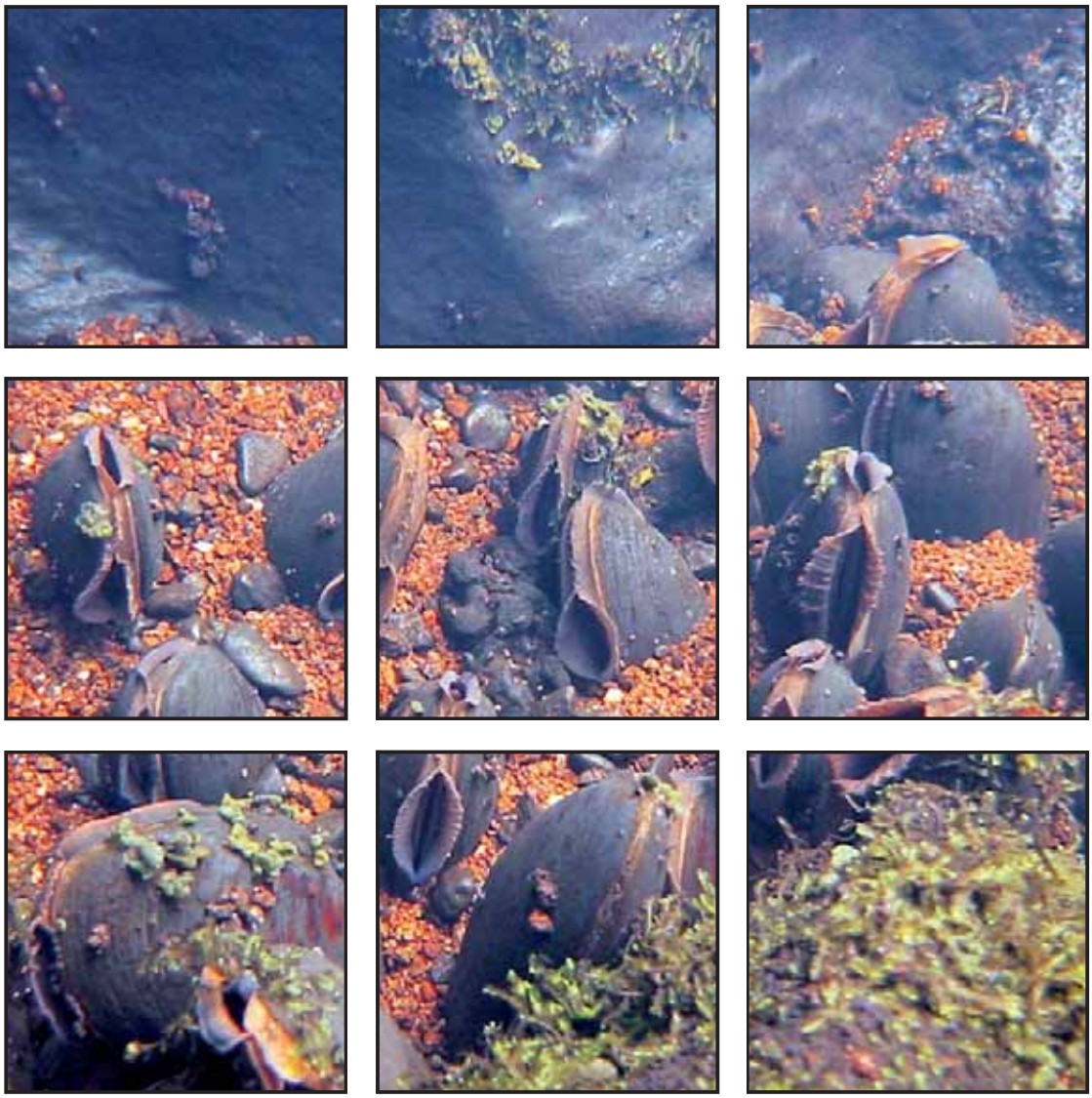
Comhshaol, Oidhreacht agus Rialtas Áitiúil
**Environment, Heritage and Local Government**

# Freshwater Pearl Mussel

## Strategic Environmental Assessment

## Environmental Report



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# TABLE OF CONTENTS

# LIST OF FIGURES



# LIST OF TABLES

# APPENDICES

# 1 NON-TECHNICAL SUMMARY

## INTRODUCTION (CHAPTER 2)

This Environmental Report has been prepared in accordance with national and EU legislation as part of the Strategic Environmental Assessment (SEA) of the proposed Freshwater Pearl Mussel (FPM) Sub-Basin Management Plans for waters designated for protection under the European Communities (Freshwater Pearl Mussel) Regulations 2009 S.I. 296 of 2009, which include:

| | | | |
|---|---|---|---|
| Bandon | Owenriff (Corrib) | Leannan | Owenea |
| Aughavaud (Barrow) | Currane | Allow (Munster Blackwater) | Owenmore |
| Ballymurphy (Barrow) | Dawros | Licky | Ownagappul |
| Mountain (Barrow) | Eske | Munster Blackwater | Cloon (Shannon Estuary) |
| Bundorragha | Kerry Blackwater | Newport) | Derreen (Slaney |
| Caragh | Gearhameen (Laune) | Nore | Clodiagh (Suir) |
| Clady | Glaskeelan (Leannan) | Owencarrow | |

SEA is a systematic method of considering the likely significant environmental effects of a Plan or Programme by integrating environmental factors into the development of the Plan and related decision-making. The purpose of this Environmental Report is to: a) inform the development of the Freshwater Pearl Mussel Sub-Basin Plans; b) identify describe and evaluate the likely significant environmental effects of the Freshwater Pearl Mussel Sub-Basin Plans and their reasonable alternatives; and c) provide an early opportunity for the statutory authorities and the public to offer views on this Environmental Report and draft Freshwater Pearl Mussel Sub-Basin Management Plans, through consultation.

## METHODOLOGY (CHAPTER 3)

The Environmental Report contains the findings of the assessment of the likely significant effects on the environment resulting from implementation of the Freshwater Pearl Mussel Sub-Basin Plans. It reflects the requirements of the SEA Directive (2001/42/EC) on the assessment of the effects of certain plans and programmes on the environment and also the transposed regulations in Ireland (S.I. 435/2004).

Integration of the SEA and draft Freshwater Pearl Mussel Sub-Basin Plans was achieved through close involvement of relevant team members in all stages of the project, including SEA scoping, review of the existing environment and public consultation. The development of the draft Freshwater Pearl Mussel Sub-Basin Plans and the SEA were progressed in consultation with the National Conservation Working Group (NCWG).

**Scoping the Relevant Environmental Aspects**

The objective of scoping is to identify key issues of concern that should be addressed in the environmental assessment of the Freshwater Pearl Mussel Sub-Basin Plans so that they can be considered in appropriate detail. Scoping also helps determine the boundaries of the assessment in terms of geographical extent and the time horizon for the assessment.

Consultation was carried out with the statutory consultees (Department of Communications, Energy and Natural Resources, Department of Environment, Heritage and Local Government and Environmental Protection Agency) and with the public and other stakeholders. Taking into consideration feedback from consultees, a broad assessment of the potential for the Freshwater Pearl Mussel Sub-Basin Plans to influence the environment was carried out. All of the environmental topics listed in the SEA Directive have been scoped in for the assessment of the draft Freshwater Pearl Mussel Sub-Basin Plans. These are: Biodiversity, Flora and Fauna; Population; Human Health; Climatic Factors; Air Quality, Soils; Material Assets; Water; Cultural, Architectural and Archaeological Heritage; and Landscape. Air Quality was scoped out as no discernable impact was identified.

The Freshwater Pearl Mussel Sub-Basin Plans considered in this SEA address pollution impacts in each of the designated FPM catchments listed above; therefore, the baseline data and assessment is focused at the catchment level for each designated FPM areas. The Freshwater Pearl Mussel Sub-Basin Plans will cover the period from 2010 up to 2015. In line with the SEA Directive, medium and long-term impacts have been considered during the assessment. However, it was considered that short-term assessment would not be very constructive as implementation of the Freshwater Pearl Mussel Sub-Basin Plans will take time to show effect; therefore, the results of such an assessment would be similar to a ‘business as usual’ scenario for the short-term.

Based on the requirements of the legislation and guidance, the following information is provided in the Environmental Report.

| Requirement of SEA Directive (Article 5(1), Annex 1) | Section of Environmental Report |
|---|---|
| An outline of the contents and main objectives of the plan or programme, or modification to a plan or programme, and relationship with other relevant plans or programmes; | Chapter 5: Description of the Plan |
| The relevant aspects of the current state of the environment and the likely evolution thereof without implementation of the plan or programme, or modification to a plan | Chapter 6: Baseline Environment and Appendix B |

| Requirement of SEA Directive (Article 5(1), Annex 1) | Section of Environmental Report |
|---|---|
| or programme, | |
| The environmental characteristics of areas likely to be significantly affected | Chapter 6: Baseline Environment and Appendix A |
| Any existing environmental problems which are relevant to the plan or programme, or modification to a plan or programme, including, in particular, those relating to any areas of a particular environmental importance, such as areas designated pursuant to the Birds Directive or the Habitats Directive | Chapter 6: Baseline Environment and Appendix B |
| The environmental protection objectives, established at international, European Union or national level, which are relevant to the plan or programme, or modification to a plan or programme, and the way those objectives and any environmental considerations have been taken into account during its preparation | Chapter 4: Review of Relevant Plans, Programmes and Policies |
| The likely significant effects on the environment, including on issues such as biodiversity, population, human health, fauna, flora, soil, water, air, climatic factors, material assets, cultural heritage including architectural and archaeological heritage, landscape and the interrelationship between the above factors | Chapter 9: Assessment |
| The measures envisaged to prevent, reduce and as fully as possible offset any significant adverse effects on the environment of implementing the plan or programme, or modification to a plan or programme | Chapter 10: Mitigation and Monitoring |
| An outline of the reasons for selecting the alternatives dealt with, and a description of how the assessment was undertaken including any difficulties (such as technical deficiencies or lack of know-how) encountered in compiling the required information | Chapter 3: Methodology<br>Chapter 7: Strategic Environmental Objectives, Targets and Indicators<br>Chapter 8: Alternatives |
| A description of the measures envisaged concerning monitoring of the significant environmental effects of implementation of the plan or programme, or modification to a plan or programme | Chapter 10: Mitigation and Monitoring |
| A non-technical summary of the information provided under the above headings | Non-Technical Summary |

## REVIEW OF RELEVANT PLANS, POLICIES AND PROGRAMMES (CHAPTER 4)

A review of plans, policies and programmes relevant to the Freshwater Pearl Mussel Sub-Basin Plans was carried out. The review focussed primarily on National, European and International plans and programmes. In reviewing other plans, the following questions were asked:

- Do the Freshwater Pearl Mussel Sub-Basin Plans contribute to the fulfilment of objectives and goals set out in other plans, policies and programmes?
- To what degree are the goals and objectives set in other plans, policies and programmes impacted by the Freshwater Pearl Mussel Sub-Basin Plans?

The findings of the review helped define the objectives for the SEA and informed the assessment of alternatives options. Some of the key plans, programmes and policies include:

- The Water Framework Directive (WFD);

- The EU Habitats and Birds Directives;
- The Nitrates Directive;
- The Urban Wastewater Treatment Directive;
- The River Basin Management Plans.

## DESCRIPTION OF THE PLANS (CHAPTER 5)

The European Communities (Freshwater Pearl Mussel) Regulations 2009 requires Sub-Basin Management Plans be established in order to reduce pollution / pressure and ensure that each of the 27 designated FPM catchments in meet the standards set out in the third and fourth schedule of the regulations. The individual Sub-Basin Plans address the key pressures identified for each designated pearl mussel catchment through the application of selected measures from a national measures toolkit, which was developed during the implementation of the Water Framework Directive (2006/60/EC). The key pressures on Freshwater Pearl Mussel which the draft Sub-Basin Management Plans have been designed to address, include pressures, such as:

- On-site wastewater treatment systems
- Agriculture
- Forestry
- Leisure Management
- Municipal and industrial discharges
- Quarries
- Abstractions
- Morphological alterations

## THE BASELINE ENVIRONMENT (CHAPTER 6)

As this SEA deals with the Freshwater Pearl Mussel Sub-Basin Plans for designated FPM catchments, the baseline data is focussed at the level of the contributing catchment for each designated area.

According to recent EPA publications (EPA, 2008), Ireland's natural environment, although under increasing pressure, generally remains of good quality and represents one of the country's most essential national assets. The fourth EPA *State of the Environment Report* (2008) identified four priority challenges for the environment, which comprise: limiting and adapting to climate change; reversing environmental degradation; mainstreaming environmental considerations; and complying with environmental legislation and agreements. All of these are relevant to the Freshwater Pearl Mussel Sub-Basin Plan development process. The existing environmental pressures are set out below.

| Issue Area | Existing Environmental Pressures |
|---|---|
| Flora, Fauna and Biodiversity | *Artificial land cover throughout Ireland remains relatively low, including in many of the catchments designated for FPM; however, the constant encroachment on natural habitats will undoubtedly have an impact on natural flora, fauna and biodiversity. Higher intensity landuses also have implications especially for such sensitive species as the FPM where intensive landuses such as agriculture and forestry are having detrimental impacts on the conservation status of this species* |
| *Population and Human Health* | *Agriculture is an important activity in all regions containing FPM. It contributes to increases in nutrient or silt to the rivers which can be damaging to pearl mussels. Pearl mussels continued to thrive until recent years in catchments with very extensive agricultural practices. The intensification of agriculture, particularly with slurry and artificial fertilisers has led to cumulative effects that have had very severe consequences for pearl mussel reproductive success. Also, new individual houses and housing clusters, reliant on septic tanks, directly threaten water quality in designated FPM waters. Activities such as quarry, peat cutting, fording and landfills are also causing issues for FPM catchments. Quarry dust and effluent can cause problems with silt pollution and, in some cases, lime pollution. The crossing of fords by vehicular or animal traffic has contributed to significant sediment and nutrient loads to rivers, and directly crushed freshwater pearl mussels.* |
| Water | *Poorly treated effluent, spills or leakage from municipal facilities and inappropriately placed / maintained on-site systems pose a risk to FPM. In addition, discharges from agriculture give rise to enrichment of waters by nutrients such as P and N and organics pollution from animal sources which is also a risk to these designated waters.* |
| Air Quality / Climate | *Currently there are no significant concerns with regard to air quality within any of the River Basin Districts containing FPM. Inputs of greenhouse gases from water management activities within the designated FPM water catchments, which require the use of fossil fuels, add to the carbon dioxide emissions produced on the island as a whole.* |
| Cultural Heritage | *Development of water-related infrastructure, in addition to development resulting from economic growth and increasing population, is placing pressure on sites or features of archaeological, architectural or cultural heritage interest.* |
| Landscape | *Existing pressures on landscape and visual resources as a result of water management activities are limited and are primarily related to impacts to sensitive views and landscapes resulting from the siting of development, including water related infrastructure, without sensitivity to these resources.* |
| Material Assets | *Increased development including residential and industrial expansion continues to put pressure on existing water sources with regards to quantity as well as on the facilities used to treat both drinking and wastewater.* |
| Soils and Geology | *Eroded soil washed into rivers during heavy rainfall contains and increased nutrient content, which can damage the balance of nutrient poor, aquatic ecosystems by shifting their species composition, supporting more nutrient-loving species. This can lead to eutrophication of rivers and lakes. If contaminated soils are eroded and transported to sea, aquatic plants and animals can be severely damaged.* |

In accordance with the SEA Directive, the interrelationship between the SEA environmental topics must be taken into account. The key interrelationships identified in this SEA are set out below. Of particular note is the primary relationship between water quality and biodiversity, flora and fauna and human health. Flora and fauna, rely directly on the aquatic environment as a habitat. The quality of this habitat has a direct relationship to the quality of foodstuffs (e.g. fish and shellfish) and its impact on human health. Water is also used for leisure and recreational purposes, providing a material asset both for local populations and as a part of the tourism economy.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Population / Human Health** | √ | | | | | | |
| **Soil** | √ | √ | | | | | |
| **Water** | √ | √ | √ | | | | |
| **Climatic Factors** | √ | √ | √ | √ | | | |
| **Material Assets** | √ | √ | √ | √ | √ | | |
| **Cultural Heritage** | X | √ | X | √ | √ | √ | |
| **Landscape** | X | √ | X | √ | X | √ | X |
| | **Biodiversity Flora, Fauna** | **Population / Human Health** | **Soil** | **Water** | **Climatic Factors** | **Material Assets** | **Cultural Heritage** |

The Freshwater Pearl Mussel Sub-Basin Plans are aimed at improving water quality in designated FPM waters in order to meet the water quality requirements contained in Schedule 2 of the EU (Freshwater Pearl Mussel) Regulations 2009. In the absence of the Freshwater Pearl Mussel Sub-Basin Plans the pressures identified in the Sub-Basin Plans, e.g. on-site wastewater treatment systems, leisure management, would continue to impact on water quality and Freshwater Pearl Mussel habitat, perpetuating the direct and indirect impacts associated with these on FPM in these areas. It should be noted however that the River Basin Management Plans, which are to be implemented in 2010, are aimed at addressing many of the same issues and in the absence of the Freshwater Pearl Mussel Sub-Basin Plans would be expected to improve water quality in the designated FPM areas.

## STRATEGIC ENVIRONMENTAL OBJECTIVES, TARGETS AND INDICATORS (CHAPTER 7)

There are essentially three types of Objectives considered as part of this SEA. The first relates to the *Objectives of the European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations and the Sub-basin Management Plans* (see **Chapter 5**). The second relates to wider Environmental Objectives, i.e. environmental protection objectives at a national, European and international level (see **Chapter 4**), and finally there are the Strategic Environmental Objectives, which were devised to test the effects of the Freshwater Pearl Mussel Sub-Basin Plans on the wider environment

The **Strategic Environmental Objectives** reflect the existing environmental issues relevant to implementation of the Sub-Basin Management Plans. They are focussed on protecting and enhancing

the natural and human environment and on minimising negative effects. The objectives were developed to be consistent with the environmental protection objectives established by international, European and national environmental policies, objectives and standards. The selected objectives for this SEA are listed below:

**Objective 1:** Prevent damage to terrestrial, aquatic and soil biodiversity, particularly EU designated sites and protected species (Biodiversity, Flora and Fauna).

**Objective 2:** Contribute to sustainable development in the contributing catchments (Population).

**Objective 3:** Protect and reduce risk to human health in undertaking water management activities (Human Health).

**Objective 4:** Avoid damage to the function and quality of the soil resource in the contributing catchments (Soils).

**Objective 5:** Achieve or maintain the water quality parameters in accordance with Regulation 2 and the Third and Fourth Schedules of the FPM Regulations (Water).

**Objective 6:** Minimise contribution to climate change by emission of greenhouse gasses associated with FPM Sub-basin Management Plan implementation (Air Quality and Climate).

**Objective 7:** Maintain level of protection provided by existing morphological infrastructure, e.g. flood defences, coastal barriers, groynes, etc. in the contributing catchments (Material Assets 1).

**Objective 8:** Support economic activities within the District without conflicting with the objectives of the WFD or the FPM Regulations (Material Assets 2).

**Objective 9:** Protect water as an economic resource in the contributing catchments (Material Assets 3).

**Objective 10:** Avoid damage to cultural heritage resources in the contributing catchments (Cultural Heritage).

**Objective 11:** Avoid damage to designated landscapes in the in the contributing catchments (Landscape).

The overall purpose of environmental indicators in the SEA is to provide a way of measuring the environmental effect of implementing the Sub-Basin Management Plans. Environmental indicators are also used to track the progress in achieving the targets set in the SEA as well as the Sub-Basin Management Plans themselves. The proposed indicators have been selected bearing in mind the availability of data and the feasibility of making direct links between any changes in the environment and the implementation of the Sub-Basin Management Plans.

Targets were considered over the duration of the baseline data collection and assessment, and throughout the consultation process, in order to ensure relevance to the strategic environmental objectives as well as the objectives of the Sub-Basin Management Plans. In each case, any target that is set must be attributable to the implementation of the Sub-Basin Management Plans. The targets and indicators associated with each SEA Objective are presented in **Chapter 7** of this report.

## ALTERNATIVES (CHAPTER 8)

The Sub-Basin Management Plans include management measures aimed at achieving the parameters laid out in the third and fourth schedules of the. European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations 2009. The measures currently under consideration represent a range of options to address the identified pressures. The proposed measures are sourced both from requirements under existing legislation (Basic Measures) as well as technical studies carried out during the early stages of implementation of the WFD and further work (including field assessment) carried out during development of the sub-basin plans (Freshwater Pearl Mussel Measures). The Basic Measures represent the Business as Usual Scenario, i.e. implementation of these measures is required regardless of the Sub-Basin Management Plans, with the Sub-Basin Management Plans simply reinforcing the need to implement and enforce these requirements. The individual Freshwater Pearl Mussel Measures will be used where the Basic Measures are not adequate to address identified pressures in particular waters. Freshwater Pearl Mussel are pressure specific and range from reducing the pressure at source, through codes of practice and voluntary agreements, or through remediation, by technical or engineering solutions, or by relocation of the pressure to a less sensitive area.

## ASSESSMENT (CHAPTER 8)

The following scenarios have been assessed in this SEA:

- Business as Usual;
- Individual Freshwater Pearl Mussel Measures; and
- Combination of Freshwater Pearl Mussel selected for each sub-basin.

This approach to the assessment of alternatives is similar to that carried out in the SEA for the River Basin Management Plans (RBMPs). It was considered important that the assessment methodologies for the RBMPs and Sub-Basin Management Plans remain consistent with each other, where possible, in recognition of the fact that the sub-basin plans and environmental objectives established for those pearl mussel populations designated under the Habitats Directive are also afforded protection under the Water Framework Directive's river basin programme of measures.

The approach used for assessing the alternatives under consideration for the draft sub-basin plans is a combination of an objectives and baseline led assessment. To assess the national toolbox of measures, which includes the Business as Usual scenario and the individual Freshwater Pearl Mussel Measures, a detailed high-level objectives led assessment was carried out, which was primarily qualitative in nature, with some assessment based on expert judgement. This qualitative assessment compares the likely impacts of each alternative against the strategic environmental objectives to see if the alternative meets the strategic environmental objectives or if it contradicts these. A further, more detailed assessment is then provided for the sub-basin plans for each of the designated FPM catchments. This assessment is focussed on the freshwater Pearl Mussel Measures selected to address the key pressures identified in the individual sub-basin plans for each of the designated FPM catchments. Where possible, the impacts associated with the implementation of the selected freshwater Pearl Mussel Measures have been quantified based on the baseline information compiled for the SEA as well as the information contained in the sub-basin plans.

Summaries of the detailed assessments for the Business as Usual Scenario and the individual Freshwater Pearl Mussel Measures are located in **Tables 8.2 to xx** in **Section 8.15**. Summaries of the detailed assessments of alternatives per designated FPM catchment are presented in **Section 8.6**.

## MITIGATION AND MONITORING (CHAPTER 9)

Article 10 of the SEA Directive requires that monitoring be carried out in order to identify at an early stage any unforeseen adverse effects due to implementation of the Sub-Basin Management Plans, with the view to taking remedial action where adverse effects are identified through monitoring. Monitoring will focus on aspects of the environment that are likely to be significantly impacted by the Sub-Basin Management Plans. Where possible, indicators have been chosen based on the availability of the necessary information and the degree to which the data will allow the target to be linked directly with the implementation of the Sub-Basin Management Plans.

The proposed monitoring programme will be carried out as implementation of the Sub-Basin Management Plans progresses and, depending on monitoring results, adjustments to targets and indicators may be made to ensure the continued effectiveness of the monitoring programme in the interest of optimal environmental protection. Responsibility for gathering and collation of the monitoring data should be assigned as soon as possible after the Sub-Basin Management Plans are adopted to ensure that information is gathered in a timely manner.

A total of 31 mitigation measures are recommended, including a number of measures identified during the Habitats Directive Assessment, all of which are required.

## NEXT STEPS (CHAPTER 10)

There is still some important work to complete before the Sub-Basin Management Plans can be adopted. This will include recording, assessing and, where appropriate, taking on board comments received during consultations on the draft Sub-Basin Management Plans and SEA Environmental Report. The next step in the SEA and Sub-Basin Management Plans process will be a 4-week consultation period. During this time comment on the findings of the Environmental Report, the Habitats Directive Assessment and the content of the draft Sub-Basin Management Plans may be submitted for consideration. See **Section 10** of the main report for information on when the consultation period closes and contact details where written submissions can be sent.

## KEY FINDINGS AND RECOMMENDATIONS

The measures assessed from the FPM Sub-Basin Management Plans are primarily directed at (1) to reducing pressures at source, to ensure discharges meet the relevant water quality and FPM regulation standards required and (2) investigation and assessment of the extent of pressures to determine risk. These measures will be used to confirm the effectiveness of these programmes and to refine the programmes where necessary.

It is anticipated that the implementation of the Sub-Basin Management Plans will give rise to improvements in water quality leading to positive impacts to aquatic biodiversity, flora and fauna as well as human health. The requirement for education and awareness among all stakeholders using our rivers will result in overall positive impacts for water quality, however in the short-term, as new management and mitigation is implemented it is anticipated that there will be negative impacts on commercial operations which rely on access to those waters containing FPM. Where feasible, mitigation measures have been proposed in Chapter 9 of the main report.

# 2 INTRODUCTION

This Environmental Report has been prepared as part of the Strategic Environmental Assessment of the Freshwater Pearl Mussel Sub-Basin Management Plans in accordance with national and EU legislation. The purpose of this Environmental Report is to: a) inform the development of the Plans; b) identify describe and evaluate the likely significant effects of the Plan and its reasonable alternatives; and c) provide an early opportunity for the statutory authorities and the public to offer views on any aspect of this Environmental Report, through consultation.

## 2.1 BACKGROUND

### 2.1.1 Status of Freshwater Pearl Mussel in Ireland

Freshwater Pearl Mussels (FPM) (*Margaritifera margaritifera* and *Margaritifera durrovensis*) are widespread in Ireland, particularly in the South West, South East, West and North West of the country. Populations range from very small relict examples with a few remaining elderly mussels that have not successfully recruited for 50 years, to some of the largest populations of pearl mussels in the world. There are 96 populations of pearl mussels in the Republic of Ireland, some of which include two or more rivers in close enough proximity to make them one single population (Moorkens et al. 2007). A total of 27 populations (26 of *M. margaritifera* and 1 for *M. durrovensis)* have been designated within 19 SAC areas for *Margaritifera margaritifera* (Figure 2.1, Table 2.1). Of the 96 populations in the country, only those in the Bundorragha catchment are considered to be in favourable conservation status, the remainder are at unfavourable status as reproduction and juvenile survival is not matching adult mortality rates and numbers are declining annually.

Many of the non-designated rivers contain very small populations of 5,000 or less, and although some of these are still internationally important compared with the remaining populations of other countries, the most important Irish populations, and the ones of most international concern are those with populations between 500,000 and 3,000,000. These are populations within catchments that were near pristine up until very recent times, but have declined within the lifetime of their designation as SACs, although much of the decline may have been the result of activities occurring before designation.

Recent declines have been due to a number of issues, which have combined to lower the quality of the river water and river bed habitat. The purpose of these sub-basin management plans is to address the catchment-wide issues that are contributing to this decline and to develop a strategy for implementing measures that will bring the catchments and thus the populations back to favourable condition.

The National Technical Co-ordination Group (NTCG) for the Water Framework Directive established a subcommittee, the National Conservation Working Group (NCWG), to work on the development of nature conservation aspects of the WFD. The NCWG is chaired by the National Parks and Wildlife Service (NPWS) of the Department of Environment, Heritage and Local Government (DEHLG), who have statutory responsibility for nature conservation in Ireland.

The initial task of the NCWG is to refine and further develop a national set ("toolkit") of standard catchment measures for freshwater pearl mussels that are practical, functional and cost effective. The objective is to ensure that the water needs of the two endangered species of freshwater pearl mussel, *Margaritifera margaritifera and Margaritifera durrovensis* can be met while minimising disruption to other land uses in the catchments.

**Table 2.1: List of the 27 Sub-Basin Catchments Designated as SAC for Freshwater Pearl Mussel Populations**

| | Freshwater Pearl Mussel Population[1] | SAC Site Code | SAC Site Name | Rivers and lakes containing *Margaritifera* (list not exhaustive) |
|---|---|---|---|---|
| 1 | Bandon | 002171 | Bandon River cSAC | Bandon & Caha |
| 2 | Aughavaud (Barrow) | 002162 | River Barrow and River Nore cSAC | Aughavaud |
| 3 | Ballymurphy (Barrow) | 002162 | River Barrow and River Nore cSAC | Ballymurphy |
| 4 | Mountain (Barrow) | 002162 | River Barrow and River Nore cSAC | Mountain, Aughnabrisky |
| 5 | Bundorragha | 001932 | Mweelrea/ Shreefry/ Erriff Complex cSAC | Bundorragha |
| 6 | Caragh | 000365 | Killarney National Park, Macgillycuddy's Reeks and Caragh River Catchment cSAC | Caragh, Owenroe, Meelagh, Caraghbeg, Glashawee, Lough Beg Stream, Lough Acoose, Cloon Lough |
| 7 | Clady | 000140 | Fawnboy Bog/ Lough Nacung cSAC | Clady |
| 8 | Owenriff (Corrib) | 000297 | Lough Corrib cSAC | Owenriff, Glengawbeg |
| 9 | Currane | 000365 | Killarney National Park, Macgillycuddy's Reeks and Caragh River Catchment cSAC | Capall, Cummeragh |
| 10 | Dawros | 002031 | The Twelve Bens/ Garraun Complex cSAC | Dawros |

[1] Population named after river of highest stream-order that contains mussels

| | Freshwater Pearl Mussel Population[1] | SAC Site Code | SAC Site Name | Rivers and lakes containing *Margaritifera* (list not exhaustive) |
|---|---|---|---|---|
| 11 | Eske | 000163 | Lough Eske and Ardnamona Wood cSAC | Eske |
| 12 | Kerry Blackwater | 002173<br>000365 | Blackwater River (Kerry) cSAC & Killarney National Park, Macgillycuddy's Reeks and Caragh River Catchment cSAC | Blackwater, Kealduff, Derreendarragh |
| 13 | Gearhameen (Laune) | 000365 | Killarney National Park, Macgillycuddy's Reeks and Caragh River Catchment cSAC | Gearhameen & Owenreagh |
| 14 | Glaskeelan (Leannan) | 002047 | Cloghernagore Bog and Glenveagh National Park cSAC | Glaskeelan |
| 15 | Leannan | 002176 | Leannan River cSAC | Leannan |
| 16 | Allow (Munster Blackwater) | 002170 | Blackwater River (Cork/Waterford) cSAC | Allow |
| 17 | Licky | 002170 | Blackwater River (Cork/Waterford) cSAC | Licky |
| 18 | Munster Blackwater | 002170 | Blackwater River (Cork/Waterford) cSAC | Munster Blackwater (main channel) |
| 19 | Newport | 002144 | Newport River cSAC | Newport |
| 20 | Nore | 002162 | River Barrow and River Nore cSAC | Nore |
| 21 | Owencarrow | 002047 | Cloghernagore Bog and Glenveagh National Park cSAC | Owencarrow |
| 22 | Owenea | 000197 | West of Ardara/Maas Road cSAC | Owenea |
| 23 | Owenmore | 000375 | Mount Brandon cSAC | Owenmore |
| 24 | Ownagappul | 001879 | Glanmore Bog cSAC | Ownagappul & Barrees |
| 25 | Cloon (Shannon Estuary) | 002165 | Lower River Shannon cSAC | Cloon |
| 26 | Derreen (Slaney) | 000781 | Slaney River Valley cSAC | Derreen |
| 27 | Clodiagh (Suir) | 002137 | Lower River Suir cSAC | Clodiagh |

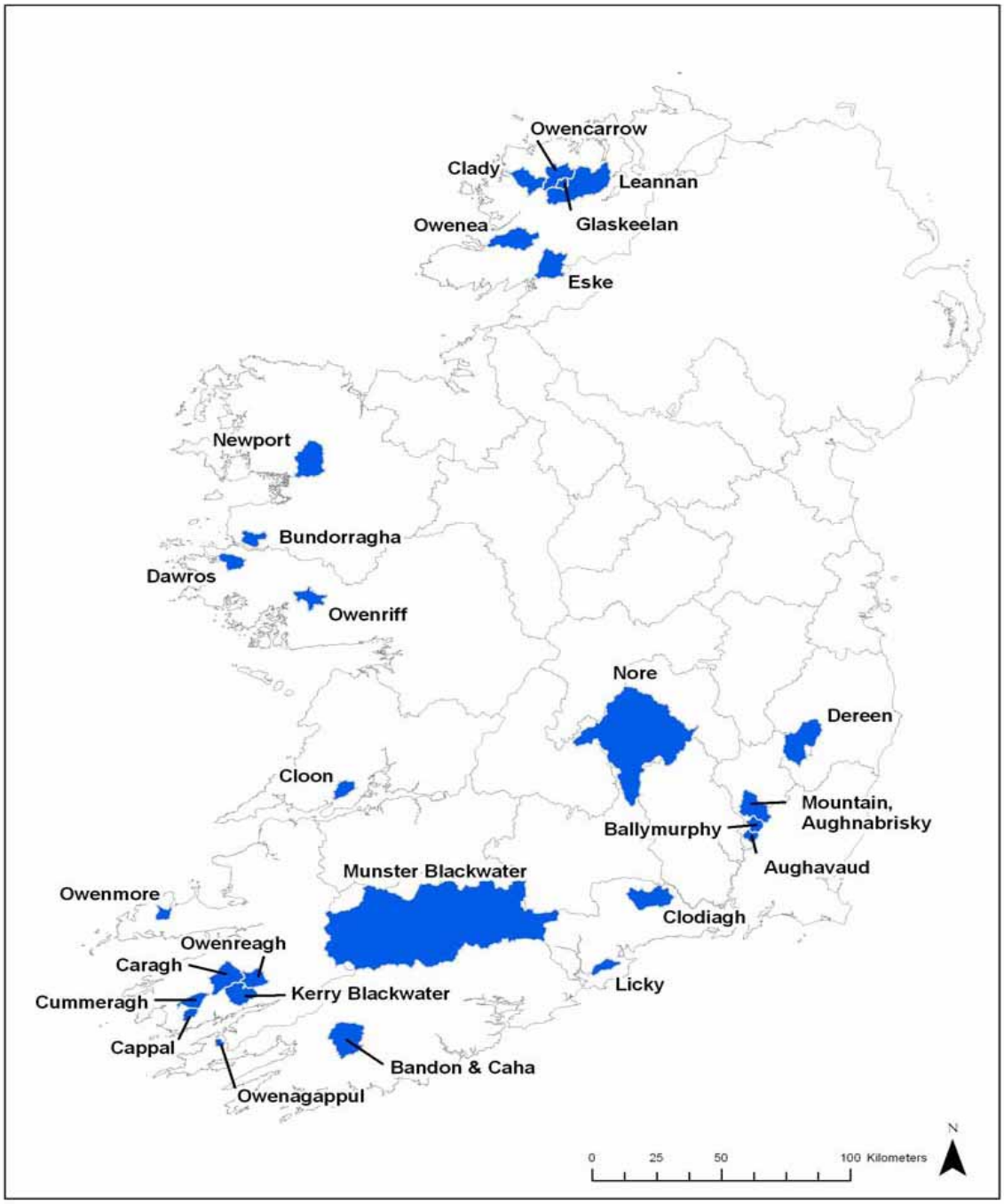


**Figure 2.1 Map of the Catchments of the Specified Pearl Mussel Populations**

## 2.2 LEGISLATIVE CONTEXT OF THE PLAN

### 2.2.1 Water Framework Directive

The EU Water Framework Directive (2000/60/EC), which came into force on 22 December 2000, is the most important piece of European water legislation. It aims to promote common approaches, standards and measures for water management on a systematic and comparable basis throughout the European Union. It establishes a new, integrated approach to the protection, improvement and sustainable use of Europe's rivers, lakes, transitional waters (estuaries), coastal waters and groundwaters. The Water Framework Directive (WFD) was transposed into law in Ireland by the European Communities (Water Policy) Regulations 2003 (S.I. 722 of 2003). The purpose of the WFD is to maintain the "high status" of waters where it exists, prevent deterioration in existing status of waters and to achieve at least *"*good status*"* in relation to all waters by 2015. The mechanism by which this is to be achieved under the WFD is through the adoption and implementation of River Basin Management Plans (RBMPs) and Programmes of Measures (POMs) for each of the identified RBDs (**Figure 2.2**).

One of the Directive's core environmental objectives relates to protected areas, requiring all such areas to achieve compliance with any standards and objectives by 2015 at the latest. Ireland's Special Areas of Conservation (SACs), established under the Habitats Directive, are part of the Water Framework Directive's Register of Protected areas and are therefore directly linked to this objective. The Water Framework Directive requires that a programme of measures is established in order to achieve its environmental objectives. The programme shall include "Basic Measures" which include those measures required to implement Community legislation for the protection of water including measures specified under 11 named Directives, one of which is the Habitats Directive. The programme of measures is to be established by 22 December 2009 and made operational by 22 December 2012 at the latest. Consequently, the sub-basin plans and environmental objectives established for those pearl mussel populations designated under the Habitats Directive are also part of the Water Framework Directive's river basin programme of measures. They form part of the Basic Measures and the objectives for these protected areas must be achieved by 2015.

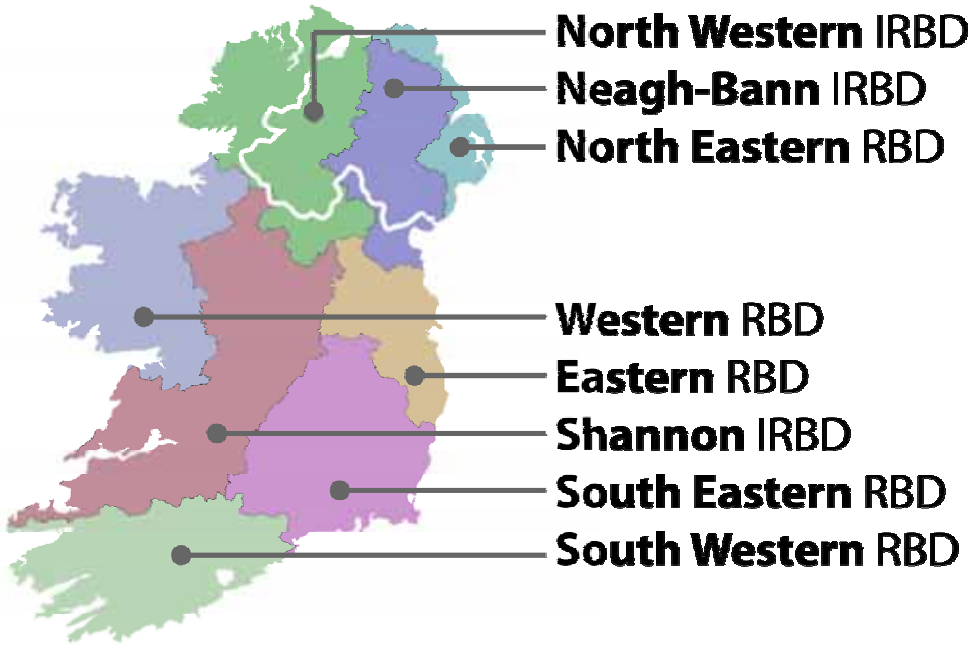


**Figure 2.2 River Basin Management areas of Ireland**

### 2.2.2 EU Habitats Directive and Natura 2000 Network

The Water Framework Directive has obvious synergies and linkages with other EU Directives, most notably the Birds (79/409/EEC) and Habitats (92/43/EC) Directives. The WFD contains both direct and indirect references to these two Directives in particular. The following summarises the main legislative links from the WFD:

| ***Article or Annex Reference in WFD*** | ***Relevance to (79/409/EEC) and Habitats (92/43/EC) Directives*** |
|---|---|
| *Article 4(1) (c)* | Protected Area Objectives<br>Member States shall achieve compliance with any standards and objectives at the latest 15 years after the date of entry into force of this Directive, unless otherwise specified in the Community legislation under which the individual protected areas have been established. |
| *Article 4(2)* | Where more than one of the objectives under paragraph 1 relates to a given body of water, the most stringent shall apply. |
| *Article 4(8)* | When applying paragraphs 3, 4, 5, 6 and 7, a Member State shall ensure that the application does not permanently exclude or compromise the achievement of the objectives of this Directive in other bodies of water within the same river basin district and is consistent with the implementation of other Community environmental legislation. |
| *Article 6* | Register of Protected Areas<br>Member States shall ensure the establishment of a register or registers of all areas lying within each river basin district which have been designated as requiring special |

| ***Article or Annex Reference in WFD*** | ***Relevance to (79/409/EEC) and Habitats (92/43/EC) Directives*** |
|---|---|
| | protection under specific Community legislation for the protection of their surface water and groundwater or for the conservation of habitats and species directly depending on water. They shall ensure that the register is completed at the latest four years after the date of entry into force of this Directive. |
| *Annex IV* | *The register of protected areas required under Article 6 shall include the following types of protected areas:*<br>(v) areas designated for the protection of habitats or species where the maintenance or improvement of the status of water is an important factor in their protection, including relevant Natura 2000 sites designated under Directive 92/43/EEC (1) and Directive 79/409/EEC (2). |
| *Article 8* | *Monitoring of surface water status, groundwater status and protected areas*<br>Member States shall ensure the establishment of programmes for the monitoring of water status in order to establish a coherent and comprehensive overview of water status within each river basin district: |
| *Annex V 1..3.5* | Monitoring of ecological status and chemical status for surface waters<br>*1.3.5 Additional monitoring requirements for protected areas.* |

While it is likely that these links will compliment the Birds and Habitats Directives by improving the status of the designated sites, it is also recognised that there is still a need to consider the various elements and proposals coming from the WFD for Appropriate Assessment on a case by case basis to ensure potential indirect negative impacts are not overlooked (WAPPA, 2007[2]).

### 2.2.3 European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations 2009 (S.I. 296 of 2009)

In 2009, national legislation was developed to support the achievement of favourable conservation status for FPM: The European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations 2009, S.I. 296 of 2009. That legislation sets environmental quality objectives (EQO) for FPM habitat, requires the production of sub-basin plans with programmes of measures to achieve these objectives and sets out the responsibilities of the public authorities in respect of implementing the sub-basin plans and associated measures. The legislation requires that the sub-basin plans include the following;

[2] The Water Framework Directive, Assessment, Participation and Protected Areas: What are the Relationships? (WAPPA) EPA, 2007.

a) Specific objectives and targets, in accordance with Regulation 2 and the Third and Fourth Schedules, and deadlines for their achievement;

b) The investigation of sources of pressures leading to the unfavourable conservation status of the pearl mussel;

c) The establishment of a programme, including a timeframe, for the reduction of pressures giving rise to unfavourable conservation status. The programme shall include pressure reduction targets and deadlines, either in relation to individual pollutants or to particular sectors or activities or both, to be implemented within the sub-basin, or parts of the sub-basin as appropriate;

d) A detailed programme of monitoring to be implemented within the sub-basin, or parts of the sub-basin as appropriate, in order to evaluate the effectiveness of measures and progress made towards restoring favourable conservation status.

### 2.2.4 Strategic Environmental Assessment Directive

Strategic Environmental Assessment (SEA) is a process for evaluating, at the earliest appropriate stage, the environmental effects of plans or programmes before they are adopted. It also gives the public and other interested parties an opportunity to comment and to be kept informed of decisions and how they were made. An early consideration of environmental concerns in the planning process creates an opportunity for environmental factors to be considered explicitly alongside other factors such as social, technical or economic aspects. The SEA process also gives interested parties an opportunity to comment on the environmental impacts of the proposed plan or programme and to be kept informed during the decision making process.

The European Directive (2001/42/EC) on the Assessment of the Effects of Certain Plans and Programmes on the Environment (the SEA Directive), was transposed into national legislation the European Communities (Environmental Assessment of Certain Plans and Programmes) Regulations 2004 (S.I. 435/2004) and the Planning and Development (Strategic Environmental Assessment) Regulations 2004 (S.I. 436/2004). The FPM sub-basin management plans fall under the remit of S.I. No. 435 of 2004. **Figure 2.3** shows an overview of the SEA Process.

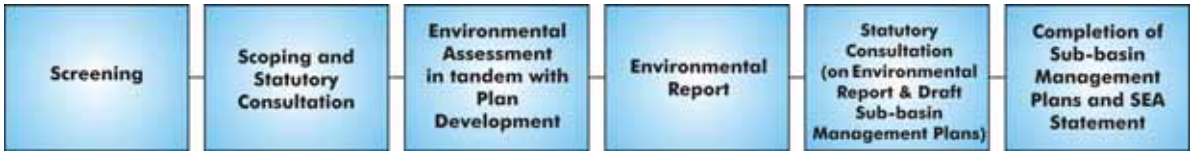


**Figure 2.3 Overview of SEA Process**

#### 2.2.4.1 Requirement for a SEA

Article 3(2) of the SEA Directive requires SEA for plans and programmes:

a) which are prepared for agriculture, forestry, fisheries, energy, industry, transport, waste management, **water management**, telecommunications, tourism, town and county planning or land use and which set the framework for future development consent for projects listed in Annexes I or II of the Environmental Impact Assessment (EIA) Directive (85/337/EEC); or
b) which, in view of the likely effect on protected sites, have been determined to require an assessment pursuant to Article 6 or 7 of the Habitats Directive (92/43/EEC).

## 2.3 RESPONSIBLE AUTHORITIES FOR THE FPM PLANS

This SEA is being carried out on behalf of the National Parks and Wildlife Service (NPWS) of the Department of the Environment, Heritage and Local Government.

## 2.4 STUDY TEAM

The study team for the FPM Sub-Basin Management Plans comprises RPS, an environmental and engineering consultancy, working with the National Conservation Working Group (NCWG) comprised of representatives from the following organisations:

- DoEHLG: NPWS; Water Inspectorate; Planning Section.
- Department of Agriculture, Food and Forestry.
- EA and Associates.
- River Basin District Co-ordinators.
- NSShare.
- EPA.
- Central Fisheries Board.
- OPW.
- ESBI.
- Forest Service.

## 2.5 CONSULTATION

A programme of consultations commenced on the initial *draft freshwater pearl mussel sub-basin management plans* on the 27 March 2009. Members of the NS 2 project team were involved in the combined public consultation process with the River Basin Management Plans where the draft freshwater pearl mussel sub-basin management plans were also presented. A report summarising the submissions made on the initial draft plans and which presents the responses to those submissions is available on the WFD Ireland website.

On- going consultation was undertaken between the NCWG, discussing the key pressures in each of the freshwater pearl mussel catchments and the evolution of the proposed measures to address those pressures.

Scoping for the SEA was carried out in between December 2009 and January 2010. In line with the SEA Directive, specific "environmental authorities" (statutory consultees) were consulted on the scope and level of detail of the information to be included in the Environmental Report. For the Freshwater Pearl Mussel Sub-Basin Management Plans, the relevant statutory consultees are:

- Department of Communications, Energy and Natural Resources (DCENR);
- Department of Environment, Heritage and Local Government (DEHLG); and
- Environmental Protection Agency (EPA).

Comments received on the scoping document are included in **Appendix F** of this Environmental Report.

# 3 METHODOLOGY

## 3.1 INTRODUCTION

The SEA Directive requires that certain Plans and Programmes, which are likely to have a significant impact on the environment, be subject to the SEA process. The SEA process is broadly comprised of the following steps (**Table 3.1**):

**Table 3.1: SEA Process and Status in Relation to FPM Sub-Basin Plans**

| SEA Step / Stage | Purpose | Status |
|---|---|---|
| Screening | Decision on whether or not an SEA of a Plan/Programme is required. | A decision was taken to progress with the SEA process based on the following:<br>SEA would make a positive contribution to the development of Freshwater Pearl Mussel Sub Basin Management Plans.<br>It would help improve the Plans by evaluating, at the earliest appropriate stage, the full range of potential environmental effects of the Plans before they are adopted.<br>A precedent has been set by the development of Shellfish PRPs under the Shellfish Waters Regulations which, like the FPM Sub-basin plans, are linked to the WFD River Basin Management Plans. |
| Scoping | Consultation with the defined statutory bodies on the scope and level of detail to be considered in the assessment. | Carried out from Q4 of 2009 to Q1 of 2010. |
| Environmental Assessment | Assessment of the likely significant impacts on the environment as a result of the Plan or Programme culminating in the production of an Environmental Report. | Completed March 2010. |
| Consultation | Consultation on the draft Plan/Programme and associated Environmental Report. | Ongoing. |
| SEA Statement | Identification of how environmental considerations and consultation have been integrated into the Final Plan/Programme culminating in the production of an SEA Statement. | To be published with the final sub-basin Plans in mid 2010. |

## 3.2 SEA GUIDANCE

The Environmental Report will contain the findings of the assessment of the likely significant effects on the environment resulting from implementation of the proposed Freshwater Pearl Mussel Sub-Basin Management Plans. It will reflect the requirements of the SEA Directive (2001/42/EC) on the assessment of the effects of certain plans and programmes on the environment and also the transposed regulations in Ireland (S.I. 435/2004). The sources of guidance used during the overall SEA process and preparation of the environmental Report are included in **Section 13**, References.

## 3.3 KEY STEPS IN STRATEGIC ENVIRONMENTAL ASSESSMENT

### 3.3.1 SCOPING

The objective of scoping is to identify key issues of concern that should be addressed in the environmental assessment of the Plans so that they can be considered in appropriate detail. Scoping also helps determine the boundaries of the assessment in terms of geographical extent and the time horizon for the assessment. **Figure 3.1** outlines how these elements combine to help shape the SEA.

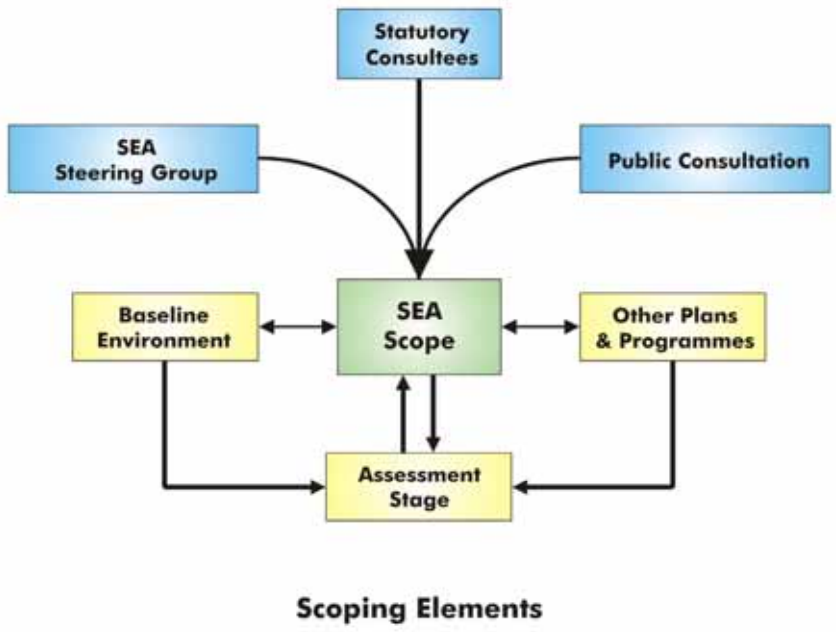


**Figure 3.1 Overview of the Scoping Process.**

Scoping for the SEA was carried out in between December 2009 and January 2010. In line with the SEA Directive, specific “environmental authorities” (statutory consultees) were consulted on the scope

and level of detail of the information to be included in the Environmental Report. For the Freshwater Pearl Mussel Sub-Basin Management Plans, the relevant statutory consultees are:

- Department of Communications, Energy and Natural Resources (DCENR);
- Department of Environment, Heritage and Local Government (DEHLG); and
- Environmental Protection Agency (EPA).

To begin the scoping process, a draft scoping document was prepared and sent to the designated statutory authorities. In addition the document was circulated internally in the DEHLG. Comments received on the scoping document are included in **Appendix F** of this Environmental Report.

#### 3.3.1.1 SCOPE OF THE SEA

**Table 3.2: Scope of the SEA**

| | |
|---|---|
| **Geographic Scope** | The Freshwater Pearl Mussel Sub-Basin Management Plans relate to a total of 19 SAC (designated for the pearl mussel), covering 27 sub-basins. Twenty-six of these sub-basins hold *Margaritifera margaritifera* and one, the River Nore, contains *M. durrovensis*. **Figure 2.1** shows the distribution of the FPM catchments nationally. RBDs which do not contain FPM designated sub-basins (i.e. ERBD) or which are not fully or partially within Ireland (i.e. NERBD) have not been included in this assessment. |
| **Temporal Scope** | These sub-basin plans will cover the period 2010 to 2015. in line with the planning cycles of the WFD and the RBMPs. A report under Article 17 of the Habitat's Directive will be compiled in 2013 (a requirement for each member state) on the status of each habitat and species protected under Annex I and Annex II of the Habitat's Directive including the FPM. At that time it is likely that the action programmes for each sub-basin plan will be reviewed and refined based on additional information obtained from monitoring and based on the effectiveness of measures put in place in the period 2010-2013. The Article 17 report is produced every six years. |
| **Level of Detail of the Plan** | The level of detail of the Environmental report is determined by the content and level of detail of the sub-basin plans. The actions within the Plans have been compiled from the RBD national toolkit of Basic Measures and more specific FPM measures which are then applied as necessary to specified designated waters. |
| **Level of Detail of Assessment** | This exercise is based on a broader judgement as to whether effects would be better assessed under lower level plans, programmes and/or projects. As portions of the sub-basin plans will be implemented within other regional or local plans, or through infrastructure projects, the local environmental concerns related to these may be examined through subsequent lower level SEAs on these plans or Environmental Impact Assessment (EIA) at the project level when greater detail is available. |
| **Assessment Parameters** | In line with the SEA Directive, short, medium and long-term impacts (including reference to secondary, cumulative, synergistic, permanent and temporary, positive and negative effects) will be considered during the assessment. |

| | |
|---|---|
| **Scoping of SEA Environmental Topics** | All of the environmental topics listed in the SEA Directive have been scoped in for the assessment of the Plans. These are: Biodiversity, Flora and Fauna (BFF); Water (W); Soil (S); Air Quality (AQ); Climate Factors (CF); Population (P) Human Health (HH); Material Assets (MA); Cultural, Architectural and Archaeological Heritage (CH); and Landscape(L). |

## 3.3.2 ENVIRONMENTAL ASSESSMENT AND ENVIRONMENTAL REPORT

### 3.3.2.1 Contents of the Environmental Report

Based on the legislation and guidance, the Environmental Report must include the information outlined in **Table 3.3**.

**Table 3.3: Key Elements of the Environmental Report**

| Requirement of SEA Directive (Article 5(1), Annex 1) | Section of Environmental Report |
|---|---|
| An outline of the contents and main objectives of the plan or programme, or modification to a plan or programme, and relationship with other relevant plans or programmes; | Chapter 5: Description of the Plan |
| The relevant aspects of the current state of the environment and the likely evolution thereof without implementation of the plan or programme, or modification to a plan or programme, | Chapter 6: Baseline Environment and Appendix B |
| The environmental characteristics of areas likely to be significantly affected | Chapter 6: Baseline Environment and Appendix A |
| Any existing environmental problems which are relevant to the plan or programme, or modification to a plan or programme, including, in particular, those relating to any areas of a particular environmental importance, such as areas designated pursuant to the Birds Directive or the Habitats Directive | Chapter 6: Baseline Environment and Appendix B |
| The environmental protection objectives, established at international, European Union or national level, which are relevant to the plan or programme, or modification to a plan or programme, and the way those objectives and any environmental considerations have been taken into account during its preparation | Chapter 4: Review of Relevant Plans, Programmes and Policies |
| The likely significant effects on the environment, including on issues such as biodiversity, population, human health, fauna, flora, soil, water, air, climatic factors, material assets, cultural heritage including architectural and archaeological heritage, landscape and the interrelationship between the above factors | Chapter 9: Assessment |
| The measures envisaged to prevent, reduce and as fully as possible offset any significant adverse effects on the environment of implementing the plan or programme, or modification to a plan or programme | Chapter 10: Mitigation and Monitoring |
| An outline of the reasons for selecting the alternatives dealt with, and a description of how the assessment was undertaken including any difficulties (such as technical deficiencies or lack of know-how) encountered in compiling the required information | Chapter 3: Methodology<br>Chapter 7: Strategic Environmental Objectives, Targets and Indicators<br>Chapter 8: Alternatives |
| A description of the measures envisaged concerning monitoring of the significant environmental effects of implementation of the plan or programme, or modification to a plan or programme | Chapter 10: Mitigation and Monitoring |
| A non-technical summary of the information provided under the above headings | Non-Technical Summary |

#### 3.3.2.2 Environmental Assessment

The approach used for assessing the scenarios/alternatives for the draft Plans was an objectives led assessment. Each assessable measure has been assessed against defined SEA environmental objectives in terms of how it contributes to achieving the environmental objective. The measure is then allotted an assessment rating for the purposes of comparison. The environmental assessment includes a combination of qualitative and quantitative assessment and expert judgement.

### 3.3.3 SEA STATEMENT

The main purpose of the SEA Statement is to provide information on the decision-making process and to document how environmental considerations, i.e. the views of consultees and the recommendations of the Environmental Report, have been taken into account in the adopted FPM Sub-Basin Management Plans. The SEA Statement illustrates how decisions were taken, making the process more transparent.

The SEA Statement for the FPM Sub-Basin Management Plans will be compiled after the statutory consultation on the draft Plans and Environmental Report has been completed.

## 3.4 APPROPRIATE ASSESSMENT OF NATURA 2000 SITES

The Habitats Directive (Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora) obliges member states to designate Special Areas of Conservation (SAC) to protect and conserve habitats and species of importance in a European Union context. Article 6 is one of the most important articles of the Habitats Directive in determining the relationship between conservation and site use. Article 6(3) requires that “Any plan or project not directly connected with or necessary to the conservation of a site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subject to appropriate assessment of its implications for the site in view of the site’s conservation objectives.”

The Freshwater Pearl Mussel Sub-Basin Management Plans are directly connected to the conservation and management of the FPM within the 27 catchments designated SAC for FPM. However, it is recognised that there is potential to indirectly impact on other listed species in these SAC as a result of measures to protect and conserve the FPM e.g. otter, birds. It has therefore been determined that the Freshwater Pearl Mussel Sub-Basin Management Plans will undergo appropriate assessment in a parallel process to the SEA.

## 3.5 DIFFICULTIES AND DATA GAPS

The following difficulties and data gaps were encountered:

- Lack of monitoring data to identify pressures.

Further investigations, required by the sub-basin plans will improve the available information going forward. An improved body of monitoring and data will also be available under the WFD and also the Shellfish Directive (where influencing catchments overlap with FPM areas). It will be essential that this information is shared between the relevant agencies.

- Difficulty in attaining existing data sets.

In some cases, data which would be useful in identifying risks and pressures for FPM are being held by government departments and regulatory agencies however, a formal sharing agreement of this information is not in place therefore it cannot be accessed. It is hoped that this can be resolved going forward.

- Requirement for further investigation to refine selection of measures.

These have been addressed by highlighting where additional assessment may be required in future once additional measures are selected to address pressures identified by future monitoring.

- Some information not compiled by the relevant agencies (e.g. biodiversity, cultural heritage).
- Lack of digitised data in some topic areas.

# 4 OTHER RELEVANT PLANS AND POLICIES

The objective of the SEA Directive is “to provide for a high level of protection of the environment and to contribute to the integration of environmental considerations in the preparation and adoption of plans and programmes with a view to promoting sustainable development”.

In order to meet the requirements of the Directive in this respect, the environmental assessment must “identify the environmental protection objectives, established at International, Community or Member State level, which are relevant to the plan or programme and the way those objectives and any environmental considerations have been taken into account during its preparation”.

The purpose of this review is to take into consideration the policy and legislative framework within which the sub-basin plans are being developed. Consideration of the key statutory and non-statutory plans, programmes and policies relevant to the FPM sub-basin plans was undertaken in order to inform the SEA of the environmental objectives and targets of these other plans, policies and programmes. As the scope of the Plans has been set at catchment level the review includes national, European and International plans and programmes. In reviewing other plans, the following questions were asked:

(i) Does the Plan contribute to the fulfilment of objectives and goals set in other Plans?

(ii) To what degree are the goals and objectives set in other plans and programmes impacted by the Plan?

**Tables 4.1 to 4.4** below summarise the key legislation, Plans and Programmes considered most relevant to the RBMP and POM. The full list of legislation, plans and programmes considered is included in the appendix to this chapter (**Appendix A**).

**Table 4.1** outlines the key **international** legislation, plans and programmes of relevance.

**Table 4.2** includes key **European Union** legislation, plans and programmes covering all relevant aspects of environmental protection.

**Table 4.3** presents the key legislation, plans and programmes in **Ireland**; these overlap somewhat with the European level plans and programmes.

