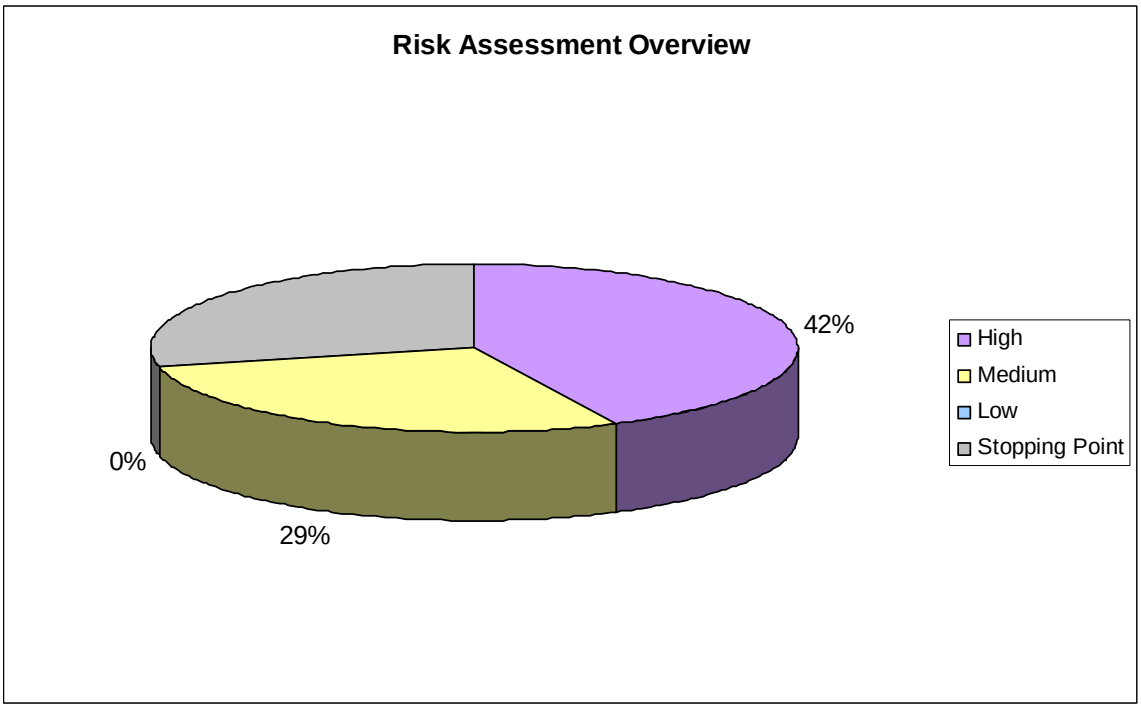

Figure 3 Risk Assessment Overview

The break-down of pressure categories identified as high risk are outlined in Figure 4

