NS 2 FRESHWATER PEARL MUSSEL SUB-BASIN MANAGEMENT PLANS

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

September 2009

TABLE OF CONTENTS

INTRODUCTION

In order to assess the hydromorphological alterations within the Cloon 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 in 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.

2.1.1 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 Cloon 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 Cloon morphology RHAT assessments were carried out throughout the catchment.

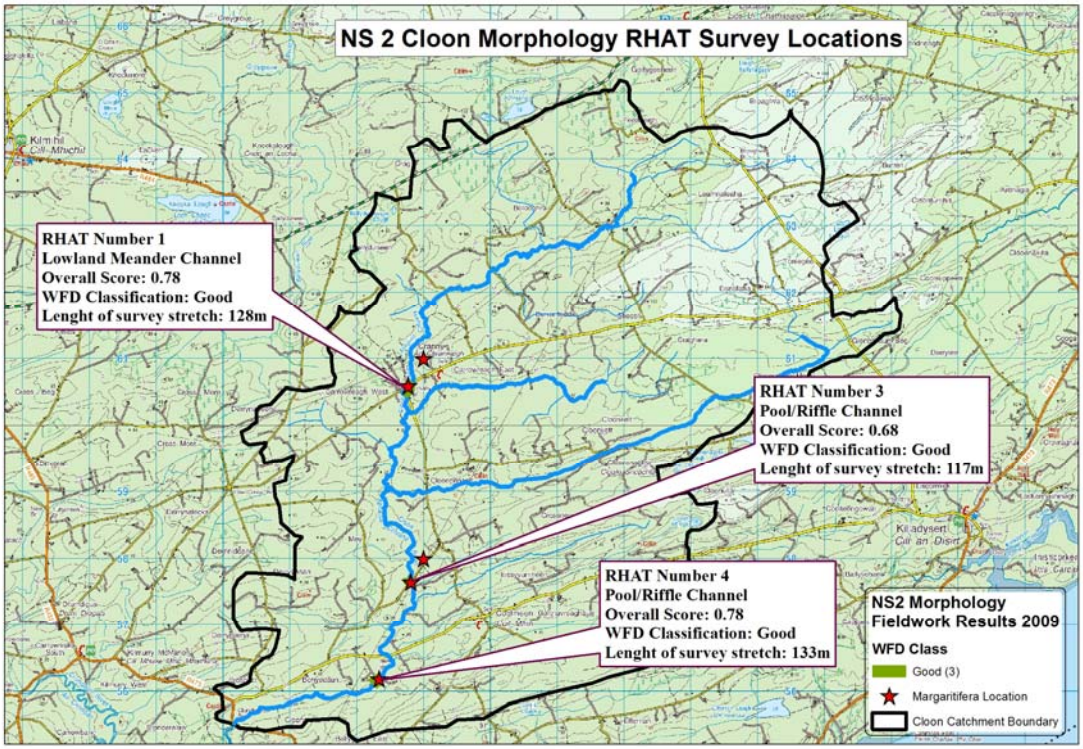


Figure 1 Morphology RHAT Assessment Locations

(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

Three RHAT surveys were carried out throughout the Cloon catchment within the vicinity of the known pearl mussel records or habitat. The results of these surveys can be found in the electronic appendix. All three survey stretches were deemed to be at "Good" status. RHAT number 1 scored well on all attributes except for bank structure and stability and floodplain connectivity. This was due to the pressure from the small village of Cranny in the vicinity of the survey stretch. The banks are steepened on the lower end of the survey stretch while upstream of the bridge more natural bank instability was found due to cattle poaching and access points. On the left bank an embankment was noted along this stretch of the lowland meandering channel which has the effect of preventing floodplain connectivity.

RHAT number 3 scored three out of a possible 4 on all attributes except channel vegetation and substrate condition. Both of these attributes scored two out of a possible four. In regards the channel vegetation for this channel type rooted aquatic vegetation may be common at channel margins during the growing season however along this survey stretch excessive *Potomagetans,* and *Apium* species were recorded across the channel. This could indicate high levels of both silt and nutrients are contained within the substrate to allow the macrophytes to take root and flourish. The substrate condition although not visible along all of the stretch was also downgraded as the high levels of macrophyte growth would indicate the substrate has greater than expected levels of siltation. Where the substrate was visible it was found to be in poor condition.

RHAT number 4 scored low on channel form and flow types and substrate condition. This is largely due to the presence of one major bridge which has been altered numerous times over the past number of years. The bridge consists of two large box culverts and a number of round culverts which were added in recent years on either side. Underneath the bridge an artificial concrete substrate has also been put in place which is acting as a minor weir. The weir and bridge structure are altering the flow regime of the river. Again, the substrate condition along this stretch is quite poor with a heavy peat stain.

Representative photographs from reach:

RHAT 1 	**RHAT 1** 
RHAT 3 	**RHAT 3** 
RHAT 4 	**RHAT 4** 

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 Cloon Sub-basin catchment; with a risk assessment carried out at nine of theses sites (five stopping points). Figure 2 outlines the stopping point locations together with the High to Low Risk Assessment from the Catchment Walkover Risk Assessments.

