NS 2 FRESHWATER PEARL MUSSEL SUB-BASIN MANAGEMENT PLANS

REPORT ON MORPHOLOGICAL MONITORING AND CATCHMENT WALKOVER RISK ASSESSMENTS IN THE KERRY BLACKWATER CATCHMENT

September 2009

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1.0 INTRODUCTION

In order to assess the hydromorphological alterations within the Kerry Blackwater 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 22nd 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 Kerry Blackwater 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 Kerry Blackwater morphology RHAT assessments were carried out throughout the catchment.

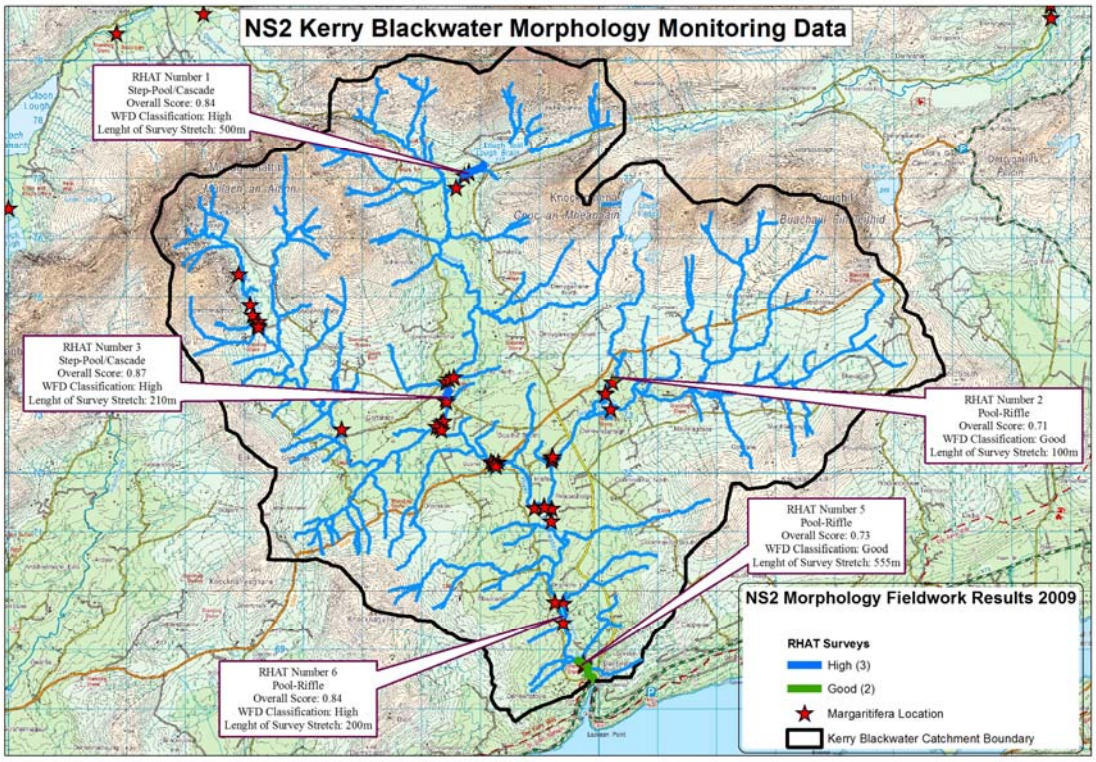


Figure 1 Morphology RHAT Assessment Locations

(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

Five RHAT surveys were carried out throughout the Kerry Blackwater catchment. The results of these surveys can be found in the electronic appendix. Two were deemed to be at good status in the lower reaches of the catchment where as the three survey stretches in the upper and mid sections of the catchment was at High status. RHAT number 1 scored well on all attributes except for substrate condition and riparian land cover. This was due to the extensive cover of filamentous algae which was found along the survey stretch both within the channel itself and along the side channels and in coming drainage channels. The riparian landcover also scored low due to the pressure from overgrazing by sheep in this area. Although fencing is good in the first portion of this stretch, the same approach needs to be continued along the entire river length to prevent further deterioration of the channel.

RHAT number 2 was carried out on the Derreendaragh tributary where again the substrate condition and bank structure scored low. Here, the substrate was found to have a lot of siltation caused by the trampling and poaching on the adjacent banks again through sheep grazing. Site 2 Photos 6, 11 & 12 give indications of the siltation along this stretch.

RHAT number 3 scored well on all attributes except riparian landcover. This is largely due to over grazing and trampling along the right bank downstream of the bridge together with the associated site works which have taken place upstream of the bridge on the left bank.