I

**Table 4.1: Review of Legislations, Plans, Policies and Programmes - International**

| Topic | Title | Summary of Objectives with Relevance to the FPM Sub-Basin Management Plans |
|---|---|---|
| Biodiversity | UN Convention on Biological Diversity (1992) | Objectives include the maintenance and enhancement of Biodiversity. |
| | The Ramsar Convention: The Convention on Wetlands of International Importance (1971 and amendments) | Objectives include protection and conservation of wetlands, particularly those of importance to waterfowl as Waterfowl Habitat. |
| Climate | UN Kyoto Protocol: The United Nations Framework Convention on Climate Change (UNFCCC) Kyoto Protocol 1997 | Objectives seek to alleviate the impacts of climate change and reduce global emissions of GHGs. |

*Please see **Appendix** A for the full list of legislation, plans and programmes considered.*

**Table 4.2: Review of Legislations, Plans, Policies and Programmes - European Union**

| Topic | Title | Summary of Objectives with Relevance to the FPM Sub-Basin Management Plans |
|---|---|---|
| Biodiversity | The EU Biodiversity Strategy<br>Communication on a European Community Biodiversity Strategy | Objectives seek to prevent and eliminate the causes of biodiversity loss and maintain and enhance current levels of biodiversity. |
| | The EU Habitats Directive (92/43/EEC) | Objectives seek to prevent and eliminate the causes of habitat loss and maintain and enhance current levels of biodiversity. |
| | The EU Birds Directive (as modified) (79/409/EEC) | Objectives seek to prevent and eliminate the causes of bird species loss and maintain and enhance current levels of biodiversity. |
| | Bern Convention (Convention on the Conservation of European Wildlife and Natural Habitats), | Objectives seek to conserve wild flora and fauna and their natural habitats and to monitor and control endangered and vulnerable species. The convention also seeks to promote cooperation between states. |
| | The EU Freshwater Fish Directive (78/659/EEC) | Objectives seek to protect those fresh water bodies identified by Member States as waters suitable for sustaining fish populations. For those waters it sets physical and chemical water quality objectives for salmonid waters and cyprinid waters |

| Topic | Title | Summary of Objectives with Relevance to the FPM Sub-Basin Management Plans |
|---|---|---|
| | Action plans for *Margaritifera auricularia* and *Margaritifera margaritifera* in Europe. Nature and Environment, No. 117. Council of Europe Publishing, Strasbourg.) | Conservation of populations, their habitats, future viability and long-term survival. |
| Climate | European Commission White Paper on Adapting to climate change: Towards a European framework for action (COM (2009) 147). | This White Paper sets out a framework to reduce the EU's vulnerability to the impact of climate change. |
| | Climate Change and Water, Coasts and Marine Issues (SEC (2009) 386/2). | The extent to which water management can be integrated into other sectoral policies such as agriculture and energy policies. |
| | Second European Climate Change Programme (ECCP II) 2005. | Objectives seek to develop the necessary elements of a strategy to implement the Kyoto protocol. |
| | Adapting to climate change in Europe – options for EU action {SEC(2007) 849} | Objective is to kick-start a Europe-wide public debate and consultation on how to take forward possible avenues for action in adapting to climate change at EU level. |
| Cultural Heritage | The Valletta Convention (1992) | Objective is to protect the archaeological heritage as a source of the European collective memory and as an instrument for historical and scientific study. |
| Human Health | The EU Environment and Health Strategy 2004-2010 (first period) | Objectives seek to prevent and reduce the impacts of pollution on human health. |
| | The EU REACH Initiative<br>Registration, Evaluation and Authorisation of Chemicals (REACH) | Objectives seek to limit the harmful effects to the environment and human health from certain chemicals through improved analysis and data collection. |
| | The Plant Protection Products Directive (91/414/EEC) | To harmonise the overall arrangements for authorisation of plant protection products within the European Union. This is achieved by harmonising the process for considering the safety of active substances at a European Community level by establishing agreed criteria for considering the safety of those products. Product authorisation remains the responsibility of individual Member States. |
| | The Seveso (II) Directive (96/82/EC as amended) | Objective to prevent major accidents involving dangerous substances and limit their consequences for man and the environment, with a view to ensuring high levels of protection throughout the Community |
| Soils | The Soils Directive (Draft) | The proposed Directive lays down a framework for the protection and sustainable use of soil based on the principles of integration of soil issues into other policies, preservation of soil functions within the context of |

| Topic | Title | Summary of Objectives with Relevance to the FPM Sub-Basin Management Plans |
|---|---|---|
| | | sustainable use, prevention of threats to soil and mitigation of their effects, as well as restoration of degraded soils to a level of functionality consistent at least with the current and approved future use of the land. |
| Sustainable Development | EU Common Agricultural Policy | Aims to provide farmers with a reasonable standard of living, consumers with quality food at fair prices and to preserve rural heritage. |
| | The Gothenburg Strategy (2001)<br>Communication from the Commission on "a Sustainable Europe for a Better World" | Objectives seek to make the future development of the EU more sustainable. |
| | The Sixth Environmental Action Programme (EAP) of the European Community 2002- 2012 | Objectives seek to make the future development of the EU more sustainable. |
| | The SEA Directive (2001/42/EC) | Objective is to provide for a high level of protection of the environment and to contribute to the integration of environmental considerations into the preparation and adoption of plans and programmes with a view to promoting sustainable development, by ensuring that, in accordance with this Directive, an environmental assessment is carried out of certain plans and programmes which are likely to have significant effects on the environment. |
| | The EIA Directive | Objective is to require Environmental Impact Assessment of the environmental effects of those public and private projects which are likely to have significant effects on the environment. |
| Water | EU Dangerous Substances Directive (76/464/EEC) | The objective is to regulate potential aquatic pollution by thousands of chemicals produced in Europe. The Directive covered discharges to inland surface waters, territorial waters, inland coastal waters and groundwater. |
| | EU Water Framework Directive (2000/60/EC) | Objectives seek to maintain and enhance the quality of all surface waters in the EU. The RBMPs and POMs are a requirement of this Directive. |
| | The Groundwater Directive (1980/68/EC) | Objectives seek to maintain and enhance the quality of all groundwater in the EU. |
| | EU Floods Directive (2007/60/EC) | The Floods Directive applies to river basins and coastal areas at risk of flooding. With trends such as climate change and increased domestic and economic development in flood risk zones, this poses a threat of flooding in coastal and river basin areas. |
| | Bathing Water Directive 2006/7/EC | The overall objective of the revised Directive remains the protection of public health whilst bathing, but it also offers an opportunity to improve management practices at bathing waters and to standardise the information |

| Topic | Title | Summary of Objectives with Relevance to the FPM Sub-Basin Management Plans |
|---|---|---|
| | | provided to bathers across Europe. |
| | Nitrates Directive 91/676/EEC | This Directive has the objective of reducing water pollution caused or induced by nitrates from agricultural sources and preventing further such pollution. |
| | Urban Wastewater Treatment Directive 91/271/EEC. Amended under Directive 98/15/EEC | The primary objective is to protect the environment from the adverse effects of discharges of urban wastewater, by the provision of urban wastewater collecting systems (sewerage) and treatment plants for urban centres. The Directive also provides general rules for the sustainable disposal of sludge arising from wastewater treatment. |
| | The Sewage Sludge Directive 86/278/EEC | Objective is to encourage the use of sewage sludge in agriculture and to regulate its use in such a way as to prevent harmful effects on soil, vegetation, animals and man. To this end, it prohibits the use of untreated sludge on agricultural land unless it is injected or incorporated into the soil. |
| | Groundwater Directive (2006/118/EC) | This new Directive establishes a regime which sets underground water quality standards and introduces measures to prevent or limit inputs of pollutants into groundwater. |
| | IPPC Directive (2008/1/EC) | Objective is to achieve a high level of protection of the environment through measures to prevent or, where that is not practicable, to reduce emissions to air, water and land. The Directive provides an integrated approach to establish pollution prevention from stationary "installations". This codified act includes all the previous amendments to the Directive 96/61/EC and introduces some linguistic changes and adaptations. |
| | Drinking Water Directive (DWD) Council Directive 98/83/EC | The primary objective is to protect the health of the consumers in the European Union and to make sure the water is wholesome and clean. |

Please see **Appendix A** for the full list of legislation, plans and programmes considered

**Table 4.3: Review of Legislations, Plans, Policies and Programmes - National**

| Topic | Title | Summary of Objectives with Relevance to the FPM Sub-Basin Management Plans |
|---|---|---|
| Biodiversity | The National Biodiversity Plan (2002) | Objectives include the enhancement and conservation of biodiversity. |
| | The Wildlife Act 1976. The Wildlife (Amendment) act 2000 | The purpose of the Wildlife Act, 1976 and the Wildlife Amendment Act, 2000 is to provide for the protection of Wildlife (both Flora and Fauna) and the control of activities which may impact adversely on the conservation of Wildlife. |
| | European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations 2009 (SI 296) | These regulations establish a programme, including a timeframe, for the reduction of pressures giving rise to unfavourable conservation status. The programme shall include pressure reduction targets and deadlines, either in relation to individual pollutants or to particular |
| | European Communities (Natural Habitats) Regulations, SI 94/1997, as amended SI 233/1998 and SI 378/2005 | These Regulations give effect to Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora (Habitats Directive) and the Minister to designate special areas of conservation (endangered species and habitats of endangered species) as a contribution to an EU Community network to be known as NATURA 2000. |
| | Flora Protection Order 1999 | Objectives are to protect listed flora and their habitats from alteration, damage or interference in any way. This protection applies wherever the plants are found and is not confined to sites designated for nature conservation. |
| | Quality of Salmonid Waters Regulations 1988 (SI 293 of 1988) | Prescribe quality standards for salmonid waters and designate the waters to which they apply, together with the sampling programmes and the methods of analysis and inspection to be used by local authorities to determine compliance with the standards. Also, give effect to Council Directive No. 78/659/EEC on the quality of fresh waters needing protection or improvement in order to support fish life |
| | NPWS Conservation Plans and/or Conservation Objectives for SAC and SPAs | The aim of conservation planning is to: to identify and evaluate the features of interest for a site; to set clear objectives for the conservation of the features of interest; to describe the site and its management; to identify issues (both positive and negative) that might influence the site; and to set out appropriate strategies/management actions to achieve the objectives. |

| Topic | Title | Summary of Objectives with Relevance to the FPM Sub-Basin Management Plans |
|---|---|---|
| | | General conservation objectives have been compiled for SACs and SPAs based on the sites qualifying features. It is the goal to have conservation plans for all areas designated for conservation. |
| Climate | National Climate Change Strategy (2000) and National Climate Change Strategy 2007-2012 | Objectives include the reduction of national GHG emissions (including those from the water sector) |
| Cultural Heritage | National Heritage Plan (2002) | Core objective is to protect Ireland's heritage. Plan uses the "polluter pays principle" and the "precautionary principle". Sets out archaeological policies and principles that should be applied by all bodies when undertaking a development. |
| Human Health | Quality of Bathing Waters Regulations 1988 (SI 84 of 1988) and amendments | Prescribe bathing water quality standards and the bathing areas to which they apply, together with the sampling programmes and the methods of analysis and inspection to be used by local authorities to determine compliance with the standards. Give effect to Council Directive No. 76/160/EEC concerning the quality of bathing water. |
| Planning | National Spatial Strategy 2002-2020 (2002) | Objectives of the NSS are to achieve a better balance of social, economic and physical development across Ireland, supported by more effective planning. |
| | National Development Plan from 2007 to 2013 | Objectives of the NDP are to promote more balanced spatial and economic development. |
| | Planning and Development Act 2000 | Revised and consolidated the law relating to planning and development by repealing and re-enacting with amendments the Local Government (Planning and Development) Acts, 1963 to 1999; to provide, in the interests of the common good, for proper planning and sustainable development including the provision of housing; to provide for the licensing of events and control of funfairs; to amend the Environmental Protection Agency Act 1992, the Roads Act 1993, the Waste Management Act 1996, and certain other enactments. |
| Sustainable Development | Sustainable Development: A Strategy for Ireland (1997) (DEHLG) | Objectives are to ensure that future development in Ireland occurs in a sustainable manner. |
| | European Communities (Environmental Assessment of Certain Plans and | The EU SEA Directive was transposed into Irish Law under S.I. 435 in 2004. |

| Topic | Title | Summary of Objectives with Relevance to the FPM Sub-Basin Management Plans |
|---|---|---|
| | Programmes Regulations 2004 (S.I. 435 of 2004) | |
| Environment | The Environmental Protection Agency Act 1992 | Objectives include the better protection of the environment and the control of pollution through improved licensing and monitoring. |
| | The Protection of the Environment Act 2003 | Objectives include for better protection of the environment and the control of pollution through improved licensing and monitoring. |
| Water | Drinking Water Regulations SI 278 of 2007 (updated Drinking Water Regulations SI 439 of 2000). | Prescribe quality standards to be applied in relation to certain supplies of drinking water, including requirements as to sampling frequency, methods of analysis, the provision of information to consumers and related matters. Give effect to provisions of EU Council Directive 98/83/EC on the quality of water intended for human consumption. These Regulations further strengthen the Drinking Water Regulations by increasing penalties for non-compliance with the requirements of the Regulations. |
| | European Communities (Drinking Water) (No,. 2) Regulations. SI 278 of 2007 | These Regulations further strengthen the Drinking Water Regulations by increasing penalties for non-compliance with the requirements of the Regulations. |
| | Local Government (Water Pollution) Act, 1977 | Provide for specified improvements in water quality conditions in rivers and lakes based on phosphorus concentrations or related water quality classifications and give effect to certain requirements arising under Council Directive 76/46/EC on pollution caused by certain dangerous substances discharged into the aquatic environment of the Community. |
| | Water Quality in Ireland 2007-2008: Key Indicators of the Aquatic Environment | The quality of rivers, lakes, estuaries, coastal waters, ground waters and canals is discussed in this report. |
| | European Communities (Water Policy) Regulations (SI 722 of 2003) | Provide for the transposition into Irish national law of the provisions of the EU Water Framework Directive. |
| | European Communities (Good Agricultural Practice for Protection of Waters) Regulations 2005 (S.I. No. 378 of 2006) | Objective is to provide statutory support for good agricultural practice to protect waters against pollution from agricultural sources. Give further effect to several EU Directives including Directives in relation to protection of waters against pollution from agricultural sources (“the Nitrates Directive”), dangerous substances in water, waste management, protection of groundwater, public participation in policy development and water policy (the |

| Topic | Title | Summary of Objectives with Relevance to the FPM Sub-Basin Management Plans |
|---|---|---|
| | | Water Framework Directive). |
| | Arterial Drainage Acts, 1945 and 1995 | Deals with the improvement of lands by drainage and the preventing or sustainably reducing the flooding of lands. Sets up the process of Arterial Drainage Schemes and provides for the maintenance of these works. Also implements a number of drainage and flood reduction related measures such as approval procedures for bridges and weirs, and iterates reporting requirements for Drainage Districts. |
| | Surface Water Regulations (SI 272 of 2009), | These Regulations apply to all surface waters and are made to give effect to the measures needed to achieve the environmental objectives established for bodies of surface water by the Water Framework Directive, including the environmental quality standards. They also give further effect to the requirements of the Dangerous Substances Direct |
| | Regulations for Good Agricultural Practice for the Nitrates Directive (SI 101 of 2009) | The purpose of these Regulations is to prevent and reduce the pollution of waters by farmyard management, nutrient management and fertilizer applications. |
| | European Communities (Quality of Shellfish Waters) Regulations 2006 (SI 268 OF 2006) | These regulations include the development of pollution reduction programmes to improve water quality in catchments draining to shellfish waters. |
| | Waste Water Discharge (Authorisation) Regulations (SI 684 of 2007) | The purpose of these Regulations is to prevent and reduce the pollution of waters by waste water discharges by giving effect to Article 6 of the Dangerous Substances Directive and includes the purpose of implementing measures required under the Water Framework Directive e.g. Article 4(1), Article 7(2) and (3), Article 16 (1) and (8). |
| | European Communities Environmental Objectives (Groundwater) Regulations 2010 | The Regulations establish a new regime for the protection of groundwater in line with the requirements of the WFD and by the Groundwater Directive (20006/118/EC). This is to be achieved by establishing Environmental Objectives, Groundwater Quality Standards and Threshold Values for the classification of groundwater. |
| | County Groundwater Protection Schemes and Biodiversity/Conservation Plans | These County Groundwater Protection Schemes were developed to prevent pollution and protect groundwater in line with the requirements of the WFD. The County Biodiversity/Conservation Plans were developed to protect local biodiversity and put conservation plans in place. |

| Topic | Title | Summary of Objectives with Relevance to the FPM Sub-Basin Management Plans |
|---|---|---|
| Waste | The Waste Management Act 1996 and amendments | Objectives include (amongst others) the more effective and environmentally sensitive management of wastes in Ireland. |

Please see **Appendix A** for the full list of legislation, plans and programmes considered

# 5 DESCRIPTION OF THE PLANS

## 5.1 INTRODUCTION

The sub-basin management plans has been produced to act alongside the wider River Basin Management Plans (RBMPs) to provide a programme of measures required to improve the habitat of the freshwater pearl mussel so that it can attain favourable conservation status. The objective of the plans is to restore the freshwater pearl mussel (FPM) populations in 27 rivers, or stretches of rivers that are within the boundaries of Special Areas of Conservation.

The FPM was historically widespread in Ireland. There appear to have been three periods over the last 150 years during which the mussel has faced very serious problems: The first was after the Drainage (Ireland) Act of 1842, when many river catchments were modified and the land adjacent the rivers changed radically. The second period of decline coincided with Ireland's entry into the EEC in 1973, and the intensification of agricultural practices, including an increase in phosphorus and nitrogen loading to river catchments. The third phase of pearl mussel population decline is currently ongoing. Three of the key pressures facing FPM populations in current times relate to:

- Land that was not intensively managed historically but has, in recent years, been improved and repeatedly fertilised for agriculture or forestry and is now a source of fine sediment and/or phosphorus;

- Forestry units which are now reaching maturity and have potential to release large quantities of phosphorus and fine sediments into rivers during and after felling; and

- Recent intensification of development, including land clearance, pressure on sewerage schemes and inappropriate siting of on-site systems for once-off housing, is adding to the nutrient and sediment load.

The FPM rivers in Ireland that are known to have recruited young recently are generally in remote areas, with short rivers and small catchments that historically have not been subject to intensive fertiliser inputs. They are typically areas of low human population density, with few urban areas and any habitation being located low down in the catchments. They are mainly below lakes, which provide an even, buffered source of water through the river. Many of the SAC rivers for *Margaritifera margaritifera* fall into this category.

## 5.2 THE SUB-BASIN PLAN DEVELOPMENT PROCESS

### 5.2.1 Step 1: What is a Sustainable Population of Pearl Mussel?

The target for a sustainable population is one that it is where reproduction and survival of sufficient numbers of young mussels to adulthood to sustain the population at current levels or previous levels (if known). **Table 5.1** shows the mussel demographic criteria for the assessment of the conservation status of pearl mussel populations, as set out in the draft European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations 2009.

**Table 5.1: The Targets for Sustainable *Margaritifera margaritifera* Population Structure.**

| Criterion | Target to pass | Notes |
|---|---|---|
| Numbers of live adults | No recent decline | Based on comparative results from the most recent surveys |
| Numbers of dead shells | <1% of population and scattered distribution | 1% considered to be indicative of natural losses. |
| Mussels shell length ≤65mm | At least 20% of population ≤65mm in length | Field survey of 0.5 X 0.5 m quadrats must be carried out in suitable habitat areas for juveniles |
| Mussels shell length ≤ 30mm | At least 5% of population ≤ 30mm in length | Field survey of 0.5 X 0.5m quadrats must be carried out in suitable habitat areas for juveniles |

### 5.2.2 Step 2: What are the Environmental Conditions Suitable for FPM?

The habitat of *Margaritifera margaritifera* in Ireland is restricted to near natural, clean flowing waters, often downstream of ultra-oligotrophic lakes. A small number of records are from the lakes themselves.

The pearl mussel requires stable cobble and gravel substrate with very little fine material below pea-sized gravel. Adult mussels are two-thirds buried and juveniles up to five to ten years old are totally buried within the substrate. The lack of fine material in the river bed allows for free water exchange between the open river and the water within the substrate. The free exchange of water means that oxygen levels within the substrate do not fall below those of the open water. This is essential for juvenile recruitment, as this species requires continuous high oxygen levels.

The clean substrate must be free of inorganic silt, organic peat, and detritus, as these can all block oxygen exchange. Organic particles within the substrate can exacerbate the problem by consuming oxygen during the process of decomposition. The habitat must be free of filamentous algal growth and rooted macrophyte growth. Both block the free exchange of water between the river and the substrate and may also cause night time drops in oxygen at the water-sediment interface.

The open water must be of high quality with very low nutrient concentrations, in order to limit algal and macrophyte growth. Nutrient levels must be close to the reference levels for the river they inhabit. Phosphorus must never reach values that could allow for sustained, excessive filamentous algal growth.

The presence of sufficient salmonid fish to carry the larval glochidial stage of the pearl mussel life cycle is essential.

The conservation targets for sustainable mussel populations include maintenance of free water exchange between the river and the substrate and minimal coverage by algae and weed. The particular emphasis is on maintenance of recruitment i.e. the river bed structure required to breed the next generation.

**Table 5.2** shows the sustainable pearl mussel habitat attributes, with ecological quality objectives for pearl mussel sites as set out in the draft European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations 2009.

The targets set out in these Regulations are interim targets that may be revised in line with the results of the monitoring programmes. These targets may be too stringent or not stringent enough – and will be reviewed following analysis of pearl mussel recruitment data with data for nearby diatoms, macroinvertebrates and other monitored elements. While it is reasonable to set Ecological quality Objectives (EQOs) for other water-borne pollutants, e.g. dangerous substances, it would not be for nutrients / general components. By setting macroinvertebrate and diatom EQOs at high status, it means the general components must also be high status (the general component standards were derived by first classifying rivers and lakes using the biology).

**Table 5.2: Ecological Quality Objectives for Freshwater Pearl Mussel Sites**

| Element | Objective | Notes |
|---|---|---|
| Macroinvertebrates | EQR ≥0.90 | High status |
| Filamentous algae<br>(Macroalgae) | Trace or Present (<5%) | Any filamentous algae should be wispy and ephemeral and never form mats |

| | | |
|---|---|---|
| Phytobenthos (Microalgae) | EQR ≥0.93 | High status |
| Macrophytes - rooted higher plants | Trace or Present (<5%) | Rooted macrophytes should be absent or rare within the mussel habitat. |
| Siltation | No artificially elevated levels of siltation | No plumes of silt when substratum is disturbed |

### 5.2.3 Step 3: What pressures need to be addressed?

The next step in Sub-basin Management Plan development was a determination of the relevant pressures on water quality and how they can affect achievement of the EQO. The following pressure categories were identified as a result of this work:

- Hydrological and Morphological Pressures
- Agricultural
- On-site wastewater treatment systems
- Quarries
- Fords
- Sand and Gravel Pits
- Forestry
- Municipal wastewater systems
- Peat Cutting
- Industrial point sources
- Point Sources
- Abstractions

### 5.2.4 Step 4: How will the pressures be addressed?

The next step was development of a national toolbox of measures. The toolbox has been derived from earlier work carried out on the River Basin Management Plans under the WFD and based on field assessment carried out as part of the sub-basin management plans. The toolkit follows the format of the RBMP and POM approach of basic and supplementary measures therefore the measures under consideration for inclusion in the toolkit to restore the FPM populations fall into one of three categories:

1. The implementation of 11 key directives specified under the Water Framework Directive. These directives have already been transposed into domestic legislation in Ireland.
2. The implementation of other stipulated measures required by the Water Framework Directive. Again domestic legislation has been or will be made in Ireland to address these stipulated measures: for example recent legislation has been introduced requiring establishment of inventories of emissions, discharges and losses of priority substances. These are termed Other Basic Measures in the River Basin Management Plans.

The first two categories are referred to as *Basic Measures and Other Basic Measures in the river Basin Management Plans* and are mandatory under the Water Framework Directive. They form the basis of national policy for the protection and restoration of all waters. Basic Measures address Ireland's most significant water management issues.

3. The implementation of Freshwater Pearl Mussel Measures.

These are measures to be implemented only where the first two categories above are not adequate to address identified pressures in particular waters. Freshwater Pearl Mussel Measures are pressure specific and were identified by a series of technical studies in Ireland carried out in the early stages of implementation of the Water Framework Directive (POM Studies) and based on field survey work carried out as part of the sub-basin plans.

The measures which form the national toolkit of measures include measures for further investigations to identify and confirm the extent of pressures, implementation of codes of practice and voluntary agreements, and specific actions including technical or engineering solutions.

### 5.2.5 Step 3: Where do the pressures need to be addressed?

The next step was the characterisation of the individual designated FPM waters and their contributing catchments. As part of this exercise information on the relevant key pressures in each area was compiled. **Table 5.3** includes a summary of the key pressures for each of the FPM catchments. The sub-basin plans have been used in describing the baseline environmental conditions at a catchment level as included in Chapter 6 of this report.

**Table 5.3: Summary of Key Pressures on the FPM Catchments**

| ***Margaritifera* Catchment** | **Key Pressures** | **Other Pressures** |
|---|---|---|
| Cloon | Agriculture;<br>On-site wastewater treatment systems;<br>Quarries;<br>Forestry; and<br>Physical Modifications. | Peat Cutting; and<br>Fords |
| Owenmore | Agriculture;<br>On-site wastewater treatment systems;<br>Forestry; and<br>Physical Modifications. | Peat Cutting; and<br>Fords. |
| Aughavaud | Agriculture;<br>Point Sources;<br>Physical Modifications;<br>On-site wastewater treatment systems; and<br>Forestry. | |
| Ballymurphy | Agriculture;<br>On-site wastewater treatment systems; | Fords |

| ***Margaritifera* Catchment** | **Key Pressures** | **Other Pressures** |
|---|---|---|
| | Forestry; and<br>Physical modification. | |
| Clodiagh | Agriculture;<br>On-site wastewater treatment systems;<br>Forestry;<br>Point Sources; and<br>Physical Modifications. | Fords |
| Derreen | Agriculture;<br>On-site wastewater treatment systems;<br>Point Sources;<br>Quarries;<br>Forestry; and<br>Physical Modifications. | Fords |
| Mountain | Agriculture;<br>On-site wastewater treatment systems;<br>Point Sources;<br>Forestry; and<br>Physical Modifications. | Fords. |
| Nore | Agriculture;<br>On-site wastewater treatment systems;<br>Point Sources;<br>Quarries;<br>Forestry; and<br>Physical Modifications. | Peat Cutting; and<br>Barriers to Fish Migration |
| Allow | Point Sources;<br>Abstractions;<br>Physical Modifications;<br>Agriculture;<br>On-site wastewater treatment systems; and<br>Forestry. | Peat Cutting; and<br>Fords. |
| Bandon / Caha | Agriculture;<br>On-site wastewater treatment systems;<br>Quarries;<br>Point Sources;<br>Forestry; and<br>Physical Modifications. | |
| Caragh | Agriculture;<br>On-site wastewater treatment systems;<br>Point Source;<br>Forestry; and<br>Physical Modifications. | Peat Cutting. |
| Currane | Agriculture;<br>On-site wastewater treatment systems;<br>Forestry;<br>Point Source; and<br>Physical Modifications. | |
| Gearhameen | Agriculture;<br>On-site wastewater treatment systems;<br>Forestry;<br>Quarries;<br>Physical Modifications; and<br>Abstractions. | Peat Cutting; and<br>Fords. |
| Kerry Blackwater | Agriculture;<br>On-site wastewater treatment systems; and<br>Forestry. | Peat Cutting. |
| Licky | Agriculture;<br>Quarries;<br>On-site wastewater treatment systems; and<br>Forestry. | Fords. |
| Ownagappul | Agriculture; | |

| ***Margaritifera* Catchment** | **Key Pressures** | **Other Pressures** |
|---|---|---|
| | On-site wastewater treatment systems;<br>Forestry; and<br>Abstractions. | |
| Munster Blackwater | Agriculture;<br>On-site wastewater treatment systems;<br>Point Sources;<br>Quarries;<br>Abstractions;<br>Forestry; and<br>Physical Modifications. | Fords. |
| Bundorragha | Agriculture;<br>Point Sources;<br>Quarries;<br>On-site wastewater treatment systems; and<br>Forestry. | Peat Cutting;<br>Recreation; and<br>Weirs. |
| Dawros | Agriculture;<br>Point Sources;<br>On-site wastewater treatment systems;<br>Quarries;<br>Forestry; and<br>Physical Modifications. | Peat Cutting; and<br>Fisheries. |
| Newport | Agriculture;<br>On-site wastewater treatment systems;<br>Point Source;<br>Quarries;<br>Forestry; and<br>Abstractions. | Peat Cutting |
| Owenriff | Agriculture;<br>On-site wastewater treatment systems;<br>Point Source;<br>Forestry; and<br>Physical Modifications. | Peat Cutting; and<br>Fords. |
| Clady | Agriculture;<br>On-site wastewater treatment systems;<br>Quarries;<br>Forestry; and<br>Physical Modifications. | Peat Cutting. |
| Eske | Agriculture;<br>On-site wastewater treatment systems;<br>Point Sources;<br>Abstraction;<br>Forestry; and<br>Physical Modifications. | |
| Glaskeelan | Agriculture;<br>On-site wastewater treatment systems; and<br>Forestry. | Peat Cutting. |
| Leannan | Agriculture;<br>On-site wastewater treatment systems;<br>Quarries;<br>Point Source;<br>Forestry; and<br>Physical Modifications. | |
| Owencarrow | Agriculture;<br>On-site wastewater treatment systems;<br>Forestry; and<br>Point Sources. | Peat Cutting. |
| Owenea | Agriculture;<br>On-site wastewater treatment systems;<br>Forestry;<br>Physical Modifications; and | Fords;<br>Wind Farms; and<br>Fisheries. |

| *Margaritifera* Catchment | Key Pressures | Other Pressures |
|---|---|---|
| | Point Source. | |

### 5.2.6 Step 4: Which measures will be used to address the pressures identified?

Based on the key pressures identified for each designated FPM catchment, individual action programmes have been developed by applying the relevant measures from the national toolkit. These individual action programmes outline the specific measures that can be used to restore FPM in the relevant catchment. These action programmes are addressed in Chapter 9, Assessment.

# 6 BASELINE ENVIRONMENT

## 6.1 INTRODUCTION

This section examines the relevant aspects of the current state of the environment in relation to biodiversity, population, human health, fauna, flora, soil, water, climatic factors, cultural heritage, landscape, material assets and the interrelationship between these factors.

The baseline has been compiled using available datasets, information gathered during field survey work as part of the management plan development and indicators suggested during scoping. The main sources of data used in the compilation of this baseline are listed in the references section of this document. This chapter provides an overview of the relevant details of the environment throughout the various catchments designated for FPM. **Appendix B** of this report elaborate on catchment specific issues relevant to individual FPM catchments and the reader is encouraged to refer to this appendix for greater detail in relation to key pressures and problems.

## 6.2 CURRENT STATE OF THE ENVIRONMENT

According to recent EPA publications (EPA, 2008), Ireland's natural environment, although under increasing pressure, generally remains of good quality and represents one of the country's most essential national assets. In the EPA's *2020 Vision – Protecting the Irish Environment* document it is noted that pressures on the environment have increased significantly. As Ireland's economy has grown in the past 10 years these pressures have accelerated at a rate that far exceeds that observed in other EU countries.

The fourth EPA *State of the Environment Report* (2008) (the most recent such assessment carried out by the EPA) identified four priority challenges for the environment, which, if addressed successfully, should benefit the present and future quality of Ireland's environment. These comprise: limiting and adapting to climate change; reversing environmental degradation; mainstreaming environmental considerations; and complying with environmental legislation and agreements. These challenges are summarised as follows:

| Challenges | Components | Relationship to Sub-basin Management Plans |
|---|---|---|
| **Limiting and Adapting to Climate Change** | Mitigating the causes and effects of climate change.<br>Adapting to climate change impacts.<br>Improving our understanding of climate change. | The Sub-basin Management Plans should take account of potential climate change impacts during selection from the toolkit of measures to ensure achievement of the water quality parameters is not hindered by climate change. |

| Challenges | Components | Relationship to Sub-basin Management Plans |
|---|---|---|
| **Mainstreaming Environmental Considerations** | Incorporating environmental considerations into policies and plans.<br>Ensuring environmental responsible business.<br>Changing behaviours. | Through the need for development plans to consider the objectives and precepts of the Sub-basin Management Plans, the Freshwater Pearl Mussel Regulations 2009 ensures that water pollution issues are brought forward into the overall planning process and provides for sustainable development. |
| **Reversing Environmental Degradation** | Preventing eutrophication and other water pollution.<br>Protecting natural habitats and species populations.<br>Remediation of contaminated land. | The purpose of the Sub-basin Management Plans is to improve water quality in designated freshwater pearl mussel catchments, thereby protecting both natural habitats and species. |
| **Complying with Environmental Legislation and Agreements** | Building a culture of environmental compliance.<br>Enforcement of legislation at national and local level.<br>Meeting EU and other international obligations. | The Sub-basin Management Plans are being developed in direct response to requirements under the Sub-basin Management Plans and will be enforced at a national and local level. Implementation of the Sub-basin Management Plans will directly meet obligations under the Freshwater Pearl Mussel Regulations 2009 and indirectly aid in meeting requirements under the Water Framework Directive. |

In *2020 Vision – Protecting the Irish Environment* (EPA, 2007) the EPA outlines six environmental goals which reflect on the main challenges identified in the State of the Environment reports as well as key issues at the global and EU level as reflected in the 6$^{th}$ Environmental Action Plan (EAP). These goals/issues, which in the majority have relevance to the Sub-basin Management Plans, are:

- Limiting and adapting to climate change;
- Protected waters;
- Protected soils and biodiversity;
- Sustainable use of natural resources; and
- Integration and enforcement.

These goals/issues are identified as a means of realising the vision of protecting and improving Ireland's environment.

## 6.3 BASELINE AND RELEVANT ENVIRONMENTAL PROBLEMS

### 6.3.1 Biodiversity, Flora and Fauna

#### 6.3.1.1 Designated Sites

Ireland has designated sites and species of conservation value and/or concern in an effort to protect its biodiversity resource. Designated conservation areas are areas containing habitats or species of national or international conservation importance. There are four types of designations considered here for the FPM sub-basin management plans; Special Areas of Conservation, Special Protection Areas, Ramsar Sites and Natural Heritage Areas. **Table 6.1** gives the numbers of each designation in proximity to the catchments of designated FPM waters grouped by RBD. In all cases, the *Margaritifera* catchment boundary overlaps all or in part with associated SACs. In order to recognise potential indirect effects beyond the catchment boundary, a buffer of 15km was added. This is consistent with the approach used in the Habitats Directive Assessment.

**Table 6.1: Designated Conservation Areas**

| ***Margaritifera* Catchment** | **Relevant RBD** | **SPA*** | **SAC*** | **Ramsar** | **NHA**** |
|---|---|---|---|---|---|
| Cloon | Shannon | 1 | 2 | 0 | 3 |
| Owenmore | Shannon | 1 | 3 | 0 | 2 |
| | | | | | |
| Aughavaud | South East | 0 | 3 | 0 | 1 |
| Ballymurphy | South East | 0 | 3 | 0 | 1 |
| Clodiagh | South East | 0 | 3 | 0 | 2 |
| Derreen | South East | 0 | 4 | 0 | 1 |
| Mountain | South East | 0 | 3 | 0 | 1 |
| Nore | South East | 1 | 13 | 1 | 22 |
| | | | | | |
| Allow | South West | 1 | 2 | 0 | 1 |
| Bandon / Caha | South West | 0 | 3 | 1 | 1 |
| Caragh | South West | 0 | 6 | 1 | 1 |
| Currane | South West | 0 | 7 | 0 | 1 |
| Gearhameen | South West | 2 | 7 | 0 | 1 |
| Kerry Blackwater | South West | 0 | 11 | 0 | 3 |
| Licky | South West | 0 | 5 | 3 | 0 |
| Ownagappul | South West | 0 | 8 | 0 | 2 |

| | | | | | |
|---|---|---|---|---|---|
| Munster Blackwater | North West | 4 | 10 | 9 | 33 |
| | | | | | |
| Bundorragha | Western | 0 | 5 | 0 | 1 |
| Dawros | Western | 0 | 7 | 0 | 2 |
| Newport | Western | 0 | 5 | 2 | 1 |
| Owenriff | Western | 1 | 9 | 1 | 4 |
| | | | | | |
| Clady | North West | 1 | 10 | 2 | 2 |
| Eske | North West | 2 | 12 | 1 | 5 |
| Glaskeelan | North West | 1 | 7 | 1 | 2 |
| Leannan | North West | 2 | 11 | 2 | 7 |
| Owencarrow | North West | 0 | 12 | 2 | 3 |
| Owenea | North West | 1 | 11 | 1 | 3 |
| ** Sites within the buffer area that fall in Northern Ireland have been included* | | | | | |
| *** Include pNHA* | | | | | |

#### 6.3.1.1 Status of EU Protected Habitats and Species

In 2008 the National Parks and Wildlife Service published a report detailing the conservation status in Ireland of habitats and species listed in the EU Habitats Directive (92/43/EEC). This report indicated that many Irish species of flora and fauna have a moderately satisfactory status; however, a small number are in urgent need of concerted efforts to protect them. The status of Freshwater Pearl Mussel is listed in this report as unfavourable with a similar outlook for the future and is considered in urgent need of intervention. The assessments of habitats presented a much bleaker picture, with the majority being rated as having poor or bad overall status. Some of the challenges relevant to the FPM and which need to be addressed include: pollution of waters by nutrient or silt, direct damage and overgrazing.

#### 6.3.1.2 Status of Freshwater Pearl Mussel

**Table 6.2** summarises the status of the FPM in each of the designated catchments.

**Table 6.2: Status of FPM Populations**

| *Margaritifera* Catchment | Status | Ranking out of 27 | Comment |
|---|---|---|---|
| Cloon | Unfavourable | 15 | Deterioration in habitat quality evident from the high levels of siltation and macrophyte growth. Demographic profile is poor. The catchment fails most of the requirements as specified in The European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations 2009. |
| Owenmore | Unfavourable | 18 | Deterioration in habitat quality which is evident from the extensive coverage of filamentous green algae which was recorded at three of the five sites surveyed for *Margaritifera* on the Owenmore River. Demographic profile is poor The catchment fails most of the requirements as specified in The European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations 2009. |
| | | | |
| Aughavaud | Unfavourable | 27 | Population is in serious trouble, if not extinct. The Aughavaud River has serious problems with shifting substrate mainly sands, and may have very few or no living mussels left. The catchment fails most of the requirements as specified in The European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations 2009. |
| Ballymurphy | Unfavourable | 25 | Evidence of heavy siltation in particular sand found to cover the river channel in places and also macrophyte growth with up to 80% *Ranunculus* cover found within the mussel habitat in places. It is estimated that approximately only 300 individuals remain where the habitat is found. The catchment fails most of the requirements as specified in The European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations 2009. |
| Clodiagh | Unfavourable | 21 | Failing in its habitat quality and on its population demographic profile, where it is evident that there are not the numbers of juveniles present in the population to provide sustainable replacement of the current adult numbers. Generally low densities of mussels were found in the Clodiagh together with an apparent absence of juveniles and small mussels. The catchment fails most of the requirements as specified in The European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations 2009. |
| Derreen | Unfavourable | 17 | The river Derreen population is in very poor status and has declined considerably in the 20 years since surveys began. Substantial juvenile numbers were found in 1990, but no evidence of recent recruitment was found in 2006 or 2009. The catchment fails most of the requirements as specified in The European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations 2009. |
| Mountain | Unfavourable | 20 | Very poor status, it is in rapid decline, and is in danger of imminent extinction. Sediment loads in the river are exceptionally high, and recent losses of adults have occurred downstream of an area of substantial bank and instream works with direct connectivity to the mussel population. The catchment fails most of the requirements as specified in The European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations 2009. |
| Nore | Unfavourable | 26 | The population of *Margaritifera durrovensis* in the Nore |

| *Margaritifera* Catchment | Status | Ranking out of 27 | Comment |
|---|---|---|---|
| | | | River is known to be critically endangered for some time. The population is failing in its habitat quality (through evidence of heavy siltation, macrophyte and filamentous green algal growth), and its population demographic profile. The catchment fails most of the requirements as specified in The European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations 2009. |
| | | | |
| Allow | Unfavourable | 12 | Deterioration in habitat quality, evident from the high levels of siltation and macrophyte growth. Demographic profile is poor as there are not the numbers of juveniles present in the population to provide sustainable replacement of the current adult numbers. The catchment fails most of the requirements as specified in The European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations 2009. |
| Bandon / Caha | Unfavourable | 14 | Status information based on most recent data which is from 2005. Absence of juveniles and rarity of small mussels throughout the catchment. The catchment fails most of the requirements as specified in The European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations 2009. |
| Caragh | Unfavourable | 2 | Caragh holds twice as many mussels as all other European countries combined, with the exception of Scotland therefore very important in European context. Juveniles and small mussels (≤65mm) rare due to the unsuitable habitat conditions. The catchment fails most of the requirements as specified in The European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations 2009. |
| Currane | Unfavourable | 8 | Very large and significant population of *Margaritifera* is present in the Cummeragh River between the salmon hatchery at Clodragh and Lough Currane (based on 2007 rapid survey). More recent survey at Dromkeare Bridge showed *Margaritifera* widely distributed throughout the Cummeragh River downstream of Lough Derriana. The catchment fails most of the requirements as specified in The European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations 2009. |
| Gearhameen | Unfavourable | 13 | Apparent absence of juveniles and the scarcity of small mussels, at the sites investigated. The catchment fails most of the requirements as specified in The European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations 2009. |
| Kerry Blackwater | Unfavourable | 7 | Observed reduction of mussel numbers at all sites investigated in 2009 with an apparent absence of juveniles and rarity of small mussels. The catchment fails most of the requirements as specified in The European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations 2009. |
| Licky | Unfavourable | 19 | Small numbers of adults from historical records, and very few juveniles. The catchment fails all requirements as specified in The European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations 2009 |
| Ownagappul | Unfavourable | 5 | Very large populations of adults, all ages of juveniles, and some juveniles in more than one area. However there are not the numbers of juveniles under 30mm present in the population to provide sustainable replacement of the current adult numbers. The catchment fails most of the requirements as specified in |

| *Margaritifera* Catchment | Status | Ranking out of 27 | Comment |
|---|---|---|---|
| | | | The European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations 2009. |
| Munster Blackwater | Unfavourable | 24 | Three sites investigated on the main channel of the Munster Blackwater upstream of Rathmore were surveyed and no evidence of *Margaritifera* was observed. Heavy siltation observed at all three locations investigated, indicating that conditions are inimical to the survival of juvenile mussels in this part of the Munster Blackwater system. The catchment fails most of the requirements as specified in The European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations 2009. |
| | | | |
| Bundorragha | Favourable | 1 | Improvement in status, since the previous survey primarily attributable to reduction in siltation and macrophyte abundance on the Bundorragha river. Very large populations of adults, all ages of juveniles, and some juveniles in more than one area. The catchment meets all requirements as specified in The European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations 2009. |
| Dawros | Unfavourable | 3 | Population is failing in its habitat quality (through evidence of siltation), and its population demographic profile. The catchment fails most of the requirements as specified in The European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations 2009. |
| Newport | Unfavourable | 11 | The population is failing in its habitat quality (through evidence of siltation, with average redox losses at 5cm up to 30%, even following scouring conditions), and it its population demographic profile. The catchment fails most of the requirements as specified in The European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations 2009. |
| Owenriff | Unfavourable | 4 | Adult mussels remain in relatively intact numbers in the best habitats, while losses are still occurring in the poorer habitats. However, juvenile numbers are much lower than those considered to be sustainable. The catchment fails most of the requirements as specified in The European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations 2009. |
| | | | |
| Clady | Unfavourable | 10 | Presence in high quantities of macrophytes and filamentous green algae showing excessive nutrient loading in the Clady compared with ideal pearl mussel habitat. The catchment fails most of the requirements as specified in The European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations 2009. |
| Eske | Unfavourable | 9 | Evidence of macrophyte abundance. The catchment fails most of the requirements as specified in The European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations 2009. |
| Glaskeelan | Unfavourable | 6 | Good numbers of adults found throughout the catchment, juveniles and small mussels (≤65mm) are rare due to the unsuitable habitat conditions for them. The catchment fails most of the requirements as specified in The European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations 2009. |
| Leannan | Unfavourable | 16 | The population is failing in its habitat quality (through evidence of severe siltation), and its population demographic profile. The catchment fails most of the requirements as specified in The European Communities |

| *Margaritifera* Catchment | Status | Ranking out of 27 | Comment |
|---|---|---|---|
| | | | Environmental Objectives (Freshwater Pearl Mussel) Regulations 2009. |
| Owencarrow | Unfavourable | 23 | Deterioration in habitat quality evident from the high levels of siltation and macrophyte growth. The lack of extent of suitable habitat suggests that the river may not have been able to support a very large population even when habitat conditions were better. The habitat that was identified has a very low capacity compared to its potential, and 57% of all the mussels surveyed were dead. The catchment fails most of the requirements as specified in The European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations 2009. |
| Owenea | Unfavourable | 22 | The population is failing in its habitat quality (through evidence of heavy siltation and macrophyte growth), and its population demographic profile. The catchment fails most of the requirements as specified in The European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations 2009. |

***Existing Environmental Pressures / Problems: Biodiversity, Flora and Fauna***

*Urban growth on the island of Ireland has been accelerating at a greater rate over recent years as increased development expands city and town limits into the countryside. Artificial land cover throughout Ireland remains relatively low, including in many of the catchments designated for FPM; however, the constant encroachment on natural habitats will undoubtedly have an impact on natural flora, fauna and biodiversity. Higher intensity landuses also have implications especially for such sensitive species as the FPM. This is particularly the case for FPM where intensive landuses such as agriculture and forestry have had detrimental impacts on the conservation status of this species. Throughout Ireland there has been a decline in many of the native species through habitat degradation or destruction due to anthropogenic affects including, forestry, land reclamation, urban sprawl, road construction, disturbance, water pollution, climate change and agriculture. Irish legislation protects some of these species. In Ireland, 18 species of plant and animal have been identified as endangered and a further 52 are recorded as vulnerable (EPA, 2006).*

### 6.3.2 Population / Land Use and Human Health

The population of Ireland was over 4.2 million in 2006, and has been increasing at ever growing rates. However the population density is still relatively low from a European perspective and the overall population still remains below that of the island in the early 19th century. **Table 6.3** shows the population of each County where a FPM Catchment occurs.

**Table 6.3: Trends in Population for Counties Containing FPM Catchments**

| *Margaritifera* Catchment | County | 1996 | 2002 | 2006 | % Change '02 - '06 |
|---|---|---|---|---|---|
| Cloon | Clare | 94,006 | 103,277 | 110,950 | 7.4 |
| Kerry Blackwater<br>Gearhameen<br>Currane<br>Caragh<br>Allow<br>Bandon Caha<br>Owenmore | Kerry | 126,130 | 132,527 | 139,835 | 5.5 |
| Licky<br>Clodiagh<br>Munster Blackwater | Waterford | 52,140 | 56,952 | 62,213 | 9.2 |
| Dawros<br>Owenriff | Galway | 131,613 | 143,245 | 159,256 | 11.2 |
| Bundorragha<br>Newport | Mayo | 111,524 | 117,446 | 123,839 | 5.4 |
| Owencarrow<br>Owenea<br>Eske<br>Clady<br>Leannan<br>Glaskeelan | Donegal | 129,994 | 137,575 | 147,264 | 7.0 |
| Aughavaud<br>Ballymurphy<br>Mountain<br>Derreen | Carlow | 46,616 | 46,014 | 50,349 | 9.4 |
| Ownagappul<br>Munster Blackwater | Cork | 293,323 | 324,767 | 361,877 | 11.4 |
| Mountain | Wexford | 104,371 | 116,596 | 131,749 | 13.0 |
| Derreen | Wicklow | 102,683 | 114,676 | 126,194 | 10.0 |
| Nore | Laois | 52,945 | 58,774 | 67,059 | 14.1 |
| Nore | Kilkenny | 75,336 | 80,339 | 87,558 | 9.0 |
| Nore | North Tipperary | 58,021 | 61,010 | 66,023 | 8.2 |
| Nore | South Tipperary | 75,514 | 79,121 | 83,221 | 5.2 |

Source: Census of Population, Ireland 1996, 2002 and 2006

**Table 6.4** shows the most common Corrine landuse type in each catchment. Further details of remaining landuses can be found in the relevant sub-basin management plans. More detail on

agricultural land-use including soil phosphorus levels (where available), stocking density, fertilizer application, slurry spread grounds and application rates are not yet available but will be collected as part of continuing work on the FPM. Figures on livestock unit densities based on national livelstock unit density data provided by Teagasc. The average nationally is 1.20 livestock units per ha farmed land. Forestry coverage in each catchment is also provided.

**Table 6.4: Most Common Corine Landuse in Each FPM Catchment**

| | **Main Corine Landuse Categories (%)** | **Forestry Coverage ha** | **Livestock Units densities** (lu/ha) |
|---|---|---|---|
| Cloon | Pastures (63.3)<br>Peat Bogs (18.2)<br>Transitional Woodland Scrub (7.3) | 595 | Up to 0.77 |
| Owenmore | Agricultural (4.1)<br>Peat Bogs (62.3)<br>Forest and semi-natural area (32.7) | 183 | Up to 0.3 |
| | | | |
| Aughavaud | Pastures (65.6)<br>Peat Bogs (20.5)<br>Coniferous Forest (5.6) | 238 | Up to 0.7 |
| Ballymurphy | Pastures (65.6)<br>Peat Bogs (21.9)<br>Coniferous Forest (2) | 181 | Up to 1.8 |
| Clodiagh | Pastures (63.3)<br>Non- irrigated Arable Land (10.1)<br>Coniferous Forestry (6.2) | 1,651 | Up to 2.3 |
| Derreen | Pastures (55.7)<br>Peat Bogs (8.4)<br>Non- irrigated Arable Land (17.4) | 2,065 | Up to 2.3 |
| Mountain | Pastures (46.5)<br>Agricultural (17.9)<br>Peat Bogs (15.4) | 858 | Up to 1.8 |
| Nore | Pastures (70.5)<br>Coniferous Forestry (7.1)<br>Peat Bogs (5.0) | 12,817 | Up to 2.5 |
| | | | |
| Allow | Pasture (73.2)<br>Coniferous Forestry (6.1)<br>Transitional Woodland Scrub (5.5)<br>Peat Bogs (3.0) | 4,142 | Up to 1.8 |
| Bandon / Caha | Pastures (48.6) | 3,369 | Up to 1.41 |

| | **Main Corine Landuse Categories (%)** | **Forestry Coverage ha** | **Livestock Units densities** (lu/ha) |
|---|---|---|---|
| | Peat Bogs (21.9)<br>Coniferous Forestry 10.1) | | |
| Caragh | Peat Bogs (62.8)<br>Natural Grassland (10.5) | 1,330 | Up to 0.7 |
| Currane | Peat Bogs (54.7)<br>Sparsely vegetated Areas (11.0)<br>Pastures (9.1) | 371.4 | Up to 0.04 |
| Gearhameen | Peat Bogs (62)<br>Sparsely vegetated Areas (20.9)<br>Transitional Woodland Scrub (7.9) | 286 | Up to 0.2 |
| Kerry Blackwater | Peat Bogs (60.4)<br>Natural Grassland (10.4)<br>Coniferous Forestry (7.5) | 1,014 | Up to 0.1 |
| Licky | Pastures (45.3)<br>Transitional Woodland Scrub (26.1)<br>Coniferous Forestry (20) | 1,646 | Up to 0.98 |
| Ownagappul | Peat Bogs (68.5)<br>Sparsely vegetated Areas (9.3)<br>Natural Grassland (9.4)<br>Agricultural (8.7) | 143 | Up to 1.2 |
| Munster Blackwater | Pastures (62)<br>Peat Bogs (5.3)<br>Coniferous Forestry (7.8) | 32,590 | Up to 2.6 |
| | | | |
| Bundorragha | Peat Bogs (54.8)<br>Natural Grassland (22.3)<br>Bare Rock (14.8) | 275 | Up to 0.04 |
| Dawros | Peat Bogs (71.7)<br>Coniferous Forestry (5.7)<br>Sparsely vegetated Areas (7.4) | 380 | Up to 0.1 |
| Newport | Peat Bogs (52.8)<br>Agricultural (17.4)<br>Pastures (0.001) | 3,296 | Up to 0.3 |
| Owenriff | Peat Bogs (64)<br>Transitional Woodland Scrub (12.3)<br>Coniferous Forestry (11.5) | 1,128 | Up to 0.1 |
| | | | |
| Clady | Peat Bogs (76.5)<br>Pastures (5.2) | 363 | Up to 0.1 |

| | **Main Corine Landuse Categories (%)** | **Forestry Coverage ha** | **Livestock Units densities** (lu/ha) |
|---|---|---|---|
| | Natural Grassland (4.6) | | |
| Eske | Peat Bogs (32.6)<br>Pastures (21.5)<br>Moors and Heathlands (20) | 918 | Up to 0.1 |
| Glaskeelan | Peat Bogs (70.1)<br>Natural Grassland (15.8)<br>Transitional Woodland Scrub (7.3) | 119.3 | Up to 1.0 |
| Leannan | Peat Bogs (32)<br>Pastures (25.8)<br>Agricultural (18) | 2,762 | Up to 1.2 |
| Owencarrow | Peat Bogs (63.5)<br>Natural Grassland (16.4)<br>Coniferous Forestry (5.5) | 649 | Up to 0.27 |
| Owenea | Peat Bogs (37.4)<br>Moors and Heathlands (22.8)<br>Coniferous Forestry (9.4)<br>Pastures (12.9) | 2,195 | Up to 0.27 |

Industrial land uses have also been identified as a pressure on water bodies, which are to be addressed by the proposed FPM plans. Industrial point sources of interest include water treatment plants, IPPC licensed facilities, mines and quarries, together with Section 4 discharges licensed by Local Authorities. The total numbers of IPPC licensed facilities, Section 4 discharges and water treatment plants within the catchments of the designated areas are provided in **Table 6.5**. Mines and quarries are discussed in **Section 6.3.8**, Soils and Geology. A more detailed breakdown of the numbers and types of industrial point sources is provided in each of the Sub-basin Management Plans as are maps showing their locations.

Urban and rural land uses can also result in pressures on water quality, and indirectly FPM waters, as a result of water abstractions and wastewater discharges. Abstractions are discussed in **Section 6.3.3.4**, Water, while the numbers of on-site wastewater treatment plants are shown in **Table 6.6**.

Simplified pathway risk maps of each catchment were prepared as part of the sub-basin management plans. These were based on WFD national programme of measures and standards study on OSWWTS. Locations were derived from An Post Geodirectory data and although generalised maps, they highlight areas where there is likelihood of risk to surface water from pathogens. Maps can be found in the relevant sub-basin management plans.

**Table 6.5: Total numbers of IPPC, Section 4 Discharges and WWTP**

| | IPPC Licensed Facilities | Section 4 Discharges | WWTP |
|---|---|---|---|
| Cloon | 0 | 0 | 0 |
| Owenmore | 0 | 0 | 0 |
| | | | |
| Aughavaud | 0 | 0 | 0 |
| Ballymurphy | 0 | 0 | 0 |
| Clodiagh | 0 | 1 | 2 |
| Derreen | 2 | 0 | 6 |
| Mountain | 1 | 0 | 2 |
| Nore | 7 | 1 | 10 |
| | | | |
| Allow | 1 | 6 | 5 |
| Bandon / Caha | 0 | 0 | 1 |
| Caragh | 0 | 1 | 0 |
| Currane | 0 | 0 | 0 |
| Gearhameen | 0 | 0 | 0 |
| Kerry Blackwater | 0 | 0 | 0 |
| Licky | 0 | 0 | 0 |
| Ownagappul | 0 | 0 | 1 |
| Munster Blackwater | 24 | 22 | 40 |
| | | | |
| Bundorragha | 0 | 2 | 0 |
| Dawros | 0 | 1 | 0 |
| Newport | 0 | 0 | 0 |
| Owenriff | 0 | 0 | 1 |
| | | | |
| Clady | 0 | 2 | 1 |
| Eske | 0 | 1 | 0 |
| Glaskeelan | 0 | 0 | 0 |
| Leannan | 0 | 4 | 2 |
| Owencarrow | 0 | 0 | 0 |
| Owenea | 0 | 1 | 1 |

**Table 6.6: On-site Wastewater Treatment Point Sources**

| | Total No. of On-site WWTS | Surface Water Pathway Pathogen Risk (Total of extreme, very high and high) |
|---|---|---|
| Cloon | 348 | 348 |
| Owenmore | 26 | 26 |
| | | |
| Aughavaud | 130 | 57 |
| Ballymurphy | 244 | 136 |
| Clodiagh | 720 | 593 |
| Derreen | 1,901 | 840 |
| Mountain | 889 | 516 |
| Nore | 7,290 | 5,139 |
| | | |
| Allow | 2.373 | 2,044 |
| Bandon / Caha | 980 | 749 |
| Caragh | 219 | 219 |
| Currane | 151 | 148 |
| Gearhameen | 56 | 56 |
| Kerry Blackwater | 184 | 184 |
| Licky | 175 | 97 |
| Ownagappul | 93 | 68 |
| Munster Blackwater | 18,867 | 14,906 |
| | | |
| Bundorragha | 15 | 15 |
| Dawros | 106 | 104 |
| Newport | 416 | 411 |
| Owenriff | 253 | 234 |
| | | |
| Clady | 398 | 390 |
| Eske | 800 | 787 |
| Glaskeelan | 7 | 7 |
| Leannan | 2,771 | 2,769 |
| Owencarrow | 66 | 60 |
| Owenea | 709 | 705 |

#### 6.3.2.1 Drinking Water Quality

The European Communities (Drinking Water) Regulations (No. 2), 2007 came into force in March 2007. In accordance with these regulations, the local authority must notify the EPA where there has been a failure to meet a quality standard. **Table 6.7** shows the overall drinking water compliance rate within each County where a FPM catchment occurs, as recorded in the EPA (2008) report, *The Provision and Quality of Drinking Water in Ireland, A Report on the Years 2006 - 2007*.

**Table 6.7: Overall Drinking Water Quality Compliance Within Each County Where a Designated FPM Catchment Occurs**

| County / City | Overall Compliance Rate of Drinking Water |
|---|---|
| Clare | Overall compliance rate of 98.2%. Above the national average and an improvement from 97.7% in 2005. |
| Kerry | Overall compliance rate of 96.0%. Below the national average. |
| Galway | Overall compliance rate of 95.0%. Below the national average in 2006, and reduced by 0.7% since 2005. |
| Waterford | Overall compliance rate of 94.2%. Below the national average, dropped marginally from 94.7% in 2005. |
| Mayo | Overall compliance rate of 91.7%. Well below the national average. |
| Donegal | Overall compliance of 95.1%. Below the national average and dropped from 95.4% in 2005 |
| Carlow | Overall compliance rate of 98.9%. Above the national average, improved from 98.0%. |
| Cork (North) | Overall compliance rate of 97.1%. Close to the national average. |
| Cork (South) | Overall compliance rate of 98.4%. Above the national average figure. |
| Cork (West) | Overall compliance rate of 96.7%. Below the national average. |
| Wexford | Overall compliance rate of 94.2%. Below the national average. |
| Wicklow | Overall compliance rate of 95.0%. Below the national average. |
| Laois | Overall compliance rate of 97.2%. Close to the national average. |
| Kilkenny | Overall compliance rate of 97.2%. Close to the national average. |
| North Tipperary | Overall compliance rate of 98.6%. Above the national average for 2006, but decreased from 99.2% in 2005. |
| South Tipperary | Overall compliance rate of 97.4%. Above the national average |

*Source: The Provision and Quality of Drinking Water in Ireland 2006-2007, EPA 2008*

***Existing Environmental Pressures / Problems: Population and Land Use***

*Agriculture is an important activity in all regions containing FPM. All of the designated catchments considered here are located in RBD where agriculture is estimated to use between 55 and 75% of the land. Agricultural practices that contribute to increases in nutrient or silt to the river can be damaging to pearl mussels. Any practice that leads to exposure of bare ground can increase the fine sediment and nutrient load to the river. The cumulative effects of such practices can have very severe impacts on the FPM. Pearl mussels continued to thrive until recent years in catchments with very extensive agricultural practices. The intensification of agriculture, particularly with slurry and artificial fertilisers has led to cumulative effects that have had very severe consequences for pearl mussel reproductive success.*

*Also, new individual houses and housing clusters, reliant on septic tanks, directly threaten water quality in designated FPM waters. Residential development without adequate wastewater provision has the*

*potential to discharge directly to designated FPM waters. On-site wastewater treatment systems and other small effluent systems can be significant sources of nutrients to rivers. Losses from such systems typically behave as diffuse nutrient sources; however, more serious leaks and inappropriate systems can cause point source pollution damage.*

*Activities such as quarry, peat cutting, fording and landfills are also causing issues for FPM catchments. Quarry dust and effluent can cause problems with silt pollution and, in some cases, lime pollution. The crossing of fords by vehicular or animal traffic has contributed to significant sediment and nutrient loads to rivers, and directly crushed freshwater pearl mussels. Landfills and landfill leachate is also a source of surface and groundwater contamination that can find pathways to the river. Storm water drainage is also a source of silt and pollutants.*

### 6.3.3 Water

#### 6.3.3.1 Water Quality

As part of the sub-basin management plans, dedicated monitoring data has been collated and compared with FPM water quality parameter requirements outlined in FPM Regulations. Additional monitoring data from other monitoring programmes has also been collated in order to highlight any water quality issues in the vicinity of the FPM catchments. Datasets were collated from the Environmental Protection Agency (EPA) and the Central Fisheries Board (CFB). **Table 6.8** contains a summary of the water quality information included in the individual sub-basin management plans for each FPM catchment.