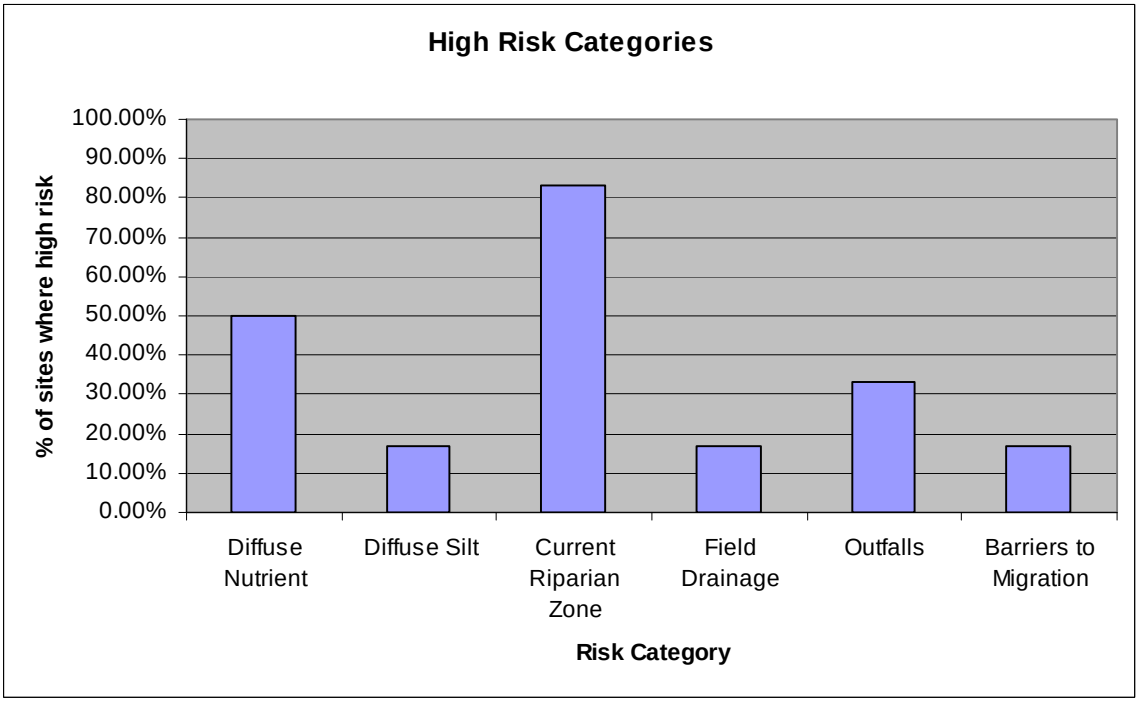

Figure 4 Breakdown of High Risk Categories

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 focusing 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.
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- 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.
It is evident that the current riparian zone category is also a major risk within this catchment, however this pressure generally relates to how a poor riparian zone can intensify other pressures e.g. increase in diffuse nutrient from housing as there is a poor buffer zone. Quantitative statistics do not successfully display the pressures created by a poor riparian buffer as they are linked with other pressure categories.

The main risks associated with the riparian buffer in this catchment were:

- Urbanisation on the banks of the river often removing natural buffer leaving some tree-line but not sufficient to deal with pressures from such an urbanized area.

