

**NS 2 FRESHWATER PEARL MUSSEL SUB-BASIN  
MANAGEMENT PLANS**

**REPORT ON MORPHOLOGICAL MONITORING AND  
CATCHMENT WALKOVER RISK ASSESSMENTS IN THE  
DERREEN CATCHMENT**

**September 2009**

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## 1.0 INTRODUCTION

In order to assess the hydromorphological alterations within the Derreen 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 1<sup>st</sup> April 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.

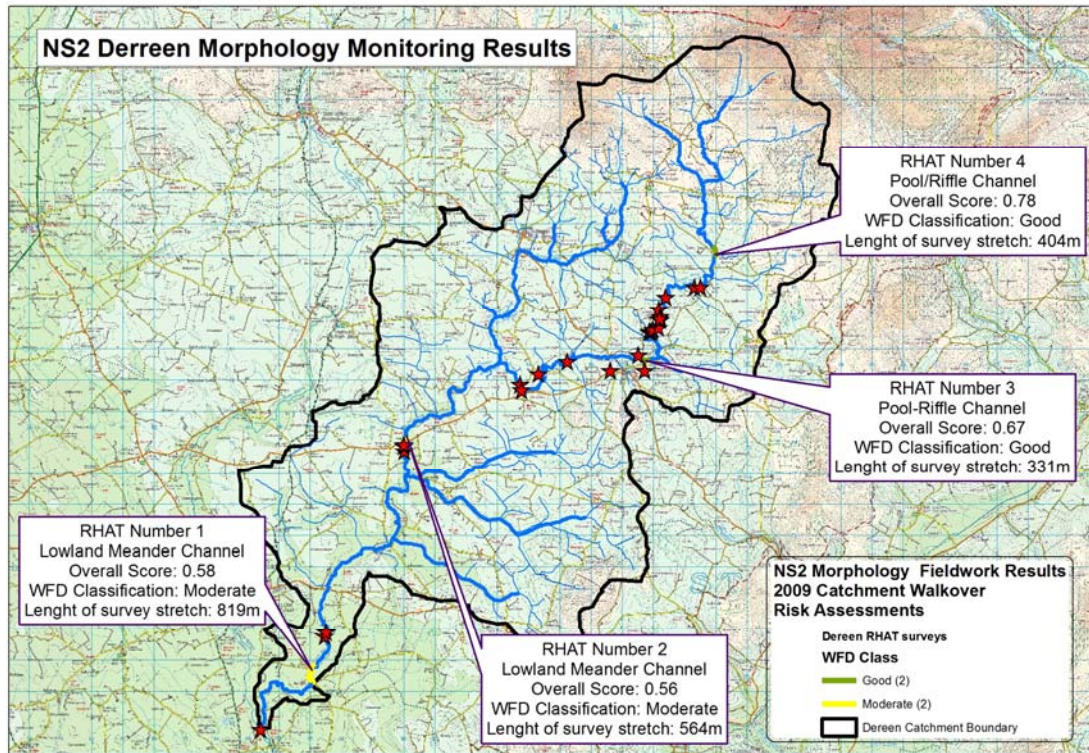
## **2.2 CATCHMENT WALKOVER RISK ASSESSMENT**

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 Derreen catchment. Best use was made of all available datasets such as the pressure source data collated by the River Basin District Projects for the Article V Characterisation and Programme of Measures Studies. This work allowed the NS 2 project team to assess the catchment through the combined availability of aerial imagery and digitised pressure information. Where gaps in this data existed together with areas that required ground truthing such as physical barriers to migration, catchment walkover risk assessments were focussed throughout the 2009 field survey season.

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

### 3.0 RESULTS

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



**Figure 3.1 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

Four RHAT surveys were carried out throughout the Derreen catchment. The results of these surveys can be found in the electronic appendix. Two were deemed to be at moderate status in the lower reaches of the catchment where as the survey stretch at the upper end of the catchment was at Good status. RHAT number 1 scored low on all attributes in particular channel vegetation, bank structure & stability, bank vegetation, riparian landcover and floodplain connectivity. Siltation is a particular problem along the survey stretch which is evident from the at this site excessive macrophyte growth in channel leading to a score of zero for this attribute. This may be exacerbated along the survey stretch due to the very narrow buffer zone which has been left between the river and the recently ploughed agricultural land. In some parts of the reach the ploughing has taken place right up to the bank with no buffer strip left. Resectioning, reinforcement

and embankments were recorded on both the left and right bank. Bank side erosion was recorded which is perhaps adding the build up of fine sandy silts in the channel. *Ranunculus* growth was found to be significant along the survey stretch. RHAT number one was classified as being at good status.