For RHAT number 5 channel vegetation scored low due to the excessive substrate coverage of filamentous green algae. Numerous dead mussels were found along this stretch both in channel and along the banks. RHAT number 6 scored highest of all the sites in the Kerry Blackwater with both dead and live mussels found in the channel. Despite this some of the attributes did not score 4 due to the large amount of silt deposition and filamentous algae attached the mussels themselves.

Representative photographs from reach:

RHAT 1	**RHAT 2**
	

RHAT 3 	**RHAT 5** 
RHAT 6. 1 	**RHAT 6.2** 

Details in relation to photographs are tabulated in Appendix 2.

3.1 Catchment Walkover Risk Assessment Results

A total of eight sites were surveyed in the Kerry Blackwater Sub-basin catchment, with a risk assessment carried out at six of these sites (two stopping points). Figure 2 outlines the locations of the Stopping points in addition to the High to Low Risk Assessment from the Catchment Walkover Risk Assessments. Two high risk sites were recorded out of the six that were assessed. The remaining four sites were recorded as medium risk, meaning no low risk sites were recorded within this catchment. Figure 3 outlines the percentage of sites classified at high and medium risk together with the number of stopping points throughout the catchment.

The most common high risk category identified was:

- Field Drainage – 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 2** indicates the percentage of stopping points also.

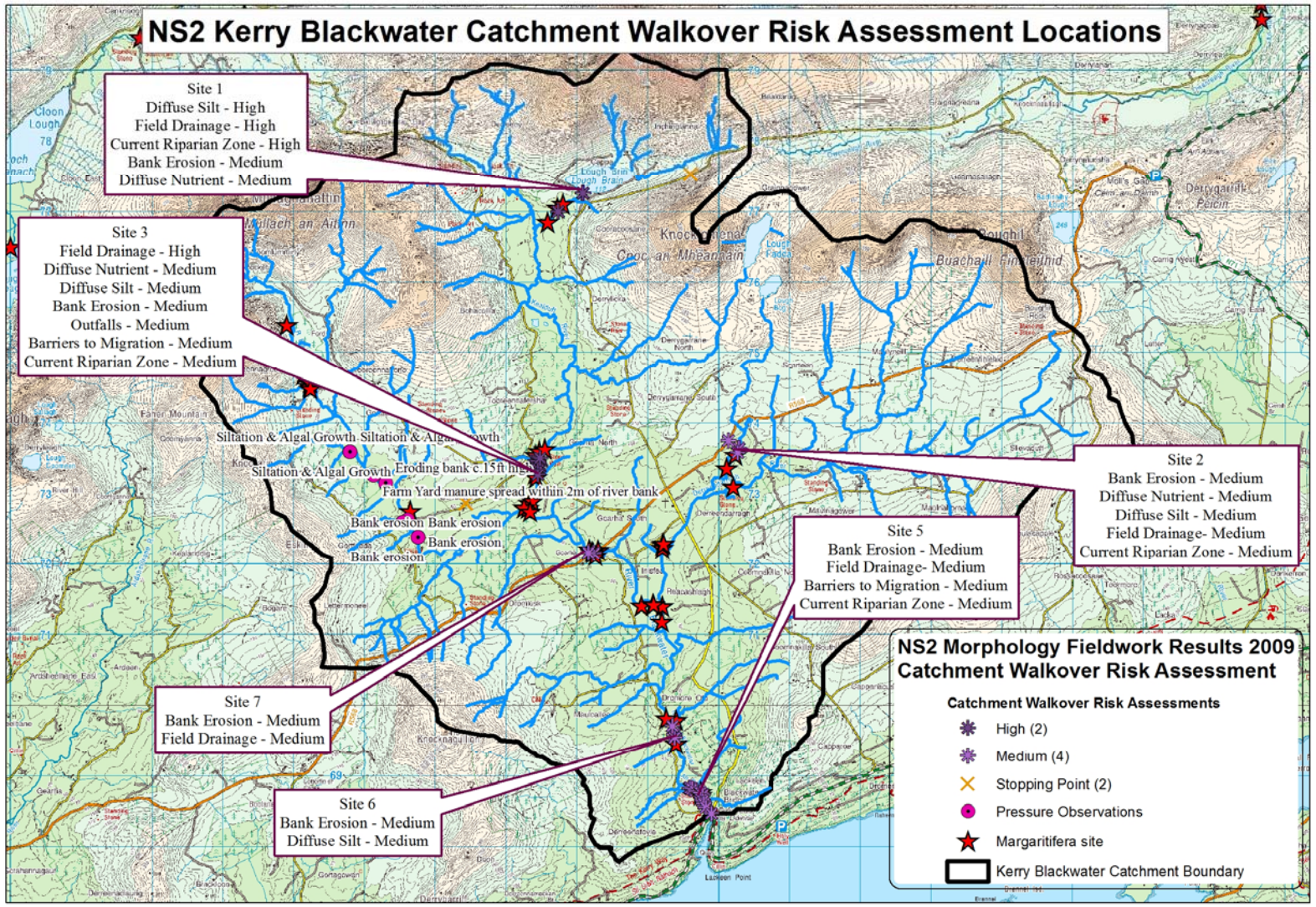
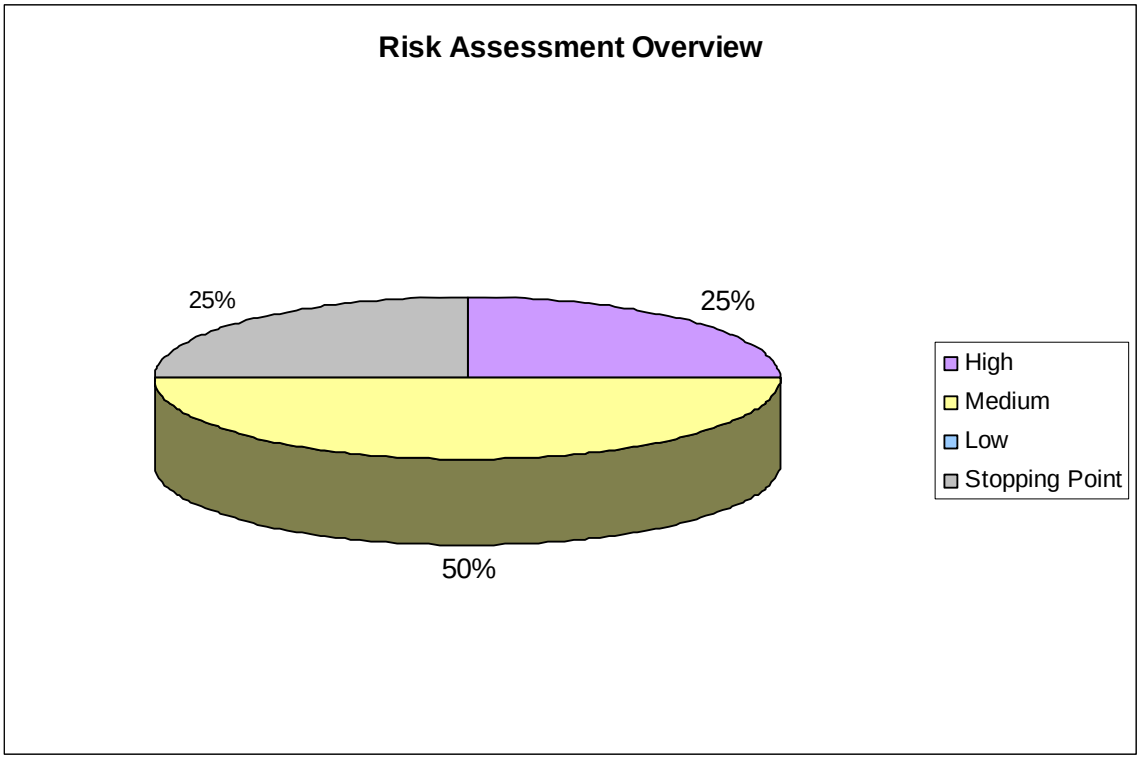