**Table 6.8: Overall Water Quality in Each FPM Catchment INCOMPLETE**

| FPM Catchment | Overall Water Quality |
|---|---|
| Cloon | The catchment fails all of the five Environmental Quality Objectives (EQOs) as specified in Schedule 4 of the European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations, S.I. 296 of 2009.<br>Under *Water Framework Directive Status from the River Basin Management Plans* (classification is based on monitoring data from 2006-2008) there are 2 high status waterbodies and 3 moderate status water bodies.<br>The unfavourable conservation status of the Freshwater Pearl Mussel led to the downgrading of 2 waterbodies to moderate, these otherwise would have been good. |
| Owenmore | The catchment fails four out of the five Environmental Quality Objectives (EQOs) as specified in Schedule 4 of the European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations, S.I. 296 of 2009.<br>Under *Water Framework Directive Status from the River Basin Management Plans* there are 4 high status waterbodies and 2 moderate status water bodies.<br>The unfavourable conservation status of the Freshwater Pearl Mussel led to the downgrading of 2 waterbodies to moderate, these otherwise would have been good (1) and high status (1). |
| | |

| FPM Catchment | Overall Water Quality |
|---|---|
| Aughavaud | The catchment fails all of the five Environmental Quality Objectives (EQOs) as specified in Schedule 4 of the European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations, S.I. 296 of 2009.<br><br>Under *Water Framework Directive Status from the River Basin Management Plans* (classification is based on monitoring data from 2006-2008), there was1 moderate status water body.<br><br>The unfavourable conservation status of the Freshwater Pearl Mussel led to the downgrading of 1 waterbodies to moderate, these otherwise would have been good/high. Other than freshwater pearl mussel status, there is no additional WFD monitoring data for this catchment. |
| Ballymurphy | The catchment fails all of the five Environmental Quality Objectives (EQOs) as specified in Schedule 4 of the European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations, S.I. 296 of 2009.<br><br>Under *Water Framework Directive Status from the River Basin Management Plans* (classification is based on monitoring data from 2006-2008) there is 1 high status waterbody and 1 moderate status waterbody.<br><br>The unfavourable conservation status of the Freshwater Pearl Mussel led to the downgrading of one water body to moderate, this otherwise would otherwise have had status assigned to it via extrapolation, as there is no addition WFD monitoring within this waterbody. |
| Clodiagh | The catchment fails all of the five Environmental Quality Objectives (EQOs) as specified in Schedule 4 of the European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations, S.I. 296 of 2009.<br><br>Under *Water Framework Directive Status from the River Basin Management Plans* (classification is based on monitoring data from 2006-2008) there are 9 high status waterbodies, 1 good status waterbody , 1 moderate status waterbody and 1 poor status waterbody.<br><br>All 9 high status waterbodies were determined via extrapolation of status from donor monitored waterbodies. General physico-chemical status led to one water body being classified at good status. Macroinvertebrates determined the status in the 1 moderate and 1 poor status water bodies. Status is moderate or worse due to other factors in the waterbodies where the freshwater pearl mussels are located. |
| Derreen | The catchment fails # out of the five Environmental Quality Objectives (EQOs) as specified in Schedule 4 of the European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations, S.I. 296 of 2009.<br><br>Under *Water Framework Directive Status from the River Basin Management Plans* (classification is based on monitoring data from 2006-2008) there are 11 high status waterbodies, 2 good status waterbodies and 3 moderate status waterbody.<br><br>11 high status waterbodies, 10 of which were determined via extrapolation from monitored donor water bodies. The 11$^{th}$ high status waterbody was determined by macroinvertebrates and physico-chemical status. 2 good status waterbodies were classified by physico-chemical status. 2 of the 3 moderate status waterbodies were classified by macroinvertebrate status, while the 3$^{rd}$ moderate waterbody was classified by the Freshwater Pearl mussel status due to unfavourable conservation status. This waterbody would otherwise have been classified at good status. |
| Mountain | The catchment fails all of the five Environmental Quality Objectives (EQOs) as specified in Schedule 4 of the European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations, S.I. 296 of 2009.<br><br>Under *Water Framework Directive Status from the River Basin Management Plans* (classification is based on monitoring data from 2006-2008) there are2 high status waterbodies, 4 good status waterbodies and 2 moderate status waterbodies.<br><br>The freshwater pearl mussel is at unfavourable conservation status and led to the downgrading of 2 water bodies to moderate status. These water bodies would otherwise have been classified at high (1) and good status (1). |

| FPM Catchment | Overall Water Quality |
|---|---|
| Nore | The catchment fails all of the five Environmental Quality Objectives (EQOs) as specified in Schedule 4 of the European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations, S.I. 296 of 2009.<br>Under *Water Framework Directive Status from the River Basin Management Plans* (classification is based on monitoring data from 2006-2008) there are 15 high status, 8 good status, 14 moderate status, 7 poor status and 1 bad status waterbodies.<br>The unfavourable conservation status of the Freshwater Pearl Mussel led to the downgrading of one waterbodies to moderate, these otherwise would have been good status. |
| | |
| Allow | The catchment fails four out of the five Environmental Quality Objectives (EQOs) as specified in Schedule 4 of the European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations, S.I. 296 of 2009.<br>Under *Water Framework Directive Status from the River Basin Management Plans* (classification is based on monitoring data from 2006-2008) there are 2 high status waterbodies, 2 good status waterbodies and 5 moderate status waterbodies.<br>The unfavourable conservation status of the Freshwater Pearl Mussel led to the downgrading of one waterbody to moderate, these otherwise would have been good. |
| Bandon | The catchment fails three out of the five Environmental Quality Objectives (EQOs) as specified in Schedule 4 of the European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations, S.I. 296 of 2009.<br>Under *Water Framework Directive Status from the River Basin Management Plans* (classification is based on monitoring data from 2006-2008) there are 11 high status waterbodies, 4 good status waterbodies and 3 moderate status waterbodies.<br>The unfavourable conservation status of the Freshwater Pearl Mussel led to the downgrading of 2 waterbodies to moderate, these otherwise would have been good/high. |
| Caragh | The catchment fails three out of the five Environmental Quality Objectives (EQOs) as specified in Schedule 4 of the European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations, S.I. 296 of 2009.<br>Under *Water Framework Directive Status from the River Basin Management Plans* (classification is based on monitoring data from 2006-2008) there are 11 High status water bodies, 8 Moderate status, and 1 Poor status water body.<br>The unfavourable conservation status of the Freshwater Pearl Mussel led to the downgrading of 7 waterbodies to moderate. Five of these waterbodies would otherwise have been assigned extrapolated status from monitored donor waterbodies, and the remaining two would have been classified at good and high status respectively. |
| Currane | The catchment fails three out of the five Environmental Quality Objectives (EQOs) as specified in Schedule 4 of the European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations, S.I. 296 of 2009.<br>Under *Water Framework Directive Status from the River Basin Management Plans* (classification is based on monitoring data from 2006-2008) there are 11 high status waterbodies, 2 good status waterbodies and 1 moderate status waterbody.<br>Due to lack of monitoring data, all 9 high status water bodies were classified through a process of extrapolation from monitored donor water bodies. Macroinvertebrates determined status in one good status water body. The 2nd good status water body was determined by fish status, while the 3 moderate status water bodies were as a result of unfavourable conservation status of the Freshwater Pearl Mussel. These water bodies would otherwise have been classified at high status (1) and good status (2) due to macroinvertebrate and physico-chemical status. |
| Gearhameen | The catchment fails three out of the five Environmental Quality Objectives (EQOs) as specified in Schedule 4 of the European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations, S.I. 296 of 2009.<br>Under *Water Framework Directive Status from the River Basin Management Plans* (classification is based on monitoring data from 2006-2008) there are 10 high status waterbodies and 1 moderate status waterbody. |

| FPM Catchment | Overall Water Quality |
|---|---|
| | The unfavourable conservation status of the Freshwater Pearl Mussel led to the downgrading of 1 waterbodies to moderate, these otherwise would have been good status. |
| Kerry Blackwater | The catchment fails all of the five Environmental Quality Objectives (EQOs) as specified in Schedule 4 of the European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations, S.I. 296 of 2009.<br>Under *Water Framework Directive Status from the River Basin Management Plans* (classification is based on monitoring data from 2006-2008) there are 12 high status waterbodies, 2 good status waterbodies and 5 moderate status waterbodies.<br>The unfavourable conservation status of the Freshwater Pearl Mussel led to the downgrading of 5 waterbodies to moderate, .2 of these water bodies would otherwise have been classified at good status, while the remaining 3 due to lack of monitoring data, would have been classified via extrapolated status. |
| Licky | The catchment fails all of the five Environmental Quality Objectives (EQOs) as specified in Schedule 4 of the European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations, S.I. 296 of 2009.<br>Under *Water Framework Directive Status from the River Basin Management Plans* (classification is based on monitoring data from 2006-2008) there are2 moderate status waterbodies.<br>The unfavourable conservation status of the Freshwater Pearl Mussel led to the downgrading of 1 waterbodies to moderate, these otherwise would have been at good status. |
| Ownagappul | The catchment fails out of the five Environmental Quality Objectives (EQOs) as specified in Schedule 4 of the European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations, S.I. 296 of 2009.<br>Under *Water Framework Directive Status from the River Basin Management Plans* (classification is based on monitoring data from 2006-2008) there are 7 high status waterbodies and 3 moderate status waterbodies.<br>The unfavourable conservation status of the Freshwater Pearl Mussel led to the downgrading of 2 waterbodies to moderate, these otherwise would have been good status due to their macroinvertebrate assessments. |
| Munster Blackwater | The catchment fails all of the five Environmental Quality Objectives (EQOs) as specified in Schedule 4 of the European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations, S.I. 296 of 2009.<br>Under *Water Framework Directive Status from the River Basin Management Plans* (classification is based on monitoring data from 2006-2008) there are 56 high status, 16 good status, 24 moderate status, 5 poor status waterbodies.<br>The unfavourable conservation status of the Freshwater Pearl Mussel led to the downgrading of 6 waterbodies to moderate, these otherwise would have been high (1) and good (5) status. |
| | |
| Bundorragha | The catchment meets all of the five Environmental Quality Objectives (EQOs) as specified in Schedule 4 of the European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations, S.I. 296 of 2009.<br>Under *Water Framework Directive Status from the River Basin Management Plans* (classification is based on monitoring data from 2006-2008) there are 3 High status waterbodies, and 1 Good status water body. |
| Dawros | The catchment fails most of the five Environmental Quality Objectives (EQOs) as specified in Schedule 4 of the European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations, S.I. 296 of 2009.<br>Under *Water Framework Directive Status from the River Basin Management Plans* (classification is based on monitoring data from 2006-2008) there are 17 high status waterbodies, 2 moderate status waterbodies and 1 poor status waterbody.<br>The unfavourable conservation status of the Freshwater Pearl Mussel led to the downgrading of 1 waterbodies to moderate, these otherwise would have been high status. |

| FPM Catchment | Overall Water Quality |
|---|---|
| Newport | The catchment fails all of the five Environmental Quality Objectives (EQOs) as specified in Schedule 4 of the European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations, S.I. 296 of 2009.<br><br>Under *Water Framework Directive Status from the River Basin Management Plans* (classification is based on monitoring data from 2006-2008) there are10 high status waterbodies, 2 good status waterbodies, 2 moderate status waterbodies and 1 poor status waterbody.<br><br>The freshwater pearl mussel population is at unfavourable conservation status in the Newport, and has led to the downgrading of 2 water bodies to moderate status. These water bodies would otherwise have been classified at high (1) and good (1) status. |
| Owenriff | The catchment fails four out of the five Environmental Quality Objectives (EQOs) as specified in Schedule 4 of the European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations, S.I. 296 of 2009.<br><br>Under *Water Framework Directive Status from the River Basin Management Plans* (classification is based on monitoring data from 2006-2008) there are 6 high status and 3 moderate status waterbodies.<br><br>The Freshwater Pearl Mussel is at unfavourable conservation status in the Owenriff catchment, and led to the downgrading of 3 water bodies to moderate status. One of these water bodies would otherwise have been classified at good status, and the remaining two would have been classify through extrapolation. |
| | |
| Clady | The catchment fails three out of the five Environmental Quality Objectives (EQOs) as specified in Schedule 4 of the European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations, S.I. 296 of 2009.<br><br>Under *Water Framework Directive Status from the River Basin Management Plans* (classification is based on monitoring data from 2006-2008) there are 4 High status, 1 Good status and 2 Moderate status waterbodies.<br><br>The freshwater pearl mussel population is at Unfavourable Conservation Status in the Clady, and has led to the downgrading of 1 water body to moderate status. This waterbody would otherwise have been classified at good status |
| Eske | The catchment fails all of the five Environmental Quality Objectives (EQOs) as specified in Schedule 4 of the European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations, S.I. 296 of 2009.<br><br>Under *Water Framework Directive Status from the River Basin Management Plans* (classification is based on monitoring data from 2006-2008) there are 7 high status waterbodies, 10 good status waterbodies and 5 moderate status waterbodies.<br><br>5 high status, 7 good status and 3 moderate status waterbodies were determined via extrapolation from monitored donor waterbodies. Macroinvertebrates determined the status in the 2 high status, 3 good status and the 2 moderate status water bodies. Status is moderate or worse due to other factors in the waterbodies where the freshwater pearl mussels are located |
| Glaskeelan | The catchment fails two out of the five Environmental Quality Objectives (EQOs) as specified in Schedule 4 of the European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations, S.I. 296 of 2009.<br><br>Under *Water Framework Directive Status from the River Basin Management Plans* (classification is based on monitoring data from 2006-2008) there are 1 high status waterbody and 2 moderate status waterbodies.<br><br>The 2$^{nd}$ moderate status water body was classified based on the unfavourable conservation status of the freshwater pearl mussel. This water body would otherwise have had its status determined by extrapolation due to lack of monitoring data. |
| Leannan | The catchment fails all of the five Environmental Quality Objectives (EQOs) as specified in Schedule 4 of the European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations, S.I. 296 of 2009.<br><br>Under *Water Framework Directive Status from the River Basin Management Plans* (classification is based on monitoring data from 2006-2008) there are 24 high status, 3 good |

| FPM Catchment | Overall Water Quality |
|---|---|
| | status, 1 moderate status, 2 poor status and 1 bad status waterbody.<br>Macroinvertebrates and general physico-chemical data dictated status in 1 high status, 3 good status, 1 moderate status, 2 poor status and 1 bad status water body. The remaining 23 high status and 1 good status water bodies were determined by extrapolation from donor monitored water bodies. Status is moderate or worse due to other factors in the water bodies where the freshwater pearl mussels are located. |
| Owencarrow | The catchment fails all of the five Environmental Quality Objectives (EQOs) as specified in Schedule 4 of the European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations, S.I. 296 of 2009.<br>Under *Water Framework Directive Status from the River Basin Management Plans* (classification is based on monitoring data from 2006-2008) there are12 high status waterbodies, 1 good status waterbody and 2 moderate status waterbodies.<br>The unfavourable conservation status of the Freshwater Pearl Mussel led to the downgrading of 2 waterbodies to moderate, these otherwise would have been high. |
| Owenea | The catchment fails all of the five Environmental Quality Objectives (EQOs) as specified in Schedule 4 of the European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations, S.I. 296 of 2009.<br>Under *Water Framework Directive Status from the River Basin Management Plans* (classification is based on monitoring data from 2006-2008) there are 4 high status, 9 good status, 1 moderate status, 1 poor status waterbodies.<br>The unfavourable conservation status of the Freshwater Pearl Mussel led to the downgrading of 1 waterbody to moderate, these otherwise would have been good. |

*Source: Section 3.0 of the individual sub-basin Management Plans*

#### 6.3.3.2 Protected Areas

Article 6 of the WFD requires each Member State to establish a register of protected areas. This register was split into five categories:

I. Drinking Waters;
II. Economically Significant Aquatic Species;
III. Recreational and Bathing Waters;
IV. Nutrient Sensitive waters; and
V. Protection of habitats.

**Table 6.9** summarises the number and types of protected areas within the contributing catchment for each FPM catchment.

#### 6.3.3.3 Morphological Pressures

Designated FPM waters come under pressure from morphological pressures; some of these pressures include, but are not limited to, heavily modified and artificial water bodies, fords, flood protection works, etc.

**Table 6.9** identifies whether an area or areas are subject to morphological pressures within the contributing catchment for each FPM area. Further details of these morphological pressures within each catchment can be reviewed in the relevant sub-basin management plans.

#### 6.3.3.4 Abstractions

Abstractions within the catchment areas of the designated FPM waters are taken from a variety of sources and are used for both public and private water supplies. **Table 6.9** identified whether a catchment is at risk or not at risk from known public and private abstractions within the contributing catchment for each designated catchment.

**Table 6.9: Water Resources in Designated FPM Catchment Areas**

| Designated Area | Total No. WFD Protected Areas* | | | | | At Risk from Abstraction** | Morphological Pressures |
|---|---|---|---|---|---|---|---|
| | I | II | III | IV | V | | |
| Cloon | 0 | 0 | 0 | 0 | 1 | Not at Risk | Yes |
| Owenmore | 0 | 0 | 0 | 0 | 2 | Not at Risk | No |
| | | | | | | | |
| Aughavaud | 0 | 0 | 0 | 0 | 2 | Not at Risk | No |
| Ballymurphy | 1 | 0 | 0 | 0 | 2 | Not at Risk | No |
| Clodiagh | 1 | 0 | 0 | 0 | 2 | At Risk | Possible |
| Derreen | 2 | 0 | 0 | 0 | 2 | Not at Risk | Possible |
| Mountain | 1 | 0 | 0 | 0 | 2 | Not at Risk | No |
| Nore | 0 | 0 | 0 | 0 | 9 | Not at Risk | Yes |
| | | | | | | | |
| Allow | 1 | 0 | 0 | 0 | 1 | At Risk | No |
| Bandon | 2 | 0 | 0 | 0 | 1 | Not at Risk | Yes |
| Caragh | 0 | 0 | 0 | 0 | 1 | Not at Risk | Yes |
| Currane | 0 | 0 | 0 | 0 | 1 | Not at Risk | No |
| Gearhameen | 0 | 0 | 0 | 0 | 1 | Not at Risk | Yes |
| Kerry Blackwater | 0 | 1 | 0 | 0 | 3 | Not at Risk | No |
| Licky | 0 | 0 | 0 | 0 | 1 | Not at Risk | No |
| Ownagappul | 2 | 1 | 0 | 0 | 2 | Not at Risk | Yes |
| Munster Blackwater | 7 | 0 | 0 | 1 | 5 | At Risk | Yes |
| | | | | | | | |
| Bundorragha | 1 | 1 | 0 | 0 | 1 | Not at Risk | Yes |
| Dawros | 1 | 1 | 0 | 0 | 2 | Not at Risk | Yes |
| Newport | 3 | 1 | 0 | 0 | 1 | At Risk | Yes |
| Owenriff | 2 | 0 | 0 | 0 | 2 | Not at Risk | Yes |
| | | | | | | | |

| Designated Area | Total No. WFD Protected Areas* | | | | | At Risk from Abstraction** | Morphological Pressures |
|---|---|---|---|---|---|---|---|
| | I | II | III | IV | V | | |
| Clady | 1 | 1 | 0 | 0 | 2 | Not at Risk | Yes |
| Eske | 3 | 1 | 0 | 0 | 3 | At Risk | No |
| Glaskeelan | 1 | 0 | 0 | 0 | 2 | Not at Risk | Yes |
| Leannan | 2 | 0 | 0 | 0 | 3 | At Risk | No |
| Owencarrow | 1 | 0 | 0 | 0 | 2 | Not at Risk | Possible |
| Owenea | 2 | 0 | 0 | 0 | 3 | At Risk | Possible |

***Note: Categories for Protected Areas:** I. Drinking Waters; II. Economically Significant Aquatic Species; III. Recreational and Bathing Waters; IV. Nutrient Sensitive Waters; V. Protection of Habitats*

***: Based on WFD POMs Standards Study.** This was a general study relating to impacts to water quality and not FPM specifically. Where additional information from field work on FPM has identified localised issues, this is recorded in the sub-basin management plans.*

***Existing Environmental Pressures / Problems: Water***

*Existing environmental pressures on the designated FPM waters have been identified in the Sub-basin Management Plans. The following categories were identified as the key and secondary pressures on water. More details on a sub-basin by sub-basin level are included in **Appendix B**.*

***Agriculture.** Trampling, poaching, direct cattle access to the channel, slurry spreading leading to eurtrophication, improved grassland and intensive agriculture can all lead to increased siltation and nutrient levels within the channel..*

***Municipal Discharges.** Inadequately treated effluents and spills or leakage from municipal sewerage networks can lead to unacceptable levels of pollutants in receiving waters. These pollutants can damage water quality.*

***Wastewater from Unsewered Properties.** In rural areas many houses and businesses are not connected to the public systems that collect, treat and dispose of wastewater. These rely mainly on on-site systems (conventional septic tanks or proprietary systems) via soil percolation areas, which if not designed, installed or operated properly can result in water pollution.*

***Physical Modifications.** Physical modifications can affect waterways by directly affecting habitats, or by indirectly changing natural processes through altering aquatic communities. Land drainage, overgrazing and de-forestation can have an indirect effect, changing how much and how fast water drains off the land, resulting in increased flood risks.*

### 6.3.4 Air Quality and Climatic Factors

The EU Air Framework Directive requires that member states divide their territory into zones for the assessment and management of air quality. The zones adopted in Ireland are as follows:

- **Zone A** - Dublin City and Environs.
- **Zone B** - Cork City and Environs.
- **Zone C** - 16 Urban areas with populations greater than 15,000.

  Note: Zone C includes Galway, Limerick, Waterford, Clonmel, Kilkenny, Sligo, Drogheda, Wexford, Athlone, Ennis, Bray, Naas, Carlow, Tralee and Dundalk.
- **Zone D** is the remainder of the state excluding Zones A, B and C.

The pearl mussel catchments lie predominantly in Zone C and D. Air quality in Zone C areas tends to be typical of towns and urban locations with the main sources of pollutants including traffic, commercial/domestic space heating and some industry. EPA monitoring results for 2006 at Zone C locations illustrate compliance with the Air Quality Standards limit values for all pollutants. Air quality in Zone D areas is generally very good with low concentrations of pollutants such as $NO_2$, $PM_{10}$, CO. Concentrations of ozone are higher in rural areas than is urban areas due to the absence of the nitrogen oxide in rural areas as an ozone scavenger. Ozone is also a transboundary pollutant with locations on the West Coast have the highest concentrations in Ireland.

In addition to the legislated air pollutants, nuisance such as dust deposition and odour can impact on amenity of the environment. Nuisance can occur at a local level in the vicinity of industrial, waste and wastewater treatment facilities. The EPA records all complaints relating to IPPC and Waste licensed facilities.

The existing climate on the island of Ireland is dominated by the Atlantic Ocean. Consequently, Ireland does not suffer from the extremes of temperature experienced by many other countries at similar latitude. According to Met Éireann, average annual temperature is about 9°C. In the middle and east of the country temperatures tend to be somewhat more extreme than in other parts of the country. For example, summer mean daily maximum is about 19°C and winter mean daily minimum is about 2.5°C in these areas.

Mean annual wind speed varies between about 4 m/sec in the east midlands and 7 m/sec in the northwest. Strong winds tend to be more frequent in winter than in summer. Sunshine duration is highest in the southeast of the country. Average rainfall varies between 800 and 2,800 mm. With south-westerly winds from the Atlantic dominating, rainfall figures are highest in the northwest, west and southwest of the country, especially over the higher ground. Rainfall accumulation tends to be highest in winter and lowest in early summer.

Met Eireann have approximately 16 synoptic weather stations located around the country which record precipitation, wind, sunshine and temperature. The most relevant stations for the FPM catchments would be Malin Head, Belmullet, Shannon Airport, Valencia, Cork Airport, Johnstown Castle and Kilkenny.

Greenhouse gases in the atmosphere are rising as a result of human activity. Under the Kyoto Protocol, Ireland's target is to limit emissions to 13% above 1990 levels over the five-year period from 2008 to 2012, within the overall EU target to reduce emissions to 8% in the same timeframe. For the period beyond 2012, the EU Council of Ministers has recently committed to achieving at least a 20% reduction of greenhouse gas emissions by 2020, compared to 1990 levels. The EU Commission's initial proposal for the post 2012 period requires Ireland to deliver by 2020 a 20% reduction in emissions of greenhouse gases. This excludes sectors covered by the Emissions Trading Scheme. The Council also agreed to extend the overall target to a 30% reduction if other developed countries commit to comparable reductions. Ireland's share of the 30% reduction target has yet to be agreed.

***Existing Environmental Pressures / Problems: Air Quality / Climate***

*Currently there are no significant concerns with regard to air quality within any of the River Basin Districts containing FPM. Poor wastewater treatment infrastructure can lead to odour nuisance issues at specific plants. Dust and $PM_{10}$ can also be an issue locally during construction and operation.*

*Inputs of greenhouse gases from water management activities within the designated FPM catchments, which require the use of fossil fuels, add to the carbon dioxide emissions produced on the island as a whole. The emission of greenhouse gases in general is currently the focus of emission reduction programmes under Ireland's Kyoto Protocol agreements. In addition, the potential changes in climate predicted as a result of anthropogenic greenhouse gas emissions are expected to result in pressures on water quantity and precipitation regimes as discussed in the previous section.*

### 6.3.5 Cultural Heritage

The sites, structures and features considered as part of the cultural heritage baseline include those listed on the:

- Record of Monuments and Places (RMP), which is the statutory list of all known archaeological monuments in Ireland and is compiled by the Archaeological Survey of Ireland;
- National Inventory of Architectural Heritage (NIAH), which identifies, records and evaluates the post-1700 architectural heritage of Ireland, uniformly and consistently as an aid in the protection and conservation of the built heritage. NIAH surveys provide the basis for the recommendations of the Minister for the Environment, Heritage and Local Government to the planning authorities for the inclusion of particular structures in their Record of Protected Structures; and
- United Nations Educational, Scientific and Cultural Organisation (UNESCO) World Heritage List, which includes cultural and natural heritage sites around the world considered to be of outstanding value to humanity.

**Table 6.10** presents the number of features listed on each of these within the contributing catchments of the FPM waters. These are in addition to previously unknown archaeological sites and features.

**Table 6.10: Number of listed/designated cultural heritage resources in each catchment**

| Designated Area | RMP | NIAH* | UNESCO |
|---|---|---|---|
| Cloon | 35 | 1 | 0 |
| Owenmore | 64 | 1 | 0 |
| | | | |
| Aughavaud | 32 | 2 | 0 |
| Ballymurphy | 55 | 2 | 0 |
| Clodiagh | 175 | 113 | 0 |
| Derreen | 233 | 44 | 0 |
| Mountain | 113 | 58* | 0 |
| Nore | 1,398 | 368 | 0 |
| | | | |
| Allow | 791 | 104 | 0 |
| Bandon | 224 | ND | 0 |
| Caragh | 132 | 1 | 0 |
| Currane | 88 | 0 | 0 |
| Gearhameen | 94 | 0 | 0 |
| Kerry Blackwater | 193 | 2 | 0 |
| Licky | 14 | 3 | 0 |
| Ownagappul | 75 | ND | 0 |
| Munster Blackwater | 5,372 | 1,513* | 0 |
| | | | |
| Bundorragha | 8 | ND | 0 |
| Dawros | 12 | ND | 0 |
| Newport | 31 | ND | 0 |
| Owenriff | 19 | ND | 0 |
| | | | |
| Clady | 9 | ND | 0 |
| Eske | 31 | ND | 0 |
| Glaskeelan | 4 | ND | 0 |
| Leannan | 152 | ND | 0 |
| Owencarrow | 2 | ND | 0 |
| Owenea | 31 | ND | 0 |

** NIAH data is currently in the process of being digitised for some Counties and parts of Counties, therefore these figures do not include the catchments or parts of catchments in Counties Donegal, Mayo, Galway, Limerick, West Cork and Wexford.*

*ND – no data*

Also of relevance may be underwater heritage features. The Underwater Heritage database is currently being compiled for Ireland.

***Existing Environmental Pressures / Problems: Cultural Heritage***

*Development resulting from economic growth and increasing population is placing pressure on these sites or features of archaeological, architectural or cultural heritage interest. Individually these developments, including development of water-related infrastructure, puts direct pressure on architectural heritage, where it is in proximity to, or increases the potential to interact with known or previously unknown archaeological sites and features. Cumulatively, this results in impacts on the overall cultural heritage resource.*

### 6.3.6 Landscape

In terms of landscape and visual amenity, local authorities in Ireland conserve and protect scenic value as Areas of High Amenity, Areas of Outstanding Natural Beauty and Protected Views. Each local authority is responsible for the designation of these within their individual jurisdictions, with each Development Plan providing objectives to protect such views. Specific landscape features within the counties are often not listed within these plans; as such it is difficult to provide a list of these within this baseline. Therefore, a summary description of the landscape character of counties containing FPM designated areas can be found in Appendix to Chapter 5 of each of the relevant River Basin Districts SEA Environmental Reports.

***Existing Environmental Pressures / Problems: Landscape***

*Existing pressures on landscape and visual resources as a result of water management activities are limited and are primarily related to impacts to sensitive views and landscapes resulting from the siting of development, including water related infrastructure, without sensitivity to these resources.*

### 6.3.7 Material Assets

The following is a summary of the baseline environment within the catchments of the designated Freshwater Pearl Mussel waters in relation to material assets. The summary below includes both water-related material assets, such as licensed aquaculture areas, and non-water related material assets, such as agriculture. The purpose of including both water and non-water related material

assets is to characterise those facilities/activities whose operations may potentially be affected, either positively or negatively, by measures included in the sub-basin plans.

Water-related infrastructure is considered a material asset for the purposes of this baseline, as existing infrastructure may be affected by implementation of the sub-basin plans. Water-related infrastructure relevant to the sub-basin plans includes facilities such as wastewater treatment plants (WWTP), as these may require upgrade under the sub-basin plans. The numbers of WWTP within each of the designated FPM water catchments have been laid out in **Section 6.3.2**, Population and Land Use. Other water-related infrastructure, such as abstractions and morphological features, such as fords can also be considered material assets. These have been discussed and listed in previous sections of this chapter.

Commercial activities in proximity to the designated waters are also considered to be material assets in the context of this SEA. The commercial activities relevant to the sub-basin plans include agriculture, forestry, and industry, as these may all be affected by implementation of the sub-basin plans. Information on forestry, agriculture and industrial activities, if present, is included in **Section 6.3.2**.

***Existing Environmental Pressures / Problems: Material Assets***

*Increased development including residential and industrial expansion continues to put pressure on existing water sources with regards to quantity as well as on the facilities used to treat both drinking and wastewater. In addition, existing water quality issues are resulting in pressures on fisheries used for recreational purposes.*

### 6.3.8 Soils and Geology

Soils issues in relation to the sub-basin management plans include disturbance to soils, erosion and nutrient movement as a result of landuses such as agriculture, forestry and quarrying / mining. In addition, nutrient movement

#### 6.3.8.1 Nutrient Movement

The movement of nutrients through the soil layer and into surface and groundwaters is primarily related to agricultural and forestry activities in the form of applied fertilisers. In addition, nutrients and pathogens are also transported to waterbodies through the soil layer from livestock grazing along waterbody edges.

#### 6.3.8.2 Quarries. Mines, Landfills and Contaminated Lands

Mining and quarrying operations can impact on levels of suspended solids and metals in receiving waters whilst landfills and contaminated sites can be more diverse and impact on the levels of nutrients, suspended sediments and oxygen levels as well as metals and other chemicals. The number of quarries, mines, landfills and contaminated sites within the catchments are provided in **Table 6.11**.

**Table 6.11: Number of Quarries, Mines, Landfills and Contaminated Sites**

| Designated Area | Quarries | Mines | Landfills | Contaminated Sites |
|---|---|---|---|---|
| Cloon | 3 | 0 | 0 | 0 |
| Owenmore | 0 | 0 | 0 | 0 |
| | | | | |
| Aughavaud | 0 | 0 | 0 | 0 |
| Ballymurphy | 0 | 0 | 0 | 0 |
| Clodiagh | 0 | 0 | 0 | 0 |
| Derreen | 4 | 0 | 0 | 0 |
| Mountain | 0 | 0 | 0 | 0 |
| Nore | 7 | 1 | 0 | 3 |
| | | | | |
| Allow | 5 | 0 | 1 | 0 |
| Bandon | 4 | 0 | 1 | 0 |
| Caragh | 0 | 0 | 0 | 0 |
| Currane | 0 | 0 | 0 | 0 |
| Gearhameen | 1 | 0 | 0 | 0 |
| Kerry Blackwater | 0 | 0 | 0 | 0 |
| Licky | 1 | 0 | 0 | 0 |
| Ownagappul | 0 | 0 | 0 | 0 |
| Munster Blackwater | 19 | 1 | 21 | 2 |
| | | | | |
| Bundorragha | 1 | 0 | 0 | 0 |
| Dawros | 2 | 0 | 0 | 0 |
| Newport | 1 | 0 | 0 | 0 |
| Owenriff | 0 | 0 | 0 | 0 |
| | | | | |
| Clady | 3 | 0 | 0 | 0 |
| Eske | 0 | 0 | 0 | 0 |
| Glaskeelan | 0 | 0 | 0 | 0 |
| Leannan | 3 | 2 | 1 | 0 |
| Owencarrow | 0 | 0 | 0 | 0 |

| Designated Area | Quarries | Mines | Landfills | Contaminated Sites |
|---|---|---|---|---|
| Owenea | 0 | 1 | 0 | 0 |

***Existing Environmental Pressures / Problems: Soils***

*Eroded soil washed into rivers during heavy rainfall contains and increased nutrient content, which can damage the balance of nutrient poor, aquatic ecosystems by shifting their species composition, supporting more nutrient-loving species. This can lead to eutrophication of rivers and lakes. If contaminated soils are eroded and transported to aquatic plants and animals can be severely damaged.*

### 6.3.9 Inter-relationships

The interrelationship between the SEA environmental topics is an important consideration for environmental assessment. **Table 6.12** highlights the key interrelationships identified in this SEA. These potential interrelationships will be taken into account in the assessment of the different alternatives.

Of particular note is the primary relationship between water quality and biodiversity, flora and fauna and human health. Flora and fauna, including FPM, rely directly on the aquatic environment as a habitat. The quality of this habitat has a direct relationship to the quality of foodstuffs (e.g. fish) and its impact on human health.

Another key interrelationship is between water and climate. Greenhouse gas emissions associated with energy use during water management activities, such as treatment of wastewater, have the potential to negatively impact on climate change. This in turn can result in more frequent and more intense flooding and drought conditions affecting materials assets and biodiversity, including Freshwater Pearl Mussel, through changes in water quality and the hydrologic regime.

**Table 6.12: Key Inter-relationships between SEA Topics**

| | Biodiversity Flora, Fauna | Population / Human Health | Soil | Water | Climatic Factors | Material Assets | Cultural Heritage |
|---|---|---|---|---|---|---|---|
| **Population / Human Health** | √ | | | | | | |
| **Soil** | √ | √ | | | | | |
| **Water** | √ | √ | √ | | | | |
| **Climatic Factors** | √ | √ | √ | √ | | | |
| **Material Assets** | √ | √ | √ | √ | √ | | |
| **Cultural Heritage** | X | √ | X | √ | √ | √ | |
| **Landscape** | X | √ | X | √ | X | √ | X |

## 6.4 EVOLUTION OF THE ENVIRONMENT IN ABSENCE OF THE SUB-BASIN MANAGEMENT PLANS

The sub-basin management plans are aimed at improving water quality in designated freshwater pearl mussel waters in order to meet the water quality requirements contained in the FPM Regulations 2009. In the absence of the sub-basin management plans, the pressures identified in the sub-basin management plans would continue to impact on water quality, perpetuating the indirect impacts associated with these on FPM populations.

It should be noted however that beyond the short-term, the River Basin Management Plans, which are to be implemented from 2010, are aimed at addressing many of the same issues and would be expected to improve water quality in the designated FPM areas regardless of the sub-basin plans.

The River Basin Management Plans incorporate the requirements of existing directives, daughter directives and measures to reduce pollution. They provide for the coordination of these controls to reduce impacts to the water environment across Ireland and examine how human activities are impacting the water environment in a holistic fashion. The implementation of these Plans will, ensure water management across Ireland is carried out in a coordinated manner with both direct and indirect positive benefits to FPM populations. That said, according to a recent EPA report (2008) trends in water quality in Ireland show an overall improvement; however, the rate of this improvement in surface waters is not sufficient to meet the requirement of having good status in all waters by 2015 as required

by the Water Framework Directive. Given the unfavourable conservation status of many of the FPM populations, without targeted and specific measures being implemented in the short term, it is possible that some populations may be beyond recovery if not sub-basin specific plans are implemented.

As a result of manmade greenhouse gas emissions, climate change is predicted to occur in the future regardless of action. The UN Intergovernmental Panel on Climate Change (IPCC) in their *Climate Change 2007: Climate Change Impacts, Adaptation and Vulnerability Report* predict sea level rise, changes in rainfall patterns and temperatures as well as changes in the frequency of droughts and extreme weather events. The potential impacts from sea level increases, increased flooding, summer droughts, etc., will impact on water management and on FPM. This is likely either with or without the Plans.

According to the EPA report "Implications of the EU Climate Protection Target for Ireland", 'water supply and quality are highly sensitive to climate variability and change. Future changes in climate are likely to have major impacts on water resources in Ireland. Recent research by Murphy and Charlton (2006) outlines spatial changes in run-off for Ireland in future downscaled scenarios. The results highlight the importance of individual catchment characteristics in controlling response to climate change. Reductions in groundwater storage and recharge will increase the risk of drought in some areas. The likelihood and magnitude of flood events are also likely to increase, which has important implications for infrastructure and development on affected flood plains. Also, there will be impacts upon the reliability of existing flood defences, and, in the future, increased insurance costs. Water quality is another area for concern as in certain areas it may be impacted by the contamination of coastal aquifers from saline intrusion'.

Therefore, evolution of the climatic environment is likely to be heavier winter rainstorms causing more flash flooding, resulting in an increase in diffuse pollution loads from soil run-off and increasing demand for flood controls. These types of flood events would continue to pose a risk to soils as a result of erosion and release of contaminants, thus potentially leading to further water quality problems for FPM populations. Summer droughts are also likely and recent reports have indicated that the effects of climate change in Ireland will have serious consequences for water resources, resulting in a potential 40% reduction in drinking water supplies. Also, temperature changes may give invasive alien species a competitive advantage, all of which would put further pressure on FPM populations.

The FPM sub-basin management plans and the RBMPs, although complementary in terms of improved water quality they each have a slightly different focus. The sub-basin management plans aim to ensure that the parameters specified in the FPM Regulations are met for FPM designated areas.

# 7 STRATEGIC ENVIRONMENTAL OBJECTIVES, TARGETS AND INDICATORS

## 7.1 INTRODUCTION

Because SEA, as its name suggests, is set at a strategic level, it is not possible for the baseline environment to be described (and assessed) in as much detail as could be done for a project-level environmental impact assessment. Instead, SEA uses a system of *objectives*, *targets* and *indicators* to rationalise information for the purposes of assessment.

In order to streamline the assessment process, this report has used broad themes, based on the environmental topics listed in the SEA Directive, to group large environmental data sets, e.g., human health, cultural heritage and climate. Assigned to each of these themes is at least one high-level Strategic Environmental Objective that specifies a desired direction for change, e.g. reduce $CO_2$ emissions, against which the future impacts of the Plans can be measured. These high-level Strategic Environmental Objectives are then paired with specific targets. The progress towards achieving these specific targets is monitored using Indicators, which are measures of identified variables over time.

It is noted that in recognition of the close links between the FPM Sub-Basin Management Plans and the RBMP and POMs under the WFD, as far as possible the objectives used in the SEA for the RBMPs and POMs has been carried through to this assessment of the sub-basin plans. The selection of the environmental objectives had regard to the environmental protection objectives outlined in **Chapter 4** *Other Relevant Plans and Policies*. Selection was also based on consultation with statutory consultees and stakeholders during the scoping stage.

**Section 7.2** describes the Strategic Environmental Objectives, Targets and Indicators used in assessing the Sub-basin Management Plans.

## 7.2 DEVELOPMENT OF STRATEGIC ENVIRONMENTAL OBJECTIVES, TARGETS AND INDICATORS

### 7.2.1 Strategic Environmental Objectives

There are essentially three types of Objectives considered as part of this SEA. The first relates to the Objectives of the European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations and the Sub-basin Management Plans (see **Chapter 5**). The second relates to wider

Environmental Objectives, i.e. environmental protection objectives at a national, European and international level (see **Chapter 4**), and finally there are the Strategic Environmental Objectives, which were devised to test the effects of the sub-basin plans on the wider environment.

The Strategic Environmental Objectives reflect the existing environmental issues relevant to implementation of the sub-basin plans. They are focussed on protecting and enhancing the natural and human environment and on minimising negative effects. The objectives were developed to be consistent with the environmental protection objectives established by international, European and national environmental policies, objectives and standards.

The selected Strategic Environmental Objectives for this SEA are set out in **Table 7.1**. These environmental objectives are based on the current understanding of the key environmental issues identified. In addition, the selection of the environmental objectives had regard to the indicative list of environmental protection objectives outlined in the documents *Implementation of SEA Directive 2001/42/EC* (DoEHLG, 2004). Selection was also based on discussions between the SEA Team and the team preparing the sub-basin plans as well as comments received from the Steering Group and from consultees during the scoping process.

Also, included in **Table 7.1** are *detailed assessment criteria*, which represent the issues that will be considered during the assessment of whether the proposed alternatives for the sub-basin plans will contribute to meeting the Strategic Environmental Objectives.

**Table 7.1: Strategic Environmental Objectives**

| Objective | Detailed Assessment Criteria* – To what extent will the Freshwater Pearl Mussel Sub-Basin Management Plans: | Related to SEA Topic(s) |
|---|---|---|
| **Objective 1** Prevent damage to terrestrial, aquatic and soil biodiversity, particularly EU designated sites and protected species. | • Provide effective protection of European and nationally designated biodiversity sites?<br>• Sustain, enhance or where relevant prevent the loss of ecological networks or parts thereof which provide significant connectivity between areas of biodiversity?<br>• Avoid loss of relevant habitats, species or their sustaining resources in national and European designated ecological sites?<br>• Support delivery of WFD and RBMP?<br>• Reduce water related impacts by alien species?<br>• Meet Favourable Conservation Status for the FPM? | Biodiversity, Flora and Fauna (BFF) |

| Objective | Detailed Assessment Criteria* – To what extent will the Freshwater Pearl Mussel Sub-Basin Management Plans: | Related to SEA Topic(s) |
|---|---|---|
| **Objective 2** Contribute to sustainable development in the contributing catchments | • Guide land use planning?<br>• Ensure adequate water and wastewater treatment infrastructure capacity is in place?<br>• Improve water quality / quantity?<br>• Improve the provision of treatment services to those areas where deficiencies exist at present?<br>• Contribute to floods or droughts on established populations?<br>• Contribute to water conservation measures within the sub-basins? | Population (P) |
| **Objective 3** Protect and reduce risk to human health in undertaking water management activities. | • Protect drinking water areas (including private abstractions), bathing waters, economic shellfish waters and fisheries? | Human Health (HH) |
| **Objective 4** Avoid damage to the function and quality of the soil resource in contributing catchments. | • Accelerate or reduce erosion?<br>• Result in impacts on the productivity of agricultural land?<br>• Safeguard soil quality, quantity and function? | Soil (S) |
| **Objective 5** Achieve or maintain the water quality parameters in accordance with Regulation 2 and the Third and Fourth Schedules of the FPM Regulations. | • Reduce the impacts on FPM from point source pollution, diffuse source pollution, abstraction, flow regulation, direct discharges to groundwater, priority substance pollution, physical modifications, accidental pollution incidents and other activities with an impact on the status of water, as required by the WFD?<br>• Reduce impact from physical modifications on habitat and fish passage?<br>• Provide effective protection of “protected areas” as defined in the WFD?<br>• Contribute toward achieving the basic (“good / high status”) objectives of the WFD? | Water (W) |
| **Objective 6** Minimise contribution to climate change by emission of greenhouse gasses associated with FPM Sub-basin Management Plan implementation. | • Contribute to reducing GHG emissions from water management activities?<br>• Encourage improved energy efficient in water management activities? | Air Quality and Climatic Factors (C) |
| **Objective 7** Maintain level of protection provided by existing morphological infrastructure, e.g. flood defences, coastal barriers, groynes, etc. in the contributing catchments | • Maintain existing infrastructure, e.g. flood defences, coastal barriers, groynes, etc.? | Material Assets (MA1) |

| Objective | Detailed Assessment Criteria* – To what extent will the Freshwater Pearl Mussel Sub-Basin Management Plans: | Related to SEA Topic(s) |
|---|---|---|
| **Objective 8**<br>Support economic activities within the District without conflicting with the objectives of the WFD or the FPM Regulations. | • Result in a loss of land available for economic activity?<br>• Result in significant changes to an existing economic activity, which would render it unviable? | Material Assets (MA2) |
| **Objective 9**<br>Protect water as an economic resource in the contributing catchments. | • Provide for efficient and sustainable use of water for consumption, as a tourism and recreational resource and for other economic activities, e.g. commercial aquaculture?<br>• Maintain the economic benefit of water associated with navigation and trade activities? | Material Assets (MA 3) |
| **Objective 10**<br>Avoid damage to cultural heritage resources in the contributing catchments. | • Conserve with archaeological, architectural or cultural heritage features? | Cultural Heritage (CH) |
| **Objective 11**<br>Avoid damage to designated landscapes in the in the contributing catchments | • Conserve designated landscape areas? | Landscape (L) |

** Detailed criteria are cited where appropriate and these will be used to ensure consistent application of the objectives.*

### 7.2.2 Internal Compatibility of Strategic Environmental Objectives

The internal compatibility of the Strategic Environmental Objectives has been examined to identify potential areas of conflict in relation to each objective so that subsequent decisions can be well based. As shown in **Figure 7.1**, generally the eleven objectives above are compatible. For example, the objective for climate change is consistent with protecting and enhancing biodiversity and protecting human health. In some cases there is no obvious relationship between the objectives, e.g. no direct link between interfering with designated landscape areas and minimising contribution to climate change. Potential conflict arises for Objectives 1, 10 and 11 as a number of other objectives, e.g. 3 and 5, may require increased treatment and construction of infrastructure and, depending on siting and design, this could have impacts on designated landscapes (Objective 11), cultural heritage features (Objective 10) and biodiversity (Objective 1). However, consideration of potential environmental impacts together with careful siting of infrastructure will reduce potential for conflict.

| | Objective 1 BFF | Objective 2 P | Objective 3 HH | Objective 4 S | Objective 5 W | Objective 6 AQ / C | Objective 7 MA1 | Objective 8 MA2 | Objective 9 MA3 | Objective 10 CH | Objective 11 L |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Objective 1 BFF** | | | | | | | | | | | |
| **Objective 2 P** | Y | | | | | | | | | | |
| **Objective 3 HH** | Y / N | Y | | | | | | | | | |
| **Objective 4 S** | Y | Y | Y | | | | | | | | |
| **Objective 5 W** | Y / N | Y | Y | Y | | | | | | | |
| **Objective 6 C** | Y | Y | Y / N | Y | Y / N | | | | | | |
| **Objective 7 MA1** | Y / N | Y | Y | Y | Y | Y | | | | | |
| **Objective 8 MA2** | Y / N | Y | Y | Y / N | Y | Y / N | Y | | | | |
| **Objective 9 MA3** | Y / N | Y | Y | Y | Y | Y | Y | Y/N | | | |
| **Objective 10 CH** | Y / N | N | Y / N | Y | Y / N | Y | Y | Y / N | Y | | |
| **Objective 11 L** | Y / N | N | Y / N | Y | Y / N | 0 | Y | Y / N | Y | Y | |

Key: Y = Yes, compatible N = No, not compatible 0 = Neutral Y/N = May be compatible depending on how it is implemented

**Figure 7.1 Matrix of SEA Objective Internal Compatibility**

### 7.2.3 Compatibility with Plan Objectives

The compatibility of the environmental objectives and the Plan objectives was also examined using a compatibility matrix (see **Table 7.2)**. The Plan objectives are based on the objectives of the FPM Regulations. The Plan objectives are broadly compatible with the environmental objectives. However, it is recognised that some Plan objectives may only be compatible with the SEA objectives depending on how they are implemented, e.g. impacts to protected landscapes or cultural heritage features may occur if new infrastructure is required to achieve the Plan objectives and environmental conflicts arise due to the sensitivity/ vulnerability of the proposed location.

**Table 7.2: Compatibility of Strategic Plan Objectives and Strategic Environmental Objectives**

| SEA / PROGRAMME | Objective 1 BFF | Objective 2 P | Objective 3 HH | Objective 4 S | Objective 5 W | Objective 6 AQ / C | Objective 7 MA1 | Objective 8 MA2 | Objective 9 MA3 | Objective 10 CH | Objective 11 L |
|---|---|---|---|---|---|---|---|---|---|---|---|
| To support the achievement of favourable conservation status for | Y | Y/N | Y/N | Y | Y | Y/N | Y/N | Y/N | Y | Y/N | Y/N |

| SEA / PROGRAMME | Objective 1 BFF | Objective 2 P | Objective 3 HH | Objective 4 S | Objective 5 W | Objective 6 AQ / C | Objective 7 MA1 | Objective 8 MA2 | Objective 9 MA3 | Objective 10 CH | Objective 11 L |
|---|---|---|---|---|---|---|---|---|---|---|---|
| freshwater pearl mussels. | | | | | | | | | | | |
| Set environmental quality objectives for the habitats of the freshwater pearl mussel populations. | Y | Y | Y/N | Y | Y | Y | Y/N | Y/N | Y | Y/N | Y/N |
| Require the production of sub-basin management plans with programmes of measures to achieve these objectives. | Y | Y | Y/N | Y | Y | Y | Y | Y/N | Y | Y/N | Y/N |
| Set the duties of public authorities in respect of the sub-basin management plans and programmes of measures | 0 | 0 | 0 | 0 | 0 | Y/N | Y/N | Y/N | 0 | Y/N | Y/N |

Key: Y = Yes, compatible N = No, not compatible 0 = Neutral Y / N = May be compatible depending on how it is implemented

### 7.2.4 Strategic Environmental Indicators and Targets

The overall purpose of environmental indicators in the SEA is to provide a way of measuring the environmental effect of implementing the Plan. Environmental indicators are also used to track the progress in achieving the targets set in the SEA as well as the Plan itself. The proposed indicators have been selected bearing in mind the availability of data and the feasibility of making direct links between any changes in the environment and the implementation of the Plans.

Targets were considered over the duration of the baseline data collection and assessment, and throughout the consultation process, in order to meet the Strategic Environmental objectives as well as the objectives of the Plans. In each case, any target that is set must be attributable to the implementation of the Plans.

The targets and indicators associated with each SEA Objective are presented in **Table 7.3**.

**Table 7.3: Strategic Environmental Objectives, Targets and Indicators**

| SEA Topic | SEA Objective | SEA Target | SEA Indicators | Data Availability, Source and Frequency |
|---|---|---|---|---|
| **Biodiversity, Flora & Fauna (BFF)** | **Objective 1**<br>Prevent damage to terrestrial, aquatic and soil biodiversity, particularly EU designated sites and protected species. | Halt deterioration of freshwater Pearl Mussel, their habitats or their associated species due to water quality issues in the contributing catchments by 2015. | The status of Freshwater Pearl Mussel as reported to the EU protected (report due every 6 years, first report in 2007). | The Status of EU Protected Habitats and Species in Ireland report. Published every 6 years. |
| **Population (P)** | **Objective 2**<br>Contribute to sustainable development in the contributing catchments | Provide adequate wastewater treatment infrastructure capacity to all urban and suburban areas (cities, towns and villages) within the contributing catchments by 2015.*<br><br>Strictly control rural development with the provision of individual wastewater treatment units in accordance with the EPA Guidelines Manual in relation to the provisions of wastewater treatment to single houses. | Number of Section 140 motions under the Planning and Development Act 2001 tabled and passed for development in urban and suburban areas where adequate wastewater treatment infrastructure capacity is not in place.<br><br>Number of Section 140 motions under the Planning and Development Act 2001 tabled and passed for development in rural areas where individual wastewater treatment are not provided in accordance with the EPA Guidelines Manual in relation to the provision of wastewater treatment to single houses. | Summary of Annual Planning Statistics. An Bord Pleanála. Published annually.<br><br>Summary of Annual Planning Statistics. An Bord Pleanála. Published annually. |

| SEA Topic | SEA Objective | SEA Target | SEA Indicators | Data Availability, Source and Frequency |
|---|---|---|---|---|
| Human Health (HH) | **Objective 3**<br>Protect and reduce risk to human health in undertaking water management activities. | All drinking water areas (including groundwater), as identified on the register of protected areas, to achieve good status, or maintain high status, by 2015. | Interim Indicators: Compliance with Drinking Water Standards. | EPA |
| | | All bathing waters, as identified on the register of protected areas, to achieve good status, or maintain high status, by 2015. | Compliance with Bathing Water Standards. | EPA |
| | | All economic shellfish waters, as identified on the register of protected areas, to achieve good status, or maintain high status, by 2015. | Compliance with the Quality of Shellfish Waters Regulations. | EPA |
| | | All water bodies designated for salmonids, as identified on the register of protected areas, to achieve good status, or maintain high status, by 2015. | Water quality in designated salmonid waters. (Ire)<br>Long Term Indicator: Parameters to be measured in accordance with the environmental quality standards to determine Good Status. (Ire and NI) | EPA<br>EPA |
| Soil (S) | **Objective 4**<br>Avoid damage to the function and quality of the soil resource in the contributing catchments | Interim Target: Achieve soil phosphorus levels in line with Teagasc targets for agricultural land.<br>Long Term Target: Achieve risk reduction targets as detailed in the Soil Directive for areas identified as at risk (not yet established). | Interim Indicator: Soil phosphorus levels.<br>Long Term Indicator: Monitoring programme as established under the requirements for the Soil Directive (once established). | National Soils Database. Teagasc and EPA. Updated as data becomes available.<br>Not yet established |
| Water (W) | **Objective 5**<br>Achieve or maintain the water quality parameters in accordance with Regulation 2 and the Third and Fourth Schedules of the FPM Regulations. | All designated pearl mussel catchments to achieve the water quality parameters identified in the FPM Regulations by 2015. | Water quality in designated pearl mussel catchments in 2015. | Water Quality in Ireland report. EPA. Published every 1 to 2 years. |

| SEA Topic | SEA Objective | SEA Target | SEA Indicators | Data Availability, Source and Frequency |
|---|---|---|---|---|
| Air Quality / Climatic Factors (AQ/C) | **Objective 6**<br>Minimise contribution to climate change by emission of greenhouse gasses associated with FPM Sub-basin Management Plan implementation. | Use BAT, including renewable energy, to minimise GHG from new or upgraded wastewater infrastructure in line with Ireland's commitments to reduce GHG emissions under the Kyoto Protocol. | Calculated $CO_2$ equivalent in tonnes from new or upgraded wastewater infrastructure, e.g. WWTP, including emissions associated with the digestion and / or incineration of sludge. | To be calculated based on changes in wastewater infrastructure. This could be incorporated as a requirement in the licence application process. |
| | | Use BAT, including renewable energy, to minimise GHG from changes in industrial practices due to Sub-basin Management Plan implementation in line with Ireland's commitments to reduce GHG emissions under the Kyoto Protocol. | Calculated $CO_2$ equivalent in tonnes due to changes in industrial practices. | To be calculated based on changes in industrial practices, records of which are held as part of the IPPC licence process by the EPA. |
| | | No net loss of $CO_2$ sequestering vegetation due to changes in forestry practices as a result of sub-basin plan implementation. | Calculated $CO_2$ sequestering potential of forest vegetation based on forest cover. | National Council for Forest Research for sequestration potential. Corine Land Cover database for forest cover figures. |
| Material Assets (MA1) | **Objective 7**<br>Maintain level of protection provided by existing morphological infrastructure, e.g. flood defences, coastal barriers, groynes, etc. in the contributing catchments. | No increase in the amount of infrastructure at risk from flooding as a result of sub-basin plans activities. In this case the length of road and rail infrastructure at risk will be used as a proxy indicator for infrastructure in general. | Interim Indicator: Number of Flood Risk Management Plans prepared in accordance with the Floods Directive (2007/60/EC).<br>Long Term Indicator: Length of road and rail infrastructure at risk in contributing catchments. | Information on number of Flood Risk Management Plans prepared to be sourced from the OPW.<br>Information on flood risk to be sourced from the OPW. |
| Material Assets (MA2) | **Objective 8**<br>Support economic activities within the District without conflicting with the objectives of the WFD or the FPM Regulations. | Minimise impacts to economic activity due to Sub-basin Plan implementation without conflicting with the objectives of the WFD or FPM Regulations. | Percent change in land cover types due to Plan implementation. | To be calculated based on changes in land cover. Data from Northern Ireland Countryside Survey and Corine Land Cover Project |
| Material Assets (MA3) | **Objective 9**<br>Protect water as an economic resource in the contributing catchments | Achieve sustainable use of water in the context of maintaining its economic benefit. | Change in economic value of water relative to the baseline report, *Economic Analysis of Water Use in Ireland*, prepared in 2004 as part of the implementation of the Water Framework Directive in Ireland. | Economic studies carried out as part of the planning process during the second cycle of river basin management planning under the Water Framework Directive. |

| SEA Topic | SEA Objective | SEA Target | SEA Indicators | Data Availability, Source and Frequency |
|---|---|---|---|---|
| **Cultural Heritage (CH)** | **Objective 10**<br>Avoid damage to cultural heritage resources in the contributing catchments | No physical damage or alteration of the context of cultural heritage features due to sub-basin management plan implementation. | Changes in the condition of monuments on the RMP due to sub-basin plan implementation.<br><br>Number of listed structures at risk due to sub-basin plan implementation. | The Archaeological Survey monitoring programme, Ireland. DoEHLG. Updated on an ongoing basis.<br><br>Buildings at Risk Register. Heritage Council Ireland. Updated on an ongoing basis. |
| **Landscape (L)** | **Objective 11**<br>Avoid damage to designated landscapes in the in the contributing catchments | No damage to designated landscapes as a result of sub-basin plan implementation. | Number of wastewater treatment plants sited in landscapes with a high sensitivity to change.<br><br>Percent change in land cover types in areas with a high sensitivity to change due to due to sub-basin plan implementation. | Data on number of wastewater treatment plants to be sourced from Local Authorities (not currently compiled centrally).<br><br>Land cover information to be sourced from the Corine Land Cover 2000 (CLC2000) project. |

# 8 ALTERNATIVES AND ASSESSMENT METHODOLOGY

## 8.1 ALTERNATIVE SCENARIOS CONSIDERED

The Water Framework Directive (WFD) requires that a programme of measures (POMs) is established in order to achieve its environmental objectives. The EU WFD (2000/60/EC), which came into force on 22 December 2000, is the most important piece of European water legislation. It aims to promote common approaches, standards and measures for water management on a systematic and comparable basis throughout the European Union. It establishes a new, integrated approach to the protection, improvement and sustainable use of Europe's rivers, lakes, transitional waters (estuaries), coastal waters and groundwaters.

The WFD POMs include "Basic Measures" which include those measures required to implement Community legislation for the protection of water including measures specified under 11 named Directives, one of which is the Habitats Directive. The programme of measures will be established by mid 2010 and must be made operational by 22 December 2012 at the latest.

In addition to this, under the Habitats Directive Member, States must show the steps taken to achieve the Directives objectives as well as avoiding deterioration in those natural habitats and habitats of species for which an area has been designated. To achieve these requirements for FPM, in Ireland the European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations 2009 (S.I. No. 296 of 2009) have been established and require:

a) Specific objectives and targets to be met, in accordance with Regulation 2 and the Fourth Schedule, and deadlines for their achievement;
b) The investigation of sources of pressures leading to the unfavourable conservation status of the pearl mussel;
c) The establishment of a programme, including a timeframe, for the reduction of pressures giving rise to unfavourable conservation status. The programme shall include pressure reduction targets and deadlines, either in relation to individual pollutants or to particular sectors or activities or both, to be implemented within the sub-basin, or parts of the sub-basin as appropriate;
d) A detailed programme of monitoring to be implemented within the sub-basin, or parts of the sub-basin as appropriate, in order to evaluate the effectiveness of measures and progress made towards restoring favourable conservation status.

Consequently, the sub-basin plans and environmental objectives established for those pearl mussel populations designated under the Habitats Directive are also afforded protection under the Water

Framework Directive's river basin programme of measures. They form part of the Basic Measures and the objectives for these protected areas must be achieved.

The measures currently under consideration represent a range of options to address identified pressures in FPM catchments. As discussed previously, the proposed measures are sourced from requirements under existing legislation (Basic Measures), technical studies carried out during the early stages of implementation of the Water Framework Directive (WFD) and further work (including field assessment) carried out during development of the sub-basin plans (Freshwater Pearl Mussel Measures).

An outline of the Basic Measures is provided in **Table 8.1**. The full detailed list of measures is provided in **Appendix C** of this document. These Basic Measures represent the Business as Usual Scenario, i.e. implementation of these measures is required regardless of the sub-basin plans. The Sub-Basin Management Plans are simply reinforcing the need to implement and enforce these requirements.

**Table 8.1: Basic Measures**

| The 11 key EU Directives | Other stipulated measures in Article 11(3) of the WFD |
|---|---|
| Bathing waters | **WFD 1:** Cost recovery for water use and promotion of efficient and sustainable water use. |
| Birds | **WFD 2:** Protection of drinking water sources. |
| Habitats | **WFD 3:** Control of abstraction and impoundment. |
| Drinking waters | **WFD 4:** Control of point and diffuse source discharges. |
| Major accidents | **WFD 5:** Controls on physical modifications to surface waters. |
| Environmental impact assessment | **WFD 6:** Prevention or reduction of the impact of accidental pollution incidents. |
| Sewage sludge | **WFD 7:** Authorisation of discharges to groundwaters |
| Urban wastewater treatment | **WFD 8:** Control of priority substances |
| Plant protection products | **WFD 9:** Controls on other activities impacting on water status |
| Nitrates | |
| Integrated pollution prevention control | |

**Appendix D** includes the Freshwater Pearl Mussel Measures sourced from the studies carried out during the early stages of implementation of the WFD and further work carried out during development of the sub-basin plans. It should be noted that these Freshwater Pearl Mussel Measures have been grouped by pressure. For clarity these are the same pressure headings included in the Sub-basin Management Plans for each designated FPM catchments.