RHAT number 2 was again along a lowland meandering channel with significant levels of fine sandy silt in the channel. Dead mussels were found on the banks of the survey reach full of silt. Only two attributes scored over 2.5 – floodplain connectivity and channel form and flow type. All other attributes scored between 2 and 2.5. The intensive land use surrounding the channel on both sides, lack of buffer zone and bank side vegetation together with the high levels of fine sands and silts in the channel and led to the combined low scores throughout. Significant morphological alterations are acting on this reach and preventing it from attaining its full potential. Overall, the reach was classified as being at moderate status.

**Plate 3.1      Representative photographs from reach**



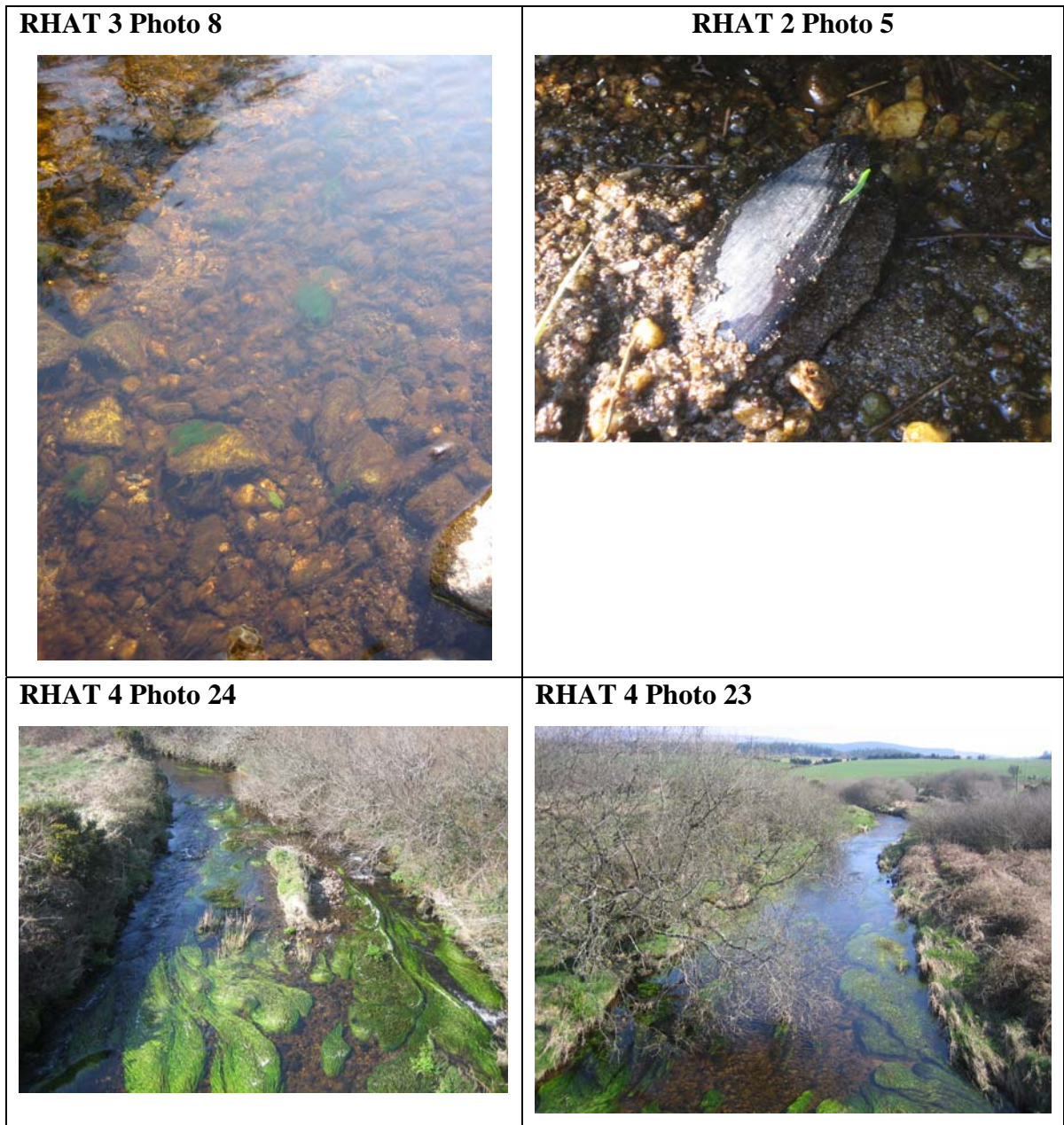




**Plate 3.2 Representative photographs from reach**

RHAT number 3 was carried out North East of Hacketstown. Some resectioning and over widening was recorded together with poaching on both the right and left bank. Again as with RHAT 1 significant *Ranunculus* was recorded along the entire survey stretch. This stretch is a pool-riffle-glide channel and whiles the floodplain connectivity and barriers to continuity are not a problem along this stretch the channel vegetation and substrate condition are a particular issue. The nature of the substrate in this catchment has led to significant levels of fine sands in the channel with dead mussels found on the banks full of sediment. Filamentous algae was found through the channel growing on the cobbles and boulders. The riparian landcover also scored quite low due to excessive levels of animal trampling along the survey stretch. Overall, this stretch was classified as good status.

**Plate 3.3 Representative photographs from reach**



RHAT number four was carried out over a 400m stretch on a pool-riffle-glide channel. Again, for a channel of this type excessive *Ranunculus* for this type of channel was recorded along the survey stretch right across the width of the channel. Overall most attributes scored well except for the channel vegetation and riparian landcover. The level of macrophyte growth is again an indication of the high levels of silt and nutrient which is leading to this excessive growth. Overall, this survey stretch was classified as good status.

Details in relation to photographs are tabulated in Appendix 2.

### 3.2 Catchment Walkover Risk Assessment Results

A total of twenty-seven sites were surveyed in the Derreen sub-basin catchment, with a risk assessment carried out at thirteen of these sites (fourteen stopping points). **Figure 3.2** outlines the stopping point locations in addition to the High to Low Risk Assessment from the Catchment Walkover Risk Assessments. All thirteen risk assessment sites were recorded as high risk. **Figure 3.3** outlines the percentage of sites classified at high risk together with the number of stopping points throughout the catchment. The most common high risk categories identified were:

- Current Riparian Zone – evident at 69% of high risk sites,
- Diffuse Silt – evident at 69% 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 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.

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.