Four high risk sites were recorded out of the nine that were assessed. The remaining five sites were recorded as medium risk, meaning no low risk sites were recorded within this catchment.

The most common high risks categories identified were:

- Erosion – evident at 100% of high risk sites,
- Current riparian zone – evident at 75% of high risk sites,

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.

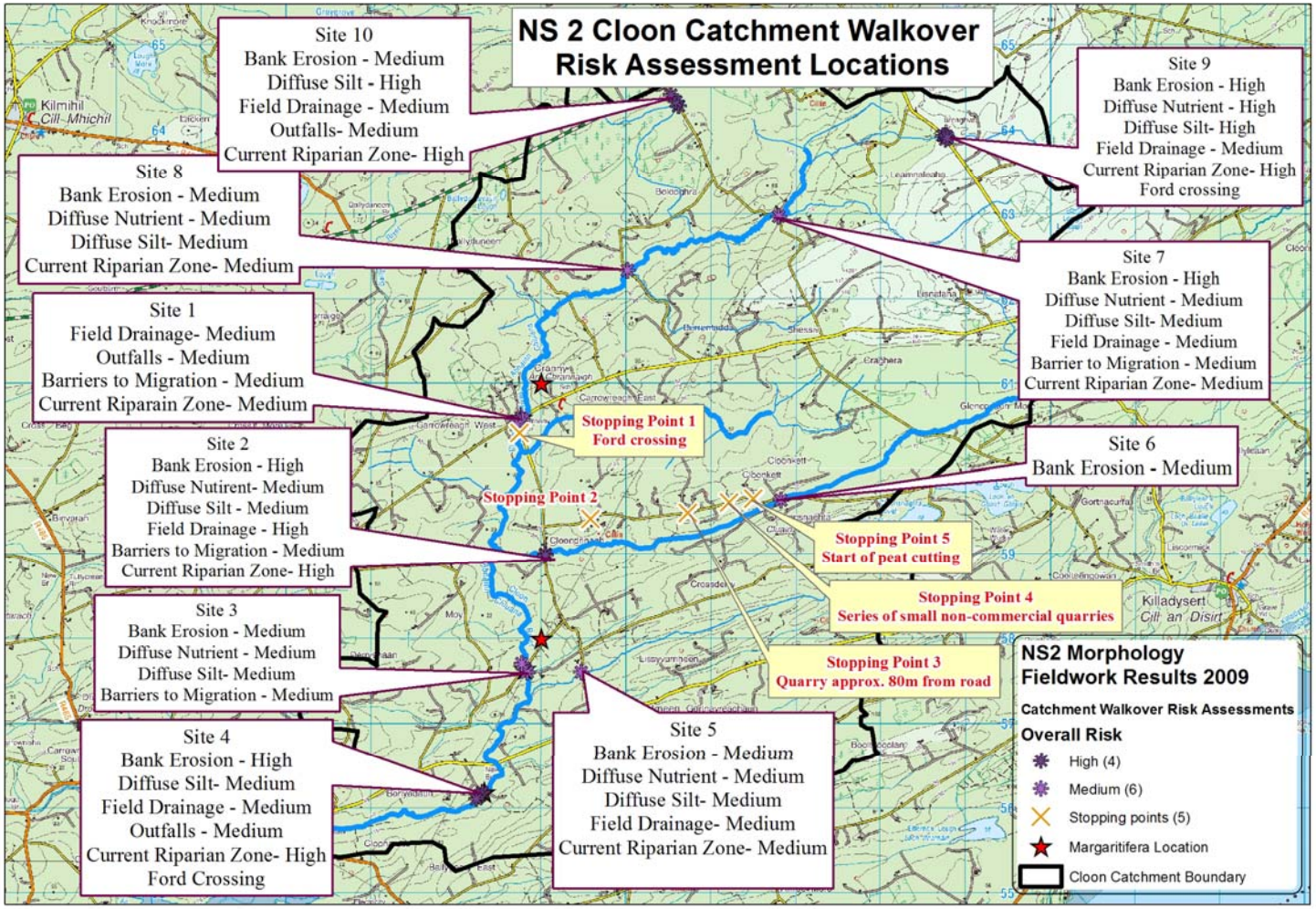
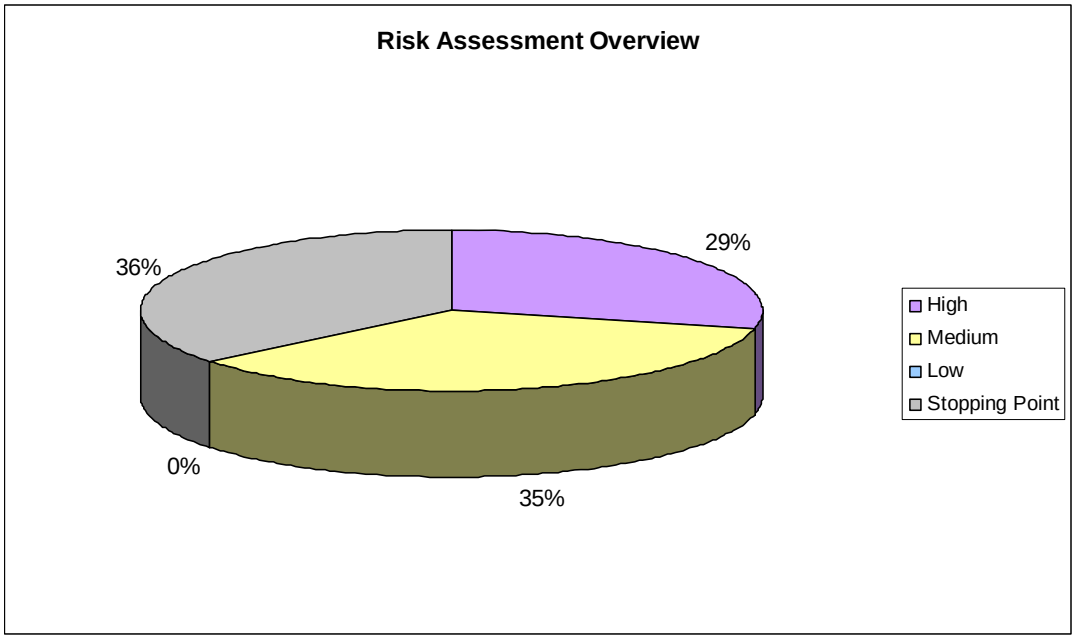