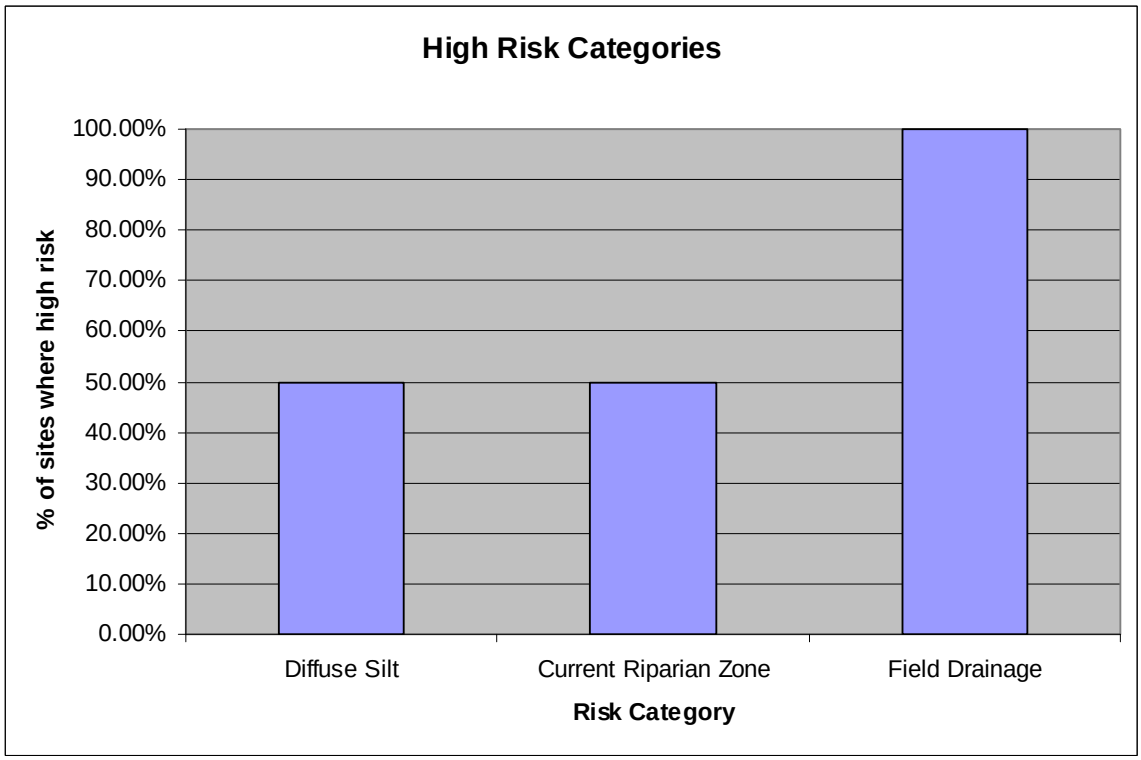
Figure 2 Location of Stopping points and Catchment Walkover Risk Assessment