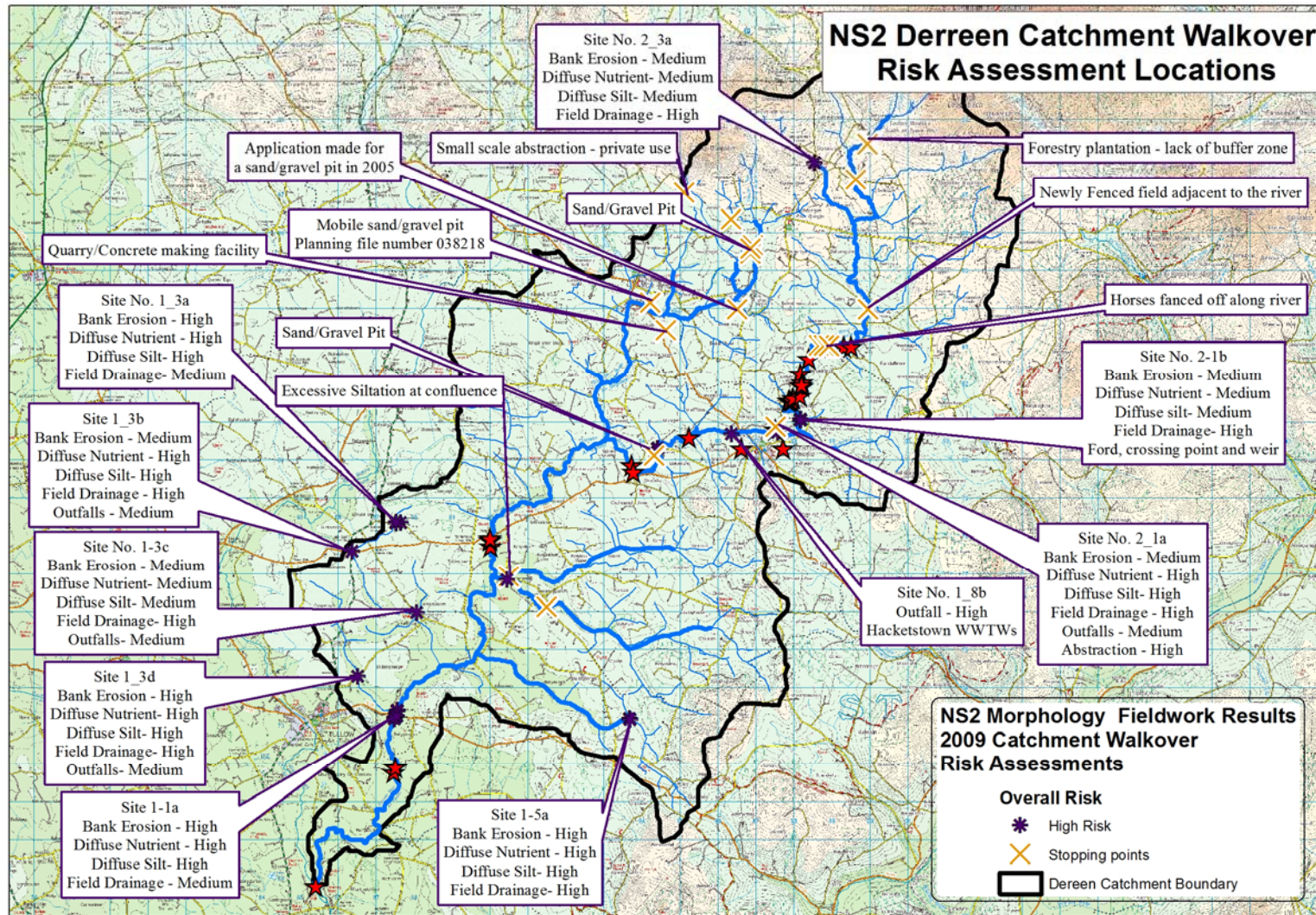