Figure 2 Location of Stopping points and Catchment Walkover Risk Assessments

Figure 3. Risk Assessment Overview



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

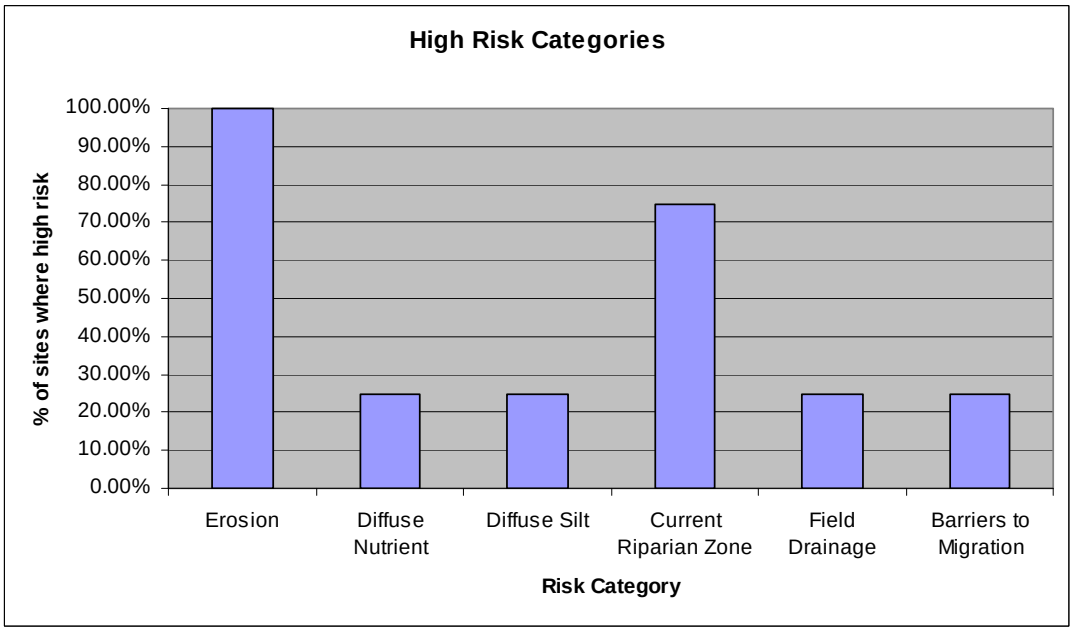


Figure 4 Breakdown of High Risk Categories

The most common source of erosion is channel manipulation being evident at three of the four high risk sites. The additional sources of high risk erosion can be seen below:

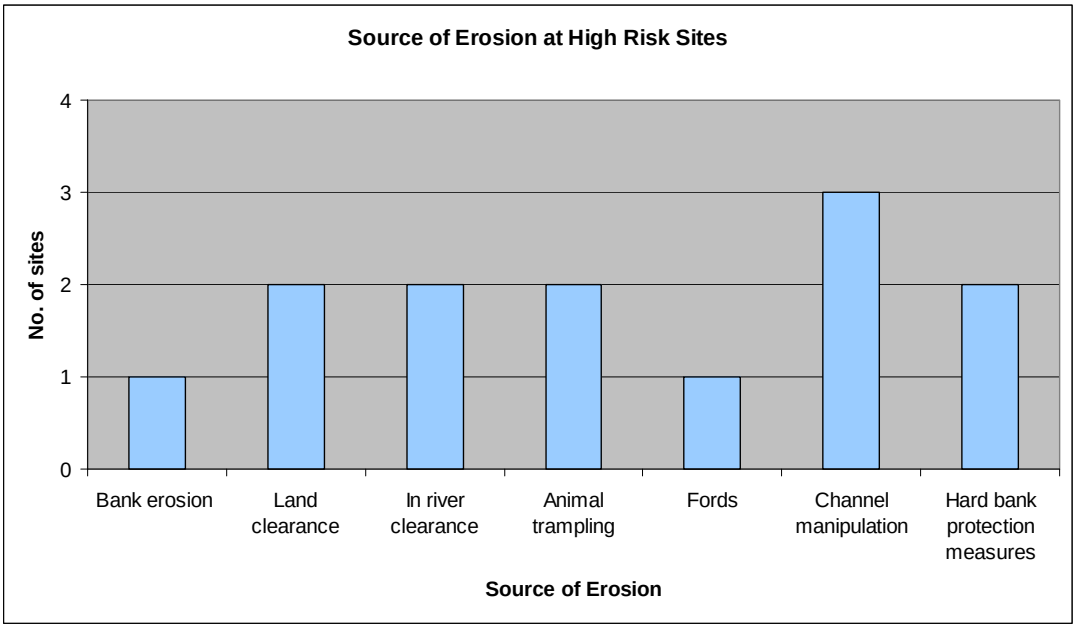


Figure 5 source of field drainage pressure at high risk sites

Evidence of drainage works were a common observation which is picked up in the channel manipulation category above, with many survey locations either within or in close proximity to stretches of channel that had been dredged, either recently or in the past. Many of the smaller tributaries had clearly been drained to form uniform channels, as field boundary ditches, with very little flow and totally choked with macrophytes.

Site 2 Photo 1	**Site 2 Photo 5**
	

Another pressure associated with agriculture in the catchment was the widespread occurrence of cattle access points to watercourses. Bank and bed erosion issues related to poaching were observed in many places largely as a result of gaining access for drinking water.

Site 9 at Breaghva Bridge in the upper Cloon catchment was found to have been significantly altered and damaged. From the road bridge and continuing downstream for approximately 200m the channel has been completed manipulated with the removal of both bank side and in channel vegetation. Large boulders have been dumped it would appear from the road side down into the channel. The river now flows underneath this channel and is acting as a total barrier to migration.

Site 9 Photo 4

Site 9 Photo 9

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.

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 a lack

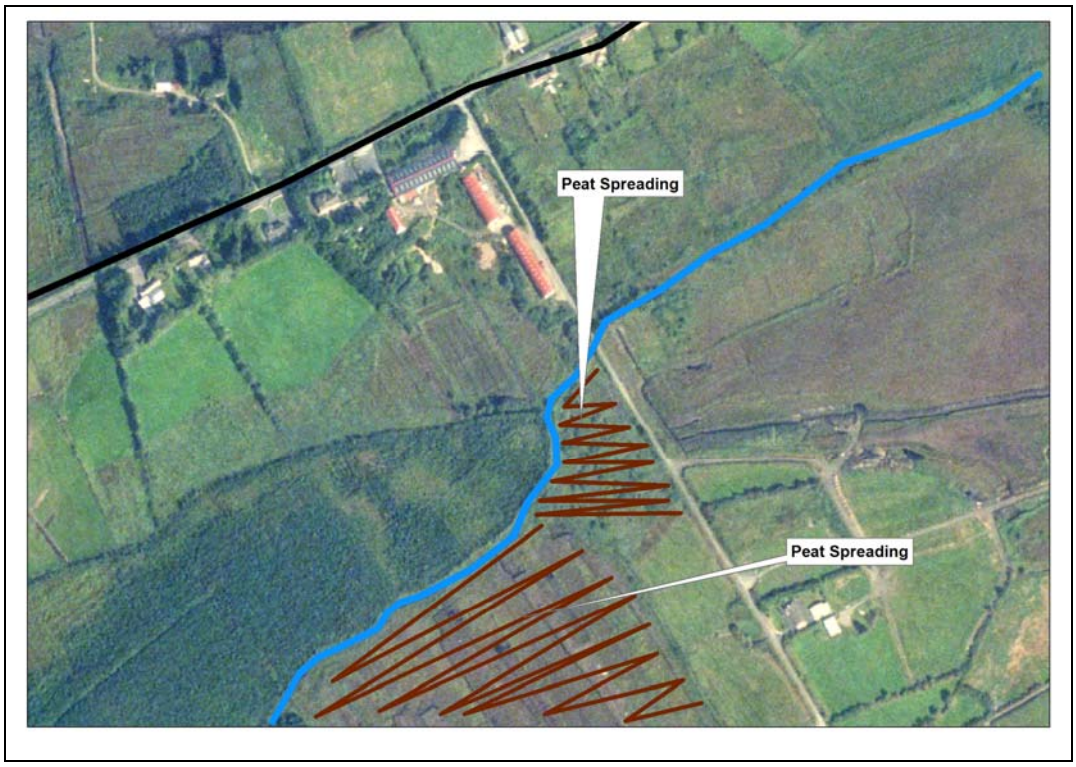
of fencing. Quantitative statistics do not successfully display the pressures created by a poor riparian buffer as they are linked with other pressure categories. The main issues identified within this catchment which lead to a high risk riparian zone were:

- Insufficient fencing on agricultural land particularly with animals having direct access to the channel – this has exacerbated the significant pressure of erosion from trampling on banks and fords, increased nutrient enrichment from animals being within or very close to channel, increased silt within channel from exposed soil on banks;
- A complete lack of riparian buffer along parts of the channel, particularly when in close proximity to improved grassland. This has caused increases in diffuse nutrient and silt as there is no effective buffer. Forestry was noted within the catchment adjacent to the river channel with little or no buffer in some cases. The direct connectivity between forest drains and the river may be a significant source of silt in the river and during felling the lack of a sufficient buffer zone may cause further pressure within the catchment. In particular this lack of buffer zone was noted at Site 10 which is above the main Cloon channel which contains the pearl mussels. Peat Cutting and peat spreading were also found in close proximity to the river channel on a number of occasions throughout the catchment.