In certain cases a ‘do nothing’ option is one of the alternatives considered as part of the strategic environmental assessment process. However, in this case the ‘do nothing’ option, i.e. no Plan, is not a realistic alternative as the Water Framework Directive, the Habitats Directive and the Freshwater

Pearl Mussel Regulations all require that action be taken with regard to the status of this protected species. Therefore, a 'do nothing' option has not been assessed. As such, the following scenarios have been assessed in this SEA:

- Business as Usual (Table 6.1 of the Sub-Basin Management Plans and Appendix C of this SEA);
- Freshwater Pearl Mussel Measures (Table 6.2 of the Sub-Basin Management Plans and Appendix D of this SEA); and
- Combination of Freshwater Pearl Mussel Measures selected for each FPM Catchment (Action Programme for each Sub-basin Management Plan).

## 8.2 ASSESSMENT APPROACH

This approach to the assessment of alternatives is similar to that carried out in the SEA for the River Basin Management Plans (RBMPs). It was considered important that the assessment methodologies for the RBMPs and Sub-basin Management Plans remain consistent with each other where possible, in recognition of the fact that the sub-basin plans and environmental objectives established for those pearl mussel populations designated under the Habitats Directive are also afforded protection under the Water Framework Directive's river basin programme of measures. They form part of the Basic Measures and the objectives for these protected areas must be achieved.

The approach used for assessing the alternatives under consideration for the draft Sub-basin Management Plans is a combination of an objectives and baseline led assessment. To assess the Business as Usual scenario (**Section 8.5.2**) and the suite of Freshwater Pearl Mussels Measures (**Section 8.5.3**), a detailed high-level objectives led assessment was carried out, which was primarily qualitative in nature, with some assessment based on expert judgement. This qualitative assessment compares the likely impacts of each alternative against the strategic environmental objectives to see if the alternative meets the strategic environmental objectives or if it contradicts these. The alternative is then allotted an assessment rating for the purposes of comparison. For the purposes of this assessment, plus (+) indicates a potential positive impact, minus (-) indicates a potential negative impact, plus/minus (+/-) indicates that both positive and negative impacts are likely or that in the absence of further detail the impact is unclear, and a neutral or no impact is indicated by 0.

A further more detailed assessment is then provided for each of the designated FPM catchments (**Section 8.6**). This assessment is focussed on the combination of Freshwater Pearl Mussel Measures selected for each FPM catchment to address the key pressures identified in the individual Sub-basin Management Plans. Where possible, the impacts associated with the implementation of

the selected Freshwater Pearl Mussel Measures have been quantified based on the baseline information compiled for the SEA as well as the information contained in the Sub-basin Management Plans.

## 8.3 ASSESSMENT PARAMETERS

Within the current scope of this SEA, temporary impacts have not been assessed. *Temporary impacts* arising from the Sub-basin Management Plans and measures contained therein would be associated with construction phase; however, no specific location or design parameters are addressed at this strategic level. It is therefore considered that the scope of the Sub-basin Management Plans do not lend themselves to an assessment of such impacts but such impacts will be addressed at the project level in relation to project specific details.

In line with the SEA Directive, *short, medium and long-term impacts* must be considered during the assessment. However, it is considered that short-term assessment may not be very constructive, as implementation of the Sub-basin Management Plans will take time to show effect. Therefore, the results of such an assessment are likely to be similar to a 'business as usual' scenario for the short-term. It is noted however, that under Article 17 of the Habitat's Directive, each member state must report to the EU on the status of each habitat and species protected under Annex I and Annex II of the Habitat's Directive. The last report was published in 2007. In 2013, the next set of Article 17 reports will be sent to the EU. This will include an update on the size and status of the various FPM populations, the measures that are in place and the improvements or deteriorations (as applicable) and will provide an interim check on implementation if not effect. For the purposes of the SEA, assessments have been made for 2020 (as a medium-term horizon) and 2027 (as a long-term horizon) in keeping with the Article 17 reporting timeline. Medium and long-term impacts are addressed in **Tables 8.3 – 8.15**.

*Cumulative effects* arise for instance where several developments may each have an insignificant effect but together have a significant effect or where several individual effects of the Sub-basin Management Plans have a combined effect. *Synergistic effects* interact to produce a total effect greater than the sum of the individual effects so that the nature of the final impact is different to the nature of the individual impact. Cumulative and synergistic effects are addressed in **Tables 8.3 – 8.15** and are also highlighted through the sections.

The primary effect of the Sub-basin Management Plans is to protect or improve water quality in designated FPM catchments in order to support FPM life and growth. Many of the alternatives under consideration will have *direct impacts* on water and aquatic biodiversity as a result. However, a number of alternatives also have the potential to directly and indirectly impact on other environmental

receptors as a consequence of the alternatives in the draft Sub-basin Management Plans. These are addressed in **Tables 8.3 – 8.15.**

### 8.3.1 Business As Usual Scenario

As detailed above, the Sub-basin Management Plans include measures required either under the existing 11 Water Protection Directives listed in the WFD or which are required as part of the implementation of WFD Article 11(3) (**Table 8.1** and **Appendix C**).

In certain cases measures included under the existing 11 Directives do not lend themselves to environmental assessment due to the nature of the action proposed. To aid in determining which of the measures can meaningfully be assessed the types of measures required under each of the existing 11 Directives have been grouped into themes (e.g. treatment and monitoring). For example, the Urban Wastewater Treatment Regulations require adequate treatment systems are put in place (DIR6) and monitoring to be carried out (DIR2). An explanation is provided in **Table 8.2** as to whether or not assessment of these in the context of the Strategic Environmental Objectives is considered practicable at this time.

**Table 8.2: Measures in the 11 Existing Directives Considered Suitable for Assessment**

| | |
|---|---|
| **DIR1: Education and Awareness** | Perhaps the most important of all the measures suggested, these types of initiatives and programmes are expected to result in improved water quality through increased public and industry awareness. Important areas will include promoting awareness of water conservation measures under the National Water Conservation Programme, education and awareness of the Water Policy Regulations and education on the need for protection of habitats and species under the Habitats Directive. However, due to their intangible nature, assessment of these with regard to the SEA Objectives will not be included. |
| **DIR2: Monitoring and Identification of Sources of Pressure** | These measures are concerned with information gathering rather than the taking of any concrete actions and as such will not be assessed. It is expected that monitoring in relation to such areas as drinking water bodies (Water Policy Regulations) and shellfish designated waters (Shellfish Regulations) will ensure water management actions are fully informed and based on scientific data and will contribute to improving the overall understanding of status and pressures going forward. |
| **DIR3: Introduction of Plans, Programmes, Schemes, Codes of Practice, etc.** | There are a number of plans, programmes, schemes, etc. identified as actions in order to address specific issues or pressures, the details of which are not yet available, therefore, it is not possible to assess the impacts associated with these at this time e.g. Forest Management Plans, Major Emergency Plans, Bathing Water Management Plans. However, it is strongly recommended that at the time the details of these are known that they are subject to an environmental assessment under the SEA and Appropriate Assessment processes in order to identify any potential impacts other than those related to water, e.g. material assets, biodiversity, population, etc. The purpose of this would be to identify focussed mitigation measures aimed at offsetting or reducing any identified negative impacts. This approach is already evident as pollution reduction programmes under the Shellfish Directive and these Sub-Basin Management Plans for FPM have undergone SEA and AA. |
| **DIR4: Review of Licensing and Introduction of Controls** | These measures may result in impacts on the operations of the industries affected. While specific details of any changes will be at the local level, a general assessment of these types of measures using the Strategic Environmental Objectives can be carried out at this time. |
| **DIR5: Changes to** | These measures may result in impacts on land use planning at the national, regional and local level, potentially resulting in impacts. A general assessment of these types |

| | |
|---|---|
| **Land Use Planning** | of measures using Strategic Environmental Objectives can be carried out at this time. |
| **DIR6: Introduction of Specific Infrastructural Requirements, e.g. pre-treatment facilities** | These types of measures require installation of specific types of infrastructure. Though specific information is not available, there is sufficient detail available at this time to carry out a general assessment of these types of measures using Strategic Environmental Objectives. |

In addition, to the measures arising out of implementation of the existing 11 Directives, the Article 11(3) requirements must also be implemented. These requirements are based on broad themes, as listed in **Table 8.1**. These broad themes have been assessed qualitatively in the SEA, where possible, in **Table 8.3**.

### 8.3.2 Freshwater Pearl Mussel Measures

Similarly, not all of the proposed Freshwater Pearl Mussel Measures included in the sub-basin plans are suitable for assessment under SEA. **Appendix D** lists all of the Freshwater Pearl Mussel Measures and outlines where a measure is unsuitable for assessment. Unsuitable measures are marked by an X on the right hand side of the table, while a check mark indicates where a measure can be assessed.

It should be noted that the measures included in the Sub-basin Management Plans have been developed to meet the objective of achieving the water quality parameters in European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations 2009 (S.I. No. 296) and as such will broadly have a positive impact on water quality, aquatic biodiversity and human health, if implemented. While many of the measures proposed in the draft Sub-basin Management Plans have been fully assessed in the SEA there are several that do not lend themselves to formal assessment, as stated above. Nonetheless these measures, if implemented, would be expected to contribute to the overall positive impact of the Sub-basin Management Plans as they would be expected to:

- Provide the tools, methodologies and controls to inform key actions;
- Allow for a more focussed response from those challenged with administration of the sub-basin plans;
- Provide a coordinated approach to improving the conservation status of FPM catchments through the provision of standardised methodologies and controls; and
- Increase public and industry awareness of the Freshwater Pearl Mussel.

## 8.4 INTEGRATION WITH THE SUB-BASIN MANAGEMENT PLAN TEAM

The SEA Team participated in a number of workshops during development of the Sub-basin Management Plans along with members of the Plan Team and National Conservation Working Group to refine the pressures to be addressed by the draft Sub-basin Management Plans. In addition, the

mitigation measures arising out of the SEA will be considered for inclusion into the Sub-basin Management Plans following close of the consultation period.

## 8.5 ASSESSMENT OF ALTERNATIVES

### 8.5.1 Detailed Assessment of High Level Alternatives

The approach used for the high-level assessment is termed an 'objectives led assessment'. In this case, each of the alternatives considered was tested against the SEA Environmental Objectives listed in **Chapter 7**. A matrix format was used for the assessment, which permitted a systematic approach and comparison of alternatives.

The high-level assessment for the Business as Usual scenario is provided in **Section 8.5.2.1 and Table 8.3** and the high level assessment of the Freshwater Pearl Mussel Measures is provided in **Section 8.5.3 and Table 8.4-8.15.** The assessment of the catchment specific measures based on the sub-basin action programmes is included in **Section 8.6.**

### 8.5.2 Business as Usual

**Table 8.3** gives a summary of the overall impact of the Basic Measures, which together represent the Business as Usual Scenario. See **Tables 8.1 and 8.2** and **Appendix C** for further detail on what is included in these measures.

#### 8.5.2.1 Assessment

**DIR4** will result in overall positive impacts to the environment. However specific measures may result in impacts on the operations of the industries affected and as such will have potential negative impacts on economic development e.g. review of discharge authorisations under the Environmental Objectives (Surface Water) Regulations (SI 272 of 2009). Indirect negative impacts are also possible for other environmental receptors but the extent of these impacts will be dependent on how required changes are implemented, e.g. new infrastructure that could impact on biodiversity and soils through site selection or changes to existing practices that could impact on climate from transport or alternate treatment and disposal.

Broadly speaking **DIR5** has the potential to have positive impacts on the environment generally although it is likely that changes to land use planning will impact negatively on economic activities

through restrictions or limits on specific development types e.g. forestry. Conversely, changes in land use planning that protect the economic water resource will contribute to long-term sustainability.

Potential negative impacts could occur from **DIR6** depending on the siting of new infrastructure. Poorly placed infrastructure has the potential to negatively impact on biodiversity, soils, cultural heritage and landscape. Negative impacts could also be experienced by industry for installation of and operation of new infrastructure. Where upgrades or provision of new infrastructure contribute to improvements in water quality, positive impacts are anticipated for water with indirect positive impacts for biodiversity and soils.

**WFD1** focuses on conservation and sustainable water use. Lower overall requirement for water has many positive knock-on effects for the environment. Water availability is a key driver of development and economies therefore strategies to reduce consumption would result in less water requiring treatment and consequently less wastewater requiring treatment. This would have indirect positive impacts on climate as less energy will be required and lower $CO_2$ outputs will result from such changes. Also, with lower consumption there will be reduced need to improve and provide more water management infrastructure allowing funds to be redirected to other areas. In the longer term, reduced consumption will improve capacity overall and facilitate continued growth and development in line with government policies i.e. spatial strategy. The success of such measures will be closely related to education and awareness. Cost recovery is a controversial measure. It has the potential to significantly reduce the volumes of water used and wastewater produced. The main negative impact relates to the financial implications for economic activity. The acceptance of cost recovery will be dependent on proper education and awareness to demonstrate how water can be conserved and also on the manner in recovery is rolled out.

**WFD2** focuses on protection of drinking water sources. Protecting drinking water sources from pollution through the use of Water Safety Plans and/or designation of Source Protection Zones would have overall positive impacts on water quality as well as biodiversity, soil, human health and economic activities reliant on good water quality, e.g. tourism, water supply. However, specific measures may result in impacts on the operations of the commercial/industrial sectors affected and as such could have potential negative impacts on economic development.

**WFD3** deals with abstraction and impoundment controls. Reducing the volume of abstractions or altering the timing of abstractions is anticipated to have positive impacts on water quality. Reduced volumes will have positive impacts for biodiversity by reducing the risk to flora and fauna from eutrophication or high levels of dangerous substances in a waterbody. Altering timing also has positive benefits for biodiversity by reducing the risk of low flows or lowering of marginal water levels where spawning takes place. This measure will also have positive impacts for human health and economic activities reliant on good water quality e.g. tourism, water supply etc.

**WFD4** details of the types of controls proposed is not available at this time however it is likely to include prevention and reduction programmes arising out of existing directives such as the Nitrates, Dangerous Substances, Groundwater, Shellfish and Bathing Water Directives. In addition, programmes focusing on IPPC and discharge authorizations are also likely. These measures are anticipated to have a positive impact on the environment through improved water quality with indirect benefit for biodiversity, soils and human health. Negative impacts are anticipated for economic activities such as farming, forestry and industry where changes arising from prevention and reduction programmes may result in management changes or reduced productivity. In certain cases this may result in a need to import products with resulting negative impacts for climate. Negative impacts may also occur if alternate treatment / disposal result in the need for additional landfill capacity or similar.

**WFD5** may include prior authorisation or registration schemes, new regulations to control physical modifications to surface waters and risk based approvals where low risk works may be simply registered while higher risk works subjected to more detailed assessment and issued more prescriptive licences. These measures have the potential to positively impact on water quality and biodiversity in particular. By introducing the need for more detailed assessment of higher risk works this will provide further protection of the environment with benefit for the environment generally if environmental considerations (based on EIA guidance) are a required part of the assessment.

**WFD6** includes for appropriate measures to reduce the risk of accidental pollution incidents. This has the potential to positively impact on water quality and also on biodiversity, human health, soils and population. The types of measures under consideration are not developed at this time however there is potential to negatively impact on the environment as a result of measures such as flood defences for industrial installations, which could impact on cultural heritage, landscape and biodiversity. It is recommended that further environmental assessment is undertaken once measures are defined.

**WFD7** requires prior authorisation to be received for reinjection of waters for a number of specific activities in order to prevent discharge of certain substances to groundwater. Protecting groundwaters from pollution would have overall positive impacts on water quality as well as biodiversity, soil, human health and economic activities reliant on good water quality, e.g. tourism, water supply. However, specific measures may result in impacts on the operations of the commercial/industrial sectors affected and as such could have potential negative impacts on economic development.

Under **WFD8** increased awareness of the impacts of using priority dangerous substances will be essential to not only the reduction of use but also prevention of use in the first place. The measures for priority substance will include creation of inventories and collection of data on emissions, discharges and losses of the priority substances. This will provide a better understanding of the scale and extent of the issue. In addition reduction plans will be developed. Plans that target improved prevention and reduction of priority substance will result in fewer emissions to the environment and consequent positive impacts on the environment in particular water quality, biodiversity, soils and

human health. In addition, they would contribute to the protection of the water as a resource for all. Plans may however, negatively impact on industries which currently use or generate priority substance as part of their processes. Changes to how emissions, discharges and losses are dealt with by industry may result in additional costs for alternative treatment or disposal or costs associated with change of practice altogether. Changes in treatment or disposal options may require additional transport with associated climate impacts. It may also include other processes for treatment or disposal with the potential to impact on biodiversity, human health, soils, cultural heritage and landscape. Without further detail it is not possible to elaborate on these potential impacts.

One of the major issues for water status is invasive alien species, which successfully establish themselves in aquatic and fringing habitats and damage natural flora and fauna. **WFD9** may include introduction of regulations to prohibit the possession or introduction of any species of wild bird, wild animal or wild flora, which may be detrimental to native species. This is anticipated to result in positive impacts to the environment generally however negative impacts will be experienced by retail sectors which trade in non-native species, e.g. garden centres, and also individuals and commercial bodies that use marine and freshwater transport as this has the potential to transport alien species.

#### 8.5.2.2 Recommended Mitigation Measures

The following mitigation measures are recommended to address impacts arising out of implementation of the following measures:

**WFD4:** Detailed assessment of higher risk works will include environmental considerations (based on EIA guidance). It is also recommended that lower risk work should be compelled to consider environmental issues as part of the registration process.

**WFD5:** It is recommended that further environmental assessment is undertaken once measures are defined.

**Table 8.3: Summary Assessment: Business as Usual Scenario**

| SEA Objectives | Review of Licensing Controls (DIR 4) | Changes in Land Use Planning (DIR 5) | Infrastructural Requirements (DIR 6) | Cost recovery for water use & promotion of sustainable water use (WFD 1) | Protection of Drinking Water Sources (WFD 2) | Abstraction and impoundment control (WFD 3) | Point source and diffuse source discharge (WFD 4) | Controls on physical modifications to surface waters (WFD 5) | Prevention or reduction of the impact of accidental pollution incidents (WFD6) | Authorisation of discharges to groundwater (WFD7) | Priority substance control (WFD 8) | Controls on other activities impacting water status (WFD 9) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Objective 1 (BFF)** | + / - | +/- | +/- | + | + | +/- | +/- | +/- | +/- | + | +/- | +/- |
| **Objective 2 (P)** | + | + | + | + | + | + | + | +/- | + | + | + | + |
| **Objective 3 (HH)** | + | + | + | + | + | + | +/- | +/- | + | + | +/- | + |
| **Objective 4 (S)** | + / - | +/- | +/- | + | + | +/- | +/- | +/- | +/- | 0 | +/- | + |
| **Objective 5 (W)** | + | + | + | + | + | + | + | +/- | + | + | +/- | + |
| **Objective 6 (C)** | + / - | +/- | +/- | + | 0 | - | 0/- | +/- | 0 | 0 | +/- | 0 |
| **Objective 7 (MA1)** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | +/- | + | 0 | 0 | 0 |
| **Objective 8 (MA2)** | + | +/0 | + | + | 0 | + | + | +/- | + | 0 | + | 0 |
| **Objective 9 (MA3)** | + | + | + | + | + | + | + | +/- | + | + | + | + |
| **Objective 10 (CH)** | 0 | 0 | +/- | + | 0 | +/- | +/- | +/- | +/- | 0 | +/- | 0 |
| **Objective 11 (L)** | 0 | 0 | +/- | 0 | 0 | +/- | +/- | +/- | +/- | 0 | +/- | 0 |

*Key: See Tables 7.1 and 7.2 for further detail on what is included in DIR4 to 6 and Appendix E for further detail on measures WFD1 to 9*

### 8.5.3 Freshwater Pearl Mussel Measures

The Freshwater Pearl Mussel Measures provide a national toolkit of measures designed to address the specific pressures impacting on the freshwater pearl mussel and its habitat in the 27 SAC catchments. It is intended that the measures in this toolkit will be implemented if and where required in the various catchments and at those sites where investigations and risk assessment show that specific pressures need to be remediated to maintain and restore pearl mussels to favourable conservation status. The assessment of Freshwater Pearl Mussel Measures is presented by pressure. **Tables 8.5 to 8.15** show a summary of the impacts under each pressure heading. The corresponding discussions and mitigation measures are presented in the following sections.

In addition to the assessment of measures under key pressure headings, the Freshwater Pearl Mussel Measures also include a number of measures (1-5 of **Appendix D** of this report) which could be seen as complementary measures which support the pressure specific measure. These relate to guidance, stakeholder involvement and public awareness. These complementary measures have been assessed in **Table 8.4.**

#### 8.5.3.1 Complementary Measures

Alternatives **1** (and alternative **2** which is related) are perhaps the most important of all the measures suggested, these types of initiatives are expected to result in improved conservation and protection of FPM as well as improved water quality through increased public and industry awareness. Important areas will include promoting awareness of FPM generally across sectors, promoting its value in a national and European context and the complexity of its life cycle. It will also be important to highlight the indirect value of FPM to our national economy through improved water quality suitable for salmonids which in turn promotes tourism and angling. The indirect benefits to population and human health associated with improved water quality should also be highlighted. It is noted that any public awareness campaign should be active and participatory to ensure that all relevant stakeholders are drawn into this action, bringing about behavioural changes. Awareness building should focus on what the issues are, how they can be prevented and the point of damage where they occur.

The NPWS has recently provided guidance on Appropriate Assessment (AA) of Natura 2000 sites and this will be of benefit to any stakeholders which must carry out AA as part of these sub-basin plans. Further guidance on compliance with the Freshwater Pearl Mussel Regulations (S.I. 296 of 2009) as indicated in alternative **3** will have a positive impact on FPM in particularly but indirectly for all aquatic biodiversity and water quality. While it is recognized that compliance with the Freshwater Pearl Mussel Regulations (S.I. 296 of 2009) and the Habitats Directive may result in additional management and operational measures in terms of material assets, guidance in these two areas will provide clear pathways for those concerned with the assessment and monitoring of FPM and will help streamline the processes. It is also noted that such guidance is supporting existing legal requirements. The

requirement for AA and SEA of plans in alternative **4** will have positive impacts on all environmental receptors by ensuring both Natura 2000 sites and the wider environment are considered during all plan preparation with the potential to impact on FPM areas. This will be particularly important for plans dealing with critical issues such as flooding and drainage which are also required under other EU Directives. Measures focusing on protection of FPM may lead to indirect negative impacts on material assets such as property where drainage of flood risk is compromised. In addition to SEA and AA, consultation with the relevant authorities for these other plans will be important in protecting the FPM, especially where conflicts are identified. Other alternatives also relevant to this assessment include **14e, 15h, 15i** and **22b** which all deal with increasing awareness, education and training in the farming community.

**Cumulative Impact.** Overall the cumulative impact of these alternatives will have a positive impact on the receiving environment. In all cases, education, awareness building and guidance will contributing to reducing negative cumulative impacts for existing poor practices and will contribute to changing attitudes and behaviours. These measures are welcomed.

**Mitigation Measures.** The following mitigation measures are recommended to address impacts arising out of implementation of the following measures:

**1 and 2:** It is noted that any public awareness campaign should be active and participatory to ensure that all relevant stakeholders are drawn into this action, bringing about behavioural changes. Awareness building should focus on what the issues are, how they can be prevented and the point of damage where they occur.

**4** Early consultation with OPW should be undertaken to identify potential conflict with drainage district maintenance programmes and catchment flood risk assessment and management plans to ensure due regard is given to the requirements for FPM.

#### 8.5.3.2 Pressure: Municipal and Industrial Discharges

A review and revisions to authorisations to discharges to pearl mussel SAC catchments required under **6a** is likely to have direct positive impacts for water quality and biodiversity over a relatively short period of time. This will have direct positive impacts for FPM but also a host of other aquatic species. Indirect positive impacts to human health via improved water quality would also be expected, as would positive impacts for material assets in terms of economic value of the water resource to tourism, fisheries etc. Where discharges are restricted, this would have negative impacts for material assets in terms of both municipal and industrial operators. It is likely in these situations that additional treatment or relocation of discharge points would be required leading to negative impacts on material assets in order to comply with Schedule 4 of S.I. No. 296 of 2009. Where relocation of the point of discharge is required to comply with Schedule 4 of S.I. No. 296 of 2009 indirect negative impacts are

possible if the point of discharge is relocated without consideration of terrestrial habitats and species or cultural heritage.

Alternatives **6b, 6d and 6e** relate to upgrade of treatment options. Increasing the level of treatment will have direct positive impacts on material assets by providing for upgrades to existing water management infrastructure. These alternatives will have indirect positive impacts for water quality, biodiversity, soils and human health by improving the quality of the effluent leaving the facility. Reducing the nutrient load entering waterbodies will reduce weed and aquatic plant growth, as well as reducing the risk of potential toxicity to fish and other aquatic life. It will increase dissolved oxygen in the waterbody to the positive benefit of the natural system. The removal of elevated levels of nutrients currently providing an unnatural level of food supply for certain bird species, may cause the composition of flora and fauna to return to a more natural and sustainable level. Altering nutrient load from treatment plants may therefore indirectly impact on biodiversity by altering the existing food web dynamics of the receiving environment. The food webs would in turn reflect the food web dynamics of a more natural and sustainable ecosystem, which would have an overall greater diversity and functionality. Upgrade of existing plants will contribute to sustainable development by ensuring adequate water and wastewater infrastructure and will also have indirect positive impacts by protecting the economic water resource as well as those sectors dependent on it. Potential negative impacts are possible if additional landtake is required for existing plant upgrades or provision of new plants. This could result in indirect negative impacts on biodiversity, soils, landscape and cultural heritage, if sited inappropriately. Additional costs are also likely to upgrade systems to secondary and tertiary treatment. In all cases additional energy may be required, with a potential negative impact on climate through emission of $CO_2$. Impacts from these alternatives are likely to be delivered in the medium to long-tern horizon, as planning permissions may be required.

**Cumulative Impact.** These alternatives have the potential to give rise to positive cumulative impacts for pearl mussel populations both at individual locations and nationally, and particularly in conjunction with the River Basin Management Plan. Negative cumulative impact was registered for climate in relation to the wastewater alternatives. While additional levels of treatment will undoubtedly improve water quality and contribute significantly to sustainable development in the contributing catchment, there will be increased energy costs associated with treating more wastewater to a higher standard. This energy will potentially give rise to GHG emissions, which will contribute to climate change. This cumulative impact could be mitigated by a commitment to source additional energy requirements from renewable sources, which will be dependent on availability of renewable energy sources. Cumulative negative impacts are also noted for cultural heritage and landscape based on possible impacts associated with new or relocated infrastructure. Consideration of the wider environment prior to siting new infrastructure, together with renewable energy sources, where possible, will greatly reduce this potential cumulative impact.

**Mitigation Measures.** The following mitigation measures are recommended to address impacts arising out of implementation of the following measures:

**6a:** This measure should be accompanied by an education and awareness campaign for commercial and industrial premises aimed at reducing pollution at source (potentially through Alternative 1)

**6a:** This measure will require project level Habitats Directive Assessment if alternative facilities for treatment of waste are constructed, e.g. incinerator.

**6b, 6d and 6e:** Negative impacts on climate associated with GHG emissions related to additional energy requirements for these measures should be offset by use of renewable energy sources or similar.

**6b, 6d and 6e:** If additional landtake is required for these alternatives, environmental studies will be undertaken to assess the impact on the environment.

#### 8.5.3.3 Pressure: Quarries

Quarrying has been identified as a significant issue for some pearl mussel catchments, in particular due to sediment loss and siltation which is a pressure both for FPM and other aquatic species. A review and revisions to authorisations of quarries (**7a**) is likely to have direct positive impacts for water quality and biodiversity over a relatively short period of time. Indirect positive impacts to human health via improved water quality would also be expected, as would positive impacts for material assets in terms of economic value of the water resource to tourism, fisheries etc. Where quarrying operations may be restricted, this would have an indirect positive impact for soils by protecting the resource in-situ and also for cultural heritage and landscape which can be negatively effected by quarrying operations. Indirect positive impacts to air quality e.g. dust generation, are also possible where restriction in quarry activity is required. However, such limitations would have negative impacts for material assets in terms of quarry owners and operators as would any requirements to install additional treatment or management measures in order to comply with Schedule 4 of S.I. No. 296 of 2009 (**7b**). Any requirement to alter discharge locations has the potential for indirect negative impact on biodiversity, cultural heritage and landscape if not carefully sited.

**Cumulative Impact.** These alternatives have the potential to give rise to positive cumulative impacts for pearl mussel populations both at individual locations and nationally, and particularly in conjunction with the River Basin Management Plan. Positive cumulative impacts are also anticipated for soils where less intensive quarrying can protect the soils resource in-situ.

**Mitigation Measures.** The following mitigation measures are recommended to address impacts arising out of implementation of the following measures:

**7a and 7b:** These measures should be accompanied by an education and awareness campaign for quarry operators and those charged with authorisations aimed at reducing pollution at source (potentially through Alternative 1).

**7a and 7b:** Any relocation of discharge points should be accompanied by an environmental assessment.

#### 8.5.3.4 Pressure: Unnatural flows

**9** will have overall positive benefits for protected areas. Ensuring that control of flows is done in a more natural manner will have a direct positive impact on water and on aquatic biodiversity with indirect positive impacts for human health and soils. Ensuring flows reflect a more natural manner will result in positive impacts across all levels of biodiversity, both terrestrial and aquatic. Indirect positive impacts are also expected for population and for material assets including angling and tourism, which depend on flows for fish migration, navigation, water supply, etc. In addition, material assets may also benefit as natural flows can offer opportunities for some protection from the effects of climate change into the future. There is some potential for impacts on cultural heritage if flows have to be altered significantly. This impact may be positive where flows keep submerged archaeology from exposure or it could be negative where natural flows cause damage to riverine or bank side archaeology. The existing local biodiversity may also be altered if flows are returned to more natural conditions, however, more natural conditions is likely to result in increased biodiversity. The impacts of alternative **9** are likely to be felt in the medium to long term.

**Cumulative Impact:** While returning river systems to natural flow regimes has potential to positively impact on FPM and other aquatic species, monitoring of this alternative will be important to fully determine its effect on the receiving environment.

**Mitigation Measures:** The following mitigation measures are recommended to address impacts arising out of implementation of this measure:

**9:** This will require monitoring of the success of changes implemented to ascertain if modification to a natural flow benefits FPM and other biota.

#### 8.5.3.5 Pressure: Morphological Controls

Morphological controls represent a key water pressure that has implications for several SEA issues, particularly material assets. Impacts associated with morphological controls relate to loss of natural habitat and alteration of natural habitat from bankside remediation and clearance, barriers to fish migration, in-stream piers, weirs and bridges. These controls can remove the natural habitat features

needed by fish and other aquatic life, reduce suitable habitat and cause changes to natural erosion and sedimentation processes.

Like 19a and 19b, **10** offers opportunities to reduce this pressure as part of the planning process by altering the necessary legislation to take account of the potential impacts form morphological alterations of surface waters. The alternative will have direct positive impacts for the environment generally by ensuring sustainable development. It will also have both direct and indirect positive impacts for water quality, biodiversity, and soils by preventing inappropriate bankside and instream works in sensitive areas. Indirect positive impacts to human health via improved water quality would also be expected. This will directly benefit FPM but also indirectly other aquatic life. Potential direct negative impacts are likely for economic resources attempting to locate in these areas especially where dealing with previously exempted development. Additional costs may be involved in engineering solutions which do not have negative impacts in the FPM catchments e.g. single span bridges instead of in-stream piers. However, indirect positive benefits would also be expected for existing economic activities that may be currently impacted by poor water quality, e.g. tourism, and which will benefit from improved water quality.

**11** requires remediation (as necessary) of morphological alterations in FPM catchments and will overall be of positive benefit for fish movement in particular, and for the wider biodiversity of surface waters. **12** will improve rivers previously impacted from sand, gravel and stone extraction, and this in particular will benefit rivers where habitats for fish spawning were destroyed. Indirect positive impacts to human health and population are expected from these alternatives as a result of improvements to water quality. The potential for negative impacts from these alternatives is dependant on the methodology in which they are implemented. There is a need for a holistic approach to be applied in each of these cases so that implementation does not result in indirect negative impacts in other issue areas. For instance, the removal of weirs may give rise to negative impacts to architecture, archaeology and cultural heritage. Industrial archaeology and cultural heritage features in particular can include old bridges, walls of dams, etc. These features may also form important parts of the landscape and their removal could give rise to further indirect negative impacts on landscape. In addition, though remediation could be seen to have direct positive impacts to biodiversity, these could in fact result in negative impacts to existing habitats, which developed as a result of these physical modifications. For example, removal of weirs could lower the water level and affect flow rates, thereby changing the hydrologic regime, which is one of the principal factors influencing the ecology of aquatic ecosystems.

Morphological alterations are usually in place to meet a specific need. The impacts of removing and/or altering these features will need to be considered against the gains in water quality that will be achieved. Also, removal of features which contribute to flood defences could result in indirect negative impacts on human health, population and material assets should flood risks increase. Further, the removal of flood defences may enlarge the floodplain, potentially restricting future development potential. Impacts are likely to be in the medium to long-term for these alternatives, as

further assessment will be required to identify where enhancement schemes are likely to provide the greatest benefit.

**Cumulative Impact.** . These alternatives have the potential to give rise to positive cumulative impacts for pearl mussel populations both at individual locations and nationally, and particularly in conjunction with the River Basin Management Plan. The proposed alternatives for morphological controls have considerable potential to improve the environment individually or cumulatively. In many cases, the potential for negative impacts from these alternatives is dependant on the methodology in which they are implemented. Possibly the most sensitive environmental receptors to morphological controls will be cultural heritage (many existing cultural heritage features may have archaeological or architectural heritage value), which in turn through their removal or remediation may negatively impacts on the landscape. Removing or altering structures may impact habitats and species, which have flourished in areas derived from a morphological controls and hence negatively impact on biodiversity. The impacts of removing and/or altering these controls will need to be considered against the gains in water quality that will be achieved.

**Mitigation Measures.** The following mitigation measures are recommended to address impacts arising out of implementation of the following measures:

**11:** An archaeology, architecture and cultural heritage assessment will be required before removal of any morphological controls with potential for cultural heritage value. Mitigation measures will be in agreement with the relevant authority. This assessment should include reference to cultural heritage in the context of the existing landscape.

**10 and 11:** A flood impact assessment should be carried out for all canalisation and barrier remediation schemes to determine whether an increased risk of flooding would occur as a result.

#### 8.5.3.6 Pressure: Agriculture

A number of the alternatives proposed under agriculture relate to agri-environmental schemes (**14a** and **14b**). It is likely that such schemes will have similarities to previous schemes under REPS however, they are focused at target areas relevant for FPM. Such schemes would contribute to supporting existing legislation such as the European Communities (Good Agricultural Practice For Protection Of Waters) Regulations 2009 (S.I. 101 of 2009) and would also assist in focusing actions on key pressures for FPM in sensitive areas. 14a and 14b and 15e offer the most fundamental approach to tackling agricultural pressures on FPM and water quality on a farm-by-farm basis. Increased participation in agri-environmental schemes should be linked to a well rounded information and advice campaign which has prevention first, followed by correct treatment and disposal as core themes. The

implementation of **14a**, **14b**, **15e** and the measures under **14f** will have the potentially to impact directly on the economic productivity of farms if substantial changes in management practices are required.

The measures proposed under **14f** all relate to changes in farm management practices and would result in some loss of productivity either through e.g. loss of land through fencing, reduced stocking rates and changes in access arrangements for livestock, which may lead to indirect negative economic impacts for the farming sector. Removal of land from agricultural production could also lead to reduced production capacity, potentially increasing the need to import food. This would indirectly impact on air quality and climate in the medium to long term through increased transport related emissions from food imports. Indirect, medium to long term negative impacts on population are also possible if increased imports are required to satisfy local demand for basic foodstuffs. However, it is noted that some of the measures under **14f** would already be part of requirements under existing legislation such as S.I. 101 of 2009 and these farm plans would merely be enhancing the exiting legislation. A key issue with existing legislation and the success of such agri-environmental schemes would be policing of existing legislation and enforcement of measures on the ground. Positive impacts on biodiversity in terms of pearl mussel and aquatic flora and fauna would be anticipated with the measures proposed in **14f** however, management of fenced or buffer areas would be important to offset negative impacts on locally important flora and fauna. The Appropriate Assessment has particularly highlighted Otter and Kingfisher as sensitive to fencing and further survey work would be required along particular stretches to ensure these species are not negatively impacted. It has also been highlighted that the type and location of fencing should take account of access for breeding birds such as Red-Throated Divers, Golden Plover which may be negatively impacted by restriction on access as a result of inappropriate fencing.

**14k** and **15j** relate directly to data flow and data gathering. Constraints are placed on targeted management where key information is not shared between agencies. These data gaps prevent efficient measures being implemented in the shortest timeframe. An agreed flow of information between government agencies tasked with administering various competing land uses would have indirect positive impacts for the protection of the environment. As much of this information is already gathered by agencies such as DAFF, it should be possible to develop an agreement for sharing of the information with the requisite controls on privacy as already implemented by administering government departments. This alternative is related to **15g** which requires prioritisation of farm inspections under the GAP regulations. Prioritisation in sensitive areas will be essential to the short and medium term effectiveness of the agricultural measures proposed.

Alternatives under **15a**, **15b** and **15d** deal with on-site management of farm activities in order to reduce the potential to pollute water bodies. Again, this is considered an enhancement of existing legislative requirements. These measures all have the potential to positively impact FPM directly through reduction in siltation and pollution run-off. This would also benefit all aquatic and riparian flora and fauna as well as soils. Indirectly this would result in positive impacts for human health through

improved water quality. Indirect positive impacts would also occur for landscape through maintenance of riparian buffer areas. The Appropriate Assessment has highlighted a possible impact to kingfisher if present due to its preference for bare earth and banks. A kingfisher survey would be required along stretch's of proposed riparian improvement and if present then allow certain stretches to remain bare. **15f** would also have indirect positive impacts for landscape and also population where recreational areas may develop as a result of association with schemes such as the Native Woodland Scheme. This alternative would also be expected to have positive indirect impacts on biodiversity (increased habitat diversity), water quality (control of nutrients and sediments), human health (improved water quality) and material assets (improved water quality for tourism, recreation, etc.) however the Appropriate Assessment has highlighted that care is needed in advance of any conversions as protected species may use the areas for feeding and / or nesting, particularly where they have developed a scrub vegetation.

**Cumulative Impact.** These alternatives have the potential to give rise to positive cumulative impacts for pearl mussel populations both at individual locations and nationally, and particularly in conjunction with the River Basin Management Plan. The proposed alternatives for agriculture have considerable potential to improve the environment individually and cumulatively. In many cases, the potential for cumulative negative impacts from these alternatives relates to costs associated with implementation and management. A system of cooperation between farms at the local level would contribute significantly to the positive cumulative impacts associated with these alternatives and could also assist in maximising the effectiveness of the measures while controlling costs.

**Mitigation Measures.** The following mitigation measures are recommended to address impacts arising out of implementation of the following measures:

**All:** It is recommended that an information and advice campaign targeted at farmers should be implemented on a national scale. This should focus on prevention first followed by best management practices as core themes. It will be important that adequate consideration is given not just to water and biodiversity but also soils and cultural heritage, as a narrowly focussed approach may lead to indirect negative impacts on these areas. It is also recommended that information campaigns highlight best practice in the sector in order to demonstrate that an economically viable farming operation is possible within such schemes.

**14f:** A management plan for buffer strips and set aside will be required to ensure there are no detrimental impacts on locally important flora and fauna. These plans should be farm specific to take account of the locally sensitive biodiversity.

**14f** To mitigate impacts to otter an otter survey would need to be carried out along the particular stretch of river prior to fencing being erected. If deemed appropriate then certain stretches of river will have gaps in the fencing for otter as deemed necessary.

**14f:** Agricultural fencing should be of a type or location that does not impede access to breeding birds such as Red-Throated Divers, Golden Plover etc for instance in Glenveagh National Park.

**15b** To mitigate impacts to Kingfisher a survey would be required along stretch's of proposed riparian improvement and if present then allow certain stretches to remain bare.

**15f:** Carry out survey of sensitive species e.g. for Hen-Harrier in areas that have turned to scrub to ensure that such species are not present in locations proposed for conversion of agricultural land.

#### 8.5.3.7 Pressure: On-site Wastewater Treatment Systems (OSWWTS)

**16c and 16d** address the impacts from onsite wastewater treatment systems by ensuring that systems are correctly located and are designed to achieve the intended treatment levels. Compliance with DEHLG standards will have direct positive impacts on the soil and water environments by reducing cumulative pressures from new unsuitable systems but are heavily reliant on the planning consent system for success and, the consistent implementation of these alternatives will be dependent on the awareness and understanding of the regulations by individuals and administrators / planners. In addition to DEHLG standards, it is a requirement to comply with the EPA recently published Code of Practice: Wastewater Treatment and Disposal Systems Serving Single Houses (p.e. $\leq$ 10), 2009. The code of practice establishes an overall framework of best practice in relation to the development of wastewater treatment and disposal systems, in unsewered rural areas, for protection of the environment and specifically water quality.

Reduced risk of pollution from poorly planned and / or designed systems will also have indirect positive impacts for biodiversity (including the FPM), human health and population through improved water quality. The installation of on-site systems in a consistent manner, and in line with recognised standards will ensure that the intended level of treatment is achieved, contributing positively to sustainable development. The expected improvement in water quality resulting from these alternatives could have significant positive cross-sector impacts, for instance, in terms of water dependent sectors such as tourism, which depend on good water quality both for consumption and recreational uses (e.g. bathing water, fisheries). Properly installed OSWWTS will also have an indirect

positive impact for air quality in terms of odours and reduced nuisance. Indirect positive impacts would also be expected for human health.

However, there may also be indirect negative impacts from a social and / or economic development perspective if conditions cannot support new on-site treatment systems even with engineered solutions. This may also result in indirect negative impacts to cultural heritage, particularly in relation to settlement in rural areas where generations of the same families may have lived and where further individual residential development may no longer be allowed due to existing environmental conditions. The impacts from these alternatives are expected to occur in the medium to long term due to the time it will take to implement the changes.

Alternative **16e** provides an option where septic tanks or similar may not be suitable due to geology. This alternative is likely to give rise to direct positive impacts to biodiversity, flora and fauna through provision of new habitats and attracting flora and fauna to the area. Indirectly the alternative would also give rise to positive impacts to biodiversity through improvements to water quality which would in turn benefit species such as FPM. **16e** would have positive impacts for soil by ensuring a viable option to inappropriately located septic tanks. This will be dependant on ensuring education and awareness about these alternative to landowners.

**16f** is aimed at addressing pressures on water quality associated with on-site wastewater treatment systems (OSWWTS) during the post-planning phase, i.e. existing houses. In the short-term removal by tanker would be expected to result in immediate direct positive impacts on water and soil quality upon implementation and indirect impacts on aquatic biodiversity and human health. The significant impacts on water quality associated with on-site wastewater treatment systems in terms of nutrient enrichment and eutrophication give rise to problems for aquatic species (including both the FPM and associated salmonids required for the life cycle of the pearl mussel) that require clean water for survival. It should be noted that alterations to biodiversity are also possible as changes in nutrient composition of some waters could result in a change in species composition, however, more natural conditions is likely to result in increased biodiversity. The Habitats Directive Assessment notes that the return of surface and groundwaters to a more natural state would be considered a positive impact. Tankering of material has the potential to negatively impact on air quality and climate through transport related emissions especially if source and destination sites are widely located but this would depend on the number of properties involved. As noted in **16f,** this should only be considered a temporary measure until the OSWWTS can be upgraded or connection to a municipal system achieved.

Connection to municipal systems could be limited as it may be difficult and/or costly to achieve over large areas with scattered development again depending on the number of properties involved. Therefore, **16f** could be more applicable in areas on the fringes of urban areas, which have experienced recent residential growth without the matching investment in wastewater infrastructure. The provision of connection to the municipal system are likely to have cost implications at the local authority and individual level, depending on how the schemes are rolled out. In addition, connection of additional houses to the municipal system could require upgrades to the wastewater treatment

facilities in areas where these are already at capacity, if a large number of OSWWTS are involved. This could have indirect impacts on climate due to the increased demand for treatment resulting from increased fuel usage as well as an increase in the amount of sludge requiring disposal. The amount and type of emissions would depend on the process used for sludge disposal, e.g. landfill, incinerators or digestors. Increases in sludge disposal resulting from tank maintenance could also result in increased emissions to air due to the need to transport sludges (e.g. $CO_2$ and $NO_x$), particularly if individual property owners do not coordinate collection, as well as from the disposal itself. There is the potential for indirect negative impacts to human health to arise if increased land spreading of sludges occurs without the proper guidance. In addition, the need to construct new facilities to deal with increased demand on municipal wastewater treatment facilities could result in indirect negative impacts to biodiversity, landscape and cultural heritage if these are not sensitively sited.

**Cumulative Impact.** Overall the cumulative impact of the alternatives proposed for unsewered properties will have a neutral to positive impact on the receiving environment both at individual locations and nationally, and particularly in conjunction with the River Basin Management Plan. Cases where negative impacts have been identified are climate, material assets and cultural heritage.

The potentially negative impacts to climate are principally related to transport of material offsite and the energy requirement for treatment / disposal of material. Co-ordination and cooperation between properties could offset some of these negative impacts. The negative effects on climate relating to the direct release of GHG from energy use during treatment could be offset somewhat by use of renewable energy sources.

The negative cumulative impact for material assets relates to increased costs associated with desludging, tankering, upgrades and / or connection.

In terms of cumulative negative impacts to cultural heritage, these are primarily of two types. The first is the cumulative physical impact on cultural heritage features resulting from the development of wastewater treatment infrastructure; however, avoidance or provision of specific mitigation measures at the project level should reduce the significance of this cumulative impact. The second would be the cumulative impact resulting from potential changes in the composition of rural communities should new generations of families that have resided in areas historically, no longer be able to continue to build individual residences on the family holding. It is recognised that the mitigation for this cumulative impact in many cases would be connection to the municipal system, which may not be feasible in the more rural areas.

**Mitigation Measures.** The following mitigation measures are recommended to address impacts arising out of implementation of the following measures:

**16f:** Where OSWWTS inspections are undertaken by local authorities, a protocol should be developed to assist in this work.

**16f:** An education programme should be carried out in relation to tank maintenance, including guidance on disposal of sludges.

**16f:** Upgraded treatment works should be required to introduce BAT, including the use of renewable energy sources, in order to reduce GHG emissions and others resulting from increased demand for treatment.

**16f:** New wastewater treatment infrastructure, including sludge disposal infrastructure, will be subject to environmental assessment at the project level to reduce indirect impacts to biodiversity, landscape, cultural heritage and climate.

#### 8.5.3.8 Pressure: Forestry

**17a** identifies the need for a long-term forestry catchment management plans based on a suite of measures to be implemented as and where appropriate. The suite of measures includes a number of specific actions to address specific impacts, e.g. eutrophication, sedimentation and pesticides, and all involve some change in forestry practices.

It is likely to take some time to realise the direct positive benefits of these alternatives to water and soil quality (and indirectly human health and aquatic biodiversity). Reserves of pesticides and fertilisers, acidification of soils and nutrient enrichment are expected to continue to exert an influence on the aquatic and terrestrial environment following implementation of this suite of measures; the positive impacts of each would be realised in the long term. In particular, the reduction of planting on peat sites under **xii**, would be expected to avoid or limit the pressure of drainage on these sensitive habitats and indirectly improve both terrestrial and aquatic biodiversity. In addition, long term, indirect positive impacts on the economic value of the water itself, for example as a habitat for fish in the context of the recreation and tourism sectors, would be expected.

The movement away from monoculture plantations to forests with more structural and species diversity in **ii, iv, xvi, xviii** could improve these forests as recreational resources. It is currently estimated that forests contribute an economic value of €500m in terms of recreation in Ireland.[3] Therefore, the maintenance and/or improvement of forests as a recreational resource would have a positive, indirect long-term impact on population and human health. These changes in forest structure and species mix would also result in long term, direct positive impacts to terrestrial biodiversity, through the reintroduction of native species, which is would be of benefit to protected areas.

[3] Economic Value of Trails and Forest Recreation in the Republic of Ireland. September 2005. Coillte and the Irish Sports Council

Alternatives **ii, vii, viii, xii, xxi** would require a change in the composition and/or extent of the forests themselves. In addition to the costs associated with implementing the required changes, these alternatives could result in direct, negative impacts to the viability of the forests as an economic resource, either through reducing the size or area of the plantation or the number of harvestable trees on the plantation. This reduction in the amount of timber produced could also impact on availability of Irish timber products for sale domestically or for export. Similarly, **v** would reduce the amount timber that could be harvested in a given period by reducing the coup size, which may also result in direct impacts in relation to material assets.

The potential for the reduction in forest size or change in composition could affect the carbon dioxide sequestering capacity of existing forest stocks. If the carbon dioxide sequestering capacity is reduced, this could result in indirect negative long-term impacts to climate. Similarly, negative impacts could occur as a result of such alternatives where they impact on protected species such as the Hen Harrier which use coniferous plantation forests for nesting and feeding opportunities. Merlin and lesser horseshoe bats also could be negatively impacted if measures are taken to change forest size and composition. A full Appropriate Assessment on a site by site basis should be carried out to prevent indirect negative impacts on other protected species. Consultation with the local NPWS ranger should take place in advance of any works.

The more holistic approach to forestry embodied in many of these alternatives will result in the greatest benefit to the environment generally and water quality in particular. However, positive impacts may not be felt even in the medium term as the implementation of some of these alternatives, e.g. changing the specific mix on replanting, will require existing crops to mature before this alternative can be implemented. Spatially, the success and impact of some of these alternatives will depend on the age of the forestry resource in a given catchment. In addition, the application of each of these alternatives will need to be considered in its site-specific context to ensure that no indirect impacts to other issue areas result.

**xv** requires a reduction in the application of pesticides in the forests themselves, using either pre-dipped plants from nurseries or developing biological control methods, both of which would reduce impacts on sensitive aquatic species, such as the Freshwater Pearl Mussel. The practice of pre-dipping of trees prior to planting would be expected to result in short, medium and long-term positive indirect impacts to biodiversity and human health, as it would decrease the requirement for aerial spraying of pesticides. Use of biological control methods would also result in a reduction in chemical pesticide use and therefore would be expected to result in direct positive impacts to water quality and indirect positive impacts to human health and aquatic biodiversity. However, without the detail as to the type of biological control methods that would be used it is unclear as to what the direct impacts of these would be on terrestrial biodiversity. Further study would be needed to establish the ramifications of using biological control methods on the existing food web dynamics and on native species.

The suite of measures would generally require a change in management practices from those already being carried out and as such would be expected to result in direct, short term impacts to the cost of forestry management. However, as these alternatives became common practice it is expected that they would become part of the normal process of forestry management, thereby reducing long term costs.

**iii, ix and xiv** each outlines a specific action to address a specific impact, e.g. eutrophication and sedimentation, and involve some type of change in forestry practices.

It is likely to take some time to realise the direct positive benefits of these alternatives to water quality and soils (and indirectly human health and aquatic biodiversity) as nutrient enrichment and sedimentation will continue to exert an influence on the aquatic and terrestrial environment. However, these measures are each expected to result in positive impacts in these issue areas in the long term, in addition to long term indirect positive impacts on the economic value of the water itself. The Habitats Directive Assessment has identified **iii** and **ix** as critical alternatives to reduce the impacts of sedimentation in sensitive protected areas, i.e. Freshwater Pearl Mussel, and their watercourses.

**Cumulative Impact.** Negative impacts have been identified for climate and material assets and particularly in conjunction with the River Basin Management Plans which also include measures for forestry in relation to water quality . Much of this relates to limitations on forestry in sensitive areas. Limiting forestry reduces the potential for carbon sequestration and this could have cumulative, long-term negative impacts on Ireland's climate change commitments. It would also prevent reaching current forestry targets throughout Ireland. The economic value of forests is also impacted by restrictions and limitations. In highly sensitive areas, the land considered suitable for forest may be considerably reduced, thereby, reducing direct income from timber related products and secondary income from recreational activity. It will be necessary to review this impact once detailed measures are available. Reduction in forest cover could also have cumulative impacts on species dependant on forestry e.g. hen harrier, as these species are already under pressure for other sectors i.e. renewable energy developments especially windfarms.

**Mitigation Measures.** The following mitigation measures are recommended to address impacts arising out of implementation of the following measures:

**All:** A screening for SEA shall be carried out in consultation with the relevant statutory bodies for any forestry catchment management plans.

**All:** A screening for AA shall be carried out on a site-by-site basis to determine potential to impact on other protected species such as hen harrier. Consultation with the local NPWS ranger shall be undertaken.

**All:** Future guidelines for forestry should be developed through a steering group represented by bodies such as Coillte, the Forest Service, National Parks and Wildlife Service, the Central Fisheries Board, and representatives from the relevant planning authorities to ensure that the final guidelines take a holistic approach to the environment which includes biodiversity, landscape, climate and cultural heritage interests. Consideration should be given to prioritising those alternatives that can be applied to forests only starting or midway through the growth cycle.

**v and xii:** It is recommended that prior to any changes in forest size or species mix, a study is carried out to determine the change, if any, in the carbon dioxide sequestering capacity of the forest. Should sequestering capacity be reduced, compensation measures will be required to offset these.

**xv:** Detailed studies should be carried out prior to the introduction of any non-native species to be used as a biological control method.

#### 8.5.3.9 Pressure: Peat Cutting

**18a** and **18b** tackle the pressure of drainage / silt and resulting sedimentation issues derived from peat cutting. Reduction of the amount of silt entering a river system will have direct positive impacts for the FPM and for aquatic biodiversity generally. It will also have positive impacts for water quality. A reduction in the intensity of peat cutting or cessation of cutting in **18b** would be expected to have indirect positive impacts on soils, landscape and cultural heritage. Similarly, indirect positive impacts would be expected for climatic factors as peat bogs are a significant carbon sink store. It is estimated that Irelands Peat bogs store and estimated 1.2 billion tonnes of carbon which equates to 4.4 billion tonnes of carbon dioxide ($CO_2$). Protecting bogs therefore has the potential to not only have positive impacts for climate but also biodiversity, population, human health and material assets, all of which suffer negative impacts associated with climate change. The alternatives in **18a** and **18b** would require a change in management practices for peatlands from those already being carried out and as such would be expected to result in direct, short to medium term negative impacts for material assets due to the costs associated with silt trapping and establishment of buffer zones and in extreme cases cessation of peat cutting altogether. The buffer zones may result in some loss of productive land. Indirect negative impacts to cultural heritage are possible in areas where peat cutting has been carried on over generations. The positive impacts are likely to be realised on a medium to long-term basis.

**Cumulative Impact.** Negative impacts have been identified for material assets both at individual locations and nationally, and particularly in conjunction with the River Basin Management Plan. Much of this relates to limitations on peat cutting in sensitive areas. Limiting peat cutting would increase the potential for carbon storage and this could have cumulative, long-term negative impacts on Ireland's climate change commitments. The economic value of bogs is also impacted by restrictions and

limitations. In highly sensitive areas, the land considered suitable for harvesting may be considerably reduced, thereby, reducing direct income from peat related industries.

**Mitigation Measures.** No mitigation proposed.

#### 8.5.3.10 Pressure: Planning

**19a and 19b** focus on sustainable planning practices which ensure that adequate consideration is given to potential impacts to FPM catchments before giving planning permission for future development. For example currently one off housing can undertake site preparation in advance of grant of planning permission, thereby increasing the risk of unforeseen damage to FPM. **19a** will ensure that such development is no longer exempt. This will have direct positive impacts for the environment generally by ensuring sustainable development. They will also have indirect positive impacts for water quality, biodiversity and soil through reduced intensity of development in areas where there is a significant threat to pearl mussel populations. Indirect positive impacts on water quality may result in potential positive secondary impacts on human health. Potential direct negative impacts are likely for economic resources attempting to locate or expand in these areas especially where dealing with previously exempted development. However, indirect positive benefits would also be expected for existing economic activities that may be currently impacted by poor water quality, e.g. tourism, and which will benefit from improved water quality. Potential indirect negative impacts are likely in relation to cultural heritage if traditional industries or families are unable to settle in these areas.

**Cumulative Impact.** Overall the cumulative impact of these alternatives for planning will have a positive impact on the receiving environment. By promoting sustainable development and focusing on prevention, these planning alternatives will reduce negative cumulative impacts for existing poor practices.

**Mitigation Measures.** The following mitigation measures are recommended to address impacts arising out of implementation of the following measures:

**19a and 19b:** It is recommended that a form of words be provided to local authorities for inclusion which could be included in development plans to aid in protection of the FPM.

**19a and 19b:** Local authority planners should be invited to participate in management groups under the relevant River Basin Districts containing FPM in order to keep them informed of measures as they are added and refined in their district.

#### 8.5.3.11 Pressure: Infrastructure (roads and bridge) Impacting on the River

**20a, 20b and 20c** outline specific actions to address the pressure of temporary / permanent pollution from road construction and operation and similarly pressure from morphological changes due to in-stream works.

Control of infrastructure developments will have direct positive impacts on FPM and other aquatic biodiversity. Consideration of this at the planning stage (in line with alternative 11) will insure no further cumulative impacts from future builds. This will have an effect in the short, medium and long terms. Additionally, such controls at the planning phase will ensure that infrastructure is designed and located in a sustainable manner which will have positive impacts for all environmental topic areas. Protection of the FPM in this way will result in indirect positive impacts for water quality, soils and human health. Impacts to cultural health and landscape would be project specific and would depend on the engineering solution used e.g. clear span bridge. Such controls would have a negative impact in terms of material assets where structures cannot be accommodated because of impacts to FPM however; protection of the water resource would also confer positive impacts on material assets in terms of water users e.g. tourism and recreational.

Remediation works as indicated in **20b** and **20c** would have positive impacts for FPM and other aquatic flora and fauna. It is noted that changes to hydromorphology may result in changes to the species composition in certain areas, returning them to more sustainable and natural state. Indirect positive impacts would be anticipated for human health through improved water quality. Soils would also benefit from remediation where morphological structures have caused changes to the natural sedimentation and erosion regimes. Depending on the structures causing damage there is potential to negatively impact on cultural heritage and landscape if structures are longstanding. It is recommended that a cultural heritage assessment is carried out before any significant structures are removed or remediated.

Alkalinity problems (pH) associated with hardcore or surfacing containing limestone will continue to exert an influence on aquatic and terrestrial environment. However, this measure is expected to result in positive impacts in the long term, in addition to long term indirect positive impacts on the economic value of the water itself. Indirect impacts on air quality and climate in the short to medium term through increased retrofitting construction related emissions (manufacture and import of new materials, export and disposal of old materials), together with direct impacts in the short-term to the cost of road construction and operation are also expected. However, as these measures became common practice it would be expected that they would become part of the normal process of road construction and operation reducing long term cost implications.

**Cumulative Impact.** Cumulative impacts have been identified in terms of biodiversity through removal of morphological controls. This will impact not only on flow regimes (retuning them to more natural levels) but this will have additional impacts on flora and fauna dependant on the more natural

regimes. Cumulative impacts are also anticipated in terms of emissions associated with rehabilitation of hardcore as a result of deconstruction and replacement of limestone with alternative products.

**Mitigation Measures.** No mitigation proposed.

#### 8.5.3.12 Pressure: Leisure Management

**21b** will result in direct positive impacts for aquatic and riparian flora and fauna. This alternative will also have indirect positive impacts on water quality, soils and material assets by limiting trampling to specific areas, protecting unstable river banks and promoting awareness of the ecology and biodiversity within these catchments. The extent of the benefits however would be dependant on an active awareness campaign to explain the significance of FPM and the pressure caused by in-stream angling. This alternative would therefore be closely linked to alternative **21c** and to **1**. **21c** will have similar impacts to those identified for **1** above. Alternative **21e** is also linked to **1** in that it infers education and awareness of potential conflicting uses in FPM water bodies. Where restrictions on use are required, this would result in potential negative impacts on population and human health as well as material assets where the water body has important tourist value. It will be essentially to work with community to find a sustainable solution e.g. control of activities in identified river stretches, marking of water trails which avoid FPM stretches. Consideration of the wider impacts associated with river morphological works in **21d** will have positive impacts not only for FPM but also other aquatic species such as salmonids which depend on hydrologic regimes for optimum survival. This will also have indirect positive impacts for material assets by protecting fisheries potential and on cultural heritage where underwater archaeological features may be impacted. Constraints on works may have indirect negative impacts in terms of flood defence and drainage.

**Cumulative Impact.** Positive cumulative impacts for population and material assets through provision of managed facilities which will benefit the local community through provision of facilities and encouragement of sustainable recreational and tourism opportunities.

**Mitigation Measures.** The following mitigation measures are recommended to address impacts arising out of implementation of the following measures:

**All:** Active awareness campaign needed to educate anglers and water recreation users of the issues and bring about behavioural changes in these key group.