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 field drainage was managed ditches. A break-down of the individual sources of field drainage at high risk sites is given below:

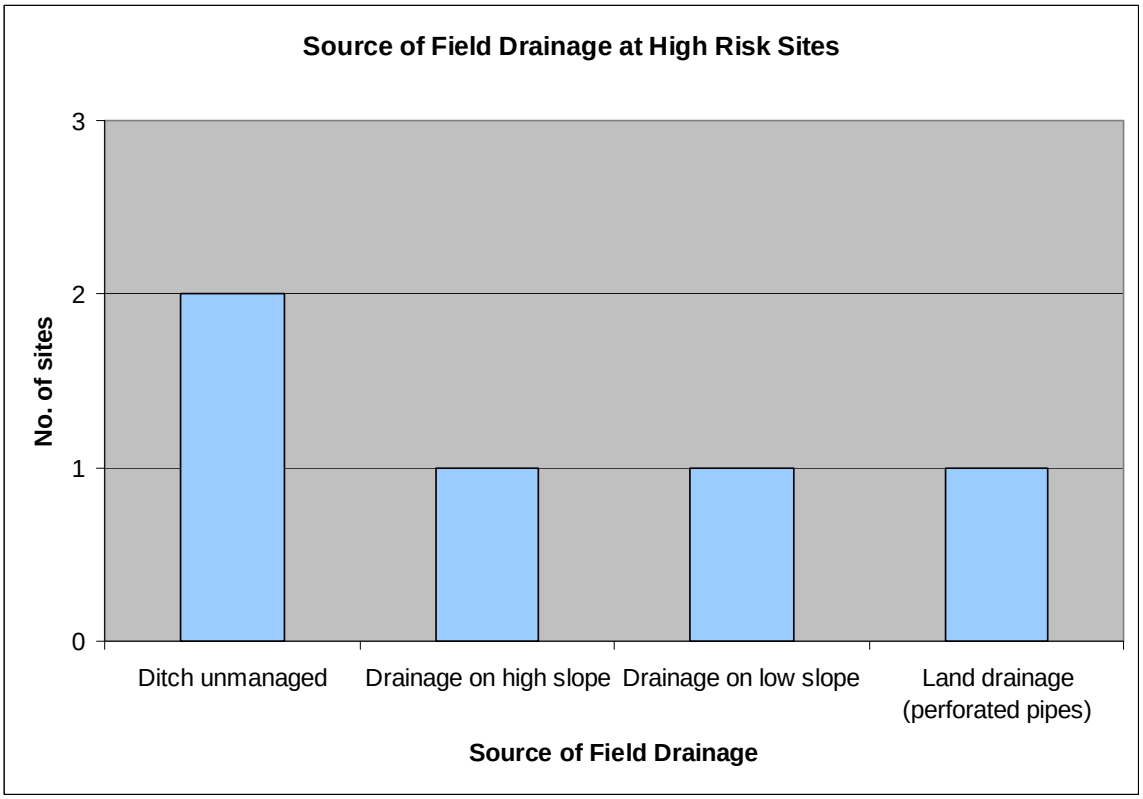


Figure 5 source of field drainage pressure at high risk sites

4.0 CONCLUSIONS

All six risk assessments were carried out in locations where Freshwater Pearl Mussel populations have been recorded, with the two high risk sites being recorded further upstream than the four medium risk sites. It is clear that field drainage is a significant pressure within this catchment creating a high risk pressure at two sites in addition to being recorded as medium risk at a further three sites. Throughout the catchment sheep grazing is an issue where adequate fencing is not provided. Sheep trampling and poaching were also noted on number of occasions.