Site 10 Peat spreading together with Forestry cover adjacent to the river channel 	**Site 10 Peat spreading together with Forestry cover adjacent to the river channel** 

Both pressures were found in close proximity and adjacent to the river channel with inadequate buffer zones in some instances. In combination these two pressures may lead to a significant source of silt in the river.

Site 10 Aerial Imagery



- Flood protection works in particular at site four is a major pressure, particularly since this is a Freshwater Pearl Mussel site. Presence of new culverts and a bridge that has been continually expanded by the council are having significant impacts.

Fords

Two fords were found within the Cloon catchment. The first was located at Stopping Point 1 as indicated in Figure 2. The access point appears to be used by animals and perhaps more infrequently by vehicles. Boulders have been placed down stream of the access point in order to prevent cattle passing down the channel. The second ford is located at Site 4 again as indicated in Figure 2. This is a larger Ford in that the entry and exist points are a considerable distance apart. An access slip road slopes down to the

entry point on the right bank from where the crossing moves downstream and exits to a field. This ford is also located within pearl mussel habitat and therefore the potential for direct damage to the mussels is also an issue here as vehicles could crush the mussels. The potential release of silt from both these fords is of particular concern given the substrate condition.

Site 4 Photo 9 	**Site 4 Photo 11** 
Stopping point 1 Photo 3 	Stopping point 1 Photo 2 

Quarries

A series of small scale non-commercial quarries were recorded along the North Cloon Kildysert tributary. While these appeared to be largely inactive or used infrequently on the day in which our surveys took place the landowners who operate the number of private quarries should be made aware of the Freshwater Pearl Mussel requirements and if developed further in the future and used commercially the landowner is aware that planning permission and a licence will be required from Clare CoCo.

Stopping point 3 Photo 1	Stopping point 4 Photo 1
	

4.0 CONCLUSIONS

The Cloon 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.

There was a high degree of siltation and waters were highly coloured in all the streams surveyed. The level of in stream manipulation from drainage works, bridge construction and reinforcement together with a high number of heavily poached access points has also greatly added to the high levels of siltation within the channel. While these morphological alterations such as bridge reinforcements were not carried out by the Local Authority it is perhaps imperative that a programme of catchment awareness is undertaken within this catchment to inform the landowners in relation to the presence of the pearl mussels and also in relation to the notifiable actions. The landuse within the catchment has also added to the overall poor condition with intensive agriculture, peat extraction and forestry all actively undertaken. The impact of these pressures is reflected in results from the ecological monitoring in particular in relation to the macroinvertebrates. In the upper reaches of the catchment where morphological alterations, forestry and peat cutting were all recorded Q3-4s have been assigned which may be directly related to the impact of these pressures.

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 Cloon 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	Cloon	Main Channel: Croany Bridge	116767	160591	1	Low	Low	Low	Medium	Medium	Low	Medium	Medium	Medium	Looking upstream from bridge
1	Cloon	Main Channel: Croany Bridge	116767	160591	2	Low	Low	Low	Medium	Medium	Low	Medium	Medium	Medium	Looking downstream from bridge
1	Cloon	Main Channel: Croany Bridge	116767	160591	3	Low	Low	Low	Medium	Medium	Low	Medium	Medium	Medium	Bridge structure
1	Cloon	Main Channel: Croany Bridge	116767	160591	4	Low	Low	Low	Medium	Medium	Low	Medium	Medium	Medium	Looking upstream on right bank at bridge
1	Cloon	Main Channel: Croany Bridge	116776	160588	5	Low	Low	Low	Medium	Medium	Low	Medium	Medium	Medium	Managed drain entering on left bank downstream of bridge
1	Cloon	Main Channel: Croany Bridge	116776	160588	6	Low	Low	Low	Medium	Medium	Low	Medium	Medium	Medium	Left bank managed green area downstream of bridge
1	Cloon	Main Channel: Croany Bridge	116788	160566	7	Low	Low	Low	Medium	Medium	Low	Medium	Medium	Medium	Storm drain -no flow in it at present
1	Cloon	Main Channel: Croany Bridge	116757	160530	8	Low	Low	Low	Medium	Medium	Low	Medium	Medium	Medium	Fast flowing perhaps slightly deepened here along to drain the land
1	Cloon	Main Channel: Croany Bridge	116712	160509	9	Low	Low	Low	Medium	Medium	Low	Medium	Medium	Medium	Embankment along right bank, deepened, end point
2	Cloon	Inflowing Tributary at Cloondrinagh	117057	158999	1	High	Medium	Medium	High	Low	Low	Medium	High	High	Downstream of bridge, severe channel manipulation
2	Cloon	Inflowing Tributary at Cloondrinagh	117057	158999	2	High	Medium	Medium	High	Low	Low	Medium	High	High	Managed land drain entering on left bank downstream of bridge