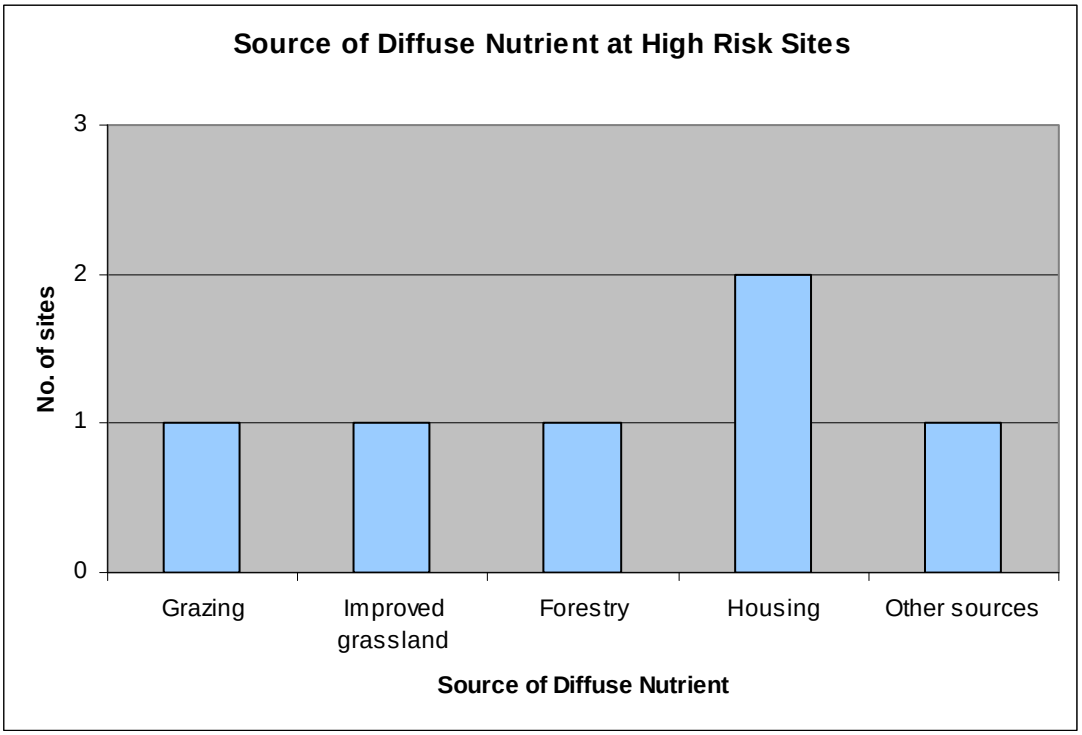

Figure 5 source of diffuse nutrient pressure at high risk sites

3.2 Peat Cutting

During the morphology field work access was not obtained to the area above Agraffard Lough. However, a field visit was carried out accompanied by NPWS staff on the 9th of April 2009. During this site visit approximately 153ha were observed as commercial peat cutting areas with extensive damage to the landscape. Very poor buffer zones, drainage systems and roading were found throughout this area. During this site visit heavy rainfall was experienced throughout the day. The potential for run-off of peat silt is greater during extreme rainfall events. This may lead to large quantities of peat silt

being discharged to the receiving waters. Peat cutting is evident throughout the Owenriff catchment, but most significantly, it occurs within the vicinity of the pearl mussel population just downstream of Agraffard Lough. This area is also delineated as "Moderately Damaged" from the NPWS Commonage Framework plans. It is also located within the SAC boundary as can be seen in Figure 6.