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 Kerry Blackwater 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	Barrier to Migration	Current Riparian Zone	Overall Risk *	Pressure/Photo Details
1	Kerry Blackwater	Kerry Blackwater Bridge	213157	82752	1	High	High	Medium	Medium	Low	Low	Medium	High	High	Looking downstream from road bridge
1	Kerry Blackwater	Kerry Blackwater Bridge	213157	82752	2	High	High	Medium	Medium	Low	Low	Medium	High	High	Bridge apron on RB just upstream of bridge underneath is flat concrete causing scouring on RB
1	Kerry Blackwater	Kerry Blackwater Bridge	213157	82752	3	High	High	Medium	Medium	Low	Low	Medium	High	High	Looking upstream from road bridge
1	Kerry Blackwater	Kerry Blackwater Bridge	213157	82752	4	High	High	Medium	Medium	Low	Low	Medium	High	High	Scouring of RB from Apron
1	Kerry Blackwater	Kerry Blackwater Bridge	213157	82752	5	High	High	Medium	Medium	Low	Low	Medium	High	High	Mid channel bar upstream from bridge
1	Kerry Blackwater	Kerry Blackwater Bridge	213130	82791	6	High	High	Medium	Medium	Low	Low	Medium	High	High	Trampling and poaching on LB downstream of bridge
1	Kerry Blackwater	Kerry Blackwater Bridge	213130	82791	7	High	High	Medium	Medium	Low	Low	Medium	High	High	Trampling and poaching on LB downstream of bridge
1	Kerry Blackwater	Kerry Blackwater Bridge	213130	82791	8	High	High	Medium	Medium	Low	Low	Medium	High	High	Trampling and poaching on LB downstream of bridge
1	Kerry Blackwater	Kerry Blackwater Bridge	213130	82791	9	High	High	Medium	Medium	Low	Low	Medium	High	High	Mid channel Island
1	Kerry Blackwater	Kerry Blackwater Bridge	213130	82791	10	High	High	Medium	Medium	Low	Low	Medium	High	High	Although good fencing along RB cattle can get access underneath
1	Kerry Blackwater	Kerry Blackwater Bridge	213130	82791	11	High	High	Medium	Medium	Low	Low	Medium	High	High	Surrounding landuse from RB
1	Kerry Blackwater	Kerry Blackwater Bridge	213130	82791	12	High	High	Medium	Medium	Low	Low	Medium	High	High	Surrounding landuse from RB
2	Kerry Blackwater	Kerry Blackwater Main Channel	215051	82994	1	Low	Medium	Medium	High	Low	Low	Low	Med	High	Looking upstream from start point
2	Kerry Blackwater	Kerry Blackwater Main Channel	215051	82994	2	Low	Medium	Medium	High	Low	Low	Low	Med	High	Looking downstream from start point
2	Kerry Blackwater	Kerry Blackwater Main Channel	215051	82994	3	Low	Medium	Medium	High	Low	Low	Low	Med	High	Fallen scyamore with conifers behind on LB, no buffer
2	Kerry Blackwater	Kerry Blackwater	215051	82994	4	Low	Medium	Medium	High	Low	Low	Low	Med	High	Possible reinforcement on LB from forestry