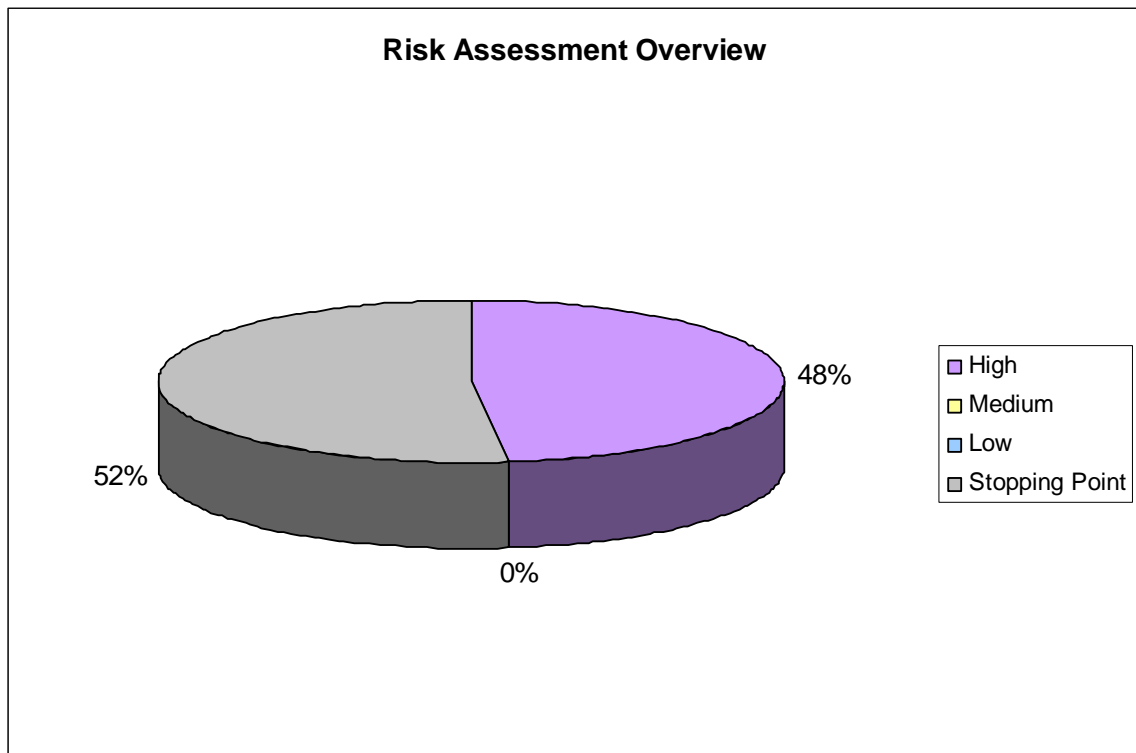