2	Cloon	Inflowing Tributary at Cloondrinagh	117057	158999	3	High	Medium	Medium	High	Low	Low	Medium	High	High	Peat stained silty water where two channels meet
2	Cloon	Inflowing Tributary at Cloondrinagh	117057	158999	4	High	Medium	Medium	High	Low	Low	Medium	High	High	Bridge structure to the right
2	Cloon	Inflowing Tributary at Cloondrinagh	117057	158999	5	High	Medium	Medium	High	Low	Low	Medium	High	High	Bank re-inforcement
2	Cloon	Inflowing Tributary at Cloondrinagh	117057	158999	6	High	Medium	Medium	High	Low	Low	Medium	High	High	Altered channel with drainage ditch entering on left bank
2	Cloon	Inflowing Tributary at Cloondrinagh	117056	158991	7	High	Medium	Medium	High	Low	Low	Medium	High	High	Second bridge
3	Cloon	Main Channel: South East of Moy	116813	157644	1	Medium	Medium	Medium	Low	Low	Low	Medium	Medium	Medium	Looking upstream from bridge
3	Cloon	Main Channel: South East of Moy	116813	157644	2	Medium	Medium	Medium	Low	Low	Low	Medium	Medium	Medium	Looking downstream from bridge
3	Cloon	Main Channel: South East of Moy	116813	157644	3	Medium	Medium	Medium	Low	Low	Low	Medium	Medium	Medium	Excessive potomageton across channel
3	Cloon	Main Channel: South East of Moy	116813	157644	4	Medium	Medium	Medium	Low	Low	Low	Medium	Medium	Medium	Cattle poaching just upstream of bridge on right bank
3	Cloon	Main Channel: South East of Moy	116813	157644	5	Medium	Medium	Medium	Low	Low	Low	Medium	Medium	Medium	Left bank downstream of bridge fenced off very little buffer
3	Cloon	Main Channel: South East of Moy	116813	157644	6	Medium	Medium	Medium	Low	Low	Low	Medium	Medium	Medium	Right bank tree line buffer
3	Cloon	Main Channel: South East of Moy	116839	157608	7	Medium	Medium	Medium	Low	Low	Low	Medium	Medium	Medium	Bridge structure
3	Cloon	Main Channel: South East of Moy	116839	157608	8	Medium	Medium	Medium	Low	Low	Low	Medium	Medium	Medium	Centre of channel -heavy macrophyte growth & silt built up, end point near cattle field
3	Cloon	Main Channel: South East of	116773	157703	9	Medium	Medium	Medium	Low	Low	Low	Medium	Medium	Medium	Poaching on right bank

		Moy													
3	Cloon	Main Channel: South East of Moy	116773	157703	10	Medium	Medium	Medium	Low	Low	Low	Medium	Medium	Medium	Upstream of bridge
4	Cloon	Main Channel: New Bridge	116281	156147	1	High	Low	Medium	Medium	Medium	Low	High	High	High	Looking downstream from bridge
4	Cloon	Main Channel: New Bridge	116281	156147	2	High	Low	Medium	Medium	Medium	Low	High	High	High	Looking upstream from bridge
4	Cloon	Main Channel: New Bridge	116281	156147	3	High	Low	Medium	Medium	Medium	Low	High	High	High	High flow, round culverts on both sides of bridge
4	Cloon	Main Channel: New Bridge	116281	156147	4	High	Low	Medium	Medium	Medium	Low	High	High	High	Bridge structure
4	Cloon	Main Channel: New Bridge	116281	156147	5	High	Low	Medium	Medium	Medium	Low	High	High	High	Diverted channel on left bank at bridge
4	Cloon	Main Channel: New Bridge	116281	156147	6	High	Low	Medium	Medium	Medium	Low	High	High	High	Ford, with drainage
4	Cloon	Main Channel: New Bridge	116281	156147	7	High	Low	Medium	Medium	Medium	Low	High	High	High	Silty, murky substrate
4	Cloon	Main Channel: New Bridge	116281	156147	8	High	Low	Medium	Medium	Medium	Low	High	High	High	Bridge structure
4	Cloon	Main Channel: New Bridge	116319	156186	9	High	Low	Medium	Medium	Medium	Low	High	High	High	Second ford crossing, very poor condition on right bank
4	Cloon	Main Channel: New Bridge	116319	156186	10	High	Low	Medium	Medium	Medium	Low	High	High	High	Mid-channel where second ford is
4	Cloon	Main Channel: New Bridge	116319	156186	11	High	Low	Medium	Medium	Medium	Low	High	High	High	Other side of ford on left bank
4	Cloon	Main Channel: New Bridge	116272	156138	12	High	Low	Medium	Medium	Medium	Low	High	High	High	Third possible ford on left bank
4	Cloon	Main Channel: New Bridge	116272	156138	13	High	Low	Medium	Medium	Medium	Low	High	High	High	Unmanaged drain entering
4	Cloon	Main Channel: New Bridge	116272	156138	14	High	Low	Medium	Medium	Medium	Low	High	High	High	Poor fencing on right bank
4	Cloon	Main Channel: New Bridge	116272	156138	15	High	Low	Medium	Medium	Medium	Low	High	High	High	Poor fencing & lack of buffer on left bank
4	Cloon	Main Channel: New Bridge	116244	156105	16	High	Low	Medium	Medium	Medium	Low	High	High	High	End point