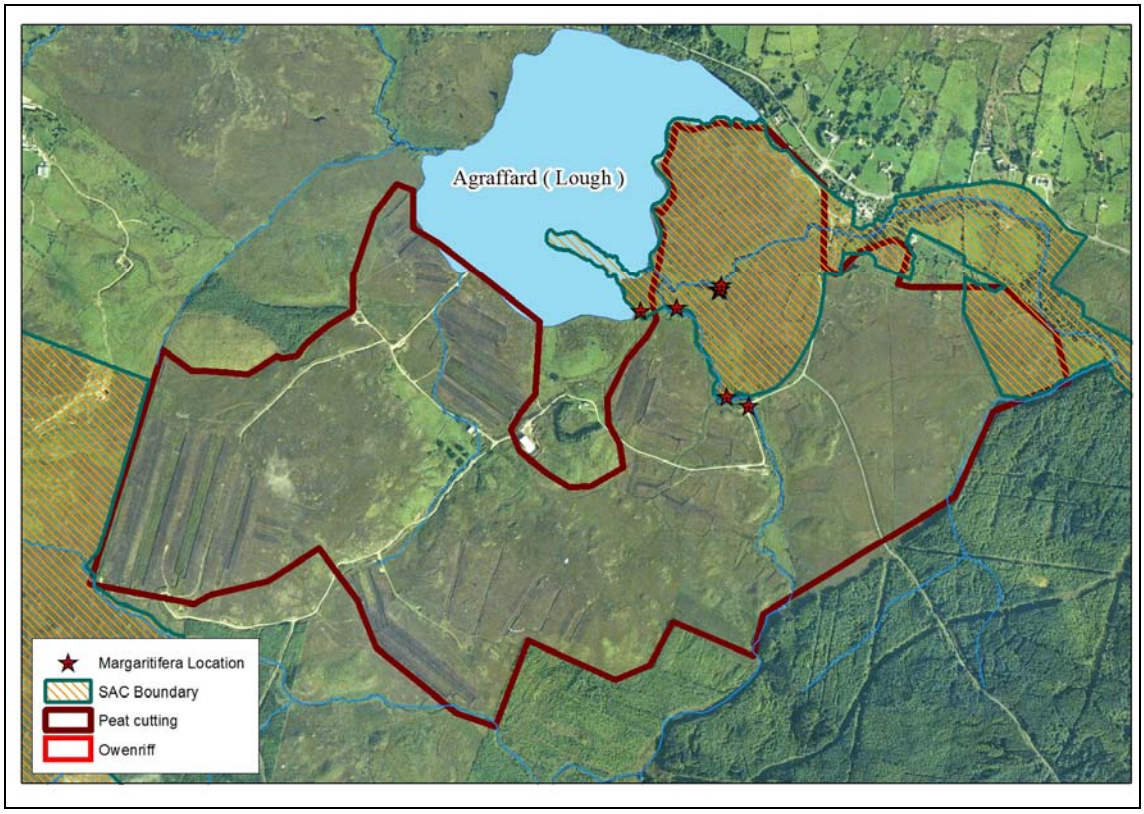

Figure 6 – Extent of peat cutting above Agraffard Lough

4.0 CONCLUSIONS

The Owenriff sub-basin catchment appears to be in an over all poor condition from a morphological point of view largely due to the nature of the current riparian zone with high risk sites identified throughout the catchment including the upper reaches of the rivers.

Four risk assessments were undertaken along a section of the Owenriff River from Oughterard to Canrawer where some of the Owenriff catchment's Freshwater Pearl Mussel populations exist; all four were recorded as high risk. High and medium risk sites were recorded throughout the catchment even in the upper reaches.

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 Owenriff 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	Owenriff	Oughterard	112276	243435	1	Low	Medium	Low	Medium	Low	Low	Medium	High	High	Boom type structure in channel
1	Owenriff	Oughterard	112276	243435	2	Low	Medium	Low	Medium	Low	Low	Medium	High	High	Boom tied to bank
1	Owenriff	Oughterard	112276	243435	3	Low	Medium	Low	Medium	Low	Low	Medium	High	High	Land drain entering main channel at point where boom is located
1	Owenriff	Oughterard	112319	243415	4	Low	Medium	Low	Medium	Low	Low	Medium	High	High	Tractor tyre marls entering river on left bank just 4m upstream of
1	Owenriff	Oughterard	112324	243401	5	Low	Medium	Low	Medium	Low	Low	Medium	High	High	Small bridge structure
1	Owenriff	Oughterard	112324	243401	6	Low	Medium	Low	Medium	Low	Low	Medium	High	High	Camillaun Corrib county angling centre
1	Owenriff	Oughterard	112324	243401	7	Low	Medium	Low	Medium	Low	Low	Medium	High	High	Land drain entering on river at bridge
1	Owenriff	Oughterard	112324	243401	8	Low	Medium	Low	Medium	Low	Low	Medium	High	High	Looking upstream from bridge
1	Owenriff	Oughterard	112324	243401	9	Low	Medium	Low	Medium	Low	Low	Medium	High	High	Looking downstream from bridge
1	Owenriff	Oughterard	112314	243399	10	Low	Medium	Low	Medium	Low	Low	Medium	High	High	Dead adult mussel in stream on the right bank
1	Owenriff	Oughterard	112348	243356	11	Low	Medium	Low	Medium	Low	Low	Medium	High	High	Angling boats on left bank
1	Owenriff	Oughterard	112348	243356	12	Low	Medium	Low	Medium	Low	Low	Medium	High	High	Angling boats on left bank
1	Owenriff	Oughterard	112348	243356	13	Low	Medium	Low	Medium	Low	Low	Medium	High	High	Angling boats on left bank
1	Owenriff	Oughterard	112348	243356	14	Low	Medium	Low	Medium	Low	Low	Medium	High	High	Angling centre on right bank
1	Owenriff	Oughterard	112348	243356	15	Low	Medium	Low	Medium	Low	Low	Medium	High	High	Reinforced left bank for boat access
2	Owenriff	Oughterard	112252	243144	1	Medium	Medium	Medium	Medium	Medium	Low	Medium	High	High	Urbanised banks
2	Owenriff	Oughterard	112252	243144	2	Medium	Medium	Medium	Medium	Medium	Low	Medium	High	High	Reinforced left bank at bridge
2	Owenriff	Oughterard	112252	243144	3	Medium	Medium	Medium	Medium	Medium	Low	Medium	High	High	Reinforced left bank at bridge
2	Owenriff	Oughterard	112252	243144	4	Medium	Medium	Medium	Medium	Medium	Low	Medium	High	High	Looking upstream from bridge
2	Owenriff	Oughterard	112252	243144	5	Medium	Medium	Medium	Medium	Medium	Low	Medium	High	High	Major bridge structure, clear span
2	Owenriff	Oughterard	112252	243144	6	Medium	Medium	Medium	Medium	Medium	Low	Medium	High	High	Staff gauge