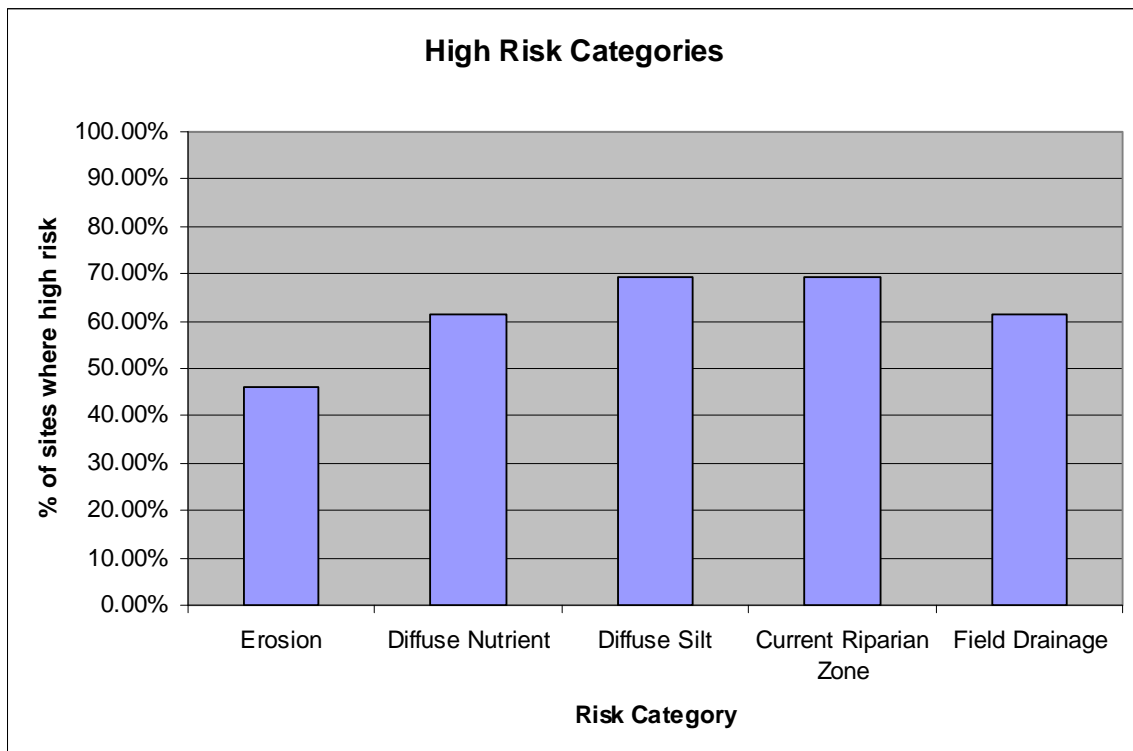
Figure 3.2 Location of Stopping points and Catchment Walkover Risk Assessments