**Table 8.4: Assessment Summary: Complementary Measures**

| | Measure | BFF | P | HH | S | W | CC | MA1 | MA2 | MA3 | CH | L |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | An education and awareness campaign shall include, farm visits, public meetings, clinics, talks (to schools, etc.) and the distribution of leaflets. Topics covered will include the biology and ecology of pearl mussels and damage caused by pearl fishing, in-stream activities, sedimentation and nutrient enrichment. The measures necessary for their conservation shall be explained. Other issues such as litter prevention, the use of low phosphate detergent, correct disposal of domestic wastewater and disposal of oil shall be included in the campaign. | + | + | + | + | + | 0 | + | + | + | 0 | 0 |
| 2 | Stakeholder assistance in the further development and design of measures will be encouraged, through meetings with relevant individuals and organisations. | + | + | + | + | + | 0 | + | + | + | 0 | 0 |
| 3 | Appropriate guidance will be provided to different sectors to assist with their compliance with the Freshwater Pearl Mussel Regulations (S.I. 296 of 2009) and Article 6 of the Habitats Directive (i.e. Appropriate Assessment). | + | + | + | + | + | 0 | + | + | + | 0 | 0 |
| 4 | All plans, programmes and projects with the potential to impact on the pearl mussel SAC population, or any other Natura 2000 sites and their qualifying features, must be screened for Appropriate Assessment in accordance with Article 6 of the Habitats Directive, and, where judged necessary, an Appropriate Assessment must be conducted. In addition, all plans (e.g. Development Plans, forestry catchment management plans) and programmes (e.g. agri-environmental schemes) are likely to require Strategic Environmental Assessment (SEA). | + | + | + | + | + | 0 | +/- | +/- | +/- | 0 | 0 |

***Key***: *BFF – Biodiversity, Flora and Fauna; C – Climate; W – Water; MA – Material Assets; L – Landscape; P – Population; HH – Human Health; S – Soils; CH – Cultural Heritage*

**Table 8.5: Assessment Summary: Municipal and Industrial Discharges**

| Measure | | BFF | P | HH | S | W | AQ / CC | MA1 | MA2 | MA3 | CH | L |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 6a | Examine and review all authorizations to discharge to waters within Freshwater Pearl Mussel SAC catchments, and revise those authorizations to comply with Schedule Four of S.I. 296 of 2009. | +/- | + | + | + | + | +/- | 0 | +/- | +/- | 0/- | 0/- |
| 6b | Upgrade treatment to ensure compliance with any revised discharge standards set by the Regulatory Authority to ensure achievement of objectives set out in Schedule Four of S.I. 296 of 2009. | +/- | + | + | + | +/- | +/- | 0 | + | +/- | 0/- | 0/- |
| 6d | Municipal wastewater. Upgrade municipal wastewater treatment through:<br>i) Provision of appropriate WwTP,<br>ii) Connection of additional unsewered/sewered properties to WwTP,<br>iii) Repair of damaged collecting systems,<br>iv) Upgrade of WwTP capacity,<br>v) Upgrade of treatment level,<br>vi) Improvements in operational performance,<br>vii) Additional monitoring. | +/- | + | + | + | +/- | +/- | 0 | + | +/- | 0/- | 0/- |
| 6e | Municipal wastewater. Prioritise investment in WwTPs within pearl mussel SAC catchments under the Water Services Investment Programme (WSIP). | +/- | + | + | + | +/- | +/- | 0 | + | +/- | 0/- | 0/- |

***Key***: *BFF – Biodiversity, Flora and Fauna; C – Climate; W – Water; MA – Material Assets; L – Landscape; P – Population; HH – Human Health; S – Soils; CH – Cultural Heritage*

**Table 8.6: Assessment Summary: Quarries**

| Measure | | BFF | P | HH | S | W | AQ/ CC | MA1 | MA2 | MA3 | CH | L |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7a | Examine and Review all authorizations to discharge from quarries to waters within pearl mussel SAC catchments, and revise those authorizations to comply with Schedule Four of S.I. 296 of 2009. | +/- | + | + | + | + | 0 | 0 | +/- | +/- | +/- | +/- |
| 7b | Upgrade treatment and mitigation measures to ensure compliance with any revised discharge standards set by the Local Authority to achievement of the objectives set out in Schedule Four of S.I. 296 of 2009. Mitigation measures will be designed to reduce sediment loss at source and/or intercept sediment along the pathway to the river. | + | + | + | + | + | 0 | 0 | 0 | +/- | 0 | 0 |

***Key**: BFF – Biodiversity, Flora and Fauna; C – Climate; W – Water; MA – Material Assets; L – Landscape; P – Population; HH – Human Health; S – Soils; CH – Cultural Heritage*

**Table 8.7: Assessment Summary: Unnatural Flows**

| Measure | | BFF | P | HH | S | W | AQ / CC | MA1 | MA2 | MA3 | CH | L |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 9 | Conduct further investigations and, where necessary, an Appropriate Assessment under Article 6 of the Habitats Directive into the impacts of any flow regulation identified in this Sub-basin Management Plan on the pearl mussel population. Where necessary, a plan shall be made and implemented to control flows in a manner that supports the sustainable reproduction of the pearl mussel. Monitoring of the success of changes implemented shall be carried out. | + | + | + | + | + | + | 0/- | +/- | + | +/- | 0 |

***Key**: BFF – Biodiversity, Flora and Fauna; C – Climate; W – Water; MA – Material Assets; L – Landscape; P – Population; HH – Human Health; S – Soils; CH – Cultural Heritage*

### Table 8.8: Assessment Summary: Morphological Alterations

| Measure | | BFF | P | HH | S | W | AQ / CC | MA1 | MA2 | MA3 | CH | L |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 10 | Enact necessary legislative change to control morphological alterations of surface waters. (Note: this measure is linked to measure 19 below, as developments such as alteration of the bed and banks of a river are currently exempted). | + | + | + | 0 | + | 0/- | 0/- | 0 | +/- | 0 | 0 |
| 11 | Undertake the required morphological remediation measures at locations identified under this Sub-basin Management Plan, or through further investigation during the life-cycle of the plan (up to 2015). | +/- | +/- | +/- | +/- | + | 0/- | 0/- | 0 | +/- | 0/- | 0/- |
| 12 | No sand, gravel or stone shall be removed from rivers designated for freshwater pearl mussel, unless an appropriate assessment determines that there will be no significant negative impacts on the pearl mussel. (Note: sand and gravel extraction should be controlled under measure 10 above). | +/- | + | + | + | + | 0 | + | 0 | +/- | 0/+ | 0/+ |

***Key***: *BFF – Biodiversity, Flora and Fauna; C – Climate; W – Water; MA – Material Assets; L – Landscape; P – Population; HH – Human Health; S – Soils; CH – Cultural Heritage*

### Table 8.9: Assessment Summary: Agriculture

| Measure | | BFF | P | HH | S | W | AQ / CC | MA1 | MA2 | MA3 | CH | L |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 14a | Develop and roll-out an agri-environmental scheme, which could, if appropriate, be incorporated into other existing schemes, for target areas within pearl mussel SAC catchments to achieve the objectives of this plan. (Work is ongoing to identify the target areas). | + | +/- | + | + | + | + | 0 | 0 | +/- | +/- | + |
| 14b | The overall objective would be that all farms within the target areas in pearl mussel SAC catchments would have a farm plan under Measure 14a. | + | + | + | + | + | + | 0 | 0 | +/- | + | + |
| 14f | Farm plans in the target areas may include any of the suite of measures, but only if they are found, under Measure 14d, to be required: | + | +/- | + | + | + | +/- | 0 | 0 | +/- | +/- | + |
| 14k | Make all data provided and collected under the agri-environmental scheme available to the relevant public authorities e.g. LA, DAFF, EPA, DEHLG. | + | + | + | + | + | 0 | 0 | 0 | 0 | 0 | 0 |
| 15a | Locate supplementary feeding stations away from watercourses (>30 m), steep slopes adjacent to watercourses and waterlogged land. Move such stations regularly to avoid nutrient build-up and excessive poaching. | + | 0 | + | + | + | 0 | 0 | 0 | +/- | 0 | + |

| Measure | | BFF | P | HH | S | W | AQ / CC | MA1 | MA2 | MA3 | CH | L |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 15b | Avoid removal or disturbance of bank side/ riparian vegetation and maintain all existing buffer zones along watercourses. | + | 0 | + | + | + | 0 | 0 | 0 | +/- | + | + |
| 15d | Locate sheep dipping stations or other livestock treatment facilities away from watercourses. | + | 0 | + | + | + | 0 | 0 | 0 | +/- | 0 | + |
| 15e | Include and promote measures for pearl mussel as options in other agri-environmental schemes that can be taken-up in non-target areas in the mussel SAC catchments. (Work is ongoing to identify the target areas). | + | +/- | + | + | + | + | 0 | 0 | +/- | +/- | + |
| 15f | Utilise Native Woodland Scheme for conversion of agricultural land along riparian corridors and within identified critical source areas for sediment and nutrients. | + | + | + | + | + | + | 0 | 0 | +/- | + | + |
| 15g | Prioritise GAP Regulation (S.I. 101 of 2009) farm inspections within pearl mussel SAC catchments. | + | 0 | + | + | + | 0 | 0 | 0 | + | 0 | 0 |
| 15j | Provide agricultural land-use data to relevant public authorities, including agriculture type, livestock density, soil phosphorus concentrations, fertiliser use, slurry spread grounds and application rates, to allow identification and mapping of target areas, etc. | + | + | + | + | + | 0 | 0 | 0 | 0 | 0 | 0 |

***Key***: *BFF – Biodiversity, Flora and Fauna; C – Climate; W – Water; MA – Material Assets; L – Landscape; P – Population; HH – Human Health; S – Soils; CH – Cultural Heritage*

### Table 8.10: Assessment Summary: On-site Wastewater Treatment Systems

| Measure | | BFF | P | HH | S | W | AQ / CC | MA1 | MA2 | MA3 | CH | L |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 16c | Install new, and upgrade older, on-site wastewater treatment systems to comply with all standards issued by DEHLG and codes of practice issued by the EPA, e.g. Code of Practice Wastewater Treatment and Disposal Systems serving Single Houses. | + | + | + | + | + | + | 0 | + | +/- | 0/- | 0 |
| 16d | Operate and maintain all on-site wastewater treatment systems in accordance with any standards issued by DEHLG. | + | + | + | + | + | + | 0 | + | +/- | 0/- | 0 |
| 16e | Where appropriate, use constructed wetlands for treating/polishing household effluent from unsewered properties. | + | + | + | + | + | + | 0 | + | +/- | 0 | + |
| 16f | Where an on-site wastewater treatment system is impacting the pearl mussel population, remove by tanker as a temporary measure until system is upgraded/ connected to municipal systems. | + | + | + | + | + | - | 0 | + | +/- | 0 | 0 |

| Measure | BFF | P | HH | S | W | AQ / CC | MA1 | MA2 | MA3 | CH | L |
|---|---|---|---|---|---|---|---|---|---|---|---|

***Key**: BFF – Biodiversity, Flora and Fauna; C – Climate; W – Water; MA – Material Assets; L – Landscape; P – Population; HH – Human Health; S – Soils; CH – Cultural Heritage*

### Table 8.11: Assessment Summary: Forestry

| Measure | | BFF | P | HH | S | W | CC | MA1 | MA2 | MA3 | CH | L |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 17a i | The option of not felling to be considered in sensitive areas, on a site-by-site basis. | +/- | 0 | + | + | + | + | 0 | + | - | 0 | 0 |
| ii | Coniferous plantations within sensitive areas of the catchment will be subject to final felling and replacement with continuous-cover native woodland or semi-natural bog/moor, where it is demonstrated to be technically feasible and silviculturally possible, and where adverse impacts on the protected area will not occur as a result of the measure. | +/- | 0 | + | + | + | - | 0 | 0 | - | 0 | +/- |
| iii | Establish riparian zone management prior to clearfelling, where technically feasible and following specific site-by-site assessment to determine the most appropriate buffer width and vegetative cover. The establishment of such management should not result in adverse impacts on water status. | +/- | 0 | + | + | + | 0 | 0 | 0 | - | 0 | 0 |
| iv | Change the tree species mix (for example to broadleaves) on replanting where soil-type permits and it is technically feasible and silviculturally possible. This measure will be site-specific. On sensitive sites, restocking with less nutrient demanding conifer species should also be considered. | +/- | + | + | + | + | - | 0 | 0 | - | 0 | + |
| v | Limit felling coupe size where it is technically feasible and where a risk assessment indicates that wind-throw is not likely to occur. The measure is also site-specific and the coup size should be linked to a multi-year felling plan for a given waterbody that would indicate the percentage of forest area to be felled and the expected nutrient and sediment release. | + | + | + | + | + | 0 | 0 | 0 | - | 0 | + |
| vi | Felling coup size shall be determined through a multi-year forest management plan that will predict nutrient and sediment loading and identify acceptable annual felling as a percentage of the catchment. The measure shall take account of the potential for adverse impacts such as wind-throw and overall forest stand stability in the design of the coupe sizes to be felled. Strict adherence to the Forestry and Freshwater Pearl Mussel Requirements and any other appropriate requirements/guidance is also required. | + | 0 | + | + | + | 0 | 0 | 0 | - | 0 | 0 |

| Measure | | BFF | P | HH | S | W | CC | MA1 | MA2 | MA3 | CH | L |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| vii | Following felling of existing forest-stands, restore blanket bog and wet heath through drain blocking and appropriate site management, where it is demonstrated to be technically feasible and where adverse impacts on the protected areas will not occur as a result of the measure. The sites where this measure is to be applied must be agreed with NPWS. | +/- | - | + | + | + | - | 0 | 0 | - | 0 | +/- |
| viii | Following site-specific assessment, remove bank-side trees by motor mechanical means and as whole trees where technically feasible and where the potential to impact on the protected species is identified as being less by these means than that by standard harvester and forwarder. | + | 0 | + | + | + | 0 | 0 | 0 | - | 0 | 0 |
| ix | Eutrophication and sedimentation - enhance sediment control through improved design of sediment traps, increased numbers and wider distribution of sediment traps and blankets. | + | 0 | + | + | + | 0 | 0 | 0 | - | 0 | 0 |
| x | Main silt traps will be large enough for *Margaritifera* conservation purposes. In the design of silt traps reference shall be made to Altmüller & Dettmer, 2006. Ensure that the sediment management system is capable of blocking sediment in preferential flow paths to watercourse. | + | 0 | + | + | + | 0 | 0 | 0 | - | 0 | 0 |
| xi | Prohibition of fertilisation on sensitive sites | + | 0 | + | + | + | 0 | 0 | 0 | - | 0 | 0 |
| xii | Avoid or limit planting on un-enclosed peatland sites (blanket bog, raised bog, fen peat and heathland) and limit forest cover on less sensitive peatland sites such as cutaway, enclosed and improved peats. The latter should be based on a site-by-site assessment. | + | 0 | + | + | + | - | 0 | 0 | - | 0 | 0/- |
| xiv | Enhanced drainage network management – minimize drainage in peat soils to reduce potential for nutrient entry to surface waters, where technically feasible. | + | 0 | + | + | + | 0 | 0 | 0 | - | 0 | 0 |
| xv | Pesticide use – reduce and monitor pesticide usage in forests. Reduce usage through allowing forest stands to lay fallow by delaying any restocking by 3-5 years, using pre-dipped plants from nurseries and by developing alternate biological control methods. Where feasible, a register of pesticide use should be maintained. | + | 0 | + | + | + | 0 | 0 | 0 | - | 0 | 0 |
| xvi | Establish native riparian woodland as a buffer including the establishment of continuous-cover, native bank-side tress at mussel habitat locations to produce dappled shade with no tunnelling of the river, where appropriate, technically feasible and silviculturally possible | + | + | + | + | + | 0 | 0 | 0 | - | 0 | + |
| xvii | Roading associated with forestry should be subject to risk assessment and carried out strictly in accordance with existing national guidelines. | + | 0 | + | + | + | 0 | 0 | 0 | - | 0 | 0 |
| xviii | Establishment of continuous-cover, native bank-side trees at mussel habitat locations to produce dappled shade with no tunnelling of the river. | + | + | + | + | + | 0 | 0 | 0 | - | 0 | + |

| Measure | | BFF | P | HH | S | W | CC | MA1 | MA2 | MA3 | CH | L |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| xix | Trees that are at risk of falling into the river shall be removed or partly removed (e.g. where some boughs are falling into the river) by suitably trained and experienced forestry personnel at mussel locations and, where necessary and technically feasible, be replaced by appropriate native species. | + | 0 | + | + | + | 0 | 0 | 0 | - | 0 | 0 |
| xxi | Where the continued development of young forest stands is judged to pose a significant future threat to the pearl mussel population due to their location, stand size or being situated on blanket peats, fen peats, raised bogs or heath peats, then such immature forest stands shall be removed through felling-to-waste and any drainage system installed should be blocked and the natural hydrology restored, to the extent possible. | + | 0 | + | + | + | - | 0 | 0 | - | 0 | 0 |
| xxii | Where the risk of felling-to-waste of immature forest stands on sensitive sites is regarded as high for the pearl mussel population, consideration shall be given to abandoning such stands and restoring the natural hydrology, where technically feasible. | + | 0 | + | + | + | - | 0 | 0 | - | 0 | 0 |

***Key**: BFF – Biodiversity, Flora and Fauna; C – Climate; W – Water; MA – Material Assets; L – Landscape; P – Population; HH – Human Health; S – Soils; CH – Cultural Heritage*

### Table 8.12: Assessment Summary: Peat Cutting

| Measure | | BFF | P | HH | S | W | CC | MA1 | MA2 | MA3 | CH | L |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 18a | Where turf-cutting and associated drainage have been identified as a significant silt source, drains shall be filled or effectively silt trapped, and an effective buffer zone established to trap overland-movement of peat silt before it reaches the rivers. | + | + | + | + | + | 0 | 0 | 0 | +/- | 0/- | 0 |
| 18b | Where impacts from peat cutting (e.g.. hydrological & siltation) are identified and cannot be mitigated along the pathway, reduction and/or cessation of peat cutting will be required. | + | + | + | + | + | + | + | 0 | +/- | + | + |

***Key**: BFF – Biodiversity, Flora and Fauna; C – Climate; W – Water; MA – Material Assets; L – Landscape; P – Population; HH – Human Health; S – Soils; CH – Cultural Heritage*

### Table 8.13: Assessment Summary: Planning

| Measure | | BFF | P | HH | S | W | AQ / CC | MA1 | MA2 | MA3 | CH | L |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 19a | Activities such as field drainage, land reclamation, site/land clearance should be made subject to further planning control in sensitive areas of the catchment. | + | + | + | + | + | 0 | 0 | - | +/- | 0/- | 0 |
| 19b | Areas where further development represents a significant risk to pearl mussel conservation shall be identified and development restrictions implemented, as necessary. | + | + | + | + | + | 0 | 0 | - | +/- | 0/- | 0 |

***Key***: *BFF – Biodiversity, Flora and Fauna; C – Climate; W – Water; MA – Material Assets; L – Landscape; P – Population; HH – Human Health; S – Soils; CH – Cultural Heritage*

### Table 8.14: Assessment Summary: Road Building

| Measure | | BFF | P | HH | S | W | CC | MA1 | MA2 | MA3 | CH | L |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 20a | All planned future roads or bridges of any size shall be assessed for potential negative impacts on mussel populations during construction and operation. Future roads or bridges of any size should be subject to morphological controls (see Measure 10). | + | +/- | + | + | + | 0 | 0 | 0 | +/- | 0 | 0 |
| 20b | Remediate hydromorphological damage caused by temporary or permanent roads and bridges, where such remediation work has been judged necessary and, through Appropriate Assessment and/or EIA, unlikely to significantly impact on the environment. | +/- | + | + | + | + | 0 | - | 0 | +/- | +/- | +/- |
| 20c | Remediate hardcore or surfacing that includes substantial limestone content, where such work has been judged necessary and, through Appropriate Assessment and/or EIA, unlikely to significantly impact on the environment. | + | 0 | 0 | +/- | + | +/- | 0 | 0 | +/- | 0 | 0 |

***Key***: *BFF – Biodiversity, Flora and Fauna; C – Climate; W – Water; MA – Material Assets; L – Landscape; P – Population; HH – Human Health; S – Soils; CH – Cultural Heritage*

**Table 8.15: Assessment Summary: Leisure Management**

| Measure | | BFF | P | HH | S | W | AQ CC | MA1 | MA2 | MA3 | CH | L |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 21b | Angling – avoid trampling on pearl mussels by fishing from the bank. | + | + | + | + | + | 0 | 0 | 0 | + | + | + |
| 21c | Angling - provide notices and leaflets advising anglers of the sensitivity of pearl mussels, the areas where care is necessary to avoid trampling on mussels and/or disturbing river banks and bed, and the penalties for causing damage to the species and its habitat. | + | + | 0 | + | + | 0 | 0 | 0 | + | + | + |
| 21d | River morphological works shall comply with any new guidance for *Margaritifera* and fisheries enhancement to ensure that any works are beneficial to both. These shall be subject to morphological controls under Measure 10. | + | + | + | + | + | 0 | +/- | 0 | + | +/- | +/- |
| 21e | Kayaking/canoeing – liaise with kayaking/canoeing clubs using pearl mussel rivers, enforce restrictions on use where necessary and provide information to kayakers/canoeists and other recreational users through signs, leaflets etc. | + | + | + | + | + | 0 | 0 | 0 | + | + | + |

***Key**: BFF – Biodiversity, Flora and Fauna; C – Climate; W – Water; MA – Material Assets; L – Landscape; P – Population; HH – Human Health; S – Soils; CH – Cultural Heritage*

## 8.6 DETAILED ASSESSMENT OF ALTERNATIVES PER FRESHWATER PEARL MUSSEL CATCHMENT

### 8.6.1 The Cloon Catchment

The Draft Cloon Sub-Basin Management Plan identified the following key and secondary pressures either within the contributing catchment or within the vicinity of the FPM populations:

- Agriculture;
- On-site Wastewater Treatment Systems;
- Forestry;
- Physical Modifications;
- Quarries;
- Other issues – Peat Cutting; and
- Other issues – Fords.

**Agriculture**

As noted in the baseline, increased levels of silt and nutrients into the watercourses is a significant pressure on FPM populations in this catchment. To address this, site specific measures for this catchment have been developed and include detailed assessment of soil nutrient status; sediment and nutrient management plans; exclusion of cattle with improved fencing and buffer zones on a prioritisation basis beginning with those stretches containing FPM populations; encouragement of participation in agri-environmental schemes; and strict enforcement of Good Agricultural Practice Regulations 2009 and cross compliance.

Detailed assessment of soil nutrient status and sediment and nutrient management plans will have positive impacts on biodiversity, flora and fauna, water, and soils by highlighting those areas where nutrient levels are above recommended levels and allowing targeted mitigation measures to be applied on a case by case basis. Improvements in water quality will also result in indirect positive impacts for population / human health and such improvements will also impact positively on material assets such as tourism which are dependant on good water quality for fishing, leisure activities etc.

Exclusion of cattle with improved fencing and buffer zones will have positive impacts for biodiversity, flora and fauna, water and soil in particular, however, negative impacts are expected for material assets through increased costs associated with fencing and maintenance and loss of agricultural land.

Based on preliminary estimates of priority stretches, which are subject to change as information becomes available, and assuming cattle are excluded from a 1.5m wide riparian strip on both sides of the river, this would result in approx. 3.75ha of land lost for grazing by cattle.

Effective and targeted implementation of the Good Agricultural Practice Regulations 2009, which are a Basic Measure, and cross compliance will address agricultural pressures, particularly where there is a focus on improved fencing, buffer zones and the provision of animal watering points on a prioritised basis. This will have overall positive impacts for FPM and biodiversity, flora and fauna generally as well as water quality and soils by reducing the amount of erosion along the river bank, together with reducing the amount of silt and nutrients entering the watercourse. Improved fencing and provision of buffer zones will have negative impacts for material assets as stated previously; however, given the close proximity to the watercourse it is unlikely to yield high agricultural outputs. The width of buffer strip will be dependant on the slope of lands adjacent to the rivers as well as the type of farming activity being carried out on specific farms. It will be necessary to undertake a field by field inspection in advance of determining site specific requirements for fencing and buffer zones.

**On-site Wastewater Treatment Systems**

Baseline studies in this catchment have identified point and diffuse sources of nutrient input to rivers from OSWWTS and have highlighted this as a pressure. Site specific measures to deal with this pressure include prioritisation of the inspection and investigation of on-site systems in high to extreme risk categories along the main channel of the Cloon; and a public awareness campaign.

As noted in the baseline, there are 146 on-site systems on extreme risk and 199 on high risk potential settings in the Cloon catchment. Following investigation further mitigation may be required on a case by case basis however, if it is assumed that 50% (or 173) of these systems require desludging once during the first 6-year Action Programme cycle, this would result in an estimated **831 tonnes** (based on 4.5$m^3$ sludge per tank and a density of 1.07tonnes/$m^3$) requiring transport and disposal. It is assumed that the catchment is within a 100km round trip of a suitable landfill site for appropriate disposal. Disposal of sludge to landfill may require additional landfill space, with resultant impacts identified in the previous high level strategic assessment in **Section 8.5.3**.

The potential emission of $CO_2$ associated with leaving the sludges in place is estimated to be **0.32 ktonnes** per year. If this is multiplied across the 6-year cycle, an estimated **1.92 ktonnes** of $CO_2$ will be emitted by on-site wastewater treatment systems that may be posing a threat to the designated FPM area.

The amount of $CO_2$ emitted by disposal of sludge to landfill is a combination of the $CO_2$ released by the sludge after disposal to landfill and the $C0_2$ emitted during transport. Transport of **831 tonnes** of sludge to landfill is estimated to produce less than **0.01 ktonnes** of $CO_2$, while $CO_2$ emissions once in the landfill are estimated to be **0.2 ktonnes** which rises to **1.2 ktonnes** if the tanks are desludged annually.

Comparing the estimated emissions of **1.92 ktonnes** of $CO_2$ if the sludges are left in place to the estimated **1.2 ktonnes** of $CO_2$ if they are removed and disposed of to landfill, it appears that in the context of contribution to climate change over a 6 year cycle of the Action Programme the removal of the sludges and disposal to landfill would be positive in the context of climate change.

Inspection and investigation of OSWWTS will require commitment from Local Authorities charged with carrying out this work, however, it is noted that there is likely to be significant overlap between investigations under the River Basin Management Plans leading to opportunities to streamline and coordinate prioritisation of this work under these two distinct but complementary pieces of legislation.

A public awareness campaign is expected to result in direct positive impacts through less physical disturbance and loss to FPM populations and indirectly to improved water quality through increased public awareness.

**Forestry**

Forestry management plans aimed at minimising hydrological, sediment, nutrient and other potential impacts from forests will have direct positive impacts on biodiversity, flora and fauna, water, and soils by minimising these and other potential impacts, and allowing targeted mitigation measures to be applied on a case by case basis. Improvements in water quality will result in indirect positive impacts for population / human health and such improvements will also impact positively on material assets such as tourism which are dependant on good water quality for fishing, leisure activities etc. Minimising hydrological, sediment, nutrient and other potential impacts may require changes to forestry management practices where such controls are not already in place resulting in negative impacts in the short to medium term on material assets. However, as these practices become the norm, this impact will become neutral over the long term.

**Physical Modifications**

Site specific measures for this catchment include no further reclamation permitted within the SAC without an assessment of its potential impact. This requirement is to be extended to areas outside of the SAC boundary also to take account of indirect impacts. In addition, existing and future drainage works require an Appropriate Assessment for Natura 2000 sites and this is also to be extended beyond the SAC boundary. As there will be no further reclamation or drainage works without an Appropriate Assessments for Natura 2000 sites, positive outcomes are anticipated for biodiversity, flora and fauna, water and soil in particular. However there may be indirect negative impacts on material assets in relation to land drainage if this constrains drainage and therefore the type of land use activities suitable in the area. There is also potential for indirect negative impacts on flood defence through restrictions to drainage maintenance and as a result indirect negative impacts on material assets, e.g. residential, which may be at risk from flooding. The requirement for Appropriate Assessments for Natura 2000 sites is considered enforcement of existing legislation which is a Basic Measure.

**Quarries**

A number of quarries have been identified in the baseline studies in this catchment. Site specific measures to deal with this pressure include an awareness campaign by the Clare County Council to inform the quarry owners of the FPM requirements and the requirement for planning permission and a license should the quarries be developed further in the future. These measures will have positive impacts for biodiversity, flora and fauna, water and soil. Potential negative impacts are anticipated for material assets if future development of the quarries is constrained or if additional management or mitigation is required to develop or operate the site. Enforcement of existing legislation is a Basic Measure.

**Other issues - Peat Cutting**

The baseline has identified a number of peat extraction operations operating within the catchment with the potential to impact on the FPM populations. Therefore, site specific measures for this catchment include assessment of the peat extraction operations for licensing and permitting requirements; and installation of appropriately sized silt traps to treat runoff from the identified peat operations.

Licensing and permitting of peat extraction operations and subsequent enforcement of existing legislation is considered a Basic Measure. Positive impacts are anticipated including to climate through a reduction in peat cutting and therefore a reduction in the burning of peat. However, this will impact negatively on material assets through potential restrictions on peat cutting and may also impact indirectly on cultural heritage if peat cutting has historically been undertaken in the area. Installation of silt traps will have positive impacts for biodiversity, flora and fauna, water and soil, however, maintenance of the systems will be important to prevent medium to long-term negative impacts on these receptors. Indirect positive impacts would also be expected for population / human health through improved water quality and on material assets e.g. tourism, angling, which rely on good water quality.

**Other issues - Fords**

Three significant vehicular and animal fords have been identified in the Cloon catchment. To address this pressure site specific measures include investigation of alternative access immediately or site mitigation measures implemented. Relocation of the access will result in positive impacts for FPM and biodiversity generally e.g. fish spawning areas, water and soil by controlling erosion, and silt and nutrient addition downstream of the crossing point, and relocating a direct impact (through crushing) to existing FPM populations. The relocation may result in negative impact to material assets as a result of changes in management practices necessary to reach alternative access points, increased time requirements to move livestock. It may also impact on other biodiversity and potentially cultural heritage if the alternative locations are not sited sensitively.

**Cumulative Impacts of the Measures in the Cloon Catchment**

A reduction in the silt loading to the watercourses in this catchment as a result of implementing the Action Programme measures under Agriculture, Forestry, Physical Modifications, Peat Cutting and Fords will result in direct positive impacts to FPM populations and habitats. In addition, a reduced silt load will have direct positive impacts on salmonid spawning and nursery areas, one of the reasons for this sites SAC designation, and reduce the impacts on other flora and fauna due to sedimentation.

Further, the implementation of said measures will have direct positive impacts on soils through the reduction of soil erosion, with again direct positive influences on water quality, which in turn would have indirect positive influences on human health. The cumulative impacts of implementing these measures would be positive.

A reduction in the nutrient loading to this catchment through the implementation of the Action Programme measures under Agriculture, Forestry, Peat Cutting and On-site wastewater treatment systems will have direct positive impacts on water quality, with indirect impacts on biodiversity, flora and fauna by reducing the potential for the eutrophication of these waters. This will also have an indirect positive influence on human health.

The potential for direct negative impacts to material assets through the implementation of the Action Programme measures may result from a reduction in agricultural productivity, restrictions to forestry activities, restrictions to peat cutting activities, restrictions to quarry activities or through restrictions to land reclamation. There is also potential for indirect negative impacts on flood defence through restrictions to drainage maintenance.

### 8.6.2 The Owenmore Catchment

The Draft Owenmore Sub-Basin Management Plan identified the following key and secondary pressures either within the contributing catchment or within the vicinity of the FPM populations:

- Agriculture;
- On-site Wastewater Treatment Systems;
- Forestry;
- Physical Modifications;
- Other issues – Peat Cutting; and
- Other issues – Fords.

**Agriculture**

As noted in the baseline, increased levels of silt and nutrients into the watercourses is a significant pressure on FPM populations in this catchment. To address this, site specific measures for this catchment have been developed and include further investigation into the extent of damaged commonage in the catchment is required; continued implementation of the commonage framework plans for this catchment (see sub-basin plan for reference); detailed assessment of soil nutrient status; sediment and nutrient management plans; improved fencing and buffer zones will be required, beginning with those stretches which contain FPM; encouragement of participation in agri-environmental schemes; and strict enforcement of Good Agricultural Practice Regulations 2009 and cross compliance.

Detailed assessment of soil nutrient status and sediment and nutrient management plans will have positive impacts on biodiversity, flora and fauna, water, and soils by highlighting those areas where nutrient levels are above recommended levels and allowing targeted mitigation measures to be applied on a case by case basis. Improvements in water quality will also result in indirect positive impacts for population / human health and such improvements will also impact positively on material assets such as tourism which are dependant on good water quality for fishing, leisure activities etc.

Exclusion of sheep with improved fencing and buffer zones will have positive impacts for biodiversity, flora and fauna, water and soil in particular, however, negative impacts are expected for material assets through increased costs associated with fencing and maintenance and loss of agricultural land.

Effective and targeted implementation of the Good Agricultural Practice Regulations 2009, which are a Basic Measure, and cross compliance will address agricultural pressures, particularly where there is a focus on improved fencing, buffer zones and the provision of animal watering points on a prioritised

basis. This will have overall positive impacts for FPM and biodiversity, flora and fauna generally as well as water quality and soils by reducing the amount of erosion along the river bank, together with reducing the amount of silt and nutrients entering the watercourse. Improved fencing and provision of buffer zones will have negative impacts for material assets as stated previously; however, given the close proximity to the watercourse it is unlikely to yield high agricultural outputs. The width of buffer strip will be dependant on the slope of lands adjacent to the rivers as well as the type of farming activity being carried out on specific farms. It will be necessary to undertake a field by field inspection in advance of determining site specific requirements for fencing and buffer zones.

**On-site Wastewater Treatment Systems**

Baseline studies in this catchment have identified point and diffuse sources of nutrient input to rivers from OSWWTS and have highlighted this as a pressure. Site specific measures to deal with this pressure include prioritisation of the inspection and investigation of on-site systems in high to extreme risk categories along the main channel of the Owenmore; and a public awareness campaign.

As noted in the baseline, there are 22 on-site systems on extreme risk and 4 on high risk potential settings in the Owenmore catchment. Following investigation further mitigation may be required on a case by case basis however, if it is assumed that 50% (or 13) of these systems require desludging once during the first 6-year Action Programme cycle, this would result in an estimated **63 tonnes** (based on 4.5$m^3$ sludge per tank and a density of 1.07tonnes/$m^3$) requiring transport and disposal. It is assumed that the catchment is within a 100km round trip of a suitable landfill site for appropriate disposal. Disposal of sludge to landfill may require additional landfill space, with resultant impacts identified in the previous high level strategic assessment in **Section 8.5.3**.

The potential emission of $CO_2$ associated with leaving the sludges in place is estimated to be **0.02 ktonnes** per year. If this is multiplied across the 6-year cycle, an estimated **0.14 ktonnes** of $CO_2$ will be emitted by on-site wastewater treatment systems that may be posing a threat to the designated FPM area.

The amount of $CO_2$ emitted by disposal of sludge to landfill is a combination of the $CO_2$ released by the sludge after disposal to landfill and the $C0_2$ emitted during transport. Transport of **63 tonnes** of sludge to landfill is estimated to produce less than **0.00 ktonnes** of $CO_2$, while $CO_2$ emissions once in the landfill are estimated to be **0.02 ktonnes** which rises to **0.09 ktonnes** if the tanks are desludged annually.

Comparing the estimated emissions of **0.14 ktonnes** of $CO_2$ if the sludges are left in place to the estimated **0.09 ktonnes** of $CO_2$ if they are removed and disposed of to landfill, it appears that in the context of contribution to climate change over a 6 year cycle of the Action Programme the removal of the sludges and disposal to landfill would be positive in the context of climate change.

Inspection and investigation of OSWWTS will require commitment from Local Authorities charged with carrying out this work, however, it is noted that there is likely to be significant overlap between

investigations under the River Basin Management Plans leading to opportunities to streamline and coordinate prioritisation of this work under these two distinct but complementary pieces of legislation.

A public awareness campaign is expected to result in direct positive impacts through less physical disturbance and loss to FPM populations and indirectly to improved water quality through increased public awareness.

**Forestry**

Forestry management plans aimed at minimising hydrological, sediment, nutrient and other potential impacts from forests will have direct positive impacts on biodiversity, flora and fauna, water, and soils by minimising these and other potential impacts, and allowing targeted mitigation measures to be applied on a case by case basis. Improvements in water quality will also result in indirect positive impacts for population / human health and such improvements will also impact positively on material assets such as tourism which are dependant on good water quality for fishing, leisure activities etc. Minimising hydrological, sediment, nutrient and other potential impacts may require changes to forestry management practices where such controls are not already in place resulting in negative impacts in the short to medium term on material assets. However, as these practices become the norm, this impact will become neutral over the long term.

**Physical Modifications**

Site specific measures for this catchment include no further reclamation permitted within the SAC without an assessment of its potential impact. This requirement is to be extended to areas outside of the SAC boundary also to take account of indirect impacts. In addition, existing and future drainage works require an Appropriate Assessment for Natura 2000 sites and this is also to be extended beyond the SAC boundary. As there will be no further reclamation or drainage works without an Appropriate Assessments for Natura 2000 sites, positive outcomes are anticipated for biodiversity, flora and fauna, water and soil in particular. However there may be indirect negative impacts on material assets in relation to land drainage if this constrains drainage and therefore the type of land use activities suitable in the area. There is also potential for indirect negative impacts on flood defence through restrictions to drainage maintenance and as a result indirect negative impacts on material assets, e.g. residential, which may be at risk from flooding. The requirement for Appropriate Assessments for Natura 2000 sites is considered enforcement of existing legislation which is a Basic Measure.

**Other issues - Cutting**

The baseline has identified a large expanse of commercial peat cutting in the centre of the catchment adjacent to the main channel with the potential to impact on the FPM populations. Therefore, site specific measures for this catchment include assessment of the peat extraction operations for risk of silt release; and installation of appropriately sized silt traps to treat runoff from the identified peat operations. Installation of silt traps will have positive impacts for biodiversity, flora and fauna, water

and soil, however, maintenance of the systems will be important to prevent medium to long-term negative impacts on these receptors. Indirect positive impacts would also be expected for population / human health through improved water quality and on material assets e.g. tourism, angling, which rely on good water quality.

**Other issues - Fords**

One significant vehicular and animal ford has been identified in the Owenmore catchment. To address this pressure site specific measures include investigation of alternative access immediately or site mitigation measures implemented. Relocation of the access will result in positive impacts for biodiversity, flora and fauna, water and soil by controlling erosion, and silt and nutrient addition downstream of the crossing point, and relocating a direct impact (through crushing) to existing FPM populations. The relocation may result in negative impact to material assets as a result of changes in management practices necessary to reach alternative access points.

**Cumulative Impacts of the Measures in the Owenmore Catchment**

A reduction in the silt loading to the watercourses in this catchment as a result of implementing the Action Programme measures under Agriculture, Forestry, Physical Modifications, Peat Cutting and Fords will result in direct positive impacts to FPM populations and habitats. In addition, a reduced silt load will have direct positive impacts on salmonid spawning and nursery areas, one of the reasons for this sites SAC designation, and reduce the impacts on other flora and fauna due to sedimentation.

Further, the implementation of said measures will have direct positive impacts on soils through the reduction of soil erosion, with again direct positive influences on water quality, which in turn would have indirect positive influences on human health. The cumulative impacts of implementing these measures would be positive.

A reduction in the nutrient loading to this catchment through the implementation of the Action Programme measures under Agriculture, Forestry, Peat Cutting and On-site wastewater treatment systems will have direct positive impacts on water quality, with indirect impacts on biodiversity, flora and fauna by reducing the potential for the eutrophication of these waters. This will also have an indirect positive influence on human health.

The potential for direct negative impacts to material assets through the implementation of the Action Programme measures may result from a reduction in agricultural productivity, restrictions to forestry activities, restrictions to peat cutting activities, or through restrictions to land reclamation.

### 8.6.3 The Aughavaud Catchment

The Draft Aughavaud Sub-Basin Management Plan identified the following key and secondary pressures either within the contributing catchment or within the vicinity of the FPM populations:

- Agriculture;
- On-site Wastewater Treatment Systems;
- Forestry;
- Physical Modifications; and
- Point Sources.

**Agriculture**

As noted in the baseline, increased levels of silt and nutrients into the watercourses is a significant pressure on FPM populations in this catchment. To address this, site specific measures for this catchment have been developed and include detailed assessment of soil nutrient status; sediment and nutrient management plans; exclusion of cattle with improved fencing and buffer zones on a prioritisation basis beginning with those stretches containing FPM populations; encouragement of participation in agri-environmental schemes; and strict enforcement of Good Agricultural Practice Regulations 2009 and cross compliance.

Detailed assessment of soil nutrient status and sediment and nutrient management plans will have positive impacts on biodiversity, flora and fauna, water, and soils by highlighting those areas where nutrient levels are above recommended levels and allowing targeted mitigation measures to be applied on a case by case basis. Improvements in water quality will also result in indirect positive impacts for population / human health and such improvements will also impact positively on material assets such as tourism which are dependant on good water quality for fishing, leisure activities etc.

Exclusion of sheep and cattle will have positive impacts for biodiversity, flora and fauna, water and soil in particular, however, negative impacts are expected for material assets through increased costs associated with fencing and maintenance and loss of agricultural land.

Effective and targeted implementation of the Good Agricultural Practice Regulations 2009, which are a Basic Measure, and cross compliance will address agricultural pressures, particularly where there is a focus on improved fencing, buffer zones and the provision of animal watering points on a prioritised basis. This will have overall positive impacts for FPM and biodiversity, flora and fauna generally as well as water quality and soils by reducing the amount of erosion along the river bank, together with reducing the amount of silt and nutrients entering the watercourse. Improved fencing and provision of buffer zones will have negative impacts for material assets as stated previously; however, given the

close proximity to the watercourse it is unlikely to yield high agricultural outputs. The width of buffer strip will be dependant on the slope of lands adjacent to the rivers as well as the type of farming activity being carried out on specific farms. It will be necessary to undertake a field by field inspection in advance of determining site specific requirements for fencing and buffer zones.

**On-site Wastewater Treatment Systems**

Baseline studies in this catchment have identified point and diffuse sources of nutrient input to rivers from OSWWTS and have highlighted this as a pressure. Site specific measures to deal with this pressure include prioritisation of the inspection and investigation of on-site systems in high to extreme risk categories with the catchment; and a public awareness campaign.

As noted in the baseline, there are 63 on-site systems on a very high risk setting in the Aughavaud catchment. Following investigation further mitigation may be required on a case by case basis however, if it is assumed that 50% (or 32) of these systems require desludging once during the first 6-year Action Programme cycle, this would result in an estimated **152 tonnes** (based on 4.5$m^3$ sludge per tank and a density of 1.07tonnes/$m^3$) requiring transport and disposal. It is assumed that the catchment is within a 100km round trip of a suitable landfill site for appropriate disposal. Disposal of sludge to landfill may require additional landfill space, with resultant impacts identified in the previous high level strategic assessment in **Section 8.5.3**.

The potential emission of $CO_2$ associated with leaving the sludges in place is estimated to be **0.06 ktonnes** per year. If this is multiplied across the 6-year cycle, an estimated **0.35 ktonnes** of $CO_2$ will be emitted by on-site wastewater treatment systems that may be posing a threat to the designated FPM area.

The amount of $CO_2$ emitted by disposal of sludge to landfill is a combination of the $CO_2$ released by the sludge after disposal to landfill and the $C0_2$ emitted during transport. Transport of **152 tonnes** of sludge to landfill is estimated to produce less than **0.00 ktonnes** of $CO_2$, while $CO_2$ emissions once in the landfill are estimated to be **0.04 ktonnes** which rises to **0.22 ktonnes** if the tanks are desludged annually.

Comparing the estimated emissions of **0.35 ktonnes** of $CO_2$ if the sludges are left in place to the estimated **0.22 ktonnes** of $CO_2$ if they are removed and disposed of to landfill, it appears that in the context of contribution to climate change over a 6 year cycle of the Action Programme the removal of the sludges and disposal to landfill would be positive in the context of climate change.

Inspection and investigation of OSWWTS will require commitment from Local Authorities charged with carrying out this work, however, it is noted that there is likely to be significant overlap between investigations under the River Basin Management Plans leading to opportunities to streamline and coordinate prioritisation of this work under these two distinct but complementary pieces of legislation.

A public awareness campaign is expected to result in direct positive impacts through less physical disturbance and loss to FPM populations and indirectly to improved water quality through increased public awareness.

**Forestry**

Forestry management plans aimed at minimising hydrological, sediment, nutrient and other potential impacts from forests will have direct positive impacts on biodiversity, flora and fauna, water, and soils by minimising these and other potential impacts, and allowing targeted mitigation measures to be applied on a case by case basis. Improvements in water quality will also result in indirect positive impacts for population / human health and such improvements will also impact positively on material assets such as tourism which are dependant on good water quality for fishing, leisure activities etc. Minimising hydrological, sediment, nutrient and other potential impacts may require changes to forestry management practices where such controls are not already in place resulting in negative impacts in the short to medium term on material assets. However, as these practices become the norm, this impact will become neutral over the long term.

**Physical Modifications**

Site specific measures for this catchment include no further reclamation permitted within the SAC without an assessment of its potential impact. This requirement is to be extended to areas outside of the SAC boundary also to take account of indirect impacts. In addition, existing and future drainage works require an Appropriate Assessment for Natura 2000 sites and this is also to be extended beyond the SAC boundary. As there will be no further reclamation or drainage works without an Appropriate Assessments for Natura 2000 sites, positive outcomes are anticipated for biodiversity, flora and fauna, water and soil in particular. However there may be indirect negative impacts on material assets in relation to land drainage if this constrains drainage and therefore the type of land use activities suitable in the area. There is also potential for indirect negative impacts on flood defence through restrictions to drainage maintenance and as a result indirect negative impacts on material assets, e.g. residential, which may be at risk from flooding. The requirement for Appropriate Assessments for Natura 2000 sites is considered enforcement of existing legislation which is a Basic Measure.

**Point Sources**

Site specific measures for this catchment include that all discharge licences or authorisations must comply with the EQOs set out of SI 296 of 2009; all WWTP, IPPC and Section 4 and 16 discharge licences must be reviewed to assess compliance with EQOs and additional conditions imposed as required. These measures will result in positive impacts for biodiversity, flora and fauna, water and soil by potentially reducing the level of nutrients entering the watercourse; however, negative impacts are expected for material assets associated with costs of alterations and / or upgrades and additional conditions being imposed. Negative impacts are also possible where relocation of discharge points is

required in order to comply as this may result in indirect negative impacts on cultural heritage, landscape and biodiversity if not sited sensitively. Positive impacts will be gained for population / human health and material assets through these alterations, up-grades and restrictions by ensuring adequate waste water treatment is in place to protect water quality.

**Cumulative Impacts of the Measures in the Aughavaud Catchment**

A reduction in the silt loading to the watercourses in this catchment as a result of implementing the Action Programme measures under Agriculture, Forestry and Physical Modifications will result in direct positive impacts to FPM populations and habitats. In addition, a reduced silt load will have direct positive impacts on salmonid spawning and nursery areas, one of the reasons for this sites SAC designation, and reduce the impacts on other flora and fauna due to sedimentation.

Further, the implementation of said measures will have direct positive impacts on soils through the reduction of soil erosion, with again direct positive influences on water quality, which in turn would have indirect positive influences on human health. The cumulative impacts of implementing these measures would be positive.

A reduction in the nutrient loading to this catchment through the implementation of the Action Programme measures under Agriculture, Forestry, Point Source and On-site wastewater treatment systems will have direct positive impacts on water quality, with indirect impacts on biodiversity, flora and fauna by reducing the potential for the eutrophication of these waters. This will also have an indirect positive influence on human health.

The potential for direct negative impacts to material assets through the implementation of the Action Programme measures may result from a reduction in agricultural productivity, restrictions to forestry activities, or through restrictions to land reclamation. There is also potential for indirect negative impacts on flood defence through restrictions to drainage maintenance.

### 8.6.4 The Ballymurphy Catchment

The Draft Ballymurphy Sub-Basin Management Plan identified the following key and secondary pressures either within the contributing catchment or within the vicinity of the FPM populations:

- Agriculture;
- On-site Wastewater Treatment Systems;
- Forestry;
- Physical Modifications; and
- Other issues – Fords.

**Agriculture**

As noted in the baseline, increased levels of silt and nutrients into the watercourses is a significant pressure on FPM populations in this catchment. To address this, site specific measures for this catchment have been developed and include detailed assessment of soil nutrient status; sediment and nutrient management plans; exclusion of cattle with improved fencing and buffer zones on a prioritisation basis beginning with those stretches containing FPM populations; encouragement of participation in agri-environmental schemes; and strict enforcement of Good Agricultural Practice Regulations 2009 and cross compliance.

Detailed assessment of soil nutrient status and sediment and nutrient management plans will have positive impacts on biodiversity, flora and fauna, water, and soils by highlighting those areas where nutrient levels are above recommended levels and allowing targeted mitigation measures to be applied on a case by case basis. Improvements in water quality will also result in indirect positive impacts for population / human health and such improvements will also impact positively on material assets such as tourism which are dependant on good water quality for fishing, leisure activities etc.

Exclusion of cattle with improved fencing and buffer zones will have positive impacts for biodiversity, flora and fauna, water and soil in particular, however, negative impacts are expected for material assets through increased costs associated with fencing and maintenance and loss of agricultural land.

Effective and targeted implementation of the Good Agricultural Practice Regulations 2009, which are a Basic Measure, and cross compliance will address agricultural pressures, particularly where there is a focus on improved fencing, buffer zones and the provision of animal watering points on a prioritised basis. This will have overall positive impacts for FPM and biodiversity, flora and fauna generally as well as water quality and soils by reducing the amount of erosion along the river bank, together with reducing the amount of silt and nutrients entering the watercourse. Improved fencing and provision of buffer zones will have negative impacts for material assets as stated previously; however, given the

close proximity to the watercourse it is unlikely to yield high agricultural outputs. The width of buffer strip will be dependant on the slope of lands adjacent to the rivers as well as the type of farming activity being carried out on specific farms. It will be necessary to undertake a field by field inspection in advance of determining site specific requirements for fencing and buffer zones.

**On-site Wastewater Treatment Systems**

Baseline studies in this catchment have identified point and diffuse sources of nutrient input to rivers from OSWWTS and have highlighted this as a pressure. Site specific measures to deal with this pressure include prioritisation of the inspection and investigation of on-site systems in high to extreme risk categories within the Ballymurphy catchment; and a public awareness campaign.

As noted in the baseline, there was 1 on-site systems on extreme risk, 90 on very high risk and 34 on high risk potential settings in the Ballymurphy catchment. Following investigation further mitigation may be required on a case by case basis however, if it is assumed that 50% (or 63) of these systems require desludging once during the first 6-year Action Programme cycle, this would result in an estimated **301 tonnes** (based on 4.5$m^3$ sludge per tank and a density of 1.07tonnes/$m^3$) requiring transport and disposal. It is assumed that the catchment is within a 100km round trip of a suitable landfill site for appropriate disposal. Disposal of sludge to landfill may require additional landfill space, with resultant impacts identified in the previous high level strategic assessment in **Section 8.5.3**.

The potential emission of $CO_2$ associated with leaving the sludges in place is estimated to be **0.12 ktonnes** per year. If this is multiplied across the 6-year cycle, an estimated **0.70 ktonnes** of $CO_2$ will be emitted by on-site wastewater treatment systems that may be posing a threat to the designated FPM area.

The amount of $CO_2$ emitted by disposal of sludge to landfill is a combination of the $CO_2$ released by the sludge after disposal to landfill and the $C0_2$ emitted during transport. Transport of **301 tonnes** of sludge to landfill is estimated to produce less than **0.00 ktonnes** of $CO_2$, while $CO_2$ emissions once in the landfill are estimated to be **0.07 ktonnes** which rises to **0.44 ktonnes** if the tanks are desludged annually.

Comparing the estimated emissions of **0.70 ktonnes** of $CO_2$ if the sludges are left in place to the estimated **0.44 ktonnes** of $CO_2$ if they are removed and disposed of to landfill, it appears that in the context of contribution to climate change over a 6 year cycle of the Action Programme the removal of the sludges and disposal to landfill would be positive in the context of climate change.

Inspection and investigation of OSWWTS will require commitment from Local Authorities charged with carrying out this work, however, it is noted that there is likely to be significant overlap between investigations under the River Basin Management Plans leading to opportunities to streamline and coordinate prioritisation of this work under these two distinct but complementary pieces of legislation.

A public awareness campaign is expected to result in direct positive impacts through less physical disturbance and loss to FPM populations and indirectly to improved water quality through increased public awareness.

**Forestry**

Forestry management plans aimed at minimising hydrological, sediment, nutrient and other potential impacts from forests will have direct positive impacts on biodiversity, flora and fauna, water, and soils by minimising these and other potential impacts, and allowing targeted mitigation measures to be applied on a case by case basis. Improvements in water quality will also result in indirect positive impacts for population / human health and such improvements will also impact positively on material assets such as tourism which are dependant on good water quality for fishing, leisure activities etc. Minimising hydrological, sediment, nutrient and other potential impacts may require changes to forestry management practices where such controls are not already in place resulting in negative impacts in the short to medium term on material assets. However, as these practices become the norm, this impact will become neutral over the long term.

**Physical Modifications**

Site specific measures for this catchment include no further intensification of pressures, drainage or maintenance drainage permitted through out the Ballymurphy catchment without an assessment of its potential impact. This requirement is to be extended to areas outside of the SAC boundary also to take account of indirect impacts. In addition, existing and future drainage works require an Appropriate Assessment for Natura 2000 sites and this is also to be extended beyond the SAC boundary. Restorative measures may also be needed where the habitat has been removed through these physical modifications.

A Freshwater Morphology Web Based tool has been developed which is driven by a Morphology Database. This tool supports decision making in authorisation systems by assessing pressure extent and risk to water body status. Damage to mussel populations, in combination with other impacts both during construction and operation will be considered in the assessment. Currently this web based tool is held and operated by the EPA. If an authorisation process is rolled out Local Authorities should be given access to this tool. Therefore structure within rivers may be subject to controls in future.

As there will be no further reclamation or drainage works without the appropriate assessment, positive outcomes are anticipated for biodiversity, flora and fauna, water and soil in particular. However there may be indirect negative impacts on material assets in relation to land drainage if this constrains drainage and therefore the type of land use activities suitable in the area. The requirement for Appropriate Assessments for Natura 2000 sites is considered enforcement of existing legislation which is a Basic Measure.

**Other issues - Fords**

Four vehicular and animal fords have been identified in the Ballymurphy catchment. To address this pressure site specific measures include investigation of alternative access immediately or site mitigation measures implemented. Relocation of the access will result in positive impacts for FPM and biodiversity generally e.g. fish spawning areas, water and soil by controlling erosion, and silt and nutrient addition downstream of the crossing point, and relocating a direct impact (through crushing) to existing FPM populations. The relocation may result in negative impact to material assets as a result of changes in management practices necessary to reach alternative access points, increased time requirements to move livestock. It may also impact on other biodiversity and potentially cultural heritage if the alternative locations are not sited sensitively.

**Cumulative Impacts of the Measures in the Ballymurphy Catchment**

A reduction in the silt loading to the watercourses in this catchment as a result of implementing the Action Programme measures under Agriculture, Forestry, Physical Modifications, Point Sources and Fords will result in direct positive impacts to FPM populations and habitats. In addition, a reduced silt load will have direct positive impacts on salmonid spawning and nursery areas, one of the reasons for this sites SAC designation, and reduce the impacts on other flora and fauna due to sedimentation.

Further, the implementation of said measures will have direct positive impacts on soils through the reduction of soil erosion, with again direct positive influences on water quality, which in turn would have indirect positive influences on human health. The cumulative impacts of implementing these measures would be positive.

A reduction in the nutrient loading to this catchment through the implementation of the Action Programme measures under Agriculture, Forestry and On-site wastewater treatment systems will have direct positive impacts on water quality, with indirect impacts on biodiversity, flora and fauna by reducing the potential for the eutrophication of these waters. This will also have an indirect positive influence on human health.

The potential for direct negative impacts to material assets through the implementation of the Action Programme measures may result from a reduction in agricultural productivity, restrictions to forestry activities, restrictions to quad bike activities, or through restrictions to land reclamation. There is also potential for indirect negative impacts on flood defence through restrictions to drainage maintenance.

### 8.6.5 The Clodiagh Catchment

The Draft Clodiagh Sub-Basin Management Plan identified the following key and secondary pressures either within the contributing catchment or within the vicinity of the FPM populations:

- Agriculture;
- On-site wastewater treatment systems;
- Forestry;
- Physical Modifications;
- Point Sources; and
- Other issues – Fords.

**Agriculture**

As noted in the baseline, increased levels of silt and nutrients into the watercourses is a significant pressure on FPM populations in this catchment. To address this, site specific measures for this catchment have been developed and include detailed assessment of soil nutrient status; sediment and nutrient management plans; exclusion of cattle with improved fencing and buffer zones on a prioritisation basis beginning with those stretches containing FPM populations; encouragement of participation in agri-environmental schemes; and strict enforcement of Good Agricultural Practice Regulations 2009 and cross compliance.

Detailed assessment of soil nutrient status and sediment and nutrient management plans will have positive impacts on biodiversity, flora and fauna, water, and soils by highlighting those areas where nutrient levels are above recommended levels and allowing targeted mitigation measures to be applied on a case by case basis. Improvements in water quality will also result in indirect positive impacts for population / human health and such improvements will also impact positively on material assets such as tourism which are dependant on good water quality for fishing, leisure activities etc.

Exclusion of cattle with improved fencing and buffer zones will have positive impacts for biodiversity, flora and fauna, water and soil in particular, however, negative impacts are expected for material assets through increased costs associated with fencing and maintenance and loss of agricultural land. Based on preliminary estimates of priority stretches, which are subject to change as information becomes available, and assuming cattle are excluded from a 1.5m wide riparian strip on both sides of the river, this would result in approximately 3.51ha of land lost for grazing by cattle.

Effective and targeted implementation of the Good Agricultural Practice Regulations 2009, which are a Basic Measure, and cross compliance, will address agricultural pressures, particularly where there is a

focus on improved fencing, buffer zones and the provision of animal watering points on a prioritised basis. This will have overall positive impacts for FPM and biodiversity, flora and fauna generally as well as water quality and soils by reducing the amount of erosion along the river bank, together with reducing the amount of silt and nutrients entering the watercourse. Improved fencing and provision of buffer zones will have negative impacts for material assets as stated previously; however, given the close proximity to the watercourse it is unlikely to yield high agricultural outputs. The width of buffer strip will be dependant on the slope of lands adjacent to the rivers as well as the type of farming activity being carried out on specific farms. It will be necessary to undertake a field by field inspection in advance of determining site specific requirements for fencing and buffer zones.

**On-site Wastewater Treatment Systems**

Baseline studies in this catchment have identified point and diffuse sources of nutrient input to rivers from OSWWTS and have highlighted this as a pressure. Site specific measures to deal with this pressure include prioritisation of the inspection and investigation of on-site systems in high to extreme risk categories within the Clodiagh catchment; and a public awareness campaign.

As noted in the baseline, there are 301 on-site systems on extreme risk, 30 on very high risk and 249 on high risk potential settings in the Clodiagh catchment. Following investigation further mitigation may be required on a case by case basis however, if it is assumed that 50% (or 290) of these systems require desludging once during the first 6-year Action Programme cycle, this would result in an estimated **1,396 tonnes** (based on 4.5$m^3$ sludge per tank and a density of 1.07tonnes/$m^3$) requiring transport and disposal. It is assumed that the catchment is within a 100km round trip of a suitable landfill site for appropriate disposal. Disposal of sludge to landfill may require additional landfill space, with resultant impacts identified in the previous high level strategic assessment in **Section 8.5.3**.

The potential emission of $CO_2$ associated with leaving the sludges in place is estimated to be **0.54 ktonnes** per year. If this is multiplied across the 6-year cycle, an estimated **3.23 ktonnes** of $CO_2$ will be emitted by on-site wastewater treatment systems that may be posing a threat to the designated FPM area.

The amount of $CO_2$ emitted by disposal of sludge to landfill is a combination of the $CO_2$ released by the sludge after disposal to landfill and the $C0_2$ emitted during transport. Transport of **1,396 tonnes** of sludge to landfill is estimated to produce less than **0.01 ktonnes** of $CO_2$, while $CO_2$ emissions once in the landfill are estimated to be **0.34 ktonnes** which rises to **2.02 ktonnes** if the tanks are desludged annually.

Comparing the estimated emissions of **3.23 ktonnes** of $CO_2$ if the sludges are left in place to the estimated **2.02 ktonnes** of $CO_2$ if they are removed and disposed of to landfill, it appears that in the context of contribution to climate change over a 6 year cycle of the Action Programme the removal of the sludges and disposal to landfill would be positive in the context of climate change.

Inspection and investigation of OSWWTS will require commitment from Local Authorities charged with carrying out this work, however, it is noted that there is likely to be significant overlap between investigations under the River Basin Management Plans leading to opportunities to streamline and coordinate prioritisation of this work under these two distinct but complementary pieces of legislation.

A public awareness campaign is expected to result in direct positive impacts through less physical disturbance and loss to FPM populations and indirectly to improved water quality through increased public awareness.

**Forestry**

Forestry management plans aimed at minimising hydrological, sediment, nutrient and other potential impacts from forests will have direct positive impacts on biodiversity, flora and fauna, water, and soils by minimising these and other potential impacts, and allowing targeted mitigation measures to be applied on a case by case basis. Improvements in water quality will also result in indirect positive impacts for population / human health and such improvements will also impact positively on material assets such as tourism which are dependant on good water quality for fishing, leisure activities etc. Minimising hydrological, sediment, nutrient and other potential impacts may require changes to forestry management practices where such controls are not already in place resulting in negative impacts in the short to medium term on material assets. However, as these practices become the norm, this impact will become neutral over the long term.

**Physical Modifications**

Site specific measures for this catchment include no further intensification of pressures, drainage or maintenance drainage is permitted within the Clodiagh catchment without an assessment of its potential impact. This requirement is to be extended to areas outside of the SAC boundary also to take account of indirect impacts. In addition, existing and future drainage works require an Appropriate Assessment for Natura 2000 sites and this is also to be extended beyond the SAC boundary. As there will be no further reclamation or drainage works without the appropriate assessment, positive outcomes are anticipated for biodiversity, flora and fauna, water and soil in particular. However there may be indirect negative impacts on material assets in relation to land drainage if this constrains drainage and therefore the type of land use activities suitable in the area. There is also potential for indirect negative impacts on flood defence through restrictions to drainage maintenance and as a result indirect negative impacts on material assets, e.g. residential, which may be at risk from flooding. The requirement for Appropriate Assessments for Natura 2000 sites is considered enforcement of existing legislation which is a Basic Measure.