2	Owenriff	Oughterard	112252	243144	7	Medium	Medium	Medium	Medium	Medium	Low	Medium	High	High	Land drain entering river 200m upstream from bridge
2	Owenriff	Oughterard	112193	243059	8	Medium	Medium	Medium	Medium	Medium	Low	Medium	High	High	Run off from rough grassland/unimproved grassland on right bank
2	Owenriff	Oughterard	112164	242997	9	Medium	Medium	Medium	Medium	Medium	Low	Medium	High	High	Approx. 270m upstream from bridge, significant unmanaged ditch.
2	Owenriff	Oughterard	112082	242890	10	Medium	Medium	Medium	Medium	Medium	Low	Medium	High	High	Approx. 270m upstream from bridge, significant unmanaged ditch.
2	Owenriff	Oughterard	112082	242890	11	Medium	Medium	Medium	Medium	Medium	Low	Medium	High	High	River in spate
2	Owenriff	Oughterard	112082	242890	12	Medium	Medium	Medium	Medium	Medium	Low	Medium	High	High	Over hanging trees
2	Owenriff	Oughterard	112082	242890	13	Medium	Medium	Medium	Medium	Medium	Low	Medium	High	High	Outfall possible from housing development
2	Owenriff	Oughterard	112084	242928	14	Medium	Medium	Medium	Medium	Medium	Low	Medium	High	High	Housing development
2	Owenriff	Oughterard	112207	243085	15	Medium	Medium	Medium	Medium	Medium	Low	Medium	High	High	Storm drain on right bank
3	Owenriff	Oughterard	112531	243215	1	Medium	High	Low	Low	High	Low	Low	High	High	Mooring and tree line bank
3	Owenriff	Oughterard	112531	243215	2	Medium	High	Low	Low	High	Low	Low	High	High	Poaching on left bank
3	Owenriff	Oughterard	112531	243215	3	Medium	High	Low	Low	High	Low	Low	High	High	Moorings at boat club
3	Owenriff	Oughterard	112491	243107	4	Medium	High	Low	Low	High	Low	Low	High	High	Site notice/application for WWTP discharge licence for Oughterad t
3	Owenriff	Oughterard	112491	243107	5	Medium	High	Low	Low	High	Low	Low	High	High	Looking downstream to Lough Corrib
3	Owenriff	Oughterard	112491	243107	6	Medium	High	Low	Low	High	Low	Low	High	High	Mooring notice
4	Owenriff	Oughterard	111589	242614	1	Medium	High	Medium	Medium	High	Low	High	High	High	Placed stone weir by anglers according to fisheries board
4	Owenriff	Oughterard	111589	242614	2	Medium	High	Medium	Medium	High	Low	High	High	High	Looking downstream from start point
4	Owenriff	Oughterard	111589	242614	3	Medium	High	Medium	Medium	High	Low	High	High	High	Right bank, bedrock
4	Owenriff	Oughterard	111589	242614	4	Medium	High	Medium	Medium	High	Low	High	High	High	Lack of riparian vegetation due to urbanisation
4	Owenriff	Oughterard	111635	242630	5	Medium	High	Medium	Medium	High	Low	High	High	High	2nd stone weir approx. 40m downstream from start point over hanging