**Figure 3.3 Risk Assessment Overview**



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

**Figure 3.4 Break-down of High Risk categories**

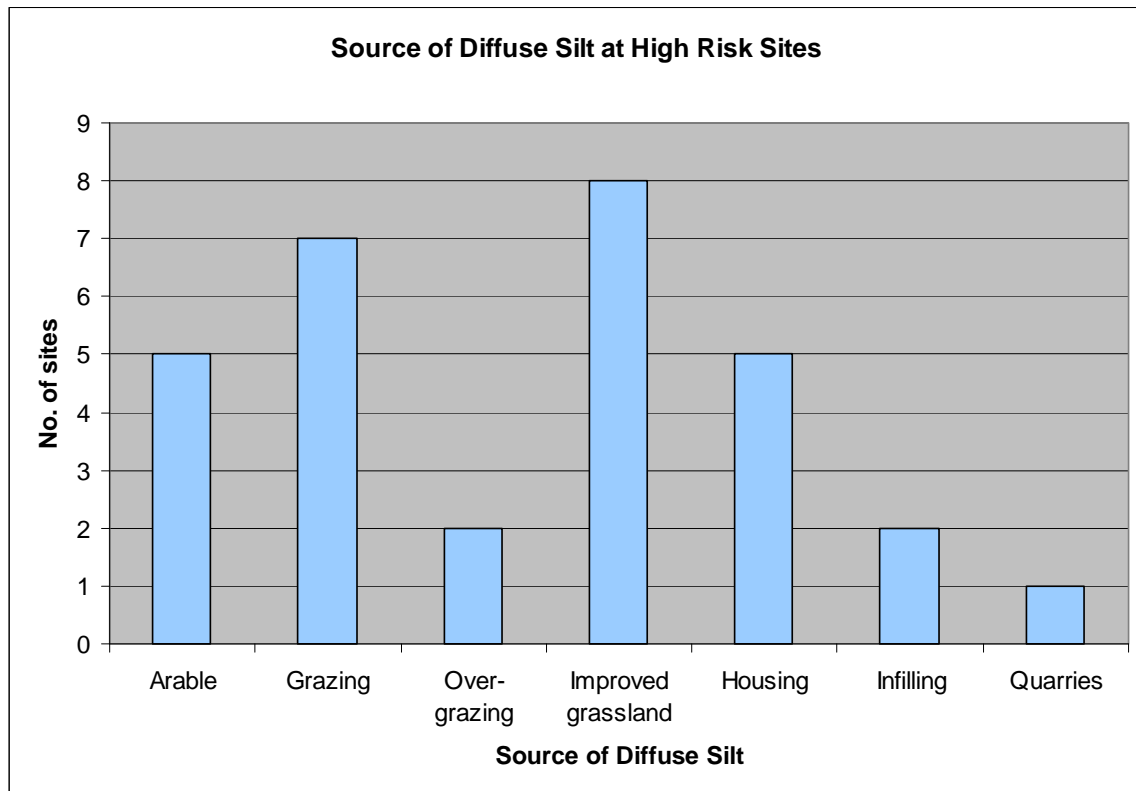


It is evident that the current riparian zone category is also a major risk within this catchment, however this pressure generally relates to how a poor riparian zone can intensify other pressures e.g. increased erosion from animal trampling caused by poor fencing. Quantitative statistics do not successfully display the pressures created by a poor riparian buffer as they are linked with other pressure categories. The main issues identified within this catchment which lead to a high risk riparian zone were:

- An insufficient buffer or a tree-line at bank is a significant pressure within this catchment, the buffer or tree-line was insufficient at eight sites high risk for riparian buffer, the main risks were at banks used for improved grassland or housing. This has impacts including the intensification of existing erosion particularly that associated with animal trampling, increases impact of diffuse silt as there is no buffer to intercept and increases the impact of diffuse nutrient as nutrients from agricultural land, housing etc are more likely to be washed directly into the river channel.
- The condition of fencing on banks is a significant pressure within this catchment, there are areas where the fencing is not sufficiently set back from the channel and placed right at the bank and indeed areas where there is no fencing at all on agricultural grazing land. This has intensified the pressure of erosion from trampling on banks and poaching, increased nutrient enrichment from animals being within or very close to channel and increased silt within channel from exposed soil on banks;

The most common source of diffuse silt was improved grassland which was evident at eight high risk sites. A break-down of the individual sources of Diffuse Silt at high risk sites is given below:

**Figure 3.5 Sources of Diffuse Silt at High Risk Sites**



#### **4.0 CONCLUSIONS**

The Derreen catchment is in a poor condition from a morphological perspective with all risk assessments recorded as being at high risk. In addition there were fourteen stopping points where additional pressures were recorded as shown in **Figure 3.1**. All three risk assessments undertaken in close proximity to the Freshwater Pearl Mussel populations were high risk demonstrating the level of pressures acting on the species not only from further up the catchment but at the point of the mussel population. The condition of the current riparian zone was found to be in poor condition throughout which significantly increases the extent to which pressures such as diffuse silt affect the overall condition of the catchment. Intensive agriculture within the catchment appears to be the most significant pressure which is posing a high risk to the decline of the freshwater pearl mussel population in the Derreen catchment.