**Other issues - Point Sources**

As noted in the baseline at Clonea bridge, in Portlaw, sewerage discharge from the town was recorded with discolouration of the wall along the bank of the river. Site specific measures for this catchment include that all discharge licences or authorisations must comply with the EQOs set out of SI 296 of

2009; all WWTP, IPPC and Section 4 and 16 discharge licences must be reviewed to assess compliance with EQOs and additional conditions imposed as required. These measures will result in positive impacts for biodiversity, flora and fauna, water and soil by potentially reducing the level of nutrients entering the watercourse; however, negative impacts are expected for material assets associated with costs of alterations and / or upgrades and additional conditions being imposed. Negative impacts are also possible where relocation of discharge points is required in order to comply as this may result in indirect negative impacts on cultural heritage, landscape and biodiversity if not sited sensitively. Positive impacts will be gained for population / human health and material assets through these alterations, up-grades and restrictions by ensuring adequate waste water treatment is in place to protect water quality.

**Other issues - Fords**

One significant vehicular and animal ford have been identified in the Clodiagh catchment. To address this pressure site specific measures include usage of the ford to stop immediately and an investigation of alternative access. Relocation of the access will result in positive impacts for FPM and biodiversity generally e.g. fish spawning areas, water and soil by controlling erosion, and silt and nutrient addition downstream of the crossing point, and relocating a direct impact (through crushing) to existing FPM populations. The relocation may result in negative impact to material assets as a result of changes in management practices necessary to reach alternative access points, increased time requirements to move livestock. It may also impact on other biodiversity and potentially cultural heritage if the alternative locations are not sited sensitively.

**Cumulative Impacts of the Measures in the Clodiagh Catchment**

A reduction in the silt loading to the watercourses in this catchment as a result of implementing the Action Programme measures under Agriculture, Forestry, Physical Modifications and Ford will result in direct positive impacts to FPM populations and habitats. In addition, a reduced silt load will have direct positive impacts on salmonid spawning and nursery areas, one of the reasons for this sites SAC designation, and reduce the impacts on other flora and fauna due to sedimentation.

Further, the implementation of said measures will have direct positive impacts on soils through the reduction of soil erosion, with again direct positive influences on water quality, which in turn would have indirect positive influences on human health. The cumulative impacts of implementing these measures would be positive.

A reduction in the nutrient loading to this catchment through the implementation of the Action Programme measures under Agriculture, Forestry, Point Sources and On-site wastewater treatment systems will have direct positive impacts on water quality, with indirect impacts on biodiversity, flora and fauna by reducing the potential for the eutrophication of these waters. This will also have an indirect positive influence on human health.

The potential for direct negative impacts to material assets through the implementation of the Action Programme measures may result from a reduction in agricultural productivity, restrictions to forestry activities or through restrictions to land reclamation. There is also potential for indirect negative impacts on flood defence through restrictions to drainage maintenance.

### 8.6.6 The Derreen Catchment

The Draft Dereen Sub-Basin Management Plan identified the following key and secondary pressures either within the contributing catchment or within the vicinity of the FPM populations:

- Agriculture;
- On-site Wastewater Treatment Systems;
- Forestry;
- Physical Modifications;
- Point Sources;
- Quarries; and
- Other issues – Fords.

**Agriculture**

As noted in the baseline, increased levels of silt and nutrients into the watercourses is a significant pressure on FPM populations in this catchment. To address this, site specific measures for this catchment have been developed and include detailed assessment of soil nutrient status; sediment and nutrient management plans; exclusion of sheep and cattle with improved fencing and buffer zones on a prioritised basis beginning with those stretches identified above the main ford at Hacketstown at the top of the catchment; encouragement of participation in agri-environmental schemes; and strict enforcement of Good Agricultural Practice Regulations 2009 and cross compliance.

Detailed assessment of soil nutrient status and sediment and nutrient management plans will have positive impacts on biodiversity, flora and fauna, water, and soils by highlighting those areas where nutrient levels are above recommended levels and allowing targeted mitigation measures to be applied on a case by case basis. Improvements in water quality will also result in indirect positive impacts for population / human health and such improvements will also impact positively on material assets such as tourism which are dependant on good water quality for fishing, leisure activities etc.

Exclusion of sheep and cattle on a prioritised basis will have positive impacts for biodiversity, flora and fauna, water and soil in particular, however, negative impacts are expected for material assets through increased costs associated with fencing and maintenance and loss of agricultural land. Based on preliminary estimates of priority stretches, which are subject to change as information becomes available, and assuming cattle are excluded from a 1.5m wide riparian strip on both sides of the river, this would result in 16.45ha of land lost for grazing by cattle.

Effective and targeted implementation of the Good Agricultural Practice Regulations 2009, which are a Basic Measure, and cross compliance, will address agricultural pressures, particularly where there is a focus on improved fencing, buffer zones and the provision of animal watering points on a prioritised basis. This will have overall positive impacts for FPM and biodiversity, flora and fauna generally as well as water quality and soils by reducing the amount of erosion along the river bank, together with reducing the amount of silt and nutrients entering the watercourse. Improved fencing and provision of buffer zones will have negative impacts for material assets as stated previously; however, given the close proximity to the watercourse it is unlikely to yield high agricultural outputs. The width of buffer strip will be dependant on the slope of lands adjacent to the rivers as well as the type of farming activity being carried out on specific farms. It will be necessary to undertake a field by field inspection in advance of determining site specific requirements for fencing and buffer zones.

**On-site Wastewater Treatment Systems**

Baseline studies in this catchment have identified point and diffuse sources of nutrient input to rivers from OSWWTS and have highlighted this as a pressure. Site specific measures to deal with this pressure include prioritisation of the inspection and investigation of on-site systems in high to extreme risk categories within the Dereen catchment; and a public awareness campaign.

As noted in the baseline, there are 52 on-site systems on extreme risk, 402 on very high risk and 385 on high risk potential settings in the Dereen catchment. Following investigation further mitigation may be required on a case by case basis however, if it is assumed that 50% (or 420) of these systems require desludging once during the first 6-year Action Programme cycle, this would result in an estimated **2,020 tonnes** (based on 4.5$m^3$ sludge per tank and a density of 1.07tonnes/$m^3$) requiring transport and disposal. It is assumed that the catchment is within a 100km round trip of a suitable landfill site for appropriate disposal. Disposal of sludge to landfill may require additional landfill space, with resultant impacts identified in the previous high level strategic assessment in **Section 8.5.3**.

The potential emission of $CO_2$ associated with leaving the sludges in place is estimated to be **0.78 ktonnes** per year. If this is multiplied across the 6-year cycle, an estimated **4.68 ktonnes** of $CO_2$ will be emitted by on-site wastewater treatment systems that may be posing a threat to the designated FPM area.

The amount of $CO_2$ emitted by disposal of sludge to landfill is a combination of the $CO_2$ released by the sludge after disposal to landfill and the $C0_2$ emitted during transport. Transport of **2,020 tonnes** of sludge to landfill is estimated to produce less than **0.01 ktonnes** of $CO_2$, while $CO_2$ emissions once in the landfill are estimated to be **0.49 ktonnes** which rises to **2.93 ktonnes** if the tanks are desludged annually.

Comparing the estimated emissions of **4.68 ktonnes** of $CO_2$ if the sludges are left in place to the estimated **2.93 ktonnes** of $CO_2$ if they are removed and disposed of to landfill, it appears that in the

context of contribution to climate change over a 6 year cycle of the Action Programme the removal of the sludges and disposal to landfill would be positive in the context of climate change.

Inspection and investigation of OSWWTS will require commitment from Local Authorities charged with carrying out this work, however, it is noted that there is likely to be significant overlap between investigations under the River Basin Management Plans leading to opportunities to streamline and coordinate prioritisation of this work under these two distinct but complementary pieces of legislation.

A public awareness campaign is expected to result in direct positive impacts through less physical disturbance and loss to FPM populations and indirectly to improved water quality through increased public awareness.

**Forestry**

Forestry management plans aimed at minimising hydrological, sediment, nutrient and other potential impacts from forests will have direct positive impacts on biodiversity, flora and fauna, water, and soils by minimising these and other potential impacts, and allowing targeted mitigation measures to be applied on a case by case basis. Improvements in water quality will also result in indirect positive impacts for population / human health and such improvements will also impact positively on material assets such as tourism which are dependant on good water quality for fishing, leisure activities etc. Minimising hydrological, sediment, nutrient and other potential impacts may require changes to forestry management practices where such controls are not already in place resulting in negative impacts in the short to medium term on material assets. However, as these practices become the norm, this impact will become neutral over the long term.

**Physical Modifications**

Site specific measures for this catchment include no further intensification of pressures, drainage or maintenance drainage be permitted within the Dereen catchment without an assessment of its potential impact. This requirement is to be extended to areas outside of the SAC boundary also to take account of indirect impacts. In addition, existing and future drainage works require an Appropriate Assessment for Natura 2000 sites and this is also to be extended beyond the SAC boundary.

A Freshwater Morphology Web Based tool has been developed which is driven by a Morphology Database. This tool supports decision making in authorisation systems by assessing pressure extent and risk to water body status. Damage to mussel populations, in combination with other impacts both during construction and operation will be considered in the assessment. Currently this web based tool is held and operated by the EPA. If an authorisation process is rolled out Local Authorities should be given access to this tool. Therefore structure within rivers may be subject to controls in future.

As there will be no further reclamation or drainage works without the appropriate assessment, positive outcomes are anticipated for biodiversity, flora and fauna, water and soil in particular. However there may be indirect negative impacts on material assets in relation to land drainage if this constrains

drainage and therefore the type of land use activities suitable in the area. The requirement for Appropriate Assessments for Natura 2000 sites is considered enforcement of existing legislation which is a Basic Measure.

**Point Sources**

Site specific measures for this catchment include that all discharge licences or authorisations must comply with the EQOs set out of SI 296 of 2009; all WWTP, IPPC and Section 4 and 16 discharge licences must be reviewed to assess compliance with EQOs and additional conditions imposed as required. These measures will result in positive impacts for biodiversity, flora and fauna, water and soil by potentially reducing the level of nutrients entering the watercourse; however, negative impacts are expected for material assets associated with costs of alterations and / or upgrades and additional conditions being imposed. Negative impacts are also possible where relocation of discharge points is required in order to comply as this may result in indirect negative impacts on cultural heritage, landscape and biodiversity if not sited sensitively. Positive impacts will be gained for population / human health and material assets through these alterations, up-grades and restrictions by ensuring adequate waste water treatment is in place to protect water quality.

**Quarries**

As noted in the baseline, four large sand/gravel pits are located within the Dereen catchment. Site specific measures to deal with this pressure include an awareness campaign by the Local Authority to inform the sand/gravel pit owners of the FPM requirements and a licence review is required. These measures will have positive impacts for biodiversity, flora and fauna, water and soil. Potential negative impacts are anticipated for material assets if future development of the quarries is constrained or if additional management or mitigation is required to develop or operate the site. Enforcement of existing legislation is a Basic Measure.

**Other issues - Fords**

Vehicular and animal fords have been identified in the Dereen catchment. To address this pressure site specific measures include usage of the fords to stop immediately and investigation of alternative access. Relocation of the access will result in positive impacts for FPM and biodiversity generally e.g. fish spawning areas, water and soil by controlling erosion, and silt and nutrient addition downstream of the crossing point, and relocating a direct impact (through crushing) to existing FPM populations. The relocation may result in negative impact to material assets as a result of changes in management practices necessary to reach alternative access points, increased time requirements to move livestock. It may also impact on other biodiversity and potentially cultural heritage if the alternative locations are not sited sensitively.

**Cumulative Impacts of the Measures in the Dereen Catchment**

A reduction in the silt loading to the watercourses in this catchment as a result of implementing the Action Programme measures under Agriculture, Forestry, Physical Modifications, Sand and Gravel Pits and Fords will result in direct positive impacts to FPM populations and habitats. In addition, a reduced silt load will have direct positive impacts on salmonid spawning and nursery areas, one of the reasons for this sites SAC designation, and reduce the impacts on other flora and fauna due to sedimentation.

Further, the implementation of said measures will have direct positive impacts on soils through the reduction of soil erosion, with again direct positive influences on water quality, which in turn would have indirect positive influences on human health. The cumulative impacts of implementing these measures would be positive.

A reduction in the nutrient loading to this catchment through the implementation of the Action Programme measures under Agriculture, Forestry, Point Sources and On-site wastewater treatment systems will have direct positive impacts on water quality, with indirect impacts on biodiversity, flora and fauna by reducing the potential for the eutrophication of these waters. This will also have an indirect positive influence on human health.

The potential for direct negative impacts to material assets through the implementation of the Action Programme measures may result from a reduction in agricultural productivity, restrictions to forestry activities, restrictions to discharge licences, or through restrictions to sand/gravel pit activities. There is also potential for indirect negative impacts on flood defence through restrictions to drainage maintenance.

### 8.6.7 The Mountain Catchment

The Draft Mountain Sub-Basin Management Plan identified the following key and secondary pressures either within the contributing catchment or within the vicinity of the FPM populations:

- Agriculture;
- On-site Wastewater Treatment Systems;
- Forestry;
- Physical Modifications;
- Point Sources; and
- Other issues – Fords.

**Agriculture**

As noted in the baseline, increased levels of silt and nutrients into the watercourses is a significant pressure on FPM populations in this catchment. To address this, site specific measures for this catchment have been developed and include detailed assessment of soil nutrient status; sediment and nutrient management plans; exclusion of sheep and cattle with improved fencing and buffer zones on a prioritisation basis beginning with those stretches containing FPM populations; encouragement of participation in agri-environmental schemes; and strict enforcement of Good Agricultural Practice Regulations 2009 and cross compliance.

Detailed assessment of soil nutrient status and sediment and nutrient management plans will have positive impacts on biodiversity, flora and fauna, water, and soils by highlighting those areas where nutrient levels are above recommended levels and allowing targeted mitigation measures to be applied on a case by case basis. Improvements in water quality will also result in indirect positive impacts for population / human health and such improvements will also impact positively on material assets such as tourism which are dependant on good water quality for fishing, leisure activities etc.

Exclusion of sheep and cattle on a prioritised basis will have positive impacts for biodiversity, flora and fauna, water and soil in particular, however, negative impacts are expected for material assets through increased costs associated with fencing and maintenance and loss of agricultural land.

Effective and targeted implementation of the Good Agricultural Practice Regulations 2009, which are a Basic Measure, and cross compliance, will address agricultural pressures, particularly where there is a focus on improved fencing, buffer zones and the provision of animal watering points on a prioritised basis. This will have overall positive impacts for FPM and biodiversity, flora and fauna generally as well as water quality and soils by reducing the amount of erosion along the river bank, together with

reducing the amount of silt and nutrients entering the watercourse. Improved fencing and provision of buffer zones will have negative impacts for material assets as stated previously; however, given the close proximity to the watercourse it is unlikely to yield high agricultural outputs. The width of buffer strip will be dependant on the slope of lands adjacent to the rivers as well as the type of farming activity being carried out on specific farms. It will be necessary to undertake a field by field inspection in advance of determining site specific requirements for fencing and buffer zones.

**On-site Wastewater Treatment Systems**

Baseline studies in this catchment have identified point and diffuse sources of nutrient input to rivers from OSWWTS and have highlighted this as a pressure. Site specific measures to deal with this pressure include prioritisation of the inspection and investigation of on-site systems in high to extreme risk categories within the Dereen catchment; and a public awareness campaign.

As noted in the baseline, there are 14 on-site systems on extreme risk, 266 on very high risk and 251 on high risk potential settings in the Mountain catchment. Following investigation further mitigation may be required on a case by case basis however, if it is assumed that 50% (or 266) of these systems require desludging once during the first 6-year Action Programme cycle, this would result in an estimated **1,278 tonnes** (based on 4.5$m^3$ sludge per tank and a density of 1.07tonnes/$m^3$) requiring transport and disposal. It is assumed that the catchment is within a 100km round trip of a suitable landfill site for appropriate disposal. Disposal of sludge to landfill may require additional landfill space, with resultant impacts identified in the previous high level strategic assessment in **Section 8.5.3**.

The potential emission of $CO_2$ associated with leaving the sludges in place is estimated to be **0.49 ktonnes** per year. If this is multiplied across the 6-year cycle, an estimated **2.96 ktonnes** of $CO_2$ will be emitted by on-site wastewater treatment systems that may be posing a threat to the designated FPM area.

The amount of $CO_2$ emitted by disposal of sludge to landfill is a combination of the $CO_2$ released by the sludge after disposal to landfill and the $C0_2$ emitted during transport. Transport of **1,278 tonnes** of sludge to landfill is estimated to produce less than **0.01 ktonnes** of $CO_2$, while $CO_2$ emissions once in the landfill are estimated to be **0.31 ktonnes** which rises to **1.85 ktonnes** if the tanks are desludged annually.

Comparing the estimated emissions of **2.96 ktonnes** of $CO_2$ if the sludges are left in place to the estimated **1.85 ktonnes** of $CO_2$ if they are removed and disposed of to landfill, it appears that in the context of contribution to climate change over a 6 year cycle of the Action Programme the removal of the sludges and disposal to landfill would be positive in the context of climate change.

Inspection and investigation of OSWWTS will require commitment from Local Authorities charged with carrying out this work, however, it is noted that there is likely to be significant overlap between investigations under the River Basin Management Plans leading to opportunities to streamline and coordinate prioritisation of this work under these two distinct but complementary pieces of legislation.

A public awareness campaign is expected to result in direct positive impacts through less physical disturbance and loss to FPM populations and indirectly to improved water quality through increased public awareness.

**Forestry**

Forestry management plans aimed at minimising hydrological, sediment, nutrient and other potential impacts from forests will have direct positive impacts on biodiversity, flora and fauna, water, and soils by minimising these and other potential impacts, and allowing targeted mitigation measures to be applied on a case by case basis. Improvements in water quality will also result in indirect positive impacts for population / human health and such improvements will also impact positively on material assets such as tourism which are dependant on good water quality for fishing, leisure activities etc. Minimising hydrological, sediment, nutrient and other potential impacts may require changes to forestry management practices where such controls are not already in place resulting in negative impacts in the short to medium term on material assets. However, as these practices become the norm, this impact will become neutral over the long term.

**Physical Modifications**

Site specific measures for this catchment include no further intensification of pressures, drainage or maintenance drainage be permitted within the Mountain catchment without an assessment of its potential impact. This requirement is to be extended to areas outside of the SAC boundary also to take account of indirect impacts. In addition, existing and future drainage works require an Appropriate Assessment for Natura 2000 sites and this is also to be extended beyond the SAC boundary.

A Freshwater Morphology Web Based tool has been developed which is driven by a Morphology Database. This tool supports decision making in authorisation systems by assessing pressure extent and risk to water body status. Damage to mussel populations, in combination with other impacts both during construction and operation will be considered in the assessment. Currently this web based tool is held and operated by the EPA. If an authorisation process is rolled out Local Authorities should be given access to this tool. Therefore structure within rivers may be subject to controls in future.

As there will be no further reclamation or drainage works without the appropriate assessment, positive outcomes are anticipated for biodiversity, flora and fauna, water and soil in particular. However there may be indirect negative impacts on material assets in relation to land drainage if this constrains drainage and therefore the type of land use activities suitable in the area. There is also potential for indirect negative impacts on flood defence through restrictions to drainage maintenance and as a result indirect negative impacts on material assets, e.g. residential, which may be at risk from flooding. The requirement for Appropriate Assessments for Natura 2000 sites is considered enforcement of existing legislation which is a Basic Measure.

**Other issues - Point Sources**

The baseline has identified the WWTP at Borris as a point source pressure within the catchment with the potential to impact on the FPM populations. Site specific measures for this catchment include that all discharge licences or authorisations must comply with the EQOs set out of SI 296 of 2009; all WWTP, IPPC and Section 4 and 16 discharge licences must be reviewed to assess compliance with EQOs and additional conditions imposed as required. These measures will result in positive impacts for biodiversity, flora and fauna, water and soil by potentially reducing the level of nutrients entering the watercourse; however, negative impacts are expected for material assets associated with costs of alterations and / or upgrades and additional conditions being imposed. Negative impacts are also possible where relocation of discharge points is required in order to comply as this may result in indirect negative impacts on cultural heritage, landscape and biodiversity if not sited sensitively. Positive impacts will be gained for population / human health and material assets through these alterations, up-grades and restrictions by ensuring adequate waste water treatment is in place to protect water quality.

**Other issues - Fords**

Three significant vehicular and animal fords have been identified in the Mountain catchment. To address this pressure site specific measures include the usage of the fords to stop immediately and investigation of alternative access. Relocation of the access will result in positive impacts for FPM and biodiversity generally e.g. fish spawning areas, water and soil by controlling erosion, and silt and nutrient addition downstream of the crossing point, and relocating a direct impact (through crushing) to existing FPM populations. The relocation may result in negative impact to material assets as a result of changes in management practices necessary to reach alternative access points, increased time requirements to move livestock. It may also impact on other biodiversity and potentially cultural heritage if the alternative locations are not sited sensitively.

**Cumulative Impacts of the Measures in the Mountain Catchment**

A reduction in the silt loading to the watercourses in this catchment as a result of implementing the Action Programme measures under Agriculture, Forestry, Physical Modifications and Fords will result in direct positive impacts to FPM populations and habitats. In addition, a reduced silt load will have direct positive impacts on salmonid spawning and nursery areas, one of the reasons for this sites SAC designation, and reduce the impacts on other flora and fauna due to sedimentation.

Further, the implementation of said measures will have direct positive impacts on soils through the reduction of soil erosion, with again direct positive influences on water quality, which in turn would have indirect positive influences on human health. The cumulative impacts of implementing these measures would be positive.

A reduction in the nutrient loading to this catchment through the implementation of the Action Programme measures under Agriculture, Forestry, Point Sources and On-site wastewater treatment

systems will have direct positive impacts on water quality, with indirect impacts on biodiversity, flora and fauna by reducing the potential for the eutrophication of these waters. This will also have an indirect positive influence on human health.

The potential for direct negative impacts to material assets through the implementation of the Action Programme measures may result from a reduction in agricultural productivity, restrictions to forestry activities, restrictions to discharge licences, or through restrictions to sand/gravel pit activities. There is also potential for indirect negative impacts on flood defence through restrictions to drainage maintenance.

### 8.6.8 The Nore Catchment

The Draft Nore Sub-Basin Management Plan identified the following key and secondary pressures either within the contributing catchment or within the vicinity of the FPM populations:

- Agriculture;
- On-site Wastewater Treatment Systems;
- Forestry;
- Physical Modifications;
- Point Source;
- Quarries; and
- Other issues – Peat Cutting.

**Agriculture**

As noted in the baseline, increased levels of silt and nutrients into the watercourses is a significant pressure on FPM populations in this catchment. To address this, site specific measures for this catchment have been developed and include detailed assessment of soil nutrient status; sediment and nutrient management plans; exclusion of cattle with improved fencing and buffer zones on a prioritisation basis beginning with those stretches containing FPM populations; encouragement of participation in agri-environmental schemes; and strict enforcement of Good Agricultural Practice Regulations 2009 and cross compliance.

Detailed assessment of soil nutrient status and sediment and nutrient management plans will have positive impacts on biodiversity, flora and fauna, water, and soils by highlighting those areas where nutrient levels are above recommended levels and allowing targeted mitigation measures to be applied on a case by case basis. Improvements in water quality will also result in indirect positive impacts for population / human health and such improvements will also impact positively on material assets such as tourism which are dependant on good water quality for fishing, leisure activities etc.

Exclusion of cattle with improved fencing and buffer zones will have positive impacts for biodiversity, flora and fauna, water and soil in particular, however, negative impacts are expected for material assets through increased costs associated with fencing and maintenance and loss of agricultural land.

Effective and targeted implementation of the Good Agricultural Practice Regulations 2009, which are a Basic Measure, and cross compliance will address agricultural pressures, particularly where there is a focus on improved fencing, buffer zones and the provision of animal watering points on a prioritised

basis. This will have overall positive impacts for FPM and biodiversity, flora and fauna generally as well as water quality and soils by reducing the amount of erosion along the river bank, together with reducing the amount of silt and nutrients entering the watercourse. Improved fencing and provision of buffer zones will have negative impacts for material assets as stated previously; however, given the close proximity to the watercourse it is unlikely to yield high agricultural outputs. The width of buffer strip will be dependant on the slope of lands adjacent to the rivers as well as the type of farming activity being carried out on specific farms. It will be necessary to undertake a field by field inspection in advance of determining site specific requirements for fencing and buffer zones.

**On-site Wastewater Treatment Systems**

Baseline studies in this catchment have identified point and diffuse sources of nutrient input to rivers from OSWWTS and have highlighted this as a pressure. Site specific measures to deal with this pressure include prioritisation of the inspection and investigation of on-site systems in high to extreme risk categories within the Munster Blackwater catchment; and a public awareness campaign.

As noted in the baseline, there was 1,396 on-site systems on extreme risk, 2,785 on very high risk and 958 on high risk potential settings in the Nore catchment. Following investigation further mitigation may be required on a case by case basis however, if it is assumed that 50% (or 2,570) of these systems require desludging once during the first 6-year Action Programme cycle, this would result in an estimated **12,372 tonnes** (based on 4.5$m^3$ sludge per tank and a density of 1.07tonnes/$m^3$) requiring transport and disposal. It is assumed that the catchment is within a 100km round trip of a suitable landfill site for appropriate disposal. Disposal of sludge to landfill may require additional landfill space, with resultant impacts identified in the previous high level strategic assessment in **Section 8.5.3**.

The potential emission of $CO_2$ associated with leaving the sludges in place is estimated to be **4.78 ktonnes** per year. If this is multiplied across the 6-year cycle, an estimated **28.65 ktonnes** of $CO_2$ will be emitted by on-site wastewater treatment systems that may be posing a threat to the designated FPM area.

The amount of $CO_2$ emitted by disposal of sludge to landfill is a combination of the $CO_2$ released by the sludge after disposal to landfill and the $C0_2$ emitted during transport. Transport of **12,372 tonnes** of sludge to landfill is estimated to produce less than **0.07 ktonnes** of $CO_2$, while $CO_2$ emissions once in the landfill are estimated to be **2.99 ktonnes** which rises to **17.93 ktonnes** if the tanks are desludged annually.

Comparing the estimated emissions of **28.65 ktonnes** of $CO_2$ if the sludges are left in place to the estimated **17.93 ktonnes** of $CO_2$ if they are removed and disposed of to landfill, it appears that in the context of contribution to climate change over a 6 year cycle of the Action Programme the removal of the sludges and disposal to landfill would be positive in the context of climate change.

Inspection and investigation of OSWWTS will require commitment from Local Authorities charged with carrying out this work, however, it is noted that there is likely to be significant overlap between investigations under the River Basin Management Plans leading to opportunities to streamline and coordinate prioritisation of this work under these two distinct but complementary pieces of legislation.

A public awareness campaign is expected to result in direct positive impacts through less physical disturbance and loss to FPM populations and indirectly to improved water quality through increased public awareness.

**Forestry**

Forestry management plans aimed at minimising hydrological, sediment, nutrient and other potential impacts from forests will have direct positive impacts on biodiversity, flora and fauna, water, and soils by minimising the these and other potential impacts, and allowing targeted mitigation measures to be applied on a case by case basis. Improvements in water quality will also result in indirect positive impacts for population / human health and such improvements will also impact positively on material assets such as tourism which are dependant on good water quality for fishing, leisure activities etc. Minimising hydrological, sediment, nutrient and other potential impacts may require changes to forestry management practices where such controls are not already in place resulting in negative impacts in the short to medium term on material assets. However, as these practices become the norm, this impact will become neutral over the long term.

**Physical Modifications**

Site specific measures for this catchment include no further intensification of pressures, drainage or maintenance drainage permitted through out the Nore catchment without an assessment of its potential impact. This requirement is to be extended to areas outside of the SAC boundary also to take account of indirect impacts. In addition, existing and future drainage works require an Appropriate Assessment for Natura 2000 sites and this is also to be extended beyond the SAC boundary. Restorative measures may also be needed where the habitat has been removed through these physical modifications.

As there will be no further reclamation or drainage works without the appropriate assessment, positive outcomes are anticipated for biodiversity, flora and fauna, water and soil in particular. However there may be indirect negative impacts on material assets in relation to land drainage if this constrains drainage and therefore the type of land use activities suitable in the area. There is also potential for indirect negative impacts on flood defence through restrictions to drainage maintenance and as a result indirect negative impacts on material assets, e.g. residential, which may be at risk from flooding. The requirement for Appropriate Assessments for Natura 2000 sites is considered enforcement of existing legislation which is a Basic Measure.

**Quarries**

One large commercial quarry and eighteen smaller quarries have been identified in the baseline studies in this catchment. Site specific measures to deal with this pressure include a review of licences for Carroll's Quarry. Any other existing quarries will also require a licence review. This measure will have positive impacts for biodiversity, flora and fauna, water and soil. Potential negative impacts are anticipated for material assets if future development of the quarries is constrained or if additional management or mitigation is required to develop or operate the site. Enforcement of existing legislation is a Basic Measure.

**Point Sources**

Site specific measures for this catchment include that all discharge licences or authorisations must comply with the EQOs set out of SI 296 of 2009; all WWTP, IPPC and Section 4 and 16 discharge licences must be reviewed to assess compliance with EQOs and additional conditions imposed as required. These measures will result in positive impacts for biodiversity, flora and fauna, water and soil by potentially reducing the level of nutrients entering the watercourse; however, negative impacts are expected for material assets associated with costs of alterations and / or upgrades and additional conditions being imposed. Negative impacts are also possible where relocation of discharge points is required in order to comply as this may result in indirect negative impacts on cultural heritage, landscape and biodiversity if not sited sensitively. Positive impacts will be gained for population / human health and material assets through these alterations, up-grades and restrictions by ensuring adequate waste water treatment is in place to protect water quality.

**Other issues – Peat Cutting**

The baseline has identified a number of peat extraction operations operating within the catchment with the potential to impact on the FPM populations. Therefore, site specific measures for this catchment include assessment of the peat extraction operations for licensing and permitting requirements; and installation of appropriately sized silt traps to treat runoff from the identified peat operations.

Licensing and permitting of peat extraction operations and subsequent enforcement of existing legislation is considered a Basic Measure. Positive impacts are anticipated including to climate through a reduction in peat cutting and therefore a reduction in the burning of peat. However, this will impact negatively on material assets through potential restrictions on peat cutting and may also impact indirectly on cultural heritage if peat cutting has historically been undertaken in the area. Installation of silt traps will have positive impacts for biodiversity, flora and fauna, water and soil, however, maintenance of the systems will be important to prevent medium to long-term negative impacts on these receptors. Indirect positive impacts would also be expected for population / human health through improved water quality and on material assets e.g. tourism, angling, which rely on good water quality.

**Other issues – Barriers to Fish Migration**

The barrier associated with the Delour Sand Trap has been identified by the fisheries board as non functional. Site specific measures include maintenance of the sand trap on a regular basis and the fish pass associated with the Delour Sand Trap needs to be made functional again. Such measures will have positive impacts for biodiversity, flora and fauna, water and soil, however, maintenance of the system will be important to prevent medium to long-term negative impacts.

**Cumulative Impacts of the Measures in the Nore Catchment**

A reduction in the silt loading to the watercourses in this catchment as a result of implementing the Action Programme measures under Agriculture, Forestry, Physical Modifications, Point Sources and Fords will result in direct positive impacts to FPM populations and habitats. In addition, a reduced silt load will have direct positive impacts on salmonid spawning and nursery areas, one of the reasons for this sites SAC designation, and reduce the impacts on other flora and fauna due to sedimentation.

Further, the implementation of said measures will have direct positive impacts on soils through the reduction of soil erosion, with again direct positive influences on water quality, which in turn would have indirect positive influences on human health. The cumulative impacts of implementing these measures would be positive.

A reduction in the nutrient loading to this catchment through the implementation of the Action Programme measures under Agriculture, Forestry and On-site wastewater treatment systems will have direct positive impacts on water quality, with indirect impacts on biodiversity, flora and fauna by reducing the potential for the eutrophication of these waters. This will also have an indirect positive influence on human health.

The potential for direct negative impacts to material assets through the implementation of the Action Programme measures may result from a reduction in agricultural productivity, restrictions to forestry activities, restrictions to peat cutting activities, or through restrictions to land reclamation. There is also potential for indirect negative impacts on flood defence through restrictions to drainage maintenance.

### 8.6.9 The Allow Catchment

The Draft Allow Sub-Basin Management Plan identified the following key and secondary pressures either within the contributing catchment or within the vicinity of the FPM populations:

- Agriculture;
- On-site Wastewater Treatment Systems;
- Forestry;
- Physical Modifications;
- Point Sources;
- Abstractions;
- Other issues – Peat Cutting; and
- Other issues – Fords.

**Agriculture**

As noted in the baseline, increased levels of silt and nutrients into the watercourses is a significant pressure on FPM populations in this catchment. To address this, site specific measures for this catchment have been developed and include detailed assessment of soil nutrient status; sediment and nutrient management plans; exclusion of animals with improved fencing and buffer zones on a prioritisation basis beginning with those stretches containing FPM populations; encouragement of participation in agri-environmental schemes; and strict enforcement of Good Agricultural Practice Regulations 2009 and cross compliance.

Detailed assessment of soil nutrient status and sediment and nutrient management plans will have positive impacts on biodiversity, flora and fauna, water, and soils by highlighting those areas where nutrient levels are above recommended levels and allowing targeted mitigation measures to be applied on a case by case basis. Improvements in water quality will also result in indirect positive impacts for population / human health and such improvements will also impact positively on material assets such as tourism which are dependant on good water quality for fishing, leisure activities etc.

Exclusion of animals with improved fencing and buffer zones will have positive impacts for biodiversity, flora and fauna, water and soil in particular, however, negative impacts are expected for material assets through increased costs associated with fencing and maintenance and loss of agricultural land.

Effective and targeted implementation of the Good Agricultural Practice Regulations 2009, which are a Basic Measure, and cross compliance will address agricultural pressures, particularly where there is a focus on improved fencing, buffer zones and the provision of animal watering points on a prioritised basis. This will have overall positive impacts for FPM and biodiversity, flora and fauna generally as well as water quality and soils by reducing the amount of erosion along the river bank, together with reducing the amount of silt and nutrients entering the watercourse. Improved fencing and provision of buffer zones will have negative impacts for material assets as stated previously; however, given the close proximity to the watercourse it is unlikely to yield high agricultural outputs. The width of buffer strip will be dependant on the slope of lands adjacent to the rivers as well as the type of farming activity being carried out on specific farms. It will be necessary to undertake a field by field inspection in advance of determining site specific requirements for fencing and buffer zones.

**On-site Wastewater Treatment Systems**

Baseline studies in this catchment have identified point and diffuse sources of nutrient input to rivers from OSWWTS and have highlighted this as a pressure. Site specific measures to deal with this pressure include prioritisation of the inspection and investigation of on-site systems in high to extreme risk categories within the Allow catchment; and a public awareness campaign.

As noted in the baseline, there are 189 on-site systems on extreme risk, 1,434 on very high risk and 387 on high risk potential settings in the Allow catchment. Following investigation further mitigation may be required on a case by case basis however, if it is assumed that 50% (or 1,005) of these systems require desludging once during the first 6-year Action Programme cycle, this would result in an estimated 4,**839 tonnes** (based on 4.5$m^3$ sludge per tank and a density of 1.07tonnes/$m^3$) requiring transport and disposal. It is assumed that the catchment is within a 100km round trip of a suitable landfill site for appropriate disposal. Disposal of sludge to landfill may require additional landfill space, with resultant impacts identified in the previous high level strategic assessment in **Section 8.5.3**.

The potential emission of $CO_2$ associated with leaving the sludges in place is estimated to be **1.87 ktonnes** per year. If this is multiplied across the 6-year cycle, an estimated **11.21 ktonnes** of $CO_2$ will be emitted by on-site wastewater treatment systems that may be posing a threat to the designated FPM area.

The amount of $CO_2$ emitted by disposal of sludge to landfill is a combination of the $CO_2$ released by the sludge after disposal to landfill and the $C0_2$ emitted during transport. Transport of 4,**839 tonnes** of sludge to landfill is estimated to produce less than **0.03 ktonnes** of $CO_2$, while $CO_2$ emissions once in the landfill are estimated to be **1.17 ktonnes** which rises to **7.01 ktonnes** if the tanks are desludged annually.

Comparing the estimated emissions of **11.21 ktonnes** of $CO_2$ if the sludges are left in place to the estimated **7.01 ktonnes** of $CO_2$ if they are removed and disposed of to landfill, it appears that in the

context of contribution to climate change over a 6 year cycle of the Action Programme the removal of the sludges and disposal to landfill would be positive in the context of climate change.

Inspection and investigation of OSWWTS will require commitment from Local Authorities charged with carrying out this work, however, it is noted that there is likely to be significant overlap between investigations under the River Basin Management Plans leading to opportunities to streamline and coordinate prioritisation of this work under these two distinct but complementary pieces of legislation.

A public awareness campaign is expected to result in direct positive impacts through less physical disturbance and loss to FPM populations and indirectly to improved water quality through increased public awareness.

**Forestry**

Forestry management plans aimed at minimising hydrological, sediment, nutrient and other potential impacts from forests will have direct positive impacts on biodiversity, flora and fauna, water, and soils by minimising these and other potential impacts, and allowing targeted mitigation measures to be applied on a case by case basis. Improvements in water quality will also result in indirect positive impacts for population / human health and such improvements will also impact positively on material assets such as tourism which are dependant on good water quality for fishing, leisure activities etc. Minimising hydrological, sediment, nutrient and other potential impacts may require changes to forestry management practices where such controls are not already in place resulting in negative impacts in the short to medium term on material assets. However, as these practices become the norm, this impact will become neutral over the long term.

**Physical Modifications**

Site specific measures for this catchment include no further reclamation permitted within the SAC without an assessment of its potential impact. This requirement is to be extended to areas outside of the SAC boundary also to take account of indirect impacts. In addition, existing and future drainage works require an Appropriate Assessment for Natura 2000 sites and this is also to be extended beyond the SAC boundary. As there will be no further reclamation or drainage works without the appropriate assessment, positive outcomes are anticipated for biodiversity, flora and fauna, water and soil in particular. However there may be indirect negative impacts on material assets in relation to land drainage if this constrains drainage and therefore the type of land use activities suitable in the area. There is also potential for indirect negative impacts on flood defence through restrictions to drainage maintenance and as a result indirect negative impacts on material assets, e.g. residential, which may be at risk from flooding. The requirement for Appropriate Assessments for Natura 2000 sites is considered enforcement of existing legislation which is a Basic Measure.

**Abstractions**

The Allow Regional Supply at Freemount has been identified as posing a risk to the freshwater pearl mussel population. This abstraction needs to be investigated further and a possible alternative source identified due to its proximity directly above the pearl mussel population. Further investigation and possible alternative source identification would result in positive benefits for biodiversity, flora and fauna and water.

**Point Sources**

The baseline has identified three major point source pressures: Newmarket Co-op; Kanturk Creamery; and Munster Joinery. Site specific measures for this catchment include that all discharge licences or authorisations must comply with the EQOs set out of SI 296 of 2009; all WWTP, IPPC and Section 4 and 16 discharge licences must be reviewed to assess compliance with EQOs and additional conditions imposed as required. These measures will result in positive impacts for biodiversity, flora and fauna, water and soil by potentially reducing the level of nutrients entering the watercourse; however, negative impacts are expected for material assets associated with costs of alterations and / or upgrades and additional conditions being imposed. Negative impacts are also possible where relocation of discharge points is required in order to comply as this may result in indirect negative impacts on cultural heritage, landscape and biodiversity if not sited sensitively. Positive impacts will be gained for population / human health and material assets through these alterations, up-grades and restrictions by ensuring adequate waste water treatment is in place to protect water quality.

**Other issues - Peat Cutting**

The baseline has identified a large commerical peat extraction operation operating within the upper catchment with the potential to impact on the FPM populations. Therefore, site specific measures for this catchment include assessment of the peat extraction operations; and installation of appropriately sized silt traps to treat runoff from the identified peat operations.

Licensing and permitting of peat extraction operations and subsequent enforcement of existing legislation is considered a Basic Measure. Positive impacts are anticipated, however, this will impact negatively on material assets through potential restrictions on peat cutting and may also impact indirectly on cultural heritage if peat cutting has historically been undertaken in the area. Installation of silt traps will have positive impacts for biodiversity, flora and fauna, water and soil, however, maintenance of the systems will be important to prevent medium to long-term negative impacts on these receptors. Indirect positive impacts would also be expected for population / human health through improved water quality and on material assets e.g. tourism, angling, which rely on good water quality.

**Other issues - Fords**

Four significant vehicular and animal fords have been identified in the Allow catchment. To address this pressure site specific measures include investigation of alternative access immediately or site mitigation measures implemented. Relocation of the access will result in positive impacts for FPM and biodiversity generally e.g. fish spawning areas, water and soil by controlling erosion, and silt and nutrient addition downstream of the crossing point, and relocating a direct impact (through crushing) to existing FPM populations. The relocation may result in negative impact to material assets as a result of changes in management practices necessary to reach alternative access points, increased time requirements to move livestock. It may also impact on other biodiversity and potentially cultural heritage if the alternative locations are not sited sensitively.

**Cumulative Impacts of the Measures in the Allow Catchment**

A reduction in the silt loading to the watercourses in this catchment as a result of implementing the Action Programme measures under Agriculture, Forestry, Physical Modifications, Peat Cutting and Fords will result in direct positive impacts to FPM populations and habitats. In addition, a reduced silt load will have direct positive impacts on salmonid spawning and nursery areas, one of the reasons for this sites SAC designation, and reduce the impacts on other flora and fauna due to sedimentation.

Further, the implementation of said measures will have direct positive impacts on soils through the reduction of soil erosion, with again direct positive influences on water quality, which in turn would have indirect positive influences on human health. The cumulative impacts of implementing these measures would be positive.

A reduction in the nutrient loading to this catchment through the implementation of the Action Programme measures under Agriculture, Forestry, Peat Cutting, Point Sources and On-site wastewater treatment systems will have direct positive impacts on water quality, with indirect impacts on biodiversity, flora and fauna by reducing the potential for the eutrophication of these waters. This will also have an indirect positive influence on human health.

The potential for direct negative impacts to material assets through the implementation of the Action Programme measures may result from a reduction in agricultural productivity, restrictions to forestry activities, restrictions to peat cutting activities, restrictions to quarry activities or through restrictions to land reclamation. There is also potential for indirect negative impacts on flood defence through restrictions to drainage maintenance.

### 8.6.10 The Bandon Catchment

The Draft Bandon Sub-Basin Management Plan identified the following key and secondary pressures either within the contributing catchment or within the vicinity of the FPM populations:

- Agriculture;
- On-site Wastewater Treatment Systems;
- Forestry;
- Physical Modifications;
- Point Sources;
- Quarries

**Agriculture**

As noted in the baseline, increased levels of silt and nutrients into the watercourses is a significant pressure on FPM populations in this catchment. To address this, site specific measures for this catchment have been developed and include continued implementation of the commonage framework plans for this catchment (see sub-basin plans for references). Further, detailed assessment of soil nutrient status; sediment and nutrient management plans; exclusion of cattle beginning with those stretches which contain FPM; encouragement of participation in agri-environmental schemes; and strict enforcement of Good Agricultural Practice Regulations 2009 and cross compliance.

Detailed assessment of soil nutrient status and sediment and nutrient management plans will have positive impacts on biodiversity, flora and fauna, water, and soils by highlighting those areas where nutrient levels are above recommended levels and allowing targeted mitigation measures to be applied on a case by case basis. Improvements in water quality will also result in indirect positive impacts for population / human health and such improvements will also impact positively on material assets such as tourism which are dependant on good water quality for fishing, leisure activities etc.

Exclusion of cattle will have positive impacts for biodiversity, flora and fauna, water and soil in particular, however, negative impacts are expected for material assets through increased costs associated with fencing and maintenance and loss of agricultural land.

Effective and targeted implementation of the commonage framework plans and the Good Agricultural Practice Regulations 2009, which are a Basic Measure, and cross compliance, will address agricultural pressures, particularly where there is a focus on improved fencing, buffer zones and the provision of animal watering points on a prioritised basis beginning. This will have overall positive impacts for FPM and biodiversity, flora and fauna generally as well as water quality and soils by

reducing the amount of erosion along the river bank, together with reducing the amount of silt and nutrients entering the watercourse. Improved fencing and provision of buffer zones will have negative impacts for material assets as stated previously; however, given the close proximity to the watercourse it is unlikely to yield high agricultural outputs. The width of buffer strip will be dependant on the slope of lands adjacent to the rivers as well as the type of farming activity being carried out on specific farms. It will be necessary to undertake a field by field inspection in advance of determining site specific requirements for fencing and buffer zones.

**On-site Wastewater Treatment Systems**

Baseline studies in this catchment have identified point and diffuse sources of nutrient input to rivers from OSWWTS and have highlighted this as a pressure. Site specific measures to deal with this pressure include inspection and investigation of the connection of all inadequate systems to the Dunmanway WWTP; prioritisation of the inspection and investigation of on-site systems in high to extreme risk categories along the rivers in the Bandon/Caha catchment; and a public awareness campaign.

As noted in the baseline, there are 260 on-site systems on extreme risk, 192 on very high risk and 304 on high risk potential settings in the Bandon catchment. Following investigation further mitigation may be required on a case by case basis however, if it is assumed that 50% (or 378) of these systems require desludging once during the first 6-year Action Programme cycle, this would result in an estimated **1820 tonnes** (based on 4.5$m^3$ sludge per tank and a density of 1.07tonnes/$m^3$) requiring transport and disposal. It is assumed that the catchment is within a 100km round trip of a suitable landfill site for appropriate disposal. Disposal of sludge to landfill may require additional landfill space, with resultant impacts identified in the previous high level strategic assessment in **Section 8.5.3**.

The potential emission of $CO_2$ associated with leaving the sludges in place is estimated to be **0.7 ktonnes** per year. If this is multiplied across the 6-year cycle, an estimated **4.22 ktonnes** of $CO_2$ will be emitted by on-site wastewater treatment systems that may be posing a threat to the designated FPM area.

The amount of $CO_2$ emitted by disposal of sludge to landfill is a combination of the $CO_2$ released by the sludge after disposal to landfill and the $C0_2$ emitted during transport. Transport of **1820 tonnes** of sludge to landfill is estimated to produce less than **0.01 ktonnes** of $CO_2$, while $CO_2$ emissions once in the landfill are estimated to be **0.44 ktonnes** which rises to **2.64 ktonnes** if the tanks are desludged annually.

Comparing the estimated emissions of **4.22 ktonnes** of $CO_2$ if the sludges are left in place to the estimated **2.64 ktonnes** of $CO_2$ if they are removed and disposed of to landfill, it appears that in the context of contribution to climate change over a 6 year cycle of the Action Programme the removal of the sludges and disposal to landfill would be positive in the context of climate change.

Inspection and investigation of OSWWTS will require commitment from Local Authorities charged with carrying out this work, however, it is noted that there is likely to be significant overlap between investigations under the River Basin Management Plans leading to opportunities to streamline and coordinate prioritisation of this work under these two distinct but complementary pieces of legislation.

A public awareness campaign is expected to result in direct positive impacts through less physical disturbance and loss to FPM populations and indirectly to improved water quality through increased public awareness.

**Forestry**

Forestry management plans aimed at minimising hydrological, sediment, nutrient and other potential impacts from forests will have direct positive impacts on biodiversity, flora and fauna, water, and soils by minimising these and other potential impacts, and allowing targeted mitigation measures to be applied on a case by case basis. Improvements in water quality will also result in indirect positive impacts for population / human health and such improvements will also impact positively on material assets such as tourism which are dependant on good water quality for fishing, leisure activities etc. Minimising hydrological, sediment, nutrient and other potential impacts may require changes to forestry management practices where such controls are not already in place resulting in negative impacts in the short to medium term on material assets. However, as these practices become the norm, this impact will become neutral over the long term.

**Physical Modifications**

Site specific measures for this catchment include no further reclamation permitted within the SAC without an assessment of its potential impact. This requirement is to be extended to areas outside of the SAC boundary also to take account of indirect impacts. In addition, existing and future drainage works require an Appropriate Assessment for Natura 2000 sites and this is also to be extended beyond the SAC boundary. As there will be no further reclamation or drainage works without the appropriate assessment, positive outcomes are anticipated for biodiversity, flora and fauna, water and soil in particular. However there may be indirect negative impacts on material assets in relation to land drainage if this constrains drainage and therefore the type of land use activities suitable in the area. There is also potential for indirect negative impacts on flood defence through restrictions to drainage maintenance. The requirement for Appropriate Assessments for Natura 2000 sites is considered enforcement of existing legislation which is a Basic Measure.

**Point Sources**

Site specific measures for this catchment include that all discharge licences or authorisations must comply with the EQOs set out of SI 296 of 2009; all WWTP, IPPC and Section 4 and 16 discharge licences must be reviewed to assess compliance with EQOs and additional conditions imposed as required. These measures will result in positive impacts for biodiversity, flora and fauna, water and soil by potentially reducing the level of nutrients entering the watercourse; however, negative impacts are

expected for material assets associated with costs of alterations and / or upgrades and additional conditions being imposed. Negative impacts are also possible where relocation of discharge points is required in order to comply as this may result in indirect negative impacts on cultural heritage, landscape and biodiversity if not sited sensitively. Positive impacts will be gained for population / human health and material assets through these alterations, up-grades and restrictions by ensuring adequate waste water treatment is in place to protect water quality.

**Quarries**

Similar to peat extraction operations, a number of quarries have been identified in the baseline studies in this catchment. Site specific measures to deal with this pressure include an awareness campaign by the Kerry County Council to inform quarry owners of the FPM requirements and all licences should be reviewed ensuring all discharges and operations are in line with FPM requirements. These measures will have positive impacts for biodiversity, flora and fauna, water and soil. Potential negative impacts are anticipated for material assets if future development of the quarries is constrained or if additional management or mitigation is required to develop or operate the site. Enforcement of existing legislation is a Basic Measure.

**Cumulative Impacts of the Measures in the Cloon Catchment**

A reduction in the silt loading to the watercourses in this catchment as a result of implementing the Action Programme measures under Agriculture, Forestry and Physical Modifications will result in direct positive impacts to FPM populations and habitats. In addition, a reduced silt load will have direct positive impacts on salmonid spawning and nursery areas, one of the reasons for this sites SAC designation, and reduce the impacts on other flora and fauna due to sedimentation.

Further, the implementation of said measures will have direct positive impacts on soils through the reduction of soil erosion, with again direct positive influences on water quality, which in turn would have indirect positive influences on human health. The cumulative impacts of implementing these measures would be positive.

A reduction in the nutrient loading to this catchment through the implementation of the Action Programme measures under Agriculture, Forestry and On-site wastewater treatment systems will have direct positive impacts on water quality, with indirect impacts on biodiversity, flora and fauna by reducing the potential for the eutrophication of these waters. This will also have an indirect positive influence on human health.

The potential for direct negative impacts to material assets through the implementation of the Action Programme measures may result from a reduction in agricultural productivity, restrictions to forestry activities, restrictions to quarry activities or through restrictions to land reclamation. There is also potential for indirect negative impacts on flood defence through restrictions to drainage maintenance.

### 8.6.11 The Caragh Catchment

The Draft Caragh Sub-Basin Management Plan identified the following key and secondary pressures either within the contributing catchment or within the vicinity of the FPM populations:

- Agriculture;
- On-site Wastewater Treatment Systems;
- Forestry;
- Point Sources;
- Physical Modifications; and
- Other issues – Peat Cutting.

**Agriculture**

As noted in the baseline, increased levels of silt and nutrients into the watercourses is a significant pressure on FPM populations in this catchment. To address this, site specific measures for this catchment have been developed and include further investigation in to the extent of damaged commonage in the catchment; continued implementation of the commonage framework plans for this catchment (see sub-basin plan for references); detailed assessment of soil nutrient status; sediment and nutrient management plans; exclusion of animals with improved fencing and buffer zones on a prioritisation basis beginning with those stretches containing FPM populations encouragement of participation in agri-environmental schemes; and strict enforcement of Good Agricultural Practice Regulations 2009 and cross compliance.

Detailed assessment of soil nutrient status and sediment and nutrient management plans will have positive impacts on biodiversity, flora and fauna, water, and soils by highlighting those areas where nutrient levels are above recommended levels and allowing targeted mitigation measures to be applied on a case by case basis. Improvements in water quality will also result in indirect positive impacts for population / human health and such improvements will also impact positively on material assets such as tourism which are dependant on good water quality for fishing, leisure activities etc.

Exclusion of animals with improved fencing and buffer zones will have positive impacts for biodiversity, flora and fauna, water and soil in particular, however, negative impacts are expected for material assets through increased costs associated with fencing and maintenance and loss of agricultural land.

Effective and targeted implementation of the commonage framework plans and the Good Agricultural Practice Regulations 2009, which are a Basic Measure, and cross compliance will address agricultural pressures, particularly where there is a focus on improved fencing, buffer zones and the provision of

animal watering points on a prioritised basis. This will have overall positive impacts for FPM and biodiversity, flora and fauna generally as well as water quality and soils by reducing the amount of erosion along the river bank, together with reducing the amount of silt and nutrients entering the watercourse. Improved fencing and provision of buffer zones will have negative impacts for material assets as stated previously; however, given the close proximity to the watercourse it is unlikely to yield high agricultural outputs. The width of buffer strip will be dependant on the slope of lands adjacent to the rivers as well as the type of farming activity being carried out on specific farms. It will be necessary to undertake a field by field inspection in advance of determining site specific requirements for fencing and buffer zones.

**On-site Wastewater Treatment Systems**

Baseline studies in this catchment have identified point and diffuse sources of nutrient input to rivers from OSWWTS and have highlighted this as a pressure. Site specific measures to deal with this pressure include prioritisation of the inspection and investigation of on-site systems in high to extreme risk categories within the Caragh catchment; and a public awareness campaign.

As noted in the baseline, there are 156 on-site systems on extreme risk, 1 on very high risk and 110 on high risk potential settings in the Caragh catchment. Following investigation further mitigation may be required on a case by case basis however, if it is assumed that 50% (or 134) of these systems require desludging once during the first 6-year Action Programme cycle, this would result in an estimated **643 tonnes** (based on 4.5$m^3$ sludge per tank and a density of 1.07tonnes/$m^3$) requiring transport and disposal. It is assumed that the catchment is within a 100km round trip of a suitable landfill site for appropriate disposal. Disposal of sludge to landfill may require additional landfill space, with resultant impacts identified in the previous high level strategic assessment in **Section 8.5.3**.

The potential emission of $CO_2$ associated with leaving the sludges in place is estimated to be **0.25 ktonnes** per year. If this is multiplied across the 6-year cycle, an estimated **1.49 ktonnes** of $CO_2$ will be emitted by on-site wastewater treatment systems that may be posing a threat to the designated FPM area.

The amount of $CO_2$ emitted by disposal of sludge to landfill is a combination of the $CO_2$ released by the sludge after disposal to landfill and the $C0_2$ emitted during transport. Transport of **643 tonnes** of sludge to landfill is estimated to produce less than **0.00 ktonnes** of $CO_2$, while $CO_2$ emissions once in the landfill are estimated to be **0.16 ktonnes** which rises to **0.93 ktonnes** if the tanks are desludged annually.

Comparing the estimated emissions of **1.49 ktonnes** of $CO_2$ if the sludges are left in place to the estimated **0.93 ktonnes** of $CO_2$ if they are removed and disposed of to landfill, it appears that in the context of contribution to climate change over a 6 year cycle of the Action Programme the removal of the sludges and disposal to landfill would be positive in the context of climate change.

Inspection and investigation of OSWWTS will require commitment from Local Authorities charged with carrying out this work, however, it is noted that there is likely to be significant overlap between investigations under the River Basin Management Plans leading to opportunities to streamline and coordinate prioritisation of this work under these two distinct but complementary pieces of legislation.

A public awareness campaign is expected to result in direct positive impacts through less physical disturbance and loss to FPM populations and indirectly to improved water quality through increased public awareness.

**Forestry**

Forestry management plans aimed at minimising hydrological, sediment, nutrient and other potential impacts from forests will have direct positive impacts on biodiversity, flora and fauna, water, and soils by minimising these and other potential impacts, and allowing targeted mitigation measures to be applied on a case by case basis. Improvements in water quality will also result in indirect positive impacts for population / human health and such improvements will also impact positively on material assets such as tourism which are dependant on good water quality for fishing, leisure activities etc. Minimising hydrological, sediment, nutrient and other potential impacts may require changes to forestry management practices where such controls are not already in place resulting in negative impacts in the short to medium term on material assets. However, as these practices become the norm, this impact will become neutral over the long term.

**Physical Modifications**

Site specific measures for this catchment include no further reclamation permitted within the SAC without an assessment of its potential impact. This requirement is to be extended to areas outside of the SAC boundary also to take account of indirect impacts. In addition, existing and future drainage works require an Appropriate Assessment for Natura 2000 sites and this is also to be extended beyond the SAC boundary. As there will be no further reclamation or drainage works without the appropriate assessment, positive outcomes are anticipated for biodiversity, flora and fauna, water and soil in particular. However there may be indirect negative impacts on material assets in relation to land drainage if this constrains drainage and therefore the type of land use activities suitable in the area. There is also potential for indirect negative impacts on flood defence through restrictions to drainage maintenance and as a result indirect negative impacts on material assets, e.g. residential, which may be at risk from flooding. The requirement for Appropriate Assessments for Natura 2000 sites is considered enforcement of existing legislation which is a Basic Measure.

**Point Sources**

Site specific measures for this catchment include that all discharge licences or authorisations must comply with the EQOs set out of SI 296 of 2009; Section 4 discharge licence must be reviewed to assess compliance with EQOs and additional conditions imposed as required. These measures will result in positive impacts for biodiversity, flora and fauna, water and soil by potentially reducing the

level of nutrients entering the watercourse; however, negative impacts are expected for material assets associated with costs of alterations and / or upgrades and additional conditions being imposed. Negative impacts are also possible where relocation of discharge points is required in order to comply as this may result in indirect negative impacts on cultural heritage, landscape and biodiversity if not sited sensitively. Positive impacts will be gained for population / human health and material assets through these alterations, up-grades and restrictions by ensuring adequate waste water treatment is in place to protect water quality.

**Other issues - Peat Cutting**

The baseline has identified a number of peat extraction operations operating within the catchment with the potential to impact on the FPM populations. Therefore, site specific measures for this catchment include assessment of the peat extraction operations for licensing and permitting requirements; and installation of appropriately sized silt traps to treat runoff from the identified peat operations.

Licensing and permitting of peat extraction operations and subsequent enforcement of existing legislation is considered a Basic Measure. Positive impacts are anticipated including to climate through a reduction in peat cutting and therefore a reduction in the burning of peat. However, this will impact negatively on material assets through potential restrictions on peat cutting and may also impact indirectly on cultural heritage if peat cutting has historically been undertaken in the area. Installation of silt traps will have positive impacts for biodiversity, flora and fauna, water and soil, however, maintenance of the systems will be important to prevent medium to long-term negative impacts on these receptors. Indirect positive impacts would also be expected for population / human health through improved water quality and on material assets e.g. tourism, angling, which rely on good water quality.

**Cumulative Impacts of the Measures in the Caragh Catchment**

A reduction in the silt loading to the watercourses in this catchment as a result of implementing the Action Programme measures under Agriculture, Forestry, Physical Modifications and Peat Cutting will result in direct positive impacts to FPM populations and habitats. In addition, a reduced silt load will have direct positive impacts on salmonid spawning and nursery areas, one of the reasons for this sites SAC designation, and reduce the impacts on other flora and fauna due to sedimentation.

Further, the implementation of said measures will have direct positive impacts on soils through the reduction of soil erosion, with again direct positive influences on water quality, which in turn would have indirect positive influences on human health. The cumulative impacts of implementing these measures would be positive.

A reduction in the nutrient loading to this catchment through the implementation of the Action Programme measures under Agriculture, Forestry, Peat Cutting and On-site wastewater treatment systems will have direct positive impacts on water quality, with indirect impacts on biodiversity, flora

and fauna by reducing the potential for the eutrophication of these waters. This will also have an indirect positive influence on human health.

The potential for direct negative impacts to material assets through the implementation of the Action Programme measures may result from a reduction in agricultural productivity, restrictions to forestry activities, restrictions to peat cutting activities, restrictions to quarry activities or through restrictions to land reclamation. There is also potential for indirect negative impacts on flood defence through restrictions to drainage maintenance.

### 8.6.12 The Currane Catchment

The Draft Currane Sub-Basin Management Plan identified the following key and secondary pressures either within the contributing catchment or within the vicinity of the FPM populations:

- Agriculture;
- On-site Wastewater Treatment Systems;
- Forestry;
- Physical Modifications; and
- Point Source.

**Agriculture**

As noted in the baseline, increased levels of silt and nutrients into the watercourses is a significant pressure on FPM populations in this catchment. To address this, site specific measures for this catchment have been developed and include continued implementation of the commonage framework plans for this catchment, plan reference (see sub-basin plan for references); detailed assessment of soil nutrient status; sediment and nutrient management plans; exclusion of animals with improved fencing and buffer zones on a prioritisation basis beginning with those stretches containing FPM populations; encouragement of participation in agri-environmental schemes; and strict enforcement of Good Agricultural Practice Regulations 2009 and cross compliance.

Detailed assessment of soil nutrient status and sediment and nutrient management plans will have positive impacts on biodiversity, flora and fauna, water, and soils by highlighting those areas where nutrient levels are above recommended levels and allowing targeted mitigation measures to be applied on a case by case basis. Improvements in water quality will also result in indirect positive impacts for population / human health and such improvements will also impact positively on material assets such as tourism which are dependant on good water quality for fishing, leisure activities etc.

Exclusion of sheep and cattle with improved fencing and buffer zones will have positive impacts for biodiversity, flora and fauna, water and soil in particular, however, negative impacts are expected for material assets through increased costs associated with fencing and maintenance and loss of agricultural land.