		Main Channel													
2	Kerry Blackwater	Kerry Blackwater Main Channel	215051	82999	5	Low	Medium	Medium	High	Low	Low	Low	Med	High	Silt and sand deposition on RB, poor substrate condition
2	Kerry Blackwater	Kerry Blackwater Main Channel	215051	83032	6	Low	Medium	Medium	High	Low	Low	Low	Med	High	Looking upstream from bridge
2	Kerry Blackwater	Kerry Blackwater Main Channel	215051	83032	7	Low	Medium	Medium	High	Low	Low	Low	Med	High	Looking downstream from bridge
2	Kerry Blackwater	Kerry Blackwater Main Channel	215051	82955	8	Low	Medium	Medium	High	Low	Low	Low	Med	High	Land drain
2	Kerry Blackwater	Kerry Blackwater Main Channel	215051	82951	9	Low	Medium	Medium	High	Low	Low	Low	Med	High	Inflowing tributary
2	Kerry Blackwater	Kerry Blackwater Main Channel	215051	82911	10	Low	Medium	Medium	High	Low	Low	Low	Med	High	Looking downstream from LB
2	Kerry Blackwater	Kerry Blackwater Main Channel	215051	83003	11	Low	Medium	Medium	High	Low	Low	Low	Med	High	Downstream end taken mid channel - deposition and side channel at this point
2	Kerry Blackwater	Kerry Blackwater Main Channel	214711	83086	12	Low	Medium	Medium	High	Low	Low	Low	Med	High	Overview of forestry from grey road
3	Kerry Blackwater	Main Channel at Toor	218575	84602	1	Medium	Medium	Medium	High	Low	Low	High	High	High	Looking upstream from road bridge
3	Kerry Blackwater	Main Channel at Toor	218575	84602	2	Medium	Medium	Medium	High	Low	Low	High	High	High	Looking downstream from road bridge
3	Kerry Blackwater	Main Channel at Toor	218575	84602	3	Medium	Medium	Medium	High	Low	Low	High	High	High	Bridge structure
3	Kerry Blackwater	Main Channel at Toor	218567	84601	4	Medium	Medium	Medium	High	Low	Low	High	High	High	Trampling and poaching on LB downstream of bridge
3	Kerry Blackwater	Main Channel at Toor	218567	84601	5	Medium	Medium	Medium	High	Low	Low	High	High	High	LB natural erosion
3	Kerry Blackwater	Main Channel at Toor	218567	84601	6	Medium	Medium	Medium	High	Low	Low	High	High	High	Eroding bank, falling rocks on LB just downstream of bridge
3	Kerry Blackwater	Main Channel at Toor	218521	84619	7	Medium	Medium	Medium	High	Low	Low	High	High	High	Stone weir
3	Kerry Blackwater	Main Channel at Toor	218517	84623	8	Medium	Medium	Medium	High	Low	Low	High	High	High	Poaching and trampling
3	Kerry Blackwater	Main Channel at Toor	218458	84651	9	Medium	Medium	Medium	High	Low	Low	High	High	High	Land clearance on RB in adjacent field
3	Kerry Blackwater	Main Channel at Toor	218458	84651	10	Medium	Medium	Medium	High	Low	Low	High	High	High	Excessive trampling
3	Kerry Blackwater	Main Channel at Toor	218454	84643	11	Medium	Medium	Medium	High	Low	Low	High	High	High	Improved buffer on LB
3	Kerry Blackwater	Main Channel at Toor	218454	84643	12	Medium	Medium	Medium	High	Low	Low	High	High	High	Stone weir
3	Kerry Blackwater	Main Channel at Toor	218428	84652	13	Medium	Medium	Medium	High	Low	Low	High	High	High	End point stone weir no further access

3	Kerry Blackwater	Main Channel at Toor	218428	84652	14	Medium	Medium	Medium	High	Low	Low	High	High	High	LB changes back to conifer plantation with no buffer
3	Kerry Blackwater	Main Channel at Toor	218638	84667	15	Medium	Medium	Medium	High	Low	Low	High	High	High	End point upstream from bridge, tree line continuous along bank
4	Kerry Blackwater	Tributary West of Knocktoor	216637	85779	1	Medium	Medium	Medium	High	Low	Low	High	High	High	Cattle access across the river with heavy poaching and trampling
4	Kerry Blackwater	Tributary West of Knocktoor	216637	85779	2	Medium	Medium	Medium	High	Low	Low	High	High	High	Very poor substrate condition
4	Kerry Blackwater	Tributary West of Knocktoor	216639	85755	3	Medium	Medium	Medium	High	Low	Low	High	High	High	Substrate condition
4	Kerry Blackwater	Tributary West of Knocktoor	216639	85755	4	Medium	Medium	Medium	High	Low	Low	High	High	High	Substrate condition
4	Kerry Blackwater	Tributary West of Knocktoor	216639	85755	5	Medium	Medium	Medium	High	Low	Low	High	High	High	Substrate condition
4	Kerry Blackwater	Tributary West of Knocktoor	216639	85755	6	Medium	Medium	Medium	High	Low	Low	High	High	High	Ford for cattle and machinery to access adjoining fields - very poor substrate condition
4	Kerry Blackwater	Tributary West of Knocktoor	216639	85755	7	Medium	Medium	Medium	High	Low	Low	High	High	High	Poor substrate condition
4	Kerry Blackwater	Tributary West of Knocktoor	216639	85755	8	Medium	Medium	Medium	High	Low	Low	High	High	High	Poor substrate condition
4	Kerry Blackwater	Tributary West of Knocktoor	216639	85755	9	Medium	Medium	Medium	High	Low	Low	High	High	High	Ford crossing showing cattle in background
4	Kerry Blackwater	Tributary West of Knocktoor	216639	85755	10	Medium	Medium	Medium	High	Low	Low	High	High	High	Looking downstream with forestry in background
4	Kerry Blackwater	Tributary West of Knocktoor	216618	85802	11	Medium	Medium	Medium	High	Low	Low	High	High	High	Looking downstream with forestry in background
4	Kerry Blackwater	Tributary West of Knocktoor	216618	85802	12	Medium	Medium	Medium	High	Low	Low	High	High	High	Looking upstream from road bridge
4	Kerry Blackwater	Tributary West of Knocktoor	216631	85772	13	Medium	Medium	Medium	High	Low	Low	High	High	High	Showing cattle in river at bridge and ford
4	Kerry Blackwater	Tributary West of Knocktoor	216631	85772	14	Medium	Medium	Medium	High	Low	Low	High	High	High	Showing cattle in river at bridge and ford
4	Kerry Blackwater	Tributary West of Knocktoor	216631	85772	15	Medium	Medium	Medium	High	Low	Low	High	High	High	Showing cattle in river at bridge and ford
5	Kerry Blackwater	Confluence of tributaries	219885	85904	1	High	Medium	High	Medium	Low	Medium	Medium	High	High	Box culverts & small scale abstraction under bridge, in channel
5	Kerry Blackwater	Confluence of tributaries	219885	85904	2	High	Medium	High	Medium	Low	Medium	Medium	High	High	Land clearance between tributaries
5	Kerry Blackwater	Confluence of tributaries	219885	85904	3	High	Medium	High	Medium	Low	Medium	Medium	High	High	Round culvert under road
5	Kerry Blackwater	Confluence of tributaries	219885	85904	4	High	Medium	High	Medium	Low	Medium	Medium	High	High	Land clearance d/s of confluence on LB
5	Kerry Blackwater	Confluence of tributaries	219885	85904	5	High	Medium	High	Medium	Low	Medium	Medium	High	High	House in background on RB possible septic tank discharging
5	Kerry Blackwater	Confluence of tributaries	219885	85904	6	High	Medium	High	Medium	Low	Medium	Medium	High	High	Small scale abstraction