## **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						
<p><b>ACTION TO TAKE PRIOR TO FIELDWORK</b></p> <p>General overall shape of river Check weirs, impoundments etc. on catchment</p>	<p>River type</p> <p>Date</p>						
<p>Floodplain connectivity and land use</p> <p>Expected river type</p> <p>Rain last week</p> <p>Estimated river width</p> <p>Estimated survey length</p> <p>Riparian land cover(s)</p> <p>River Agency designated?</p> <p>Other comments including geology - limestone / siliceous / peat*</p>	<p>Time</p> <p>Surveyors</p> <p>Weather conditions now</p> <p>Estimated river width (m) (average 3 readings)</p> <p>Estimated survey length (m) (40 X wetted width)</p> <p>Estimated river depth (m)</p> <p>Channel characteristics (e.g. different stream types on the reach)</p>						
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;"><b>RESULTS</b></td> <td></td> </tr> <tr> <td>Hydromorph score</td> <td></td> </tr> <tr> <td>WFD class</td> <td></td> </tr> </table>	<b>RESULTS</b>		Hydromorph score		WFD class		<p>Pressures</p>
<b>RESULTS</b>							
Hydromorph score							
WFD class							
*Circle as appropriate							

Photograph details include IGR or approximate location

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*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 <input type="checkbox"/> Left bank <input type="checkbox"/> Right bank <input type="checkbox"/>
Reinforcement	None <input type="checkbox"/> Left bank <input type="checkbox"/> Right bank <input type="checkbox"/>
Embankments NO*	LB <input type="checkbox"/> RB <input type="checkbox"/> Set back LB <input type="checkbox"/> SB RB <input type="checkbox"/>
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
<b>TOTAL</b>	<b>32</b>	<b>32</b>	<b>32</b>	<b>32</b>
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 Derreen 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 Code	Catchment Name	Photo No.	Bank Erosion	Diffuse Nutrient	Diffuse Silt	Field Drainage	Outfalls	Abs.	Barriers to Migration	Overall Risk*	Pressure/Photo Details
1_1a	Derreen	Derreen 2 River Confluence	High	High	High	Medium	Low	Low	Low	High	Trib entering Derreen has been excavated, deepened and re-aligned.
1_1a	Derreen	Derreen 4 Extensive Ranunculus	High	High	High	Medium	Low	Low	Low	High	Excessive ranunculus growth along river stretch
1_1a	Derreen	Derreen 5 Bank erosion	High	High	High	Medium	Low	Low	Low	High	The field adjacent to the RB has been ploughed leaving a very small buffer zone approx. 0.5m, no fencing, vegetation not natural
1_1a	Derreen	Derreen 6 Lack of buffer zone	High	High	High	Medium	Low	Low	Low	High	Very small buffer zone
1_1a	Derreen	Derreen 7	High	High	High	Medium	Low	Low	Low	High	Very small buffer zone
1_1a	Derreen	Derreen 8 Under cutting	High	High	High	Medium	Low	Low	Low	High	Evidence of bank erosion and undercutting
1_1b	Derreen	Derreen 9 Dumping of spoil from site	High	High	High	Low	Low	Low	Low	High	Dumping of excessive spoil from adjacent site approx. 100m upstream of bridge
1_1b	Derreen	Derreen 10 Dumping of spoil from site	High	High	High		Low	Low	Low	High	Extensive site works adjacent to river in relation to housing re-development works, numerous spoil heaps along right bank
1_1b	Derreen	Derreen 12 Boulders dumped	High	High	High	Low	Low	Low	Low	High	Boulders possible from land clearance along left river bank approx. 200m upstream of bridge. Some have fallen into the water
1_1b	Derreen	Derreen 13 Trashline	High	High	High	Low	Low	Low	Low	High	Trashline evident above watermark on trees, spoil heap adjacent to right hand bank
1_3a	Derreen	Derreen 24 Arable farming - no buffer	High	High	High	Medium	Low	Low	Low	High	Extensive areas of arable farming, large open fields, no buffer zone
1_3a	Derreen	Derreen 25 one off housing	High	High	High	Medium	Low	Low	Low	High	Two new houses in field next to river. Noted >5 new houses along this road
1_3a	Derreen	Derreen 26 stream above bridge	High	High	High	Medium	Low	Low	Low	High	Stream upstream of bridge and adjacent to a new housing site
1_8a	Derreen	Derreen 52, 53, 54	High	High	High	Low	Low	Low	Low	High	Excessive Ranunculus growth, two mussels dead in substrate