Effective and targeted implementation of the commonage framework plans and the Good Agricultural Practice Regulations 2009, which are a Basic Measure, and cross compliance, will address agricultural pressures, particularly where there is a focus on improved fencing, buffer zones and the provision of animal watering points on a prioritised basis. This will have overall positive impacts for FPM and biodiversity, flora and fauna generally as well as water quality and soils by reducing the

amount of erosion along the river bank, together with reducing the amount of silt and nutrients entering the watercourse. Improved fencing and provision of buffer zones will have negative impacts for material assets as stated previously; however, given the close proximity to the watercourse it is unlikely to yield high agricultural outputs. The width of buffer strip will be dependant on the slope of lands adjacent to the rivers as well as the type of farming activity being carried out on specific farms. It will be necessary to undertake a field by field inspection in advance of determining site specific requirements for fencing and buffer zones.

**On-site Wastewater Treatment Systems**

Baseline studies in this catchment have identified point and diffuse sources of nutrient input to rivers from OSWWTS and have highlighted this as a pressure. Site specific measures to deal with this pressure include prioritisation of the inspection and investigation of on-site systems in high to extreme risk categories within the Currane catchment; and a public awareness campaign.

As noted in the baseline, there are 119 on-site systems on extreme risk, 2 on very high risk and 27 on high risk potential settings in the Currane catchment. Following investigation further mitigation may be required on a case by case basis however, if it is assumed that 50% (or 74) of these systems require desludging once during the first 6-year Action Programme cycle, this would result in an estimated **356 tonnes** (based on 4.5$m^3$ sludge per tank and a density of 1.07tonnes/$m^3$) requiring transport and disposal. It is assumed that the catchment is within a 100km round trip of a suitable landfill site for appropriate disposal. Disposal of sludge to landfill may require additional landfill space, with resultant impacts identified in the previous high level strategic assessment in **Section 8.5.3**.

The potential emission of $CO_2$ associated with leaving the sludges in place is estimated to be **0.14 ktonnes** per year. If this is multiplied across the 6-year cycle, an estimated **0.83 ktonnes** of $CO_2$ will be emitted by on-site wastewater treatment systems that may be posing a threat to the designated FPM area.

The amount of $CO_2$ emitted by disposal of sludge to landfill is a combination of the $CO_2$ released by the sludge after disposal to landfill and the $C0_2$ emitted during transport. Transport of **356 tonnes** of sludge to landfill is estimated to produce less than **0.00 ktonnes** of $CO_2$, while $CO_2$ emissions once in the landfill are estimated to be **0.09 ktonnes** which rises to **0.52 ktonnes** if the tanks are desludged annually.

Comparing the estimated emissions of **0.83 ktonnes** of $CO_2$ if the sludges are left in place to the estimated **0.52 ktonnes** of $CO_2$ if they are removed and disposed of to landfill, it appears that in the context of contribution to climate change over a 6 year cycle of the Action Programme the removal of the sludges and disposal to landfill would be positive in the context of climate change.

Inspection and investigation of OSWWTS will require commitment from Local Authorities charged with carrying out this work, however, it is noted that there is likely to be significant overlap between

investigations under the River Basin Management Plans leading to opportunities to streamline and coordinate prioritisation of this work under these two distinct but complementary pieces of legislation.

A public awareness campaign is expected to result in direct positive impacts through less physical disturbance and loss to FPM populations and indirectly to improved water quality through increased public awareness.

**Forestry**

Forestry management plans aimed at minimising hydrological, sediment, nutrient and other potential impacts from forests will have direct positive impacts on biodiversity, flora and fauna, water, and soils by minimising these and other potential impacts, and allowing targeted mitigation measures to be applied on a case by case basis. Improvements in water quality will also result in indirect positive impacts for population / human health and such improvements will also impact positively on material assets such as tourism which are dependant on good water quality for fishing, leisure activities etc. Minimising hydrological, sediment, nutrient and other potential impacts may require changes to forestry management practices where such controls are not already in place resulting in negative impacts in the short to medium term on material assets. However, as these practices become the norm, this impact will become neutral over the long term.

**Physical Modifications**

Site specific measures for this catchment include no further reclamation permitted within the SAC without an assessment of its potential impact. This requirement is to be extended to areas outside of the SAC boundary also to take account of indirect impacts. In addition, existing and future drainage works require an Appropriate Assessment for Natura 2000 sites and this is also to be extended beyond the SAC boundary. As there will be no further reclamation or drainage works without the appropriate assessment, positive outcomes are anticipated for biodiversity, flora and fauna, water and soil in particular. However there may be indirect negative impacts on material assets in relation to land drainage if this constrains drainage and therefore the type of land use activities suitable in the area. There is also potential for indirect negative impacts on flood defence through restrictions to drainage maintenance and as a result indirect negative impacts on material assets, e.g. residential, which may be at risk from flooding. The requirement for Appropriate Assessments for Natura 2000 sites is considered enforcement of existing legislation which is a Basic Measure.

**Other issues - Point Sources**

The baseline has identified two point source pressures; Willow Herb Ltd – Mink farm and a fish farm at Clodragh. Site specific measures for this catchment include that all discharge licences or authorisations must comply with the EQOs set out of SI 296 of 2009; all WWTP, IPPC and Section 4 and 16 discharge licences must be reviewed to assess compliance with EQOs and additional conditions imposed as required. These measures will result in positive impacts for biodiversity, flora and fauna, water and soil by potentially reducing the level of nutrients entering the watercourse;

however, negative impacts are expected for material assets associated with costs of alterations and / or upgrades and additional conditions being imposed. Negative impacts are also possible where relocation of discharge points is required in order to comply as this may result in indirect negative impacts on cultural heritage, landscape and biodiversity if not sited sensitively. Positive impacts will be gained for population / human health and material assets through these alterations, up-grades and restrictions by ensuring adequate waste water treatment is in place to protect water quality.

**Cumulative Impacts of the Measures in the Currane Catchment**

A reduction in the silt loading to the watercourses in this catchment as a result of implementing the Action Programme measures under Agriculture, Forestry and Physical Modifications will result in direct positive impacts to FPM populations and habitats. In addition, a reduced silt load will have direct positive impacts on salmonid spawning and nursery areas, one of the reasons for this sites SAC designation, and reduce the impacts on other flora and fauna due to sedimentation.

Further, the implementation of said measures will have direct positive impacts on soils through the reduction of soil erosion, with again direct positive influences on water quality, which in turn would have indirect positive influences on human health. The cumulative impacts of implementing these measures would be positive.

A reduction in the nutrient loading to this catchment through the implementation of the Action Programme measures under Agriculture, Forestry, Point Sources and On-site wastewater treatment systems will have direct positive impacts on water quality, with indirect impacts on biodiversity, flora and fauna by reducing the potential for the eutrophication of these waters. This will also have an indirect positive influence on human health.

The potential for direct negative impacts to material assets through the implementation of the Action Programme measures may result from a reduction in agricultural productivity, restrictions to forestry activities, restrictions to wind farm activities, or through restrictions to land reclamation. There is also potential for indirect negative impacts on flood defence through restrictions to drainage maintenance.

### 8.6.13 The Gearhameen Catchment

The Draft Gearhameen Sub-Basin Management Plan identified the following key and secondary pressures either within the contributing catchment or within the vicinity of the FPM populations:

- Agriculture;
- On-site Wastewater Treatment Systems;
- Forestry;
- Physical Modifications;
- Abstractions;
- Quarries;
- Other issues – Peat Cutting; and
- Other issues – Fords.

**Agriculture**

As noted in the baseline, increased levels of silt and nutrients into the watercourses is a significant pressure on FPM populations in this catchment. To address this, site specific measures for this catchment have been developed and include further investigation in to the extent of damaged commonage in the catchment is required together with an investigation of potential overgrazing along the mountain slopes of the Gearhameen; continued implementation of the commonage framework plans for this catchment, plan reference (see sub-basin plan for references); detailed assessment of soil nutrient status; sediment and nutrient management plans; exclusion of animals with improved fencing and buffer zones on a prioritisation basis beginning with those stretches containing FPM populations; encouragement of participation in agri-environmental schemes; and strict enforcement of Good Agricultural Practice Regulations 2009 and cross compliance.

Detailed assessment of soil nutrient status and sediment and nutrient management plans will have positive impacts on biodiversity, flora and fauna, water, and soils by highlighting those areas where nutrient levels are above recommended levels and allowing targeted mitigation measures to be applied on a case by case basis. Improvements in water quality will also result in indirect positive impacts for population / human health and such improvements will also impact positively on material assets such as tourism which are dependant on good water quality for fishing, leisure activities etc.

Exclusion of cattle with improved fencing and buffer zones will have positive impacts for biodiversity, flora and fauna, water and soil in particular, however, negative impacts are expected for material

assets through increased costs associated with fencing and maintenance and loss of agricultural land. Based on preliminary estimates of priority stretches, which are subject to change as information becomes available, and assuming cattle are excluded from a 1.5m wide riparian strip on both sides of the river, this would result in approximately 6.50ha of land lost for grazing by cattle.

Effective and targeted implementation of the commonage framework plans and the Good Agricultural Practice Regulations 2009, which are a Basic Measure, and cross compliance will address agricultural pressures, particularly where there is a focus on improved fencing, buffer zones and the provision of animal watering points on a prioritised basis. This will have overall positive impacts for FPM and biodiversity, flora and fauna generally as well as water quality and soils by reducing the amount of erosion along the river bank, together with reducing the amount of silt and nutrients entering the watercourse. Improved fencing and provision of buffer zones will have negative impacts for material assets as stated previously; however, given the close proximity to the watercourse it is unlikely to yield high agricultural outputs. The width of buffer strip will be dependant on the slope of lands adjacent to the rivers as well as the type of farming activity being carried out on specific farms. It will be necessary to undertake a field by field inspection in advance of determining site specific requirements for fencing and buffer zones.

**On-site Wastewater Treatment Systems**

Baseline studies in this catchment have identified point and diffuse sources of nutrient input to rivers from OSWWTS and have highlighted this as a pressure. Site specific measures to deal with this pressure include the inspection of all systems along the Owenreagh River as a priority; and the inspection and investigation of on-site systems in high to extreme risk categories within the Gearhameen catchment; and a public awareness campaign.

As noted in the baseline, there are 25 on-site systems on extreme risk and 31 on very high risk potential settings in the Gearhameen catchment. Following investigation further mitigation may be required on a case by case basis however, if it is assumed that 50% (or 28) of these systems require desludging once during the first 6-year Action Programme cycle, this would result in an estimated **135 tonnes** (based on 4.5$m^3$ sludge per tank and a density of 1.07tonnes/$m^3$) requiring transport and disposal. It is assumed that the catchment is within a 100km round trip of a suitable landfill site for appropriate disposal. Disposal of sludge to landfill may require additional landfill space, with resultant impacts identified in the previous high level strategic assessment in **Section 8.5.3**.

The potential emission of $CO_2$ associated with leaving the sludges in place is estimated to be **0.05 ktonnes** per year. If this is multiplied across the 6-year cycle, an estimated **0.31 ktonnes** of $CO_2$ will be emitted by on-site wastewater treatment systems that may be posing a threat to the designated FPM area.

The amount of $CO_2$ emitted by disposal of sludge to landfill is a combination of the $CO_2$ released by the sludge after disposal to landfill and the $C0_2$ emitted during transport. Transport of **135 tonnes** of

sludge to landfill is estimated to produce less than **0.00 ktonnes** of $CO_2$, while $CO_2$ emissions once in the landfill are estimated to be **0.03 ktonnes** which rises to **0.20 ktonnes** if the tanks are desludged annually.

Comparing the estimated emissions of **0.31 ktonnes** of $CO_2$ if the sludges are left in place to the estimated **0.20 ktonnes** of $CO_2$ if they are removed and disposed of to landfill, it appears that in the context of contribution to climate change over a 6 year cycle of the Action Programme the removal of the sludges and disposal to landfill would be positive in the context of climate change.

Inspection and investigation of OSWWTS will require commitment from Local Authorities charged with carrying out this work, however, it is noted that there is likely to be significant overlap between investigations under the River Basin Management Plans leading to opportunities to streamline and coordinate prioritisation of this work under these two distinct but complementary pieces of legislation.

A public awareness campaign is expected to result in direct positive impacts through less physical disturbance and loss to FPM populations and indirectly to improved water quality through increased public awareness.

**Forestry**

Forestry management plans aimed at minimising hydrological, sediment, nutrient and other potential impacts from forests will have direct positive impacts on biodiversity, flora and fauna, water, and soils by minimising these and other potential impacts, and allowing targeted mitigation measures to be applied on a case by case basis. Improvements in water quality will also result in indirect positive impacts for population / human health and such improvements will also impact positively on material assets such as tourism which are dependant on good water quality for fishing, leisure activities etc. Minimising hydrological, sediment, nutrient and other potential impacts may require changes to forestry management practices where such controls are not already in place resulting in negative impacts in the short to medium term on material assets. However, as these practices become the norm, this impact will become neutral over the long term.

**Physical Modifications**

The baseline identified numerous culverts were noted in the catchment, particularly along the smaller tributaries of the Owenreagh. Site specific measures for this catchment include a review of the culverts and impacts associated with them. Such a measure would result in positive impacts for biodiversity, flora and fauna, water and soil by reducing the level of sediment entering the watercourse, together with improving the migration of fish; however, negative impacts are expected for material assets through increased costs associated with the culvert upgrades.

**Abstractions**

As noted in the baseline, a small scale abstraction was recorded at Lord Brandon's cottage in association with the restaurant and historical site. Site specific measures include an investigation of the abstraction to determine if it is having no impact particularly at low flows. Such an investigation would result in positive impacts for biodiversity, flora and fauna and water by identification of any potential negative impacts from the abstraction and highlighting the appropriate mitigation measures that may be applied.

**Other issues - Peat Cutting**

The baseline has identified large areas of peat cutting along the banks of the Owenreagh with the potential to impact on the FPM populations. Therefore, site specific measures for this catchment include assessment of the peat extraction operations for licensing and permitting requirements; and installation of appropriately sized silt traps to treat runoff from the identified peat operations.

Licensing and permitting of peat extraction operations and subsequent enforcement of existing legislation is considered a Basic Measure. Positive impacts are anticipated including to climate through a reduction in peat cutting and therefore a reduction in the burning of peat. However, this will impact negatively on material assets through potential restrictions on peat cutting and may also impact indirectly on cultural heritage if peat cutting has historically been undertaken in the area. Installation of silt traps as mitigation measures would have positive impacts for biodiversity, flora and fauna, water and soil, however, maintenance of the systems will be important to prevent medium to long-term negative impacts on these receptors. Indirect positive impacts would also be expected for population / human health through improved water quality and on material assets e.g. tourism, angling, which rely on good water quality.

**Quarries**

One quarry was recorded at the top of the catchment – Moll's Gap Quarry. Site specific measures to deal with this pressure include an awareness campaign by the Kerry County Council to inform the quarry owners of the FPM requirements. An inspection has been carried out and conditions have been imposed which Kerry County Council is enforcing. The Quarry should continue to be monitored in order to ensure no impacts are caused within the catchment. This measure will have positive impacts for biodiversity, flora and fauna, water and soil. Potential negative impacts are anticipated for material assets if future development of the quarries is constrained or if additional management or mitigation is required to develop or operate the site. Enforcement of existing legislation is a Basic Measure.

**Other issues - Fords**

One significant vehicular and animal fords have been identified was observed downstream of Lord Brandon's cottage. To address this pressure site specific measures include investigation of alternative access immediately or site mitigation measures implemented. Relocation of the access will result in

positive impacts for FPM and biodiversity generally e.g. fish spawning areas, water and soil by controlling erosion, and silt and nutrient addition downstream of the crossing point, and relocating a direct impact (through crushing) to existing FPM populations. The relocation may result in negative impact to material assets as a result of changes in management practices necessary to reach alternative access points, increased time requirements to move livestock. It may also impact on other biodiversity and potentially cultural heritage if the alternative locations are not sited sensitively.

**Cumulative Impacts of the Measures in the Gearhameen Catchment**

A reduction in the silt loading to the watercourses in this catchment as a result of implementing the Action Programme measures under Agriculture, Forestry, Physical Modifications, Peat Cutting, Quarries and Fords will result in direct positive impacts to FPM populations and habitats. In addition, a reduced silt load will have direct positive impacts on salmonid spawning and nursery areas, one of the reasons for this sites SAC designation, and reduce the impacts on other flora and fauna due to sedimentation.

Further, the implementation of said measures will have direct positive impacts on soils through the reduction of soil erosion, with again direct positive influences on water quality, which in turn would have indirect positive influences on human health. The cumulative impacts of implementing these measures would be positive.

A reduction in the nutrient loading to this catchment through the implementation of the Action Programme measures under Agriculture, Forestry, Peat Cutting and On-site wastewater treatment systems will have direct positive impacts on water quality, with indirect impacts on biodiversity, flora and fauna by reducing the potential for the eutrophication of these waters. This will also have an indirect positive influence on human health.

The potential for direct negative impacts to material assets through the implementation of the Action Programme measures may result from a reduction in agricultural productivity, restrictions to forestry activities, restrictions to peat cutting activities, restrictions to quarry activities or through restrictions to land reclamation. There is also potential for indirect negative impacts on flood defence through restrictions to drainage maintenance.

### 8.6.14 The Kerry Blackwater Catchment

The Draft Kerry Blackwater Sub-Basin Management Plan identified the following key and secondary pressures either within the contributing catchment or within the vicinity of the FPM populations:

- Agriculture;
- On-site Wastewater Treatment Systems;
- Forestry;
- Other issues – Peat Cutting

**Agriculture**

As noted in the baseline, increased levels of silt and nutrients into the watercourses is a significant pressure on FPM populations in this catchment. To address this, site specific measures for this catchment have been developed and include detailed assessment of soil nutrient status; sediment and nutrient management plans; exclusion of cattle with improved fencing and buffer zones on a prioritisation basis beginning with those stretches containing FPM populations; encouragement of participation in agri-environmental schemes; and strict enforcement of Good Agricultural Practice Regulations 2009 and cross compliance.

Detailed assessment of soil nutrient status and sediment and nutrient management plans will have positive impacts on biodiversity, flora and fauna, water, and soils by highlighting those areas where nutrient levels are above recommended levels and allowing targeted mitigation measures to be applied on a case by case basis. Improvements in water quality will also result in indirect positive impacts for population / human health and such improvements will also impact positively on material assets such as tourism which are dependant on good water quality for fishing, leisure activities etc.

Exclusion of cattle with improved fencing and buffer zones will have positive impacts for biodiversity, flora and fauna, water and soil in particular, however, negative impacts are expected for material assets through increased costs associated with fencing and maintenance and loss of agricultural land.

Effective and targeted implementation of the commonage framework plans and the Good Agricultural Practice Regulations 2009, which are a Basic Measure, and cross compliance will address agricultural pressures, particularly where there is a focus on improved fencing, buffer zones and the provision of animal watering points on a prioritised basis. This will have overall positive impacts for FPM and biodiversity, flora and fauna generally as well as water quality and soils by reducing the amount of erosion along the river bank, together with reducing the amount of silt and nutrients entering the watercourse. Improved fencing and provision of buffer zones will have negative impacts for material assets as stated previously; however, given the close proximity to the watercourse it is unlikely to yield

high agricultural outputs. The width of buffer strip will be dependant on the slope of lands adjacent to the rivers as well as the type of farming activity being carried out on specific farms. It will be necessary to undertake a field by field inspection in advance of determining site specific requirements for fencing and buffer zones.

**On-site Wastewater Treatment Systems**

Baseline studies in this catchment have identified point and diffuse sources of nutrient input to rivers from OSWWTS and have highlighted this as a pressure. Site specific measures to deal with this pressure include prioritisation of the inspection and investigation of on-site systems in high to extreme risk categories within the Kerry Blackwater catchment; and a public awareness campaign.

As noted in the baseline, there are 205 on-site systems on extreme risk, 3 on very high risk and 40 on very high risk potential settings in the Gearhameen catchment. Following investigation further mitigation may be required on a case by case basis however, if it is assumed that 50% (or 124) of these systems require desludging once during the first 6-year Action Programme cycle, this would result in an estimated **597 tonnes** (based on 4.5$m^3$ sludge per tank and a density of 1.07tonnes/$m^3$) requiring transport and disposal. It is assumed that the catchment is within a 100km round trip of a suitable landfill site for appropriate disposal. Disposal of sludge to landfill may require additional landfill space, with resultant impacts identified in the previous high level strategic assessment in **Section 8.5.3**.

The potential emission of $CO_2$ associated with leaving the sludges in place is estimated to be **0.23 ktonnes** per year. If this is multiplied across the 6-year cycle, an estimated **1.38 ktonnes** of $CO_2$ will be emitted by on-site wastewater treatment systems that may be posing a threat to the designated FPM area.

The amount of $CO_2$ emitted by disposal of sludge to landfill is a combination of the $CO_2$ released by the sludge after disposal to landfill and the $C0_2$ emitted during transport. Transport of **597 tonnes** of sludge to landfill is estimated to produce less than **0.00 ktonnes** of $CO_2$, while $CO_2$ emissions once in the landfill are estimated to be **0.14 ktonnes** which rises to **0.87 ktonnes** if the tanks are desludged annually.

Comparing the estimated emissions of **1.38 ktonnes** of $CO_2$ if the sludges are left in place to the estimated **0.87 ktonnes** of $CO_2$ if they are removed and disposed of to landfill, it appears that in the context of contribution to climate change over a 6 year cycle of the Action Programme the removal of the sludges and disposal to landfill would be positive in the context of climate change.

Inspection and investigation of OSWWTS will require commitment from Local Authorities charged with carrying out this work, however, it is noted that there is likely to be significant overlap between investigations under the River Basin Management Plans leading to opportunities to streamline and coordinate prioritisation of this work under these two distinct but complementary pieces of legislation.

A public awareness campaign is expected to result in direct positive impacts through less physical disturbance and loss to FPM populations and indirectly to improved water quality through increased public awareness.

**Forestry**

Forestry management plans aimed at minimising hydrological, sediment, nutrient and other potential impacts from forests will have direct positive impacts on biodiversity, flora and fauna, water, and soils by minimising these and other potential impacts, and allowing targeted mitigation measures to be applied on a case by case basis. Improvements in water quality will also result in indirect positive impacts for population / human health and such improvements will also impact positively on material assets such as tourism which are dependant on good water quality for fishing, leisure activities etc. Minimising hydrological, sediment, nutrient and other potential impacts may require changes to forestry management practices where such controls are not already in place resulting in negative impacts in the short to medium term on material assets. However, as these practices become the norm, this impact will become neutral over the long term.

**Other issues - Peat Cutting**

The baseline has identified large areas of peat cutting within the catchment which have the potential to impact on the FPM populations. Therefore, site specific measures for this catchment include assessment of the peat extraction operations for licensing and permitting requirements.

Licensing and permitting of peat extraction operations and subsequent enforcement of existing legislation is considered a Basic Measure. Positive impacts are anticipated including to climate through a reduction in peat cutting and therefore a reduction in the burning of peat. However, this will impact negatively on material assets through potential restrictions on peat cutting and may also impact indirectly on cultural heritage if peat cutting has historically been undertaken in the area. Installation of silt traps as mitigation measures would have positive impacts for biodiversity, flora and fauna, water and soil, however, maintenance of the systems will be important to prevent medium to long-term negative impacts on these receptors. Indirect positive impacts would also be expected for population / human health through improved water quality and on material assets e.g. tourism, angling, which rely on good water quality.

**Cumulative Impacts of the Measures in the Gearhameen Catchment**

A reduction in the silt loading to the watercourses in this catchment as a result of implementing the Action Programme measures under Agriculture, Forestry and Peat Cutting will result in direct positive impacts to FPM populations and habitats. In addition, a reduced silt load will have direct positive impacts on salmonid spawning and nursery areas, one of the reasons for this sites SAC designation, and reduce the impacts on other flora and fauna due to sedimentation.

Further, the implementation of said measures will have direct positive impacts on soils through the reduction of soil erosion, with again direct positive influences on water quality, which in turn would have indirect positive influences on human health. The cumulative impacts of implementing these measures would be positive.

A reduction in the nutrient loading to this catchment through the implementation of the Action Programme measures under Agriculture, Forestry, Peat Cutting and On-site wastewater treatment systems will have direct positive impacts on water quality, with indirect impacts on biodiversity, flora and fauna by reducing the potential for the eutrophication of these waters. This will also have an indirect positive influence on human health.

The potential for direct negative impacts to material assets through the implementation of the Action Programme measures may result from a reduction in agricultural productivity, restrictions to forestry activities, restrictions to peat cutting activities, restrictions to quarry activities or through restrictions to land reclamation. There is also potential for indirect negative impacts on flood defence through restrictions to drainage maintenance.

### 8.6.15 The Licky Catchment

The Draft Licky Sub-Basin Management Plan identified the following key and secondary pressures either within the contributing catchment or within the vicinity of the FPM populations:

- Agriculture;
- On-site Wastewater Treatment Systems;
- Forestry;
- Quarries; and
- Other issues - Fords

**Agriculture**

As noted in the baseline, increased levels of silt and nutrients into the watercourses is a significant pressure on FPM populations in this catchment. To address this, site specific measures for this catchment have been developed and include detailed assessment of soil nutrient status; sediment and nutrient management plans; exclusion of cattle with improved fencing and buffer zones on a prioritisation basis beginning with those stretches containing FPM populations; encouragement of participation in agri-environmental schemes; and strict enforcement of Good Agricultural Practice Regulations 2009 and cross compliance.

Detailed assessment of soil nutrient status and sediment and nutrient management plans will have positive impacts on biodiversity, flora and fauna, water, and soils by highlighting those areas where nutrient levels are above recommended levels and allowing targeted mitigation measures to be applied on a case by case basis. Improvements in water quality will also result in indirect positive impacts for population / human health and such improvements will also impact positively on material assets such as tourism which are dependant on good water quality for fishing, leisure activities etc.

Exclusion of cattle with improved fencing and buffer zones will have positive impacts for biodiversity, flora and fauna, water and soil in particular, however, negative impacts are expected for material assets through increased costs associated with fencing and maintenance and loss of agricultural land. Based on preliminary estimates of the 3 priority stretches, which are subject to change as information becomes available, and assuming cattle are excluded from a 1.5m wide riparian strip on both sides of the river, this would result in 0.49ha of land lost for grazing by cattle.

Effective and targeted implementation of the commonage framework plans and the Good Agricultural Practice Regulations 2009, which are a Basic Measure, and cross compliance will address agricultural pressures, particularly where there is a focus on improved fencing, buffer zones and the provision of animal watering points on a prioritised basis. This will have overall positive impacts for FPM and

biodiversity, flora and fauna generally as well as water quality and soils by reducing the amount of erosion along the river bank, together with reducing the amount of silt and nutrients entering the watercourse. Improved fencing and provision of buffer zones will have negative impacts for material assets as stated previously; however, given the close proximity to the watercourse it is unlikely to yield high agricultural outputs. The width of buffer strip will be dependant on the slope of lands adjacent to the rivers as well as the type of farming activity being carried out on specific farms. It will be necessary to undertake a field by field inspection in advance of determining site specific requirements for fencing and buffer zones.

**On-site Wastewater Treatment Systems**

Baseline studies in this catchment have identified point and diffuse sources of nutrient input to rivers from OSWWTS and have highlighted this as a pressure. Site specific measures to deal with this pressure include inspection of all OSWWTS in the catchment; and inspection and review of Section 4 licences with respect to the 3 commercial facilities located within the catchment.

As noted in the baseline, there are 48 on-site systems on very high risk and 76 on high risk potential settings in the Licky catchment. Following investigation further mitigation may be required on a case by case basis however, if it is assumed that 50% (or 62) of these systems require desludging once during the first 6-year Action Programme cycle, this would result in an estimated **299 tonnes** (based on 4.5$m^3$ sludge per tank and a density of 1.07tonnes/$m^3$) requiring transport and disposal. It is assumed that the catchment is within a 100km round trip of a suitable landfill site for appropriate disposal. Disposal of sludge to landfill may require additional landfill space, with resultant impacts identified in the previous high level strategic assessment in **Section 8.5.3**.

The potential emission of $CO_2$ associated with leaving the sludges in place is estimated to be **0.12 ktonnes** per year. If this is multiplied across the 6-year cycle, an estimated **0.69 ktonnes** of $CO_2$ will be emitted by on-site wastewater treatment systems that may be posing a threat to the designated FPM area.

The amount of $CO_2$ emitted by disposal of sludge to landfill is a combination of the $CO_2$ released by the sludge after disposal to landfill and the $C0_2$ emitted during transport. Transport of **299 tonnes** of sludge to landfill is estimated to produce less than **0.00 ktonnes** of $CO_2$, while $CO_2$ emissions once in the landfill are estimated to be **0.07 ktonnes** which rises to **0.43 ktonnes** if the tanks are desludged annually.

Comparing the estimated emissions of **0.69 ktonnes** of $CO_2$ if the sludges are left in place to the estimated **0.43 ktonnes** of $CO_2$ if they are removed and disposed of to landfill, it appears that in the context of contribution to climate change over a 6 year cycle of the Action Programme the removal of the sludges and disposal to landfill would be positive in the context of climate change.

Inspection and investigation of OSWWTS will require commitment from Local Authorities charged with carrying out this work, however, it is noted that there is likely to be significant overlap between

investigations under the River Basin Management Plans leading to opportunities to streamline and coordinate prioritisation of this work under these two distinct but complementary pieces of legislation.

A public awareness campaign is expected to result in direct positive impacts through less physical disturbance and loss to FPM populations and indirectly to improved water quality through increased public awareness.

**Forestry**

Forestry management plans aimed at minimising hydrological, sediment, nutrient and other potential impacts from forests will have direct positive impacts on biodiversity, flora and fauna, water, and soils by minimising these and other potential impacts, and allowing targeted mitigation measures to be applied on a case by case basis. Improvements in water quality will also result in indirect positive impacts for population / human health and such improvements will also impact positively on material assets such as tourism which are dependant on good water quality for fishing, leisure activities etc. Minimising hydrological, sediment, nutrient and other potential impacts may require changes to forestry management practices where such controls are not already in place resulting in negative impacts in the short to medium term on material assets. However, as these practices become the norm, this impact will become neutral over the long term.

**Quarries**

One small non-commercial quarry was recorded within the catchment. This quarry has been investigated by Waterford County Council and does not require a licence. Should the quarry be developed further in the future and used commercially the landowner is aware he will need to seek planning permission and a licence from Waterford County Council. This measure will have positive impacts for biodiversity, flora and fauna, water and soil. Potential negative impacts are anticipated for material assets if future development of the quarry is constrained or if additional management or mitigation is required to develop or operate the site. Enforcement of existing legislation is a Basic Measure.

**Other issues - Fords**

Two significant vehicular and animal fords have been identified was observed within the catchment. To address this pressure site specific measures include investigation of alternative access immediately or site mitigation measures implemented. Relocation of the access will result in positive impacts for FPM and biodiversity generally e.g. fish spawning areas, water and soil by controlling erosion, and silt and nutrient addition downstream of the crossing point, and relocating a direct impact (through crushing) to existing FPM populations. The relocation may result in negative impact to material assets as a result of changes in management practices necessary to reach alternative access points, increased time requirements to move livestock. It may also impact on other biodiversity and potentially cultural heritage if the alternative locations are not sited sensitively.

**Cumulative Impacts of the Measures in the Licky Catchment**

A reduction in the silt loading to the watercourses in this catchment as a result of implementing the Action Programme measures under Agriculture, Forestry, Quarries and Fords will result in direct positive impacts to FPM populations and habitats. In addition, a reduced silt load will have direct positive impacts on salmonid spawning and nursery areas, one of the reasons for this sites SAC designation, and reduce impacts on of other flora and fauna due to sedimentation.

Further, the implementation of said measures will have direct positive impacts on soils through the reduction of soil erosion, with again direct positive influences on water quality, which in turn would have indirect positive influences on human health. The cumulative impacts of implementing these measures would be positive.

A reduction in the nutrient loading to this catchment through the implementation of the Action Programme measures under Agriculture, Forestry and On-site wastewater treatment systems will have direct positive impacts on water quality, with indirect impacts on biodiversity, flora and fauna by reducing the potential for the eutrophication of these waters. This will also have an indirect positive influence on human health.

The potential for direct negative impacts to material assets through the implementation of the Action Programme measures may result from a reduction in agricultural productivity, restrictions to forestry activities, restrictions to peat cutting activities, restrictions to quarry activities or through restrictions to land reclamation. There is also potential for indirect negative impacts on flood defence through restrictions to drainage maintenance.

### 8.6.16 The Ownagappul Catchment

The Draft Ownagappul Sub-Basin Management Plan identified the following key and secondary pressures either within the contributing catchment or within the vicinity of the FPM populations:

- Agriculture;
- On-site Wastewater Treatment Systems;
- Forestry; and
- Abstractions.

**Agriculture**

As noted in the baseline, increased levels of silt and nutrients into the watercourses is a significant pressure on FPM populations in this catchment. To address this, site specific measures for this catchment have been developed and include detailed assessment of soil nutrient status; sediment and nutrient management plans; exclusion of cattle with improved fencing and buffer zones on a prioritisation basis beginning with those stretches containing FPM populations; encouragement of participation in agri-environmental schemes; and strict enforcement of Good Agricultural Practice Regulations 2009 and cross compliance.

Detailed assessment of soil nutrient status and sediment and nutrient management plans will have positive impacts on biodiversity, flora and fauna, water, and soils by highlighting those areas where nutrient levels are above recommended levels and allowing targeted mitigation measures to be applied on a case by case basis. Improvements in water quality will also result in indirect positive impacts for population / human health and such improvements will also impact positively on material assets such as tourism which are dependant on good water quality for fishing, leisure activities etc.

Effective and targeted implementation of the Good Agricultural Practice Regulations 2009, which are a Basic Measure, and cross compliance will address agricultural pressures, particularly where there is a focus on improved fencing, buffer zones and the provision of animal watering points on a prioritised basis. This will have overall positive impacts for FPM and biodiversity, flora and fauna generally as well as water quality and soils by reducing the amount of erosion along the river bank, together with reducing the amount of silt and nutrients entering the watercourse. Improved fencing and provision of buffer zones will have negative impacts for material assets through increased costs associated with fencing and maintenance and loss of agricultural land. Based on preliminary estimates of priority stretches, which are subject to change as information becomes available, and assuming cattle are excluded from a 1.5m wide riparian strip on both sides of the river, this would result in approximately 1.14ha of land lost for grazing by cattle. However, given the close proximity to the watercourse it is unlikely to yield high agricultural outputs. The width of buffer strip will be dependant on the slope of

lands adjacent to the rivers as well as the type of farming activity being carried out on specific farms. It will be necessary to undertake a field by field inspection in advance of determining site specific requirements for fencing and buffer zones.

**On-site Wastewater Treatment Systems**

Baseline studies in this catchment have identified point and diffuse sources of nutrient input to rivers from OSWWTS and have highlighted this as a pressure. Site specific measures to deal with this pressure include connection of the Ardgroom village to the WWTP immediately; further investigation in relation to the timescale for connection of houses in Ardgroom village and the extent of the proposed connections to the WWTP is required from Cork County Council; inspection of on-site waste water treatment systems upstream of Ardgroom should be prioritised; and as a second priority, inspection of the remaining on-site systems in the catchment i.e. along the Barrees catchment, is required.

As noted in the baseline, there are 36 on-site systems on extreme risk, 12 on very high risk and 31 on high risk potential settings in the Ownagappul catchment. Following investigation further mitigation may be required on a case by case basis however, if it is assumed that 50% (or 40) of these systems require desludging once during the first 6-year Action Programme cycle, this would result in an estimated **190 tonnes** (based on 4.5$m^3$ sludge per tank and a density of 1.07tonnes/$m^3$) requiring transport and disposal. It is assumed that the catchment is within a 100km round trip of a suitable landfill site for appropriate disposal. Disposal of sludge to landfill may require additional landfill space, with resultant impacts identified in the previous high level strategic assessment in **Section 8.5.3**.

The potential emission of $CO_2$ associated with leaving the sludges in place is estimated to be **0.07 ktonnes** per year. If this is multiplied across the 6-year cycle, an estimated **0.44 ktonnes** of $CO_2$ will be emitted by on-site wastewater treatment systems that may be posing a threat to the designated FPM area.

The amount of $CO_2$ emitted by disposal of sludge to landfill is a combination of the $CO_2$ released by the sludge after disposal to landfill and the $C0_2$ emitted during transport. Transport of **190 tonnes** of sludge to landfill is estimated to produce less than **0.00 ktonnes** of $CO_2$, while $CO_2$ emissions once in the landfill are estimated to be **0.05 ktonnes** which rises to **0.28 ktonnes** if the tanks are desludged annually.

Comparing the estimated emissions of **0.44 ktonnes** of $CO_2$ if the sludges are left in place to the estimated **0.28 ktonnes** of $CO_2$ if they are removed and disposed of to landfill, it appears that in the context of contribution to climate change over a 6 year cycle of the Action Programme the removal of the sludges and disposal to landfill would be positive in the context of climate change.

Inspection and investigation of OSWWTS will require commitment from Local Authorities charged with carrying out this work, however, it is noted that there is likely to be significant overlap between investigations under the River Basin Management Plans leading to opportunities to streamline and coordinate prioritisation of this work under these two distinct but complementary pieces of legislation.

A public awareness campaign is expected to result in direct positive impacts through less physical disturbance and loss to FPM populations and indirectly to improved water quality through increased public awareness.

**Forestry**

Forestry management plans aimed at minimising hydrological, sediment, nutrient and other potential impacts from forests will have direct positive impacts on biodiversity, flora and fauna, water, and soils by minimising these and other potential impacts, and allowing targeted mitigation measures to be applied on a case by case basis. Improvements in water quality will also result in indirect positive impacts for population / human health and such improvements will also impact positively on material assets such as tourism which are dependant on good water quality for fishing, leisure activities etc. Minimising hydrological, sediment, nutrient and other potential impacts may require changes to forestry management practices where such controls are not already in place resulting in negative impacts in the short to medium term on material assets. However, as these practices become the norm, this impact will become neutral over the long term.

**Abstractions**

As noted in the baseline, Cork County Council abstract from Glenbeg Lough and have plans to intensify the current level of abstraction. Site specific measures for this catchment include a review of abstractions from the lake; further discussions with NPWS before any alterations to current abstractions; and the provision of adequate compensation flow to satisfy all stages of the lifecycle of both the salmonids and the FPM populations present in the Ownagappul River.

These measures are expected to have positive benefits for biodiversity, flora and fauna and water by ensuring adequate flow to maintain the life cycle of the FPM and indirectly other aquatic flora and fauna. While this will give rise to more sustainable abstraction limits it would give rise to indirect negative impacts for material assets through restrictions on abstraction volumes and / or timing of abstractions to allow for the necessary compensation flows. This may constrain future development in the area.

**Cumulative Impacts of the Measures in the Ownagappul Catchment**

A reduction in the silt loading to the watercourses in this catchment as a result of implementing the Action Programme measures under Agriculture and Forestry will result in direct positive impacts to FPM populations and habitats. In addition, a reduced silt load will have direct positive impacts on salmonid spawning and nursery areas, one of the reasons for this sites SAC designation, and reduce the impacts on other flora and fauna due to sedimentation.

Further, the implementation of said measures will have direct positive impacts on soils through the reduction of soil erosion, with again direct positive influences on water quality, which in turn would

have indirect positive influences on human health. The cumulative impacts of implementing these measures would be positive.

A reduction in the nutrient loading to this catchment through the implementation of the Action Programme measures under Agriculture, Forestry and On-site wastewater treatment systems will have direct positive impacts on water quality, with indirect impacts on biodiversity, flora and fauna by reducing the potential for the eutrophication of these waters. This will also have an indirect positive influence on human health.

The potential for direct negative impacts to material assets through the implementation of the Action Programme measures may result from a reduction in agricultural productivity, restrictions to forestry activities or through restrictions to abstractions from Glenbeg Lough.

### 8.6.17 The Munster Blackwater Catchment

The Draft Munster Blackwater Sub-Basin Management Plan identified the following key and secondary pressures either within the contributing catchment or within the vicinity of the FPM populations:

- Agriculture;
- On-site Wastewater Treatment Systems;
- Forestry;
- Physical Modifications;
- Abstractions;
- Fords;
- Quarries; and
- Point Source.

**Agriculture**

As noted in the baseline, increased levels of silt and nutrients into the watercourses is a significant pressure on FPM populations in this catchment. To address this, site specific measures for this catchment have been developed and include detailed assessment of soil nutrient status; sediment and nutrient management plans; exclusion of cattle with improved fencing and buffer zones on a prioritisation basis beginning with those stretches containing FPM populations; encouragement of participation in agri-environmental schemes; and strict enforcement of Good Agricultural Practice Regulations 2009 and cross compliance.

Detailed assessment of soil nutrient status and sediment and nutrient management plans will have positive impacts on biodiversity, flora and fauna, water, and soils by highlighting those areas where nutrient levels are above recommended levels and allowing targeted mitigation measures to be applied on a case by case basis. Improvements in water quality will also result in indirect positive impacts for population / human health and such improvements will also impact positively on material assets such as tourism which are dependant on good water quality for fishing, leisure activities etc.

Exclusion of cattle with improved fencing and buffer zones will have positive impacts for biodiversity, flora and fauna, water and soil in particular, however, negative impacts are expected for material assets through increased costs associated with fencing and maintenance and loss of agricultural land.

Effective and targeted implementation of the Good Agricultural Practice Regulations 2009, which are a Basic Measure, and cross compliance will address agricultural pressures, particularly where there is a focus on improved fencing, buffer zones and the provision of animal watering points on a prioritised basis. This will have overall positive impacts for FPM and biodiversity, flora and fauna generally as well as water quality and soils by reducing the amount of erosion along the river bank, together with reducing the amount of silt and nutrients entering the watercourse. Improved fencing and provision of buffer zones will have negative impacts for material assets as stated previously; however, given the close proximity to the watercourse it is unlikely to yield high agricultural outputs. The width of buffer strip will be dependant on the slope of lands adjacent to the rivers as well as the type of farming activity being carried out on specific farms. It will be necessary to undertake a field by field inspection in advance of determining site specific requirements for fencing and buffer zones.

**On-site Wastewater Treatment Systems**

Baseline studies in this catchment have identified point and diffuse sources of nutrient input to rivers from OSWWTS and have highlighted this as a pressure. Site specific measures to deal with this pressure include prioritisation of the inspection and investigation of on-site systems in high to extreme risk categories within the Munster Blackwater catchment; and a public awareness campaign.

As noted in the baseline, there was 7,557 on-site systems on extreme risk, 4,724 on very high risk and 2,625 on high risk potential settings in the Munster Blackwater catchment. Following investigation further mitigation may be required on a case by case basis however, if it is assumed that 50% (or 7,453) of these systems require desludging once during the first 6-year Action Programme cycle, this would result in an estimated **35,886 tonnes** (based on 4.5$m^3$ sludge per tank and a density of 1.07tonnes/$m^3$) requiring transport and disposal. It is assumed that the catchment is within a 100km round trip of a suitable landfill site for appropriate disposal. Disposal of sludge to landfill may require additional landfill space, with resultant impacts identified in the previous high level strategic assessment in **Section 8.5.3**.

The potential emission of $CO_2$ associated with leaving the sludges in place is estimated to be **13.85 ktonnes** per year. If this is multiplied across the 6-year cycle, an estimated **83.11 ktonnes** of $CO_2$ will be emitted by on-site wastewater treatment systems that may be posing a threat to the designated FPM area.

The amount of $CO_2$ emitted by disposal of sludge to landfill is a combination of the $CO_2$ released by the sludge after disposal to landfill and the $C0_2$ emitted during transport. Transport of **35,886 tonnes** of sludge to landfill is estimated to produce less than **0.20 ktonnes** of $CO_2$, while $CO_2$ emissions once in the landfill are estimated to be **8.67 ktonnes** which rises to **52.00 ktonnes** if the tanks are desludged annually.

Comparing the estimated emissions of **83.11 ktonnes** of $CO_2$ if the sludges are left in place to the estimated **52.00 ktonnes** of $CO_2$ if they are removed and disposed of to landfill, it appears that in the

context of contribution to climate change over a 6 year cycle of the Action Programme the removal of the sludges and disposal to landfill would be positive in the context of climate change.

Inspection and investigation of OSWWTS will require commitment from Local Authorities charged with carrying out this work, however, it is noted that there is likely to be significant overlap between investigations under the River Basin Management Plans leading to opportunities to streamline and coordinate prioritisation of this work under these two distinct but complementary pieces of legislation.

A public awareness campaign is expected to result in direct positive impacts through less physical disturbance and loss to FPM populations and indirectly to improved water quality through increased public awareness.

**Forestry**

Forestry management plans aimed at minimising hydrological, sediment, nutrient and other potential impacts from forests will have direct positive impacts on biodiversity, flora and fauna, water, and soils by minimising these and other potential impacts, and allowing targeted mitigation measures to be applied on a case by case basis. Improvements in water quality will also result in indirect positive impacts for population / human health and such improvements will also impact positively on material assets such as tourism which are dependant on good water quality for fishing, leisure activities etc. Minimising hydrological, sediment, nutrient and other potential impacts may require changes to forestry management practices where such controls are not already in place resulting in negative impacts in the short to medium term on material assets. However, as these practices become the norm, this impact will become neutral over the long term.

**Physical Modifications**

Site specific measures for this catchment include no further intensification of pressures, drainage or maintenance drainage permitted through out the Munster Blackwater catchment without an assessment of its potential impact. This requirement is to be extended to areas outside of the SAC boundary also to take account of indirect impacts. In addition, existing and future drainage works require an Appropriate Assessment for Natura 2000 sites and this is also to be extended beyond the SAC boundary. Restorative measures may also be needed where the habitat has been removed through these physical modifications.

A Freshwater Morphology Web Based tool has been developed which is driven by a Morphology Database. This tool supports decision making in authorisation systems by assessing pressure extent and risk to water body status. Damage to mussel populations, in combination with other impacts both during construction and operation will be considered in the assessment. Currently this web based tool is held and operated by the EPA. If an authorisation process is rolled out Local Authorities should be given access to this tool. Therefore structure within rivers may be subject to controls in future.

As there will be no further reclamation or drainage works without the appropriate assessment, positive outcomes are anticipated for biodiversity, flora and fauna, water and soil in particular. However there may be indirect negative impacts on material assets in relation to land drainage if this constrains drainage and therefore the type of land use activities suitable in the area. There is also potential for indirect negative impacts on flood defence through restrictions to drainage maintenance and as a result indirect negative impacts on material assets, e.g. residential, which may be at risk from flooding. The requirement for Appropriate Assessments for Natura 2000 sites is considered enforcement of existing legislation which is a Basic Measure.

**Abstractions**

As noted in the baseline, a small scale abstraction was recorded at Mallow racecourse in association with sprinklers which operate 2-3 days prior to a race meeting. Site specific measures include an investigation of the abstraction to determine if it is having no impact particularly at low flows. Such an investigation would result in positive impacts for biodiversity, flora and fauna and water by identification of any potential negative impacts from the abstraction and highlighting the appropriate mitigation measures that may be applied.

**Fords**

Vehicular and animal fords have been identified in the Munster Blackwater catchment. To address this pressure site specific measures include investigation of alternative access immediately or site mitigation measures implemented. Relocation of the access will result in positive impacts for FPM and biodiversity generally e.g. fish spawning areas, water and soil by controlling erosion, and silt and nutrient addition downstream of the crossing point, and relocating a direct impact (through crushing) to existing FPM populations. The relocation may result in negative impact to material assets as a result of changes in management practices necessary to reach alternative access points, increased time requirements to move livestock. It may also impact on other biodiversity and potentially cultural heritage if the alternative locations are not sited sensitively.

**Quarries**

One large commercial quarry and nineteen smaller quarries have been identified in the baseline studies in this catchment. Site specific measures to deal with this pressure include a review of licences for J.A. Wood Quarries at Lackanamona, Mallow is required. Any other existing quarries will also require a licence review. This measure will have positive impacts for biodiversity, flora and fauna, water and soil. Potential negative impacts are anticipated for material assets if future development of the quarries is constrained or if additional management or mitigation is required to develop or operate the site. Enforcement of existing legislation is a Basic Measure.

**Point Sources**

Site specific measures for this catchment include that all discharge licences or authorisations must comply with the EQOs set out of SI 296 of 2009; all WWTP, IPPC and Section 4 and 16 discharge licences must be reviewed to assess compliance with EQOs and additional conditions imposed as required. These measures will result in positive impacts for biodiversity, flora and fauna, water and soil by potentially reducing the level of nutrients entering the watercourse; however, negative impacts are expected for material assets associated with costs of alterations and / or upgrades and additional conditions being imposed. Negative impacts are also possible where relocation of discharge points is required in order to comply as this may result in indirect negative impacts on cultural heritage, landscape and biodiversity if not sited sensitively. Positive impacts will be gained for population / human health and material assets through these alterations, up-grades and restrictions by ensuring adequate waste water treatment is in place to protect water quality.

**Cumulative Impacts of the Measures in the Munster Blackwater Catchment**

A reduction in the silt loading to the watercourses in this catchment as a result of implementing the Action Programme measures under Agriculture, Forestry, Physical Modifications, Point Sources and Fords will result in direct positive impacts to FPM populations and habitats. In addition, a reduced silt load will have direct positive impacts on salmonid spawning and nursery areas, one of the reasons for this sites SAC designation, and reduce the impacts on other flora and fauna due to sedimentation.

Further, the implementation of said measures will have direct positive impacts on soils through the reduction of soil erosion, with again direct positive influences on water quality, which in turn would have indirect positive influences on human health. The cumulative impacts of implementing these measures would be positive.

A reduction in the nutrient loading to this catchment through the implementation of the Action Programme measures under Agriculture, Forestry and On-site wastewater treatment systems will have direct positive impacts on water quality, with indirect impacts on biodiversity, flora and fauna by reducing the potential for the eutrophication of these waters. This will also have an indirect positive influence on human health.

The potential for direct negative impacts to material assets through the implementation of the Action Programme measures may result from a reduction in agricultural productivity, restrictions to forestry activities, restrictions to quad bike activities, or through restrictions to land reclamation. There is also potential for indirect negative impacts on flood defence through restrictions to drainage maintenance.

### 8.6.18 The Bundorragha Catchment

The Draft Bundorragha Sub-Basin Management Plan identified the following key and secondary pressures either within the contributing catchment or within the vicinity of the FPM populations:

- Agriculture;
- On-site Wastewater Treatment Systems;
- Forestry;
- Point Sources;
- Quarries;
- Other issues – Peat Cutting;
- Other issues – Recreation; and
- Other issues – Weirs.

**Agriculture**

As noted in the baseline, increased levels of silt and nutrients into the watercourses is a significant pressure on FPM populations in this catchment. To address this, site specific measures for this catchment have been developed and include continued adherence with a de-stocking plan for the Bundorragha catchment; continued implementation of the commonage framework plans for this catchment' plan references (see sub-basin plan for references); detailed assessment of soil nutrient status; sediment and nutrient management plans; exclusion of sheep with improved fencing and buffer zones on a prioritisation basis beginning with those stretches containing FPM populations; and strict enforcement of Good Agricultural Practice Regulations 2009 and cross compliance.

Detailed assessment of soil nutrient status and sediment and nutrient management plans will have positive impacts on biodiversity, flora and fauna, water, and soils by highlighting those areas where nutrient levels are above recommended levels and allowing targeted mitigation measures to be applied on a case by case basis. Improvements in water quality will also result in indirect positive impacts for population / human health and such improvements will also impact positively on material assets such as tourism which are dependant on good water quality for fishing, leisure activities etc.

De-stocking will have positive impacts on biodiversity, flora and fauna, water and soils by reducing the level of erosion and nutrient addition to the watercourses, and allowing the environment to recover. Improvements in water quality will also result in indirect positive impacts for population / human health

and such improvements will also impact positively on material assets such as tourism which are dependant on good water quality for fishing, leisure activities etc.

Exclusion of sheep with improved fencing and buffer zones will have positive impacts for biodiversity, flora and fauna, water and soil in particular, however, negative impacts are expected for material assets through increased costs associated with fencing and maintenance and loss of agricultural land.

Effective and targeted implementation of the Good Agricultural Practice Regulations 2009, which are a Basic Measure, and cross compliance will address agricultural pressures, particularly where there is a focus on improved fencing, buffer zones and the provision of animal watering points on a prioritised basis. This will have overall positive impacts for FPM and biodiversity, flora and fauna generally as well as water quality and soils by reducing the amount of erosion along the river bank, together with reducing the amount of silt and nutrients entering the watercourse. Improved fencing and provision of buffer zones will have negative impacts for material assets as stated previously; however, given the close proximity to the watercourse it is unlikely to yield high agricultural outputs. The width of buffer strip will be dependant on the slope of lands adjacent to the rivers as well as the type of farming activity being carried out on specific farms. It will be necessary to undertake a field by field inspection in advance of determining site specific requirements for fencing and buffer zones.

**On-site Wastewater Treatment Systems**

Baseline studies in this catchment have identified point and diffuse sources of nutrient input to rivers from OSWWTS and have highlighted this as a pressure. Site specific measures to deal with this pressure include prioritisation of the inspection and investigation of on-site systems in high to extreme risk categories within the Bundorragha catchment; and a public awareness campaign.

As noted in the baseline, there are 23 on-site systems on extreme risk and 1 on very high risk potential settings in the Bundorragha catchment. Following investigation further mitigation may be required on a case by case basis however, if it is assumed that 50% (or 12) of these systems require desludging once during the first 6-year Action Programme cycle, this would result in an estimated **58 tonnes** (based on 4.5$m^3$ sludge per tank and a density of 1.07tonnes/$m^3$) requiring transport and disposal. It is assumed that the catchment is within a 100km round trip of a suitable landfill site for appropriate disposal. Disposal of sludge to landfill may require additional landfill space, with resultant impacts identified in the previous high level strategic assessment in **Section 8.5.3**.

The potential emission of $CO_2$ associated with leaving the sludges in place is estimated to be **0.02 ktonnes** per year. If this is multiplied across the 6-year cycle, an estimated **0.13 ktonnes** of $CO_2$ will be emitted by on-site wastewater treatment systems that may be posing a threat to the designated FPM area.

The amount of $CO_2$ emitted by disposal of sludge to landfill is a combination of the $CO_2$ released by the sludge after disposal to landfill and the $C0_2$ emitted during transport. Transport of **58 tonnes** of sludge to landfill is estimated to produce less than **0.00 ktonnes** of $CO_2$, while $CO_2$ emissions once in

the landfill are estimated to be **0.01 ktonnes** which rises to **0.08 ktonnes** if the tanks are desludged annually.

Comparing the estimated emissions of **0.13 ktonnes** of $CO_2$ if the sludges are left in place to the estimated **0.08 ktonnes** of $CO_2$ if they are removed and disposed of to landfill, it appears that in the context of contribution to climate change over a 6 year cycle of the Action Programme the removal of the sludges and disposal to landfill would be positive in the context of climate change.

Inspection and investigation of OSWWTS will require commitment from Local Authorities charged with carrying out this work, however, it is noted that there is likely to be significant overlap between investigations under the River Basin Management Plans leading to opportunities to streamline and coordinate prioritisation of this work under these two distinct but complementary pieces of legislation.

A public awareness campaign is expected to result in direct positive impacts through less physical disturbance and loss to FPM populations and indirectly to improved water quality through increased public awareness.

**Forestry**

Forestry management plans aimed at minimising hydrological, sediment, nutrient and other potential impacts from forests will have direct positive impacts on biodiversity, flora and fauna, water, and soils by minimising these and other potential impacts, and allowing targeted mitigation measures to be applied on a case by case basis. Improvements in water quality will also result in indirect positive impacts for population / human health and such improvements will also impact positively on material assets such as tourism which are dependant on good water quality for fishing, leisure activities etc. Minimising hydrological, sediment, nutrient and other potential impacts may require changes to forestry management practices where such controls are not already in place resulting in negative impacts in the short to medium term on material assets. However, as these practices become the norm, this impact will become neutral over the long term.

**Point Sources**

Site specific measures for this catchment include that all discharge licences or authorisations must comply with the EQOs set out of SI 296 of 2009; all WWTP, IPPC and Section 4 and 16 discharge licences must be reviewed to assess compliance with EQOs and additional conditions imposed as required. Following a joint inspection of the polishing filter and its surrounds by Mayo County Council and NPWS, the Discharge Licence at Delphi Mountain Resort shall, if judged necessary, be reviewed. Such a review shall include a detailed hydrogeological assessment to investigate if the effluent can discharge fully to ground and if there is sufficient thickness of unsaturated mineral soil beneath the polishing filter to adequately treat the effluent, for the life-time of the resort and spa.

These measures will result in positive impacts for biodiversity, flora and fauna, water and soil by potentially reducing the level of nutrients entering the watercourse; however, negative impacts are

expected for material assets associated with costs of alterations and / or upgrades and additional conditions being imposed. Negative impacts are also possible where relocation of discharge points is required in order to comply as this may result in indirect negative impacts on cultural heritage, landscape and biodiversity if not sited sensitively. Positive impacts will be gained for population / human health and material assets through these alterations, up-grades and restrictions by ensuring adequate waste water treatment is in place to protect water quality.

**Quarries**

Inspection by Mayo Co. Co. of the quarry located on the Glencullin Tributary is required and a license to be issued if appropriate. This measure will have positive impacts for biodiversity, flora and fauna, water and soil. Potential negative impacts are anticipated for material assets if future development of the quarry is constrained or if additional management or mitigation is required to develop or operate the site. Enforcement of existing legislation is a Basic Measure.

**Other issues - Peat Cutting**

The baseline has identified a number of peat extraction operations operating upstream of Glencullin Lough within the catchment, with the potential to impact on the FPM populations. Therefore, site specific measures for this catchment include no new peat cutting within the catchment without prior assessment and appropriate mitigation; assessment of the active peat extraction operations; and installation of appropriate mitigation measures (e.g. silt traps) to treat runoff from the identified peat operations.

Licensing and permitting of peat extraction operations and subsequent enforcement of existing legislation is considered a Basic Measure. Positive impacts are anticipated, however, this will impact negatively on material assets through potential restrictions on peat cutting and may also impact indirectly on cultural heritage if peat cutting has historically been undertaken in the area. Installation of silt traps and other mitigation measures will have positive impacts for biodiversity, flora and fauna, water and soil, however, maintenance of the systems will be important to prevent medium to long-term negative impacts on these receptors. Indirect positive impacts would also be expected for population / human health through improved water quality and on material assets e.g. tourism, angling, which rely on good water quality.

**Other Issues - Recreation**

The baseline has identified water sport in the Bundorragha River as potential damaging to FPM populations. Site specific measures to deal with this pressure include no wading in the Bundorragha River, with the exception of statutory monitoring and for the purposes of fish release; and a public awareness campaign in relation to no wading or kayaking. This will result in positive impacts for biodiversity, flora and fauna, water and soil by reducing the level of sediment and nutrients entering the watercourse, together with reduced disturbance of FPM populations. However, negative impacts

are expected for material assets as a result of changes in management practices necessary to control wading and kayaking.

**Other Issues - Weirs**

Baseline studies in this catchment have identified numerous stone weirs on the Bundorragha River as a potential pressure on FPM populations in the river. Site specific measures to address this pressure in this catchment include silt control measures in the catchment to reduce the risk associated with the weirs. This will result in positive impacts for biodiversity, flora and fauna, water and soil by reducing the level of sediment entering the watercourses.

**Cumulative Impacts of the Measures in the Bundorragha Catchment**

A reduction in the silt loading to the watercourses in this catchment as a result of implementing the Action Programme measures under Agriculture, Forestry, Weirs, and Peat Cutting will result in direct positive impacts to FPM populations and habitats. In addition, a reduced silt load will have direct positive impacts on salmonid spawning and nursery areas, one of the reasons for this sites SAC designation, and reduce the impacts on other flora and fauna due to sedimentation.

Further, the implementation of said measures will have direct positive impacts on soils through the reduction of soil erosion, with again direct positive influences on water quality, which in turn would have indirect positive influences on human health. The cumulative impacts of implementing these measures would be positive.

A reduction in the nutrient loading to this catchment through the implementation of the Action Programme measures under Agriculture, Forestry, Peat Cutting and On-site wastewater treatment systems will have direct positive impacts on water quality, with indirect impacts on biodiversity, flora and fauna by reducing the potential for the eutrophication of these waters. This will also have an indirect positive influence on human health.

The potential for direct negative impacts to material assets through the implementation of the Action Programme measures may result from a reduction in agricultural productivity, restrictions to forestry activities, restrictions to peat cutting activities, restrictions to quarry activities or through restrictions to land reclamation. There is also potential for indirect negative impacts on flood defence through restrictions to drainage maintenance.

### 8.6.19 The Dawros Catchment

The Draft Dawros Sub-Basin Management Plan identified the following key and secondary pressures either within the contributing catchment or within the vicinity of the FPM populations:

- Agriculture;
- On-site Wastewater Treatment Systems;
- Forestry;
- Point sources;
- Physical Modifications;
- Quarries;
- Other issues – Peat Cutting; and
- Other issues – Fisheries.

**Agriculture**

As noted in the baseline, increased levels of silt and nutrients into the watercourses is a significant pressure on FPM populations in this catchment. To address this, site specific measures for this catchment have been developed and include further investigation in to the extent of damaged commonage in the catchment; continued implementation of the commonage framework plans for this catchment (see sub-basin plan for reference); detailed assessment of soil nutrient status; sediment and nutrient management plans; exclusion of animals with improved fencing and buffer zones on a prioritisation basis beginning with those stretches containing FPM populations; encouragement of participation in agri-environmental schemes; and strict enforcement of Good Agricultural Practice Regulations 2009 and cross compliance.

Detailed assessment of soil nutrient status and sediment and nutrient management plans will have positive impacts on biodiversity, flora and fauna, water, and soils by highlighting those areas where nutrient levels are above recommended levels and allowing targeted mitigation measures to be applied on a case by case basis. Improvements in water quality will also result in indirect positive impacts for population / human health and such improvements will also impact positively on material assets such as tourism which are dependant on good water quality for fishing, leisure activities etc.