4	Cloon	Main Channel: New Bridge	116244	156105	17	High	Low	Medium	Medium	Medium	Low	High	High	High	Land drain unmanaged
5	Cloon	Inflowing Tributary West of Lissyvurriheen	117474	157608	1	Medium	Medium	Medium	Medium	Low	Low	Low	Medium	Medium	Inflowing trib/ unmanaged land drain on right bank
5	Cloon	Inflowing Tributary West of Lissyvurriheen	117474	157608	2	Medium	Medium	Medium	Medium	Low	Low	Low	Medium	Medium	Heavy poaching
5	Cloon	Inflowing Tributary West of Lissyvurriheen	117474	157608	3	Medium	Medium	Medium	Medium	Low	Low	Low	Medium	Medium	Photo from bridge
5	Cloon	Inflowing Tributary West of Lissyvurriheen	117474	157608	4	Medium	Medium	Medium	Medium	Low	Low	Low	Medium	Medium	Tree line
6	Cloon	Inflowing Tributary at Cloonsnaghta	119826	159633	1	Medium	Low	Low	Low	Low	Low	Low	Low	Medium	Looking downstream from bridge
6	Cloon	Inflowing Tributary at Cloonsnaghta	119826	159633	2	Medium	Low	Low	Low	Low	Low	Low	Low	Medium	Poaching on right bank downstream from bridge
6	Cloon	Inflowing Tributary at Cloonsnaghta	119826	159633	3	Medium	Low	Low	Low	Low	Low	Low	Low	Medium	Looking upstream from road bridge
7	Cloon	Breaghva River South East of Bolooghra	119802	162973	1	High	Medium	Medium	Medium	Low	Low	Medium	Medium	Medium	Looking downstream from bridge - prevent cattle access
7	Cloon	Breaghva River South East of Bolooghra	119802	162973	2	High	Medium	Medium	Medium	Low	Low	Medium	Medium	Medium	Heavy poaching on left bank at bridge just upstream
7	Cloon	Breaghva River South East of Bolooghra	119802	162973	3	High	Medium	Medium	Medium	Low	Low	Medium	Medium	Medium	Looking upstream from bridge
7	Cloon	Breaghva River South East of Bolooghra	119802	162973	4	High	Medium	Medium	Medium	Low	Low	Medium	Medium	Medium	Poaching / Trampling on left bank upstream of bridge
7	Cloon	Breaghva River South East of Bolooghra	119802	162973	5	High	Medium	Medium	Medium	Low	Low	Medium	Medium	Medium	Broken pipe at bridge upstream (Black perforated)

7	Cloon	Breaghva River South East of Bolooghra	119802	162973	6	High	Medium	Medium	Medium	Low	Low	Medium	Medium	Medium	Forestry downstream on left bank
7	Cloon	Breaghva River South East of Bolooghra	119802	162973	7	High	Medium	Medium	Medium	Low	Low	Medium	Medium	Medium	Possible small abstraction from right bank downstream just at bridge
8	Cloon	Main Channel: North of Burrenfadda	118019	162337	1	Medium	Medium	Medium	Low	Low	Low	Low	Medium	Medium	Land clearance excavation upstream
8	Cloon	Main Channel: North of Burrenfadda	118019	162337	2	Medium	Medium	Medium	Low	Low	Low	Low	Medium	Medium	Looking upstream from road bridge
8	Cloon	Main Channel: North of Burrenfadda	118019	162337	3	Medium	Medium	Medium	Low	Low	Low	Low	Medium	Medium	Good fencing, grazing on left bank
8	Cloon	Main Channel: North of Burrenfadda	118019	162337	4	Medium	Medium	Medium	Low	Low	Low	Low	Medium	Medium	Looking downstream from road bridge
8	Cloon	Main Channel: North of Burrenfadda	118019	162337	5	Medium	Medium	Medium	Low	Low	Low	Low	Medium	Medium	Forestry on left bank downstream
9	Cloon	Breaghva River at Breaghva Bridge	121774	163927	1	High	High	High	Medium	Low	Low	Low	High	High	Bridge structure with river bed containing muddy substrate
9	Cloon	Breaghva River at Breaghva Bridge	121774	163927	2	High	High	High	Medium	Low	Low	Low	High	High	Very poor substrate
9	Cloon	Breaghva River at Breaghva Bridge	121774	163927	3	High	High	High	Medium	Low	Low	Low	High	High	Brown stained water possibly from iron pan or peat
9	Cloon	Breaghva River at Breaghva Bridge	121766	163929	4	High	High	High	Medium	Low	Low	Low	High	High	Banks full of rocky material falling into river
9	Cloon	Breaghva River at Breaghva Bridge	121766	163929	5	High	High	High	Medium	Low	Low	Low	High	High	Boulders and chippings placed at side of road beside river
9	Cloon	Breaghva River at Breaghva Bridge	121766	163929	6	High	High	High	Medium	Low	Low	Low	High	High	Mounds of quarry chippings on bank