1_8a	Derreen	Derreen 51 Poaching of river bank	High	High	High	Low	Low	Low	Low	High	Fenced off but areas for access allowed, underlying soil type very silty/sandy
1_8b	Derreen	Derreen 55 Hacketstown WWTW					High	Low	Low	High	Very old WWTWs just outside of Hacketstown
2_1b	Derreen	Derreen 15 Ford	Medium	Medium	Medium	High	Low	Low	Low	High	Ford, crossing point and Weir
2_1b	Derreen	Derreen 16 Fenced off fields	Medium	Medium	Medium	High	Low	Low	Low	High	Newly fenced off fields adjacent to river on both sides
2_1b	Derreen	Derreen 18 Land drain	Medium	Medium	Medium	High	Low	Low	Low	High	Land drain into main stream, evidence of additional macrophyte growth at this point
2_1b	Derreen	Derreen 19 Downstream macrophyte growth	Medium	Medium	Medium	High	Low	Low	Low	High	Downstream Ranunculus growth
Stopping point	Derreen	Derreen 20 Horses fenced back from river									Appears to be newly fenced back river stretches
Stopping point	Derreen	Derreen 21 Felled area									Hard to see but appears to be a recently felled area
Stopping point	Derreen	Derreen 22 Horses fenced off along stretch									Entire river stretch fenced off on both sides of river
Stopping point	Derreen	Derreen 26 & 27 Fenced off - CHECK									Newly fenced fields adjacent to river - sheep
2_3a	Derreen	Derreen 28 Filamentous algae	Medium	Medium	Medium	High	Low	Low	Low	High	Filamentous algae on cobbles in river bed
2_3a	Derreen	Derreen 29 outfall pipe	Medium	Medium	Medium	High	Low	Low	Low	High	Outfall pipe in stream
Stopping point	Derreen	Derreen 32 looking downstream from bridge									Looking downstream - fenced off
Stopping point	Derreen	Derreen 33 Boulders placed instream									Boulders added to river bank to deflect flow perhaps - evidence of filamentous algae buildup
Stopping point	Derreen	Derreen 34									Forestry planted right up to river bank - no buffer zone



Stopping point	Derreen											Sand/Gravel pit
Stopping point	Derreen											Sand/Gravel Pit
Stopping point	Derreen											Sand/Gravel Pit
Stopping point	Derreen											Robert Young Applied to Wicklow Co.Co. ref 05-2956 for a sand & gravel pit at Borkil Beg, Kiltegan in 2005.

**Appendix 3 – Catchment Walkover Risk Assessment Survey Sheet**

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

	Present?		Grid Reference of specific pressure	No. of Photographs	Comments
	Yes	No			
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					
<b>Overall Risk</b>	High	Medium	Low		
Field Drainage					
Ditch managed					
Ditch unmanaged					
Drainage on high slope					
Drainage on low slope					
Land drainage (perforated pipes)					
Other sources					
<b>Overall Risk</b>	High	Medium	Low		
Outfalls					
Industrial discharges					
Storm drains					
Culvert outfalls					
Other sources					
<b>Overall Risk</b>	High	Medium	Low		
Abstractions					
Small					
Large					
<b>Overall Risk</b>	High	Medium	Low		
Barriers to migration					
Culverts					
Bridge aprons					
Weirs					
Stone weirs					
Other sources					
<b>Overall Risk</b>	High	Medium	Low		