4	Owenriff	Oughterard	111622	242623	6	Medium	High	Medium	Medium	High	Low	High	High	High	Difference in substrate from where weirs are placed
4	Owenriff	Oughterard	111646	242650	7	Medium	High	Medium	Medium	High	Low	High	High	High	3rd weir approx. 80 m downstream of starting point
4	Owenriff	Oughterard	111687	242680	8	Medium	High	Medium	Medium	High	Low	High	High	High	Lack of riparian zone
4	Owenriff	Oughterard	111736	242703	9	Medium	High	Medium	Medium	High	Low	High	High	High	Overhanging rock on right bank
4	Owenriff	Oughterard	111765	242716	10	Medium	High	Medium	Medium	High	Low	High	High	High	Riffle sequence, eroding, undercutting on right bank
4	Owenriff	Oughterard	111765	242716	11	Medium	High	Medium	Medium	High	Low	High	High	High	Invasive species, Japanese knotweed on right bank
4	Owenriff	Oughterard	111833	242732	12	Medium	High	Medium	Medium	High	Low	High	High	High	Bridge structure
4	Owenriff	Oughterard	111853	242750	13	Medium	High	Medium	Medium	High	Low	High	High	High	Outfall with foul smell
4	Owenriff	Oughterard	111880	242760	14	Medium	High	Medium	Medium	High	Low	High	High	High	4th weir
4	Owenriff	Oughterard	111880	242760	15	Medium	High	Medium	Medium	High	Low	High	High	High	Urbanisation on right bank, lack of buffer zone.
4	Owenriff	Oughterard	111880	242760	16	Medium	High	Medium	Medium	High	Low	High	High	High	Grassy bank, no riparian cover
4	Owenriff	Oughterard	111892	242766	17	Medium	High	Medium	Medium	High	Low	High	High	High	5th stone weir
4	Owenriff	Oughterard	111911	242771	18	Medium	High	Medium	Medium	High	Low	High	High	High	Outfall on right bank covered in Filamentous Algae
4	Owenriff	Oughterard	111912	242776	19	Medium	High	Medium	Medium	High	Low	High	High	High	6th stone weir
4	Owenriff	Oughterard	111941	242794	20	Medium	High	Medium	Medium	High	Low	High	High	High	7th stone weir
4	Owenriff	Oughterard	111949	242805	21	Medium	High	Medium	Medium	High	Low	High	High	High	Outfall with lots of sewage fungus with increased macrophyte growth
4	Owenriff	Oughterard	111954	242809	22	Medium	High	Medium	Medium	High	Low	High	High	High	Start of tree line buffer
4	Owenriff	Oughterard	111980	242833	23	Medium	High	Medium	Medium	High	Low	High	High	High	Discharge pipes heading towards WWTP
5	Owenriff	d/s Lough Beg	109367	241151	1	Medium	Medium	Medium	Medium	Low	Low	Low	Medium	Medium	Site clearance works, diggers, tractors, stock piling rocks
5	Owenriff	d/s Lough Beg	109367	241151	2	Medium	Medium	Medium	Medium	Low	Low	Low	Medium	Medium	Forestation
5	Owenriff	d/s Lough Beg	109367	241151	3	Medium	Medium	Medium	Medium	Low	Low	Low	Medium	Medium	Overall site clearance works
5	Owenriff	d/s Lough Beg	109367	241151	4	Medium	Medium	Medium	Medium	Low	Low	Low	Medium	Medium	Site clearance works
0	Owenriff	Slievenarushe	110834	239882	1										Peat Extraction