9	Cloon	Breaghva River at Breaghva Bridge	121735	163934	7	High	High	High	Medium	Low	Low	Low	High	High	Material obstructing flow
9	Cloon	Breaghva River at Breaghva Bridge	121735	163934	8	High	High	High	Medium	Low	Low	Low	High	High	Rock material and trees fallen into river impeding flow
9	Cloon	Breaghva River at Breaghva Bridge	121735	163934	9	High	High	High	Medium	Low	Low	Low	High	High	Large rock boulder near riverside
9	Cloon	Breaghva River at Breaghva Bridge	121735	163934	10	High	High	High	Medium	Low	Low	Low	High	High	Large rock boulder near riverside
9	Cloon	Breaghva River at Breaghva Bridge	121735	163934	11	High	High	High	Medium	Low	Low	Low	High	High	Large rock boulder near riverside
9	Cloon	Breaghva River at Breaghva Bridge	121764	163891	12	High	High	High	Medium	Low	Low	Low	High	High	Construction of a house nearby
9	Cloon	Breaghva River at Breaghva Bridge	121791	163911	13	High	High	High	Medium	Low	Low	Low	High	High	Flow from bridge
10	Cloon	Inflowing Tributary South East of Lisnafaha	118621	164286	1	Medium	Low	High	Medium	Low	Low	Low	High	High	Peat cutting on ripian zone
10	Cloon	Inflowing Tributary South East of Lisnafaha	118621	164286	2	Medium	Low	High	Medium	Low	Low	Low	High	High	Peat cutting on ripian zone
10	Cloon	Inflowing Tributary South East of Lisnafaha	118621	164286	3	Medium	Low	High	Medium	Low	Low	Low	High	High	Peat cutting on bank side
10	Cloon	Inflowing Tributary South East of Lisnafaha	118621	164286	4	Medium	Low	High	Medium	Low	Low	Low	High	High	Peat cutting on bank side
10	Cloon	Inflowing Tributary South East of Lisnafaha	118621	164286	5	Medium	Low	High	Medium	Low	Low	Low	High	High	Peat cutting on bank side plus forestry landcover
10	Cloon	Inflowing Tributary	118587	164336	6	Medium	Low	High	Medium	Low	Low	Low	High	High	Peat spreading on bank at trib

		South East of Lisnafaha													
10	Cloon	Inflowing Tributary South East of Lisnafaha	118587	164336	7	Medium	Low	High	Medium	Low	Low	Low	High	High	Peat spreading on bank at trib
10	Cloon	Inflowing Tributary South East of Lisnafaha	118587	164336	8	Medium	Low	High	Medium	Low	Low	Low	High	High	Looking upstream from road bridge
10	Cloon	Inflowing Tributary South East of Lisnafaha	118587	164336	9	Medium	Low	High	Medium	Low	Low	Low	High	High	Looking downstream from road bridge
10	Cloon	Inflowing Tributary South East of Lisnafaha	118587	164336	10	Medium	Low	High	Medium	Low	Low	Low	High	High	Looking downstream from road bridge peat spread up to bank
10	Cloon	Inflowing Tributary South East of Lisnafaha	118587	164336	11	Medium	Low	High	Medium	Low	Low	Low	High	High	Looking downstream from road bridge
10	Cloon	Inflowing Tributary South East of Lisnafaha	118533	164416	12	Medium	Low	High	Medium	Low	Low	Low	High	High	Peat spreading
10	Cloon	Inflowing Tributary South East of Lisnafaha	118533	164416	13	Medium	Low	High	Medium	Low	Low	Low	High	High	Peat spreading
Stopping point 1	Cloon	Main Channel: Croany Bridge	116753	160410	1										River flowing downstream, Ford at this point
Stopping point 1	Cloon	Main Channel: Croany Bridge	116753	160410	2										Rocks placed across channel after ford point
Stopping point 1	Cloon	Main Channel: Croany Bridge	116753	160410	3										Substrate is poor here and water is peat stained
Stopping point 2	Cloon	Inflowing Tributary: at Cloondrinagh	117586	159408	1										New decideous forest left of road
Stopping point 3	Cloon	Near Inflowing Tributary: West of Cloonkett	118730	159480	1										Quarry approx 80m from road

Stopping point 4	Cloon	Near Inflowing Tributary: West of Cloonkett	119220	159604	1										Small quarries the whole way along
Stopping point 4	Cloon	Near Inflowing Tributary: West of Cloonkett	119220	159604	2										Small quarries the whole way along
Stopping point 5	Cloon	Near Inflowing Tributary: South of Cloonkett	119503	159649	1										Start of peat cutting
Stopping point 5	Cloon	Near Inflowing Tributary: South of Cloonkett	119503	159649	2										Start of peat cutting

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			