5	Kerry Blackwater	Confluence of tributaries	219877	85911	7	High	Medium	High	Medium	Low	Medium	Medium	High	High	Looking u/s of road bridge - overgrown, silty substrate
SP 2	Kerry Blackwater	Downstream of site 5, ford crossing	220075	85765	1										Looking upstream from ford
SP 2	Kerry Blackwater	Downstream of site 5, ford crossing	220075	85765	2										Looking downstream from ford
SP 2	Kerry Blackwater	Downstream of site 5, ford crossing	220075	85765	3										Ford gives access to grey road from main road, small abstraction pipe continues from site 5
SP 2	Kerry Blackwater	Downstream of site 5, ford crossing	220075	85765	4										Very poor substrate condition, with heavy siltation
SP 3	Kerry Blackwater		219331	88671	1										Surrounding pressures - silage in foreground and forestry in background, passed lorries with logs indicating felling in operation
6	Kerry Blackwater	At road bridge	220735	87918	1	Low	Medium	Medium	Medium	Low	Low	Low	Low	Medium	Looking u/s from road bridge
6	Kerry Blackwater	At road bridge	220735	87918	2	Low	Medium	Medium	Medium	Low	Low	Low	Low	Medium	Looking d/s from road bridge
6	Kerry Blackwater	At road bridge	220735	87918	3	Low	Medium	Medium	Medium	Low	Low	Low	Low	Medium	Looking d/s, pressures: improved grassland on RB
6	Kerry Blackwater	At road bridge	220735	87918	4	Low	Medium	Medium	Medium	Low	Low	Low	Low	Medium	Forestry downstream from tributary
7	Kerry Blackwater	Trib of Kerry Blackwater	224615	87421	1	High	High	High	High	Low	Low	Low	High	High	Upstream forestry felled on LB - no buffer, very poor condition
7	Kerry Blackwater	Trib of Kerry Blackwater	224615	87421	2	High	High	High	High	Low	Low	Low	High	High	Looking d/s from road bridge
7	Kerry Blackwater	Trib of Kerry Blackwater	224615	87421	3	High	High	High	High	Low	Low	Low	High	High	Looking u/s recent felling to bank, no buffer
7	Kerry Blackwater	Trib of Kerry Blackwater	224615	87421	4	High	High	High	High	Low	Low	Low	High	High	Brash on LB d/s of bridge
7	Kerry Blackwater	Trib of Kerry Blackwater	224615	87421	5	High	High	High	High	Low	Low	Low	High	High	Large trees recently felled on LB d/s of bridge
7	Kerry Blackwater	Trib of Kerry Blackwater	224615	87421	6	High	High	High	High	Low	Low	Low	High	High	Brash and felled trees
7	Kerry Blackwater	Trib of Kerry Blackwater	224615	87421	7	High	High	High	High	Low	Low	Low	High	High	FGA on LB u/s of road bridge
7	Kerry Blackwater	Trib of Kerry Blackwater	224615	87421	8	High	High	High	High	Low	Low	Low	High	High	Excessive brash left upstream
7	Kerry Blackwater	Trib of Kerry Blackwater	224615	87421	9	High	High	High	High	Low	Low	Low	High	High	Peat stained plus iron pan layer
7	Kerry Blackwater	Trib of Kerry Blackwater	224615	87421	10	High	High	High	High	Low	Low	Low	High	High	Poor substrate condition
7	Kerry Blackwater	Trib of Kerry Blackwater	224615	87421	11	High	High	High	High	Low	Low	Low	High	High	Totally destruction of LB downstream of bridge