0	Owenriff	Slievenarushe	110834	239882	2										Peat Extraction
0	Owenriff	Slievenarushe	110834	239882	3										Peat Extraction
0	Owenriff	Slievenarushe	110834	239882	4										Peat Extraction
0	Owenriff	Ford Crossing	107289	242061	1										Looking across Ford
0	Owenriff	Ford Crossing	107289	242061	2										Drainage dtich entering Ford
0	Owenriff	Ford Crossing	107289	242061	3										Looking downstream from Ford
0	Owenriff	Ford Crossing	107289	242061	4										Cattle poaching at Ford
0	Owenriff	Ford Crossing	107289	242061	5										
8	Owenriff	Letterfore Ri	105078	245167	1	Low	High	High	High	Low	Low	Low	Medium	High	Improved grassland,horse grazing,one off housing
9	Owenriff	Near Lough Ag	106945	241994	1	Medium	Low	Low	Medium	Low	Low	Medium	Medium	Medium	Looking downstream from bridge
9	Owenriff	Near Lough Ag	106945	241994	2	Medium	Low	Low	Medium	Low	Low	Medium	Medium	Medium	Loss of habitat on left bank, downstream of bridge
9	Owenriff	Near Lough Ag	106945	241994	3	Medium	Low	Low	Medium	Low	Low	Medium	Medium	Medium	Bridge structure
9	Owenriff	Near Lough Ag	106945	241994	4	Medium	Low	Low	Medium	Low	Low	Medium	Medium	Medium	In channel deflector, remnants of dismantled railway line
9	Owenriff	Near Lough Ag	106945	241994	5	Medium	Low	Low	Medium	Low	Low	Medium	Medium	Medium	Stockpiles on left bank from site clearance
0	Owenriff		106765	241595	1										Looking downstream from bridge
0	Owenriff		106765	241595	2										Bridge structure looking upstream
0	Owenriff		106765	241595	3										Old & new part of bridge, causing loss of habitat
0	Owenriff		106765	241595	4										Split in channel caused by bridge structure
10	Owenriff	At Lough Adre	105473	242788	1	Low	Medium	Medium	Medium	Low	Low	Medium	Medium	Medium	Looking upstream to lake, significant seiching effect
10	Owenriff	At Lough Adre	105473	242788	2	Low	Medium	Medium	Medium	Low	Low	Medium	Medium	Medium	Last years growth of Ranunculus & excessive Potomagetan
10	Owenriff	At Lough Adre	105473	242788	3	Low	Medium	Medium	Medium	Low	Low	Medium	Medium	Medium	Looking downstream from bridge

10	Owenriff	At Lough Adre	105473	242788	4	Low	Medium	Medium	Medium	Low	Low	Medium	Medium	Medium	Fenced off on right bank approx. 1m back
10	Owenriff	At Lough Adre	105473	242788	5	Low	Medium	Medium	Medium	Low	Low	Medium	Medium	Medium	Rough unimproved grassland on left & right bank
10	Owenriff	At Lough Adre	105473	242788	6	Low	Medium	Medium	Medium	Low	Low	Medium	Medium	Medium	Major Bridge Structure
11	Owenriff	Tributary to	104412	242439	1	Medium	Medium	Medium	Medium	Medium	Low	Low	High	High	Land drain with outfall to river
11	Owenriff	Tributary to	104412	242439	2	Medium	Medium	Medium	Medium	Medium	Low	Low	High	High	Road reinforced with concrete & gully put in
11	Owenriff	Tributary to	104412	242439	3	Medium	Medium	Medium	Medium	Medium	Low	Low	High	High	Cobble river substrate
11	Owenriff	Tributary to	104412	242439	4	Medium	Medium	Medium	Medium	Medium	Low	Low	High	High	Looking upstream from survey point
11	Owenriff	Tributary to	104412	242439	5	Medium	Medium	Medium	Medium	Medium	Low	Low	High	High	Looking downstream from survey point
12	Owenriff	Tributary to	104465	243231	1	Medium	Low	Low	Medium	Low	Low	Low	Medium	Medium	Looking downstream as tributary flows into lake
12	Owenriff	Tributary to	104465	243231	2	Medium	Low	Low	Medium	Low	Low	Low	Medium	Medium	Looking upstream, channel overgrown
12	Owenriff	Tributary to	104465	243231	3	Medium	Low	Low	Medium	Low	Low	Low	Medium	Medium	Cattle crush adjacent to the river bank
12	Owenriff	Tributary to	104465	243231	4	Medium	Low	Low	Medium	Low	Low	Low	Medium	Medium	Some site clearance works upstream
0	Owenriff		105213	242798	0										Planning application

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			