7	Kerry Blackwater	Trib of Kerry Blackwater	224615	87421	12	High	High	High	High	Low	Low	Low	High	High	View downstream of L & R banks
7	Kerry Blackwater	Trib of Kerry Blackwater	224615	87421	13	High	High	High	High	Low	Low	Low	High	High	Felling downstream
8	Kerry Blackwater	Carrigeen Ford	220699	86689	1	Low	High	High	Medium	Low	Low	Medium	High	High	Trampling on LB
8	Kerry Blackwater	Carrigeen Ford	220699	86689	2	Low	High	High	Medium	Low	Low	Medium	High	High	Carrigeen Ford - recent felling
8	Kerry Blackwater	Carrigeen Ford	220699	86689	3	Low	High	High	Medium	Low	Low	Medium	High	High	Dead mussel in channel at ford
8	Kerry Blackwater	Carrigeen Ford	220699	86689	4	Low	High	High	Medium	Low	Low	Medium	High	High	Siltation on RB
8	Kerry Blackwater	Carrigeen Ford	220699	86689	5	Low	High	High	Medium	Low	Low	Medium	High	High	Tributary through forestry joining main channel
8	Kerry Blackwater	Carrigeen Ford	220699	86689	6	Low	High	High	Medium	Low	Low	Medium	High	High	Carrigeen Ford
8	Kerry Blackwater	Carrigeen Ford	220707	86705	7	Low	High	High	Medium	Low	Low	Medium	High	High	Forestry drain feeding into main channel on RB
8	Kerry Blackwater	Carrigeen Ford	220699	86689	8	Low	High	High	Medium	Low	Low	Medium	High	High	Dead mussel in channel
8	Kerry Blackwater	Carrigeen Ford	220699	86689	9	Low	High	High	Medium	Low	Low	Medium	High	High	Dead mussel in channel
8	Kerry Blackwater	Carrigeen Ford	220699	86689	10	Low	High	High	Medium	Low	Low	Medium	High	High	Dead juvenile mussel
8	Kerry Blackwater	Carrigeen Ford	220789	86696	11	Low	High	High	Medium	Low	Low	Medium	High	High	Sandstone quarry on LB u/s from ford
8	Kerry Blackwater	Carrigeen Ford	220789	86696	12	Low	High	High	Medium	Low	Low	Medium	High	High	Sandstone quarry on LB u/s from ford
8	Kerry Blackwater	Carrigeen Ford	220794	86713	13	Low	High	High	Medium	Low	Low	Medium	High	High	Conifer plantation up to bank
8	Kerry Blackwater	Carrigeen Ford	220794	86713	14	Low	High	High	Medium	Low	Low	Medium	High	High	Overgrown channel
8	Kerry Blackwater	Carrigeen Ford	220794	86713	15	Low	High	High	Medium	Low	Low	Medium	High	High	Overgrown channel
9	Kerry Blackwater	Just North of Reanagullee	222146	86767	1	Medium	Medium	Medium	High	Low	Low	Low	High	High	Looking upstream from road bridge - lack of buffer zone
9	Kerry Blackwater	Just North of Reanagullee	222146	86767	2	Medium	Medium	Medium	High	Low	Low	Low	High	High	Looking downstream from road bridge - tree line at bank
9	Kerry Blackwater	Just North of Reanagullee	222146	86767	3	Medium	Medium	Medium	High	Low	Low	Low	High	High	Looking downstream - peat stained, sluggish flow
9	Kerry Blackwater	Just North of Reanagullee	222146	86767	4	Medium	Medium	Medium	High	Low	Low	Low	High	High	Very poor substrate condition
SP 1	Kerry Blackwater	Just above Kerry Blackwater bridge	213237	82924	1										Quarry operations
SP 1	Kerry Blackwater	Just above Kerry Blackwater bridge	213237	82924	2										Quarry operations
SP 1	Kerry	Just above	213237	82924	3										Quarry operations

	Blackwater	Kerry Blackwater bridge Just above				
SP1	Kerry Blackwater	Kerry Blackwater bridge Just above	213237	82924	4	Quarry operations
SP 1	Kerry Blackwater	Kerry Blackwater bridge	213237	82924	5	Quarry operations

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			