Exclusion of sheep and cattle with improved fencing and buffer zones will have positive impacts for biodiversity, flora and fauna, water and soil in particular, however, negative impacts are expected for material assets through increased costs associated with fencing and maintenance and loss of

agricultural land. Based on preliminary estimates of priority stretches, which are subject to change as information becomes available, and assuming cattle are excluded from a 1.5m wide riparian strip on both sides of the river, this would result in approximately 3.10ha of land lost for grazing by sheep and cattle.

Effective and targeted implementation of the commonage framework plans and the Good Agricultural Practice Regulations 2009, which are a Basic Measure, and cross compliance will address agricultural pressures, particularly where there is a focus on improved fencing, buffer zones and the provision of animal watering points on a prioritised basis. This will have overall positive impacts for FPM and biodiversity, flora and fauna generally as well as water quality and soils by reducing the amount of erosion along the river bank, together with reducing the amount of silt and nutrients entering the watercourse. Improved fencing and provision of buffer zones will have negative impacts for material assets as stated previously; however, given the close proximity to the watercourse it is unlikely to yield high agricultural outputs. The width of buffer strip will be dependant on the slope of lands adjacent to the rivers as well as the type of farming activity being carried out on specific farms. It will be necessary to undertake a field by field inspection in advance of determining site specific requirements for fencing and buffer zones.

**On-site Wastewater Treatment Systems**

Baseline studies in this catchment have identified point and diffuse sources of nutrient input to rivers from OSWWTS and have highlighted this as a pressure. Site specific measures to deal with this pressure include prioritisation of the inspection and investigation of on-site systems in high to extreme risk categories along the main channel of the Dawros; and a public awareness campaign.

As noted in the baseline, there are 33 on-site systems on extreme risk, 71 on very high risk and 1 on high risk potential settings in the Dawros catchment. Following investigation further mitigation may be required on a case by case basis however, if it is assumed that 50% (or 53) of these systems require desludging once during the first 6-year Action Programme cycle, this would result in an estimated **253 tonnes** (based on 4.5$m^3$ sludge per tank and a density of 1.07tonnes/$m^3$) requiring transport and disposal. It is assumed that the catchment is within a 100km round trip of a suitable landfill site for appropriate disposal. Disposal of sludge to landfill may require additional landfill space, with resultant impacts identified in the previous high level strategic assessment in **Section 8.5.3**.

The potential emission of $CO_2$ associated with leaving the sludges in place is estimated to be **0.10 ktonnes** per year. If this is multiplied across the 6-year cycle, an estimated **0.59 ktonnes** of $CO_2$ will be emitted by on-site wastewater treatment systems that may be posing a threat to the designated FPM area.

The amount of $CO_2$ emitted by disposal of sludge to landfill is a combination of the $CO_2$ released by the sludge after disposal to landfill and the $C0_2$ emitted during transport. Transport of **253 tonnes** of sludge to landfill is estimated to produce less than **0.00 ktonnes** of $CO_2$, while $CO_2$ emissions once in

the landfill are estimated to be **0.06 ktonnes** which rises to **0.37 ktonnes** if the tanks are desludged annually.

Comparing the estimated emissions of **0.59 ktonnes** of $CO_2$ if the sludges are left in place to the estimated **0.37 ktonnes** of $CO_2$ if they are removed and disposed of to landfill, it appears that in the context of contribution to climate change over a 6 year cycle of the Action Programme the removal of the sludges and disposal to landfill would be positive in the context of climate change.

Inspection and investigation of OSWWTS will require commitment from Local Authorities charged with carrying out this work, however, it is noted that there is likely to be significant overlap between investigations under the River Basin Management Plans leading to opportunities to streamline and coordinate prioritisation of this work under these two distinct but complementary pieces of legislation.

A public awareness campaign is expected to result in direct positive impacts through less physical disturbance and loss to FPM populations and indirectly to improved water quality through increased public awareness.

**Forestry**

Forestry management plans aimed at minimising hydrological, sediment, nutrient and other potential impacts from forests will have direct positive impacts on biodiversity, flora and fauna, water, and soils by minimising these and other potential impacts, and allowing targeted mitigation measures to be applied on a case by case basis. Improvements in water quality will also result in indirect positive impacts for population / human health and such improvements will also impact positively on material assets such as tourism which are dependant on good water quality for fishing, leisure activities etc. Minimising hydrological, sediment, nutrient and other potential impacts may require changes to forestry management practices where such controls are not already in place resulting in negative impacts in the short to medium term on material assets. However, as these practices become the norm, this impact will become neutral over the long term.

**Physical Modifications**

Site specific measures for this catchment include discussion with Galway County Council to take place in order to ensure that such road works are actually necessary and where required are carried out in an appropriate manner in order to minimise silt release; and if appropriate gravel and large fractions removed should be replaced in the tributary downstream of the bridge. This will result in positive impacts for biodiversity, flora and fauna, water and soil by reducing the level of sediment entering the watercourse; however, negative impacts are expected for material assets through increased costs associated with the road works.

**Point Sources**

Site specific measures for this catchment include that all discharge licences or authorisations must comply with the EQOs set out of SI 296 of 2009; all WWTP, IPPC and Section 4 and 16 discharge licences must be reviewed to assess compliance with EQOs and additional conditions imposed as required. These measures will result in positive impacts for biodiversity, flora and fauna, water and soil by potentially reducing the level of nutrients entering the watercourse; however, negative impacts are expected for material assets associated with costs of alterations and / or upgrades and additional conditions being imposed. Negative impacts are also possible where relocation of discharge points is required in order to comply as this may result in indirect negative impacts on cultural heritage, landscape and biodiversity if not sited sensitively. Positive impacts will be gained for population / human health and material assets through these alterations, up-grades and restrictions by ensuring adequate waste water treatment is in place to protect water quality.

**Other issues - Peat Cutting**

The baseline has identified commercial peat extraction on the banks of the Bunnaboghec Lough and along the banks of the Dawros River which contain FPM habitat. Therefore, site specific measures for this catchment include assessment of the peat extraction operations for licensing and permitting requirements; and installation of appropriate mitigation measures if required.

Licensing and permitting of peat extraction operations and subsequent enforcement of existing legislation is considered a Basic Measure. Positive impacts are anticipated including to climate through a reduction in peat cutting and therefore a reduction in the burning of peat. However, this will impact negatively on material assets through potential restrictions on peat cutting and may also impact indirectly on cultural heritage if peat cutting has historically been undertaken in the area. Installation of mitigation measures to reduce silt loading will have positive impacts for biodiversity, flora and fauna, water and soil, however, maintenance of the systems will be important to prevent medium to long-term negative impacts on these receptors. Indirect positive impacts would also be expected for population / human health through improved water quality and on material assets e.g. tourism, angling, which rely on good water quality.

**Quarries**

The baseline has identified Guys Quarry site as allowing high levels of silt run-off to enter the main channel of the Dawros River. Site specific measures to deal with this pressure include an inspection of their quarry – Guys Quarry; and remediation of the impacts associated with the quarry. These measures will have positive impacts for biodiversity, flora and fauna, water and soil. Potential negative impacts are anticipated for material assets if future development of the quarry is constrained or if additional management or mitigation is required to develop or operate the site. Enforcement of existing legislation is a Basic Measure.

**Other Issues - Fisheries**

The baseline has identified bank side fishing, associated with Kylemore fishery, as a source of silt and nutrients to the river channel as a result of crumbling river banks. To address this pressure the site specific measures have identified that local NPWS staff should liaise with Kylemore Fishery and to survey the extent of the damage and remediation required along the Dawros River bank. Such measures would result in positive impacts for biodiversity, flora and fauna, water and soil by controlling/preventing erosion, and silt and nutrient addition downstream of the fishery works.

**Cumulative Impacts of the Measures in the Dawros Catchment**

A reduction in the silt loading to the watercourses in this catchment as a result of implementing the Action Programme measures under Agriculture, Forestry, Physical Modifications, Peat Cutting, Quarries and Fisheries will result in direct positive impacts to FPM populations and habitats. In addition, a reduced silt load will have direct positive impacts on salmonid spawning and nursery areas, one of the reasons for this sites SAC designation, and reduce the impacts on other flora and fauna due to sedimentation.

Further, the implementation of said measures will have direct positive impacts on soils through the reduction of soil erosion, with again direct positive influences on water quality, which in turn would have indirect positive influences on human health. The cumulative impacts of implementing these measures would be positive.

A reduction in the nutrient loading to this catchment through the implementation of the Action Programme measures under Agriculture, Forestry, Peat cutting and On-site wastewater treatment systems will have direct positive impacts on water quality, with indirect impacts on biodiversity, flora and fauna by reducing the potential for the eutrophication of these waters. This will also have an indirect positive influence on human health.

The potential for direct negative impacts to material assets through the implementation of the Action Programme measures may result from a reduction in agricultural productivity, restrictions to forestry activities, restrictions to wind farm activities, or through restrictions to land reclamation. There is also potential for indirect negative impacts on flood defence through restrictions to drainage maintenance.

### 8.6.20 The Newport Catchment

The Draft Newport Sub-Basin Management Plan identified the following key and secondary pressures either within the contributing catchment or within the vicinity of the FPM populations:

- Agriculture;
- On-site Wastewater Treatment Systems;
- Forestry;
- Abstractions;
- Quarries;
- Point Source; and
- Other issues – Peat Cutting.

**Agriculture**

As noted in the baseline, increased levels of silt and nutrients into the watercourses is a significant pressure on FPM populations in this catchment. To address this, site specific measures for this catchment have been developed and include further investigation in to the extent of potential overgrazing is required; repeat monitoring of the commonage and investigation of the non-commonage land should be carried out; detailed assessment of soil nutrient status; sediment and nutrient management plans; exclusion of animals with improved fencing and buffer zones on a prioritisation basis beginning with those stretches containing FPM populations; and strict enforcement of Good Agricultural Practice Regulations 2009 and cross compliance.

Detailed assessment of soil nutrient status and sediment and nutrient management plans will have positive impacts on biodiversity, flora and fauna, water, and soils by highlighting those areas where nutrient levels are above recommended levels and allowing targeted mitigation measures to be applied on a case by case basis. Improvements in water quality will also result in indirect positive impacts for population / human health and such improvements will also impact positively on material assets such as tourism which are dependant on good water quality for fishing, leisure activities etc.

Exclusion of cattle with improved fencing and buffer zones will have positive impacts for biodiversity, flora and fauna, water and soil in particular, however, negative impacts are expected for material assets through increased costs associated with fencing and maintenance and loss of agricultural land.

Effective and targeted implementation of the commonage framework plans and the Good Agricultural Practice Regulations 2009, which are a Basic Measure, and cross compliance will address agricultural

pressures, particularly where there is a focus on improved fencing, buffer zones and the provision of animal watering points on a prioritised basis. This will have overall positive impacts for FPM and biodiversity, flora and fauna generally as well as water quality and soils by reducing the amount of erosion along the river bank, together with reducing the amount of silt and nutrients entering the watercourse. Improved fencing and provision of buffer zones will have negative impacts for material assets as stated previously; however, given the close proximity to the watercourse it is unlikely to yield high agricultural outputs. The width of buffer strip will be dependant on the slope of lands adjacent to the rivers as well as the type of farming activity being carried out on specific farms. It will be necessary to undertake a field by field inspection in advance of determining site specific requirements for fencing and buffer zones.

**On-site Wastewater Treatment Systems**

Baseline studies in this catchment have identified point and diffuse sources of nutrient input to rivers from OSWWTS and have highlighted this as a pressure. Site specific measures to deal with this pressure include the inspection of all systems should be prioritised along the stretch of the Newport River which contains the FPM populations.

As noted in the baseline, there are 364 on-site systems on extreme risk, 36 on very high risk and 10 on high risk potential settings in the Newport catchment. Following investigation further mitigation may be required on a case by case basis however, if it is assumed that 50% (or 205) of these systems require desludging once during the first 6-year Action Programme cycle, this would result in an estimated **987 tonnes** (based on 4.5$m^3$ sludge per tank and a density of 1.07tonnes/$m^3$) requiring transport and disposal. It is assumed that the catchment is within a 100km round trip of a suitable landfill site for appropriate disposal. Disposal of sludge to landfill may require additional landfill space, with resultant impacts identified in the previous high level strategic assessment in **Section 8.5.3**.

The potential emission of $CO_2$ associated with leaving the sludges in place is estimated to be **0.38 ktonnes** per year. If this is multiplied across the 6-year cycle, an estimated **2.29 ktonnes** of $CO_2$ will be emitted by on-site wastewater treatment systems that may be posing a threat to the designated FPM area.

The amount of $CO_2$ emitted by disposal of sludge to landfill is a combination of the $CO_2$ released by the sludge after disposal to landfill and the $C0_2$ emitted during transport. Transport of **987 tonnes** of sludge to landfill is estimated to produce less than **0.01 ktonnes** of $CO_2$, while $CO_2$ emissions once in the landfill are estimated to be **0.24 ktonnes** which rises to **1.43 ktonnes** if the tanks are desludged annually.

Comparing the estimated emissions of **2.29 ktonnes** of $CO_2$ if the sludges are left in place to the estimated **1.43 ktonnes** of $CO_2$ if they are removed and disposed of to landfill, it appears that in the context of contribution to climate change over a 6 year cycle of the Action Programme the removal of the sludges and disposal to landfill would be positive in the context of climate change.

Inspection and investigation of OSWWTS will require commitment from Local Authorities charged with carrying out this work, however, it is noted that there is likely to be significant overlap between investigations under the River Basin Management Plans leading to opportunities to streamline and coordinate prioritisation of this work under these two distinct but complementary pieces of legislation.

A public awareness campaign is expected to result in direct positive impacts through less physical disturbance and loss to FPM populations and indirectly to improved water quality through increased public awareness.

**Forestry**

Forestry management plans aimed at minimising hydrological, sediment, nutrient and other potential impacts from forests will have direct positive impacts on biodiversity, flora and fauna, water, and soils by minimising these and other potential impacts, and allowing targeted mitigation measures to be applied on a case by case basis. Improvements in water quality will also result in indirect positive impacts for population / human health and such improvements will also impact positively on material assets such as tourism which are dependant on good water quality for fishing, leisure activities etc. Minimising hydrological, sediment, nutrient and other potential impacts may require changes to forestry management practices where such controls are not already in place resulting in negative impacts in the short to medium term on material assets. However, as these practices become the norm, this impact will become neutral over the long term.

**Abstractions**

As noted in the baseline, the Local Authority abstract water for a group scheme along the Skerdagh River. NPWS have requested that this abstraction would be augmented by another source, which would relieve this pressure. This has been agreed by the Local Authority and will be up and running by the end of the year. Such a measure would result in positive impacts for biodiversity, flora and fauna and water by removing this abstraction.

**Quarries**

Site specific measures include a review of licence for Matt Forrestal & Sons Ltd quarry. This measure will have positive impacts for biodiversity, flora and fauna, water and soil. Potential negative impacts are anticipated for material assets if future development of the quarry is constrained or if additional management or mitigation is required to develop or operate the site. Enforcement of existing legislation is a Basic Measure.

**Other Issues – Peat Cutting**

The baseline has identified areas of peat cutting adjacent to the watercourses with the potential to impact on the FPM populations. Therefore, site specific measures for this catchment include

assessment of the peat extraction operations for licensing and permitting requirements; and installation of appropriately sized silt traps to treat runoff from the identified peat operations.

Licensing and permitting of peat extraction operations and subsequent enforcement of existing legislation is considered a Basic Measure. Positive impacts are anticipated including to climate through a reduction in peat cutting and therefore a reduction in the burning of peat. However, this will impact negatively on material assets through potential restrictions on peat cutting and may also impact indirectly on cultural heritage if peat cutting has historically been undertaken in the area. Installation of silt traps will have positive impacts for biodiversity, flora and fauna, water and soil, however, maintenance of the systems will be important to prevent medium to long-term negative impacts on these receptors. Indirect positive impacts would also be expected for population / human health through improved water quality and on material assets e.g. tourism, angling, which rely on good water quality.

**Point Source**

The baseline has identified the Derrinumera Recycling Amenity Centre as a potential point source to the Glaishwy River which has historically had low macroinvertebrate Q scores. Site specific measures for this catchment include that all discharge licences or authorisations must comply with the EQOs set out of SI 296 of 2009; all WWTP, IPPC and Section 4 and 16 discharge licences must be reviewed to assess compliance with EQOs and additional conditions imposed as required. These measures will result in positive impacts for biodiversity, flora and fauna, water and soil by potentially reducing the level of nutrients entering the watercourse; however, negative impacts are expected for material assets through alterations and up-grades to WWTP, and additional conditions being imposed.

**Cumulative Impacts of the Measures in the Newport Catchment**

A reduction in the silt loading to the watercourses in this catchment as a result of implementing the Action Programme measures under Agriculture, Forestry and Peat Cutting will result in direct positive impacts to FPM populations and habitats. In addition, a reduced silt load will have direct positive impacts on salmonid spawning and nursery areas, one of the reasons for this sites SAC designation, and reduce the impacts on other flora and fauna due to sedimentation.

Further, the implementation of said measures will have direct positive impacts on soils through the reduction of soil erosion, with again direct positive influences on water quality, which in turn would have indirect positive influences on human health. The cumulative impacts of implementing these measures would be positive.

A reduction in the nutrient loading to this catchment through the implementation of the Action Programme measures under Agriculture, Forestry, Point Sources and On-site wastewater treatment systems will have direct positive impacts on water quality, with indirect impacts on biodiversity, flora and fauna by reducing the potential for the eutrophication of these waters. This will also have an indirect positive influence on human health.

The potential for direct negative impacts to material assets through the implementation of the Action Programme measures may result from a reduction in agricultural productivity, restrictions to forestry activities, restrictions to peat cutting activities or through restrictions to the Derrinumera Recycling Amenity Centre. There is also potential for indirect negative impacts on flood defence through restrictions to drainage maintenance.

### 8.6.21 The Owenriff Catchment

The Draft Owenriff Sub-Basin Management Plan identified the following key and secondary pressures either within the contributing catchment or within the vicinity of the FPM populations:

- Agriculture;
- On-site Wastewater Treatment Systems;
- Forestry;
- Physical Modifications;
- Point Sources;
- Other issues – Peat Cutting; and
- Other issues – Fords.

**Agriculture**

As noted in the baseline, increased levels of silt and nutrients into the watercourses is a significant pressure on FPM populations in this catchment. To address this, site specific measures for this catchment have been developed and include further investigation in to the extent of damaged commonage in the catchment is required; continued implementation of the commonage framework plans for this catchment, plan reference (see sub-basin plan for references); detailed assessment of soil nutrient status; sediment and nutrient management plans; exclusion of animals with improved fencing and buffer zones on a prioritisation basis beginning with those stretches containing FPM populations; and strict enforcement of Good Agricultural Practice Regulations 2009 and cross compliance.

Detailed assessment of soil nutrient status and sediment and nutrient management plans will have positive impacts on biodiversity, flora and fauna, water, and soils by highlighting those areas where nutrient levels are above recommended levels and allowing targeted mitigation measures to be applied on a case by case basis. Improvements in water quality will also result in indirect positive impacts for population / human health and such improvements will also impact positively on material assets such as tourism which are dependant on good water quality for fishing, leisure activities etc.

Exclusion of animals with improved fencing and buffer zones will have positive impacts for biodiversity, flora and fauna, water and soil in particular, however, negative impacts are expected for material assets through increased costs associated with fencing and maintenance and loss of agricultural land.

Effective and targeted implementation of the Commonage Framework Plans and the Good Agricultural Practice Regulations 2009, which are a Basic Measure, and cross compliance, will address agricultural pressures, particularly where there is a focus on improved fencing, buffer zones and the provision of animal watering points on a prioritised basis. This will have overall positive impacts for FPM and biodiversity, flora and fauna generally as well as water quality and soils by reducing the amount of erosion along the river bank, together with reducing the amount of silt and nutrients entering the watercourse. Improved fencing and provision of buffer zones will have negative impacts for material assets as stated previously; however, given the close proximity to the watercourse it is unlikely to yield high agricultural outputs. The width of buffer strip will be dependant on the slope of lands adjacent to the rivers as well as the type of farming activity being carried out on specific farms. It will be necessary to undertake a field by field inspection in advance of determining site specific requirements for fencing and buffer zones.

**On-site Wastewater Treatment Systems**

Baseline studies in this catchment have identified point and diffuse sources of nutrient input to rivers from OSWWTS and have highlighted this as a pressure. Site specific measures to deal with this pressure include prioritisation of the inspection and investigation of on-site systems in high to extreme risk categories within the Allow catchment; and a public awareness campaign.

As noted in the baseline, there are 124 on-site systems on extreme risk, 91 on very high risk and 40 on high risk potential settings in the Owenriff catchment. Following investigation further mitigation may be required on a case by case basis however, if it is assumed that 50% (or 128) of these systems require desludging once during the first 6-year Action Programme cycle, this would result in an estimated **614 tonnes** (based on 4.5$m^3$ sludge per tank and a density of 1.07tonnes/$m^3$) requiring transport and disposal. It is assumed that the catchment is within a 100km round trip of a suitable landfill site for appropriate disposal. Disposal of sludge to landfill may require additional landfill space, with resultant impacts identified in the previous high level strategic assessment in **Section 8.5.3**.

The potential emission of $CO_2$ associated with leaving the sludges in place is estimated to be **0.24 ktonnes** per year. If this is multiplied across the 6-year cycle, an estimated **1.42 ktonnes** of $CO_2$ will be emitted by on-site wastewater treatment systems that may be posing a threat to the designated FPM area.

The amount of $CO_2$ emitted by disposal of sludge to landfill is a combination of the $CO_2$ released by the sludge after disposal to landfill and the $C0_2$ emitted during transport. Transport of **614 tonnes** of sludge to landfill is estimated to produce less than **0.00 ktonnes** of $CO_2$, while $CO_2$ emissions once in the landfill are estimated to be **0.15 ktonnes** which rises to **0.89 ktonnes** if the tanks are desludged annually.

Comparing the estimated emissions of **1.42 ktonnes** of $CO_2$ if the sludges are left in place to the estimated **0.89 ktonnes** of $CO_2$ if they are removed and disposed of to landfill, it appears that in the

context of contribution to climate change over a 6 year cycle of the Action Programme the removal of the sludges and disposal to landfill would be positive in the context of climate change.

Inspection and investigation of OSWWTS will require commitment from Local Authorities charged with carrying out this work, however, it is noted that there is likely to be significant overlap between investigations under the River Basin Management Plans leading to opportunities to streamline and coordinate prioritisation of this work under these two distinct but complementary pieces of legislation.

A public awareness campaign is expected to result in direct positive impacts through less physical disturbance and loss to FPM populations and indirectly to improved water quality through increased public awareness.

**Forestry**

Forestry management plans aimed at minimising hydrological, sediment, nutrient and other potential impacts from forests will have direct positive impacts on biodiversity, flora and fauna, water, and soils by minimising these and other potential impacts, and allowing targeted mitigation measures to be applied on a case by case basis. Improvements in water quality will also result in indirect positive impacts for population / human health and such improvements will also impact positively on material assets such as tourism which are dependant on good water quality for fishing, leisure activities etc. Minimising hydrological, sediment, nutrient and other potential impacts may require changes to forestry management practices where such controls are not already in place resulting in negative impacts in the short to medium term on material assets. However, as these practices become the norm, this impact will become neutral over the long term.

**Physical Modifications**

Site specific measures for this catchment include an investigation of all outfalls entering the Owenriff as an immediate priority; all outfalls to be connected to the WWTP in Oughterard once upgraded; and existing and future drainage maintenance & flood mitigation works require an Appropriate Assessment for Natura 2000 Sites under the Habitats Directive. The investigations of all outfalls and connection to the WWTP in Oughterard should have positive outcomes for biodiversity, flora and fauna, and water in particular. As there will be no further reclamation or drainage works without the appropriate assessment, positive outcomes are anticipated for biodiversity, flora and fauna, water and soil in particular. However there may be indirect negative impacts on material assets in relation to land drainage if this constrains drainage and therefore the type of land use activities suitable in the area There is also potential for indirect negative impacts on flood defence through restrictions to drainage maintenance and as a result indirect negative impacts on material assets, e.g. residential, which may be at risk from flooding. The requirement for Appropriate Assessments for Natura 2000 sites is considered enforcement of existing legislation which is a Basic Measure.

**Point Sources**

Site specific measures for this catchment include that all discharge licences or authorisations must comply with the EQOs set out of SI 296 of 2009; all WWTP, IPPC and Section 4 and 16 discharge licences must be reviewed to assess compliance with EQOs and additional conditions imposed as required. These measures will result in positive impacts for biodiversity, flora and fauna, water and soil by potentially reducing the level of nutrients entering the watercourse; however, negative impacts are expected for material assets associated with costs of alterations and / or upgrades and additional conditions being imposed. Negative impacts are also possible where relocation of discharge points is required in order to comply as this may result in indirect negative impacts on cultural heritage, landscape and biodiversity if not sited sensitively. Positive impacts will be gained for population / human health and material assets through these alterations, up-grades and restrictions by ensuring adequate waste water treatment is in place to protect water quality.

**Other Issues - Peat Cutting**

The baseline has identified a large commercial peat extraction operation operating within the Owenriff catchment with the potential to impact on the FPM populations. Therefore, site specific measures for this catchment include assessment of the peat extraction operations; installation of appropriately sized silt traps to treat runoff from the identified peat operations; and all new peat cutting operations will require an Appropriate Assessment for Natura 2000 Sites.

Licensing and permitting of peat extraction operations and subsequent enforcement of existing legislation is considered a Basic Measure. Positive impacts are anticipated, however, this will impact negatively on material assets through potential restrictions on peat cutting and may also impact indirectly on cultural heritage if peat cutting has historically been undertaken in the area. Installation of silt traps will have positive impacts for biodiversity, flora and fauna, water and soil, however, maintenance of the systems will be important to prevent medium to long-term negative impacts on these receptors. Indirect positive impacts would also be expected for population / human health through improved water quality and on material assets e.g. tourism, angling, which rely on good water quality.

**Other Issues - Fords**

Significant vehicular and animal fords have been identified in the Owenriff catchment. To address this pressure site specific measures include investigation of alternative access immediately or site mitigation measures implemented. Relocation of the access will result in positive impacts for FPM and biodiversity generally e.g. fish spawning areas, water and soil by controlling erosion, and silt and nutrient addition downstream of the crossing point, and relocating a direct impact (through crushing) to existing FPM populations. The relocation may result in negative impact to material assets as a result of changes in management practices necessary to reach alternative access points, increased time

requirements to move livestock. It may also impact on other biodiversity and potentially cultural heritage if the alternative locations are not sited sensitively.

**Cumulative Impacts of the Measures in the Owenriff Catchment**

A reduction in the silt loading to the watercourses in this catchment as a result of implementing the Action Programme measures under Agriculture, Forestry, Physical Modifications, Peat Cutting and Fords will result in direct positive impacts to FPM populations and habitats. In addition, a reduced silt load will have direct positive impacts on salmonid spawning and nursery areas, one of the reasons for this sites SAC designation, and reduce the impacts on other flora and fauna due to sedimentation.

Further, the implementation of said measures will have direct positive impacts on soils through the reduction of soil erosion, with again direct positive influences on water quality, which in turn would have indirect positive influences on human health. The cumulative impacts of implementing these measures would be positive.

A reduction in the nutrient loading to this catchment through the implementation of the Action Programme measures under Agriculture, Forestry, Peat Cutting, Physical Modifications and On-site wastewater treatment systems will have direct positive impacts on water quality, with indirect impacts on biodiversity, flora and fauna by reducing the potential for the eutrophication of these waters. This will also have an indirect positive influence on human health.

The potential for direct negative impacts to material assets through the implementation of the Action Programme measures may result from a reduction in agricultural productivity, restrictions to forestry activities, restrictions to peat cutting activities or through restrictions to land reclamation. There is also potential for indirect negative impacts on flood defence through restrictions to drainage maintenance.

### 8.6.22 The Clady Catchment

The Draft Clady Sub-Basin Management Plan identified the following key and secondary pressures either within the contributing catchment or within the vicinity of the FPM populations:

- Agriculture;
- On-site Wastewater Treatment Systems;
- Forestry;
- Physical Modifications;
- Quarries;
- Point Sources; and
- Other issues – Peat Cutting.

**Agriculture**

As noted in the baseline, increased levels of silt and nutrients into the watercourses is a significant pressure on FPM populations in this catchment. To address this, site specific measures for this catchment have been developed and include detailed assessment of soil nutrient status; sediment and nutrient management plans; exclusion of sheep downstream, beginning with those prioritised stretches which are below the hydroelectric scheme; encouragement of participation in agri-environmental schemes; and strict enforcement of Good Agricultural Practice Regulations 2009 and cross compliance.

Detailed assessment of soil nutrient status and sediment and nutrient management plans will have positive impacts on biodiversity, flora and fauna, water, and soils by highlighting those areas where nutrient levels are above recommended levels and allowing targeted mitigation measures to be applied on a case by case basis. Improvements in water quality will also result in indirect positive impacts for population / human health and such improvements will also impact positively on material assets such as tourism which are dependant on good water quality for fishing, leisure activities etc.

Exclusion of sheep downstream, beginning with those prioritised stretches which are below the hydroelectric scheme, will have positive impacts for biodiversity, flora and fauna, water and soil in particular, however, negative impacts are expected for material assets through increased costs associated with fencing and maintenance and loss of agricultural land. Based on preliminary estimates of priority stretches, which are subject to change as information becomes available, and assuming cattle are excluded from a 1.5m wide riparian strip on both sides of the river, this would result in approximately 1.39ha of land lost for grazing by cattle.

Effective and targeted implementation of the Good Agricultural Practice Regulations 2009, which are a Basic Measure, and cross compliance will address agricultural pressures, particularly where there is a focus on improved fencing, buffer zones and the provision of animal watering points on a prioritised basis. This will have overall positive impacts for FPM and biodiversity, flora and fauna generally as well as water quality and soils by reducing the amount of erosion along the river bank, together with reducing the amount of silt and nutrients entering the watercourse. Improved fencing and provision of buffer zones will have negative impacts for material assets as stated previously; however, given the close proximity to the watercourse it is unlikely to yield high agricultural outputs. The width of buffer strip will be dependant on the slope of lands adjacent to the rivers as well as the type of farming activity being carried out on specific farms. It will be necessary to undertake a field by field inspection in advance of determining site specific requirements for fencing and buffer zones.

**On-site Wastewater Treatment Systems**

Baseline studies in this catchment have identified point and diffuse sources of nutrient input to rivers from OSWWTS and have highlighted this as a pressure. Site specific measures to deal with this pressure include prioritisation of the inspection and investigation of on-site systems in high to extreme risk categories along the stretch of the Clady below the hydroelectric scheme where the FPM are located followed by those in the Moneybeg area; and a public awareness campaign.

As noted in the baseline, there are 335 on-site systems on extreme risk and 52 on very high risk potential settings in the Clady catchment. Following investigation further mitigation may be required on a case by case basis however, if it is assumed that 50% (or 194) of these systems require desludging once during the first 6-year Action Programme cycle, this would result in an estimated **932 tonnes** (based on 4.5$m^3$ sludge per tank and a density of 1.07tonnes/$m^3$) requiring transport and disposal. It is assumed that the catchment is within a 100km round trip of a suitable landfill site for appropriate disposal. Disposal of sludge to landfill may require additional landfill space, with resultant impacts identified in the previous high level strategic assessment in **Section 8.5.3**.

The potential emission of $CO_2$ associated with leaving the sludges in place is estimated to be **0.36 ktonnes** per year. If this is multiplied across the 6-year cycle, an estimated **2.16 ktonnes** of $CO_2$ will be emitted by on-site wastewater treatment systems that may be posing a threat to the designated FPM area.

The amount of $CO_2$ emitted by disposal of sludge to landfill is a combination of the $CO_2$ released by the sludge after disposal to landfill and the $C0_2$ emitted during transport. Transport of **932 tonnes** of sludge to landfill is estimated to produce less than **0.01 ktonnes** of $CO_2$, while $CO_2$ emissions once in the landfill are estimated to be **0.23 ktonnes** which rises to **1.35 ktonnes** if the tanks are desludged annually.

Comparing the estimated emissions of **2.16 ktonnes** of $CO_2$ if the sludges are left in place to the estimated **1.35 ktonnes** of $CO_2$ if they are removed and disposed of to landfill, it appears that in the

context of contribution to climate change over a 6 year cycle of the Action Programme the removal of the sludges and disposal to landfill would be positive in the context of climate change.

Inspection and investigation of OSWWTS will require commitment from Local Authorities charged with carrying out this work, however, it is noted that there is likely to be significant overlap between investigations under the River Basin Management Plans leading to opportunities to streamline and coordinate prioritisation of this work under these two distinct but complementary pieces of legislation.

A public awareness campaign is expected to result in direct positive impacts through less physical disturbance and loss to FPM populations and indirectly to improved water quality through increased public awareness.

**Forestry**

Forestry management plans aimed at minimising hydrological, sediment, nutrient and other potential impacts from forests will have direct positive impacts on biodiversity, flora and fauna, water, and soils by minimising these and other potential impacts, and allowing targeted mitigation measures to be applied on a case by case basis. Improvements in water quality will also result in indirect positive impacts for population / human health and such improvements will also impact positively on material assets such as tourism which are dependant on good water quality for fishing, leisure activities etc. Minimising hydrological, sediment, nutrient and other potential impacts may require changes to forestry management practices where such controls are not already in place resulting in negative impacts in the short to medium term on material assets. However, as these practices become the norm, this impact will become neutral over the long term.

**Physical Modifications**

Site specific measures for this catchment include a review of the potential impact from the hydroelectric station needs to be carried out. The low compensatory flow together with the assimilative capacity should be addressed at source. In addition, water quality information is needed from downstream of the modification to assess the impact. Consistencies in relation to flows together with appropriate measures to ensure conditions for fish are adequate. Further, a review of the waste water discharge licence from the hydroelectric station is also required.

A Freshwater Morphology Web Based tool has been developed which is driven by a Morphology Database. This tool supports decision making in authorisation systems by assessing pressure extent and risk to water body status. Damage to mussel populations, in combination with other impacts both during construction and operation will be considered in the assessment. Currently this web based tool is held and operated by the EPA. If an authorisation process is rolled out Local Authorities should be given access to this tool. Therefore structure within rivers may be subject to controls in future.

With such measures put in place, positive outcomes are anticipated for biodiversity, flora and fauna, water and soil in particular. However there may be indirect negative impacts on material assets in

relation to output from the hydroelectric scheme. A requirement for Appropriate Assessments for Natura 2000 sites is considered enforcement of existing legislation which is a Basic Measure.

**Quarries**

Similar to peat extraction operations, three large quarries have been identified in the baseline studies in this catchment directly upstream of the FPM populations. Site specific measures to deal with this pressure include an awareness campaign by the Donegal County Council to inform quarry owners of the FPM requirements. Two of the three quarries located in the Clady catchment are not licensed and will therefore require licensing. The third, which is licensed will require a review. These measures will have positive impacts for biodiversity, flora and fauna, water and soil. Potential negative impacts are anticipated for material assets if future development of the quarries is constrained or if additional management or mitigation is required to develop or operate the site. Enforcement of existing legislation is a Basic Measure.

**Point Sources**

Site specific measures for this catchment include that all discharge licences or authorisations must comply with the EQOs set out of SI 296 of 2009; all WWTP, IPPC and Section 4 and 16 discharge licences must be reviewed to assess compliance with EQOs and additional conditions imposed as required. These measures will result in positive impacts for biodiversity, flora and fauna, water and soil by potentially reducing the level of nutrients entering the watercourse; however, negative impacts are expected for material assets associated with costs of alterations and / or upgrades and additional conditions being imposed. Negative impacts are also possible where relocation of discharge points is required in order to comply as this may result in indirect negative impacts on cultural heritage, landscape and biodiversity if not sited sensitively. Positive impacts will be gained for population / human health and material assets through these alterations, up-grades and restrictions by ensuring adequate waste water treatment is in place to protect water quality.

**Other Issues - Peat Cutting**

The baseline has identified a large expanse of commercial peat extraction operations operating in the upper reaches of the catchment with the potential to impact on the FPM populations. Therefore, site specific measures for this catchment include assessment of the peat extraction operations for licensing and permitting requirements; and installation of appropriately sized silt traps to treat runoff from the identified peat operations.

Licensing and permitting of peat extraction operations and subsequent enforcement of existing legislation is considered a Basic Measure. Positive impacts are anticipated including to climate through a reduction in peat cutting and therefore a reduction in the burning of peat. However, this will impact negatively on material assets through potential restrictions on peat cutting and may also impact indirectly on cultural heritage if peat cutting has historically been undertaken in the area. Installation of silt traps will have positive impacts for biodiversity, flora and fauna, water and soil, however,

maintenance of the systems will be important to prevent medium to long-term negative impacts on these receptors. Indirect positive impacts would also be expected for population / human health through improved water quality and on material assets e.g. tourism, angling, which rely on good water quality.

**Cumulative Impacts of the Measures in the Clady Catchment**

A reduction in the silt loading to the watercourses in this catchment as a result of implementing the Action Programme measures under Agriculture, Forestry, Physical Modifications and Peat Cutting will result in direct positive impacts to FPM populations and habitats. In addition, a reduced silt load will have direct positive impacts on salmonid spawning and nursery areas, one of the reasons for this sites SAC designation, and reduce the impacts on other flora and fauna due to sedimentation.

Further, the implementation of said measures will have direct positive impacts on soils through the reduction of soil erosion, with again direct positive influences on water quality, which in turn would have indirect positive influences on human health. The cumulative impacts of implementing these measures would be positive.

A reduction in the nutrient loading to this catchment through the implementation of the Action Programme measures under Agriculture, Forestry, Peat Cutting and On-site wastewater treatment systems will have direct positive impacts on water quality, with indirect impacts on biodiversity, flora and fauna by reducing the potential for the eutrophication of these waters. This will also have an indirect positive influence on human health.

The potential for direct negative impacts to material assets through the implementation of the Action Programme measures may result from a reduction in agricultural productivity, restrictions to forestry activities, restrictions to peat cutting activities, or through restrictions to quarry activities. There is also potential for indirect negative impacts on flood defence through restrictions to drainage maintenance.

### 8.6.23 The Eske Catchment

The Draft Eske Sub-Basin Management Plan identified the following key and secondary pressures either within the contributing catchment or within the vicinity of the FPM populations:

- Agriculture;
- On-site Wastewater Treatment Systems;
- Forestry;
- Abstractions;
- Physical Modifications; and
- Point Sources.

**Agriculture**

As noted in the baseline, increased levels of silt and nutrients into the watercourses is a significant pressure on FPM populations in this catchment. To address this, site specific measures for this catchment have been developed and include detailed assessment of soil nutrient status; sediment and nutrient management plans; exclusion of sheep with improved fencing and buffer zones on a prioritisation basis beginning with those stretches containing FPM populations; encouragement of participation in agri-environmental schemes; and strict enforcement of Good Agricultural Practice Regulations 2009 and cross compliance.

Detailed assessment of soil nutrient status and sediment and nutrient management plans will have positive impacts on biodiversity, flora and fauna, water, and soils by highlighting those areas where nutrient levels are above recommended levels and allowing targeted mitigation measures to be applied on a case by case basis. Improvements in water quality will also result in indirect positive impacts for population / human health and such improvements will also impact positively on material assets such as tourism which are dependant on good water quality for fishing, leisure activities etc.

Exclusion of sheep on a prioritised basis will have positive impacts for biodiversity, flora and fauna, water and soil in particular, however, negative impacts are expected for material assets through increased costs associated with fencing and maintenance and loss of agricultural land. Based on preliminary estimates of priority stretches, which are subject to change as information becomes available, and assuming sheep are excluded from a 1.5m wide riparian strip on both sides of the river, this would result in approximately 1.73ha of land lost for grazing by sheep.

Effective and targeted implementation of the Good Agricultural Practice Regulations 2009, which are a Basic Measure, and cross compliance, will address agricultural pressures, particularly where there is a

focus on improved fencing, buffer zones and the provision of animal watering points on a prioritised basis. This will have overall positive impacts for FPM and biodiversity, flora and fauna generally as well as water quality and soils by reducing the amount of erosion along the river bank, together with reducing the amount of silt and nutrients entering the watercourse. Improved fencing and provision of buffer zones will have negative impacts for material assets as stated previously; however, given the close proximity to the watercourse it is unlikely to yield high agricultural outputs. The width of buffer strip will be dependant on the slope of lands adjacent to the rivers as well as the type of farming activity being carried out on specific farms. It will be necessary to undertake a field by field inspection in advance of determining site specific requirements for fencing and buffer zones.

**On-site Wastewater Treatment Systems**

Baseline studies in this catchment have identified point and diffuse sources of nutrient input to rivers from OSWWTS and have highlighted this as a pressure. Site specific measures to deal with this pressure include prioritisation of the inspection and investigation of on-site systems in high to extreme risk categories within the Eske catchment; and a public awareness campaign.

As noted in the baseline, there are 711 on-site systems on extreme risk, 66 on very high risk and 3 on high risk potential settings in the Eske catchment. Following investigation further mitigation may be required on a case by case basis however, if it is assumed that 50% (or 390) of these systems require desludging once during the first 6-year Action Programme cycle, this would result in an estimated **1,878 tonnes** (based on 4.5$m^3$ sludge per tank and a density of 1.07tonnes/$m^3$) requiring transport and disposal. It is assumed that the catchment is within a 100km round trip of a suitable landfill site for appropriate disposal. Disposal of sludge to landfill may require additional landfill space, with resultant impacts identified in the previous high level strategic assessment in **Section 8.5.3**.

The potential emission of $CO_2$ associated with leaving the sludges in place is estimated to be **0.72 ktonnes** per year. If this is multiplied across the 6-year cycle, an estimated **4.35 ktonnes** of $CO_2$ will be emitted by on-site wastewater treatment systems that may be posing a threat to the designated FPM area.

The amount of $CO_2$ emitted by disposal of sludge to landfill is a combination of the $CO_2$ released by the sludge after disposal to landfill and the $C0_2$ emitted during transport. Transport of **1,878 tonnes** of sludge to landfill is estimated to produce less than **0.01 ktonnes** of $CO_2$, while $CO_2$ emissions once in the landfill are estimated to be **0.45 ktonnes** which rises to **2.72 ktonnes** if the tanks are desludged annually.

Comparing the estimated emissions of **4.35 ktonnes** of $CO_2$ if the sludges are left in place to the estimated **2.72 ktonnes** of $CO_2$ if they are removed and disposed of to landfill, it appears that in the context of contribution to climate change over a 6 year cycle of the Action Programme the removal of the sludges and disposal to landfill would be positive in the context of climate change.

Inspection and investigation of OSWWTS will require commitment from Local Authorities charged with carrying out this work, however, it is noted that there is likely to be significant overlap between investigations under the River Basin Management Plans leading to opportunities to streamline and coordinate prioritisation of this work under these two distinct but complementary pieces of legislation.

A public awareness campaign is expected to result in direct positive impacts through less physical disturbance and loss to FPM populations and indirectly to improved water quality through increased public awareness.

**Forestry**

Forestry management plans aimed at minimising hydrological, sediment, nutrient and other potential impacts from forests will have direct positive impacts on biodiversity, flora and fauna, water, and soils by minimising these and other potential impacts, and allowing targeted mitigation measures to be applied on a case by case basis. Improvements in water quality will also result in indirect positive impacts for population / human health and such improvements will also impact positively on material assets such as tourism which are dependant on good water quality for fishing, leisure activities etc. Minimising hydrological, sediment, nutrient and other potential impacts may require changes to forestry management practices where such controls are not already in place resulting in negative impacts in the short to medium term on material assets. However, as these practices become the norm, this impact will become neutral over the long term.

**Physical Modifications**

Site specific measures for this catchment include no further intensification of pressures, drainage or maintenance drainage be permitted within the Eske catchment without an assessment of its potential impact; and no new bridge installations or bridge maintenance is permitted within the Eske catchment without appropriate planning and where necessary an Appropriate Assessment of potential impacts on Natura 2000 sites. This requirement is to be extended to areas outside of the SAC boundary also to take account of indirect impacts. In addition, existing and future drainage works require an Appropriate Assessment for Natura 2000 sites and this is also to be extended beyond the SAC boundary.

As there will be no further reclamation or drainage works without the appropriate assessment, positive outcomes are anticipated for biodiversity, flora and fauna, water and soil in particular. However, there may be indirect negative impacts on material assets in relation to land drainage if this constrains drainage and therefore the type of land use activities suitable in the area. There is also potential for indirect negative impacts on flood defence through restrictions to drainage maintenance and as a result indirect negative impacts on material assets, e.g. residential, which may be at risk from flooding. The requirement for Appropriate Assessments for Natura 2000 sites is considered enforcement of existing legislation which is a Basic Measure.

**Abstractions**

The abstraction located on the Eske main channel for a domestic water supply has the potential to impact on this sensitive habitat, especially at times of low flow. Further investigation and possible alternative source identification would result in positive benefits for biodiversity, flora and fauna and water. However, sourcing of a new water supply may have negative impacts for material assets in terms of cost and may result in indirect negative impacts to local biodiversity elsewhere in the catchment. Potential negative impacts to cultural heritage are also possible at an alternative source location.

**Point Sources**

The baseline has identified one major point source pressure within the catchment with the potential to impact on the FPM populations. Therefore, site specific measures for this catchment include a review of the licence for Harvey's Point Hotel should be carried out as priority. These measures will result in positive impacts for biodiversity, flora and fauna, water and soil by potentially reducing the level of nutrients entering the watercourse; however, negative impacts are expected for material assets associated with costs of alterations and / or upgrades and additional conditions being imposed. Negative impacts are also possible where relocation of discharge points is required in order to comply as this may result in indirect negative impacts on cultural heritage, landscape and biodiversity if not sited sensitively. Positive impacts will be gained for population / human health and material assets through these alterations, up-grades and restrictions by ensuring adequate waste water treatment is in place to protect water quality.

**Cumulative Impacts of the Measures in the Eske Catchment**

A reduction in the silt loading to the watercourses in this catchment as a result of implementing the Action Programme measures under Agriculture, Forestry and Physical Modifications will result in direct positive impacts to FPM populations and habitats. In addition, a reduced silt load will have direct positive impacts on salmonid spawning and nursery areas, one of the reasons for this sites SAC designation, and reduce the impacts on other flora and fauna due to sedimentation.

Further, the implementation of said measures will have direct positive impacts on soils through the reduction of soil erosion, with again direct positive influences on water quality, which in turn would have indirect positive influences on human health. The cumulative impacts of implementing these measures would be positive.

A reduction in the nutrient loading to this catchment through the implementation of the Action Programme measures under Agriculture, Forestry, Point Sources and On-site wastewater treatment systems will have direct positive impacts on water quality, with indirect impacts on biodiversity, flora and fauna by reducing the potential for the eutrophication of these waters. This will also have an indirect positive influence on human health.

The potential for direct negative impacts to material assets through the implementation of the Action Programme measures may result from a reduction in agricultural productivity, restrictions to forestry activities, or through restrictions to discharge licences. There is also potential for indirect negative impacts on flood defence through restrictions to drainage maintenance.

### 8.6.24 The Glaskeelan Catchment

The Draft Glaseelan Sub-Basin Management Plan identified the following key and secondary pressures either within the contributing catchment or within the vicinity of the FPM populations:

- Agriculture;
- On-site Wastewater Treatment Systems;
- Forestry;
- Other issues – Peat Cutting

**Agriculture**

As noted in the baseline, increased levels of silt and nutrients into the watercourses is a significant pressure on FPM populations in this catchment. To address this, site specific measures for this catchment have been developed and include the de-stocking rates which have been implemented should be maintained with no further re-stocking; detailed assessment of soil nutrient status; sediment and nutrient management plans; where penning of sheep does occur such practices should be carried out ensuring no pollution to the surrounding environment; and strict enforcement of Good Agricultural Practice Regulations 2009 and cross compliance.

Detailed assessment of soil nutrient status and sediment and nutrient management plans will have positive impacts on biodiversity, flora and fauna, water, and soils by highlighting those areas where nutrient levels are above recommended levels and allowing targeted mitigation measures to be applied on a case by case basis. Improvements in water quality will also result in indirect positive impacts for population / human health and such improvements will also impact positively on material assets such as tourism which are dependant on good water quality for fishing, leisure activities etc.

De-stocking will have positive impacts on biodiversity, flora and fauna, water and soils by reducing the level of erosion and nutrient addition to the watercourses, and allowing the environment to recover. Improvements in water quality will also result in indirect positive impacts for population / human health and such improvements will also impact positively on material assets such as tourism which are dependant on good water quality for fishing, leisure activities etc.

Restricting where penning of sheep occurs will have positive impacts for biodiversity, flora and fauna, water and soil in particular; however, negative impacts are expected for material assets through restrictions to the use of agricultural land.

Effective and targeted implementation of the Good Agricultural Practice Regulations 2009, which are a Basic Measure, and cross compliance, will address agricultural pressures, particularly where there is a focus on improved fencing, buffer zones and the provision of animal watering points on a prioritised

basis. This will have overall positive impacts for FPM and biodiversity, flora and fauna generally as well as water quality and soils by reducing the amount of erosion along the river bank, together with reducing the amount of silt and nutrients entering the watercourse. Improved fencing and provision of buffer zones will have negative impacts for material assets by removing land from agricultural production; however, given the close proximity to the watercourse it is unlikely to yield high agricultural outputs. The width of buffer strip will be dependant on the slope of lands adjacent to the rivers as well as the type of farming activity being carried out on specific farms. It will be necessary to undertake a field by field inspection in advance of determining site specific requirements for fencing and buffer zones.

**On-site Wastewater Treatment Systems**

Baseline studies in this catchment have identified point and diffuse sources of nutrient input to rivers from OSWWTS and have highlighted this as a pressure. Site specific measures to deal with this pressure include the inspection and investigation of 7 on-site systems in high to extreme risk categories along the main channel of the Glaskeelan; and a public awareness campaign.

As noted in the baseline, there are 6 on-site systems on extreme risk and 1 on very high risk potential settings in the Glaskeelan catchment. Following investigation further mitigation may be required on a case by case basis however, if it is assumed that 50% (or 4) of these systems require desludging once during the first 6-year Action Programme cycle, this would result in an estimated **17 tonnes** (based on 4.5$m^3$ sludge per tank and a density of 1.07tonnes/$m^3$) requiring transport and disposal. It is assumed that the catchment is within a 100km round trip of a suitable landfill site for appropriate disposal. Disposal of sludge to landfill may require additional landfill space, with resultant impacts identified in the previous high level strategic assessment in **Section 8.5.3**.

The potential emission of $CO_2$ associated with leaving the sludges in place is estimated to be **0.01 ktonnes** per year. If this is multiplied across the 6-year cycle, an estimated **0.04 ktonnes** of $CO_2$ will be emitted by on-site wastewater treatment systems that may be posing a threat to the designated FPM area.

The amount of $CO_2$ emitted by disposal of sludge to landfill is a combination of the $CO_2$ released by the sludge after disposal to landfill and the $C0_2$ emitted during transport. Transport of **17 tonnes** of sludge to landfill is estimated to produce less than **0.00 ktonnes** of $CO_2$, while $CO_2$ emissions once in the landfill are estimated to be **0.00 ktonnes** which rises to **0.02 ktonnes** if the tanks are desludged annually.

Comparing the estimated emissions of **0.04 ktonnes** of $CO_2$ if the sludges are left in place to the estimated **0.02 ktonnes** of $CO_2$ if they are removed and disposed of to landfill, it appears that in the context of contribution to climate change over a 6 year cycle of the Action Programme the removal of the sludges and disposal to landfill would be positive in the context of climate change.

Inspection and investigation of OSWWTS will require commitment from Local Authorities charged with carrying out this work, however, it is noted that there is likely to be significant overlap between investigations under the River Basin Management Plans leading to opportunities to streamline and coordinate prioritisation of this work under these two distinct but complementary pieces of legislation.

A public awareness campaign is expected to result in direct positive impacts through less physical disturbance and loss to FPM populations and indirectly to improved water quality through increased public awareness.

**Forestry**

Forestry management plans aimed at minimising hydrological, sediment, nutrient and other potential impacts from forests will have direct positive impacts on biodiversity, flora and fauna, water, and soils by minimising these and other potential impacts, and allowing targeted mitigation measures to be applied on a case by case basis. Improvements in water quality will also result in indirect positive impacts for population / human health and such improvements will also impact positively on material assets such as tourism which are dependant on good water quality for fishing, leisure activities etc. Minimising hydrological, sediment, nutrient and other potential impacts may require changes to forestry management practices where such controls are not already in place resulting in negative impacts in the short to medium term on material assets. However, as these practices become the norm, this impact will become neutral over the long term.

**Other Issues - Peat Cutting**

The baseline has identified one location (currently active) with peat extraction operations operating within the catchment with the potential to impact on the FPM populations. Therefore, site specific measures for this catchment include assessment of the peat extraction operations for licensing and permitting requirements; and installation of appropriately sized silt traps to treat runoff from the identified peat operations.

Licensing and permitting of peat extraction operations and subsequent enforcement of existing legislation is considered a Basic Measure. Positive impacts are anticipated including to climate through a reduction in peat cutting and therefore a reduction in the burning of peat. However, this will impact negatively on material assets through potential restrictions on peat cutting and may also impact indirectly on cultural heritage if peat cutting has historically been undertaken in the area. Installation of silt traps will have positive impacts for biodiversity, flora and fauna, water and soil, however, maintenance of the systems will be important to prevent medium to long-term negative impacts on these receptors. Indirect positive impacts would also be expected for population / human health through improved water quality and on material assets e.g. tourism, angling, which rely on good water quality.

**Cumulative Impacts of the Measures in the Glaskeelan Catchment**

A reduction in the silt loading to the watercourses in this catchment as a result of implementing the Action Programme measures under Agriculture, Forestry and Peat Cutting will result in direct positive impacts to FPM populations and habitats. In addition, a reduced silt load will have direct positive impacts on salmonid spawning and nursery areas, one of the reasons for this sites SAC designation, and reduce the impacts on other flora and fauna due to sedimentation.

Further, the implementation of said measures will have direct positive impacts on soils through the reduction of soil erosion, with again direct positive influences on water quality, which in turn would have indirect positive influences on human health. The cumulative impacts of implementing these measures would be positive.

A reduction in the nutrient loading to this catchment through the implementation of the Action Programme measures under Agriculture, Forestry, Peat Cutting and On-site wastewater treatment systems will have direct positive impacts on water quality, with indirect impacts on biodiversity, flora and fauna by reducing the potential for the eutrophication of these waters. This will also have an indirect positive influence on human health.

The potential for direct negative impacts to material assets through the implementation of the Action Programme measures may result from a reduction in agricultural productivity, restrictions to forestry activities, or though restrictions to peat cutting activities.

### 8.6.25 The Leannan Catchment

The Draft Leannan Sub-Basin Management Plan identified the following key and secondary pressures either within the contributing catchment or within the vicinity of the FPM populations:

- Agriculture;
- On-site Wastewater Treatment Systems;
- Forestry;
- Physical Modifications;
- Quarries; and
- Point Source.

**Agriculture**

As noted in the baseline, increased levels of silt and nutrients into the watercourses is a significant pressure on FPM populations in this catchment. To address this, site specific measures for this catchment have been developed and include detailed assessment of soil nutrient status; sediment and nutrient management plans; fencing together with drinking water provision should be prioritised within the top priority catchment, subsequently, it should be carried out in the second priority catchment; further information in relation to farms and farming practices in the Leannan catchment is required from DAFF and strict enforcement of Good Agricultural Practice Regulations 2009 and cross compliance.

Detailed assessment of soil nutrient status and sediment and nutrient management plans will have positive impacts on biodiversity, flora and fauna, water, and soils by highlighting those areas where nutrient levels are above recommended levels and allowing targeted mitigation measures to be applied on a case by case basis. Improvements in water quality will also result in indirect positive impacts for population / human health and such improvements will also impact positively on material assets such as tourism which are dependant on good water quality for fishing, leisure activities etc.

Exclusion of cattle from the watercourses within this catchment, particularly in the priority catchments will have positive impacts for biodiversity, flora and fauna, water and soil in particular, however, negative impacts are expected for material assets through increased costs associated with fencing and maintenance and loss of agricultural land.

Effective and targeted implementation of the Good Agricultural Practice Regulations 2009, which are a Basic Measure, and cross compliance, will address agricultural pressures, particularly where there is a focus on improved fencing, buffer zones and the provision of animal watering points on a prioritised

basis. This will have overall positive impacts for FPM and biodiversity, flora and fauna generally as well as water quality and soils by reducing the amount of erosion along the river bank, together with reducing the amount of silt and nutrients entering the watercourse. Improved fencing and provision of buffer zones will have negative impacts for material assets as stated previously; however, given the close proximity to the watercourse it is unlikely to yield high agricultural outputs. The width of buffer strip will be dependant on the slope of lands adjacent to the rivers as well as the type of farming activity being carried out on specific farms. It will be necessary to undertake a field by field inspection in advance of determining site specific requirements for fencing and buffer zones.

**On-site Wastewater Treatment Systems**

Baseline studies in this catchment have identified point and diffuse sources of nutrient input to rivers from OSWWTS and have highlighted this as a pressure. Site specific measures to deal with this pressure include prioritisation of the inspection and investigation of on-site systems in high to extreme risk categories along the priority catchments and subsequently downstream of Kilmacrennan; and a public awareness campaign.

As noted in the baseline, there are 2080 on-site systems on extreme risk and 689 on high risk potential settings in the Cloon catchment. Following investigation further mitigation may be required on a case by case basis however, if it is assumed that 50% (or 1385) of these systems require desludging once during the first 6-year Action Programme cycle, this would result in an estimated **6,666 tonnes** (based on 4.5$m^3$ sludge per tank and a density of 1.07tonnes/$m^3$) requiring transport and disposal. It is assumed that the catchment is within a 100km round trip of a suitable landfill site for appropriate disposal. Disposal of sludge to landfill may require additional landfill space, with resultant impacts identified in the previous high level strategic assessment in **Section 8.5.3**.

The potential emission of $CO_2$ associated with leaving the sludges in place is estimated to be **2.57 ktonnes** per year. If this is multiplied across the 6-year cycle, an estimated **15.44 ktonnes** of $CO_2$ will be emitted by on-site wastewater treatment systems that may be posing a threat to the designated FPM area.

The amount of $CO_2$ emitted by disposal of sludge to landfill is a combination of the $CO_2$ released by the sludge after disposal to landfill and the $C0_2$ emitted during transport. Transport of **6,690 tonnes** of sludge to landfill is estimated to produce less than **0.04 ktonnes** of $CO_2$, while $CO_2$ emissions once in the landfill are estimated to be **1.61 ktonnes** which rises to **9.66 ktonnes** if the tanks are desludged annually.

Comparing the estimated emissions of **15.44 ktonnes** of $CO_2$ if the sludges are left in place to the estimated **9.66 ktonnes** of $CO_2$ if they are removed and disposed of to landfill, it appears that in the context of contribution to climate change over a 6 year cycle of the Action Programme the removal of the sludges and disposal to landfill would be positive in the context of climate change.

Inspection and investigation of OSWWTS will require commitment from Local Authorities charged with carrying out this work, however, it is noted that there is likely to be significant overlap between investigations under the River Basin Management Plans leading to opportunities to streamline and coordinate prioritisation of this work under these two distinct but complementary pieces of legislation.

A public awareness campaign is expected to result in direct positive impacts through less physical disturbance and loss to FPM populations and indirectly to improved water quality through increased public awareness.

**Forestry**

Forestry management plans aimed at minimising hydrological, sediment, nutrient and other potential impacts from forests will have direct positive impacts on biodiversity, flora and fauna, water, and soils by minimising these and other potential impacts, and allowing targeted mitigation measures to be applied on a case by case basis. Improvements in water quality will also result in indirect positive impacts for population / human health and such improvements will also impact positively on material assets such as tourism which are dependant on good water quality for fishing, leisure activities etc. Minimising hydrological, sediment, nutrient and other potential impacts may require changes to forestry management practices where such controls are not already in place resulting in negative impacts in the short to medium term on material assets. However, as these practices become the norm, this impact will become neutral over the long term.

**Physical Modifications**

Site specific measures for this catchment include investigation into the two main areas (Near Bellaned Bridge at Maghernagran, and at Milltown Bridge in Kilmacrenan (Kilmac Foamworks Ltd. Site works)) with significant site clearance works is required by Donegal County Council and NPWS; and no further reclamation permitted within the SAC without an assessment of its potential impact. This requirement is to be extended to areas outside of the SAC boundary also to take account of indirect impacts. In addition, existing and future drainage works require an Appropriate Assessment for Natura 2000 sites and this is also to be extended beyond the SAC boundary. As there will be no further reclamation or drainage works without the appropriate assessment, positive outcomes are anticipated for biodiversity, flora and fauna, water and soil in particular. However there may be indirect negative impacts on material assets in relation to land drainage if this constrains drainage and therefore the type of land use activities suitable in the area. There is also potential for indirect negative impacts on flood defence through restrictions to drainage maintenance and as a result indirect negative impacts on material assets, e.g. residential, which may be at risk from flooding. The requirement for Appropriate Assessments for Natura 2000 sites is considered enforcement of existing legislation which is a Basic Measure.

**Quarries**

Two large commercial quarries have been identified in the baseline studies in this catchment. Site specific measures to deal with this pressure include an awareness campaign by the Donegal County Council to inform the quarry owners of the FPM requirements; review of licences for both quarries is required and immediate cessation of works is required, and the current sediment loss must be stopped through remediation measures. Any other existing quarries will also require a licence review. These measures will have positive impacts for biodiversity, flora and fauna, water and soil. Negative impacts are anticipated for material assets as the measures require that the quarrying operations cease until remediation measures are in place. This will result in loss of productivity until pressure sources can be fixed. Future development of the quarries may also be constrained or require additional management or mitigation to develop or operate the site. Enforcement of existing legislation is a Basic Measure.

**Point Sources**

Site specific measures for this catchment include that all discharge licences or authorisations must comply with the EQOs set out of SI 296 of 2009; all WWTP, IPPC and Section 4 and 16 discharge licences must be reviewed to assess compliance with EQOs and additional conditions imposed as required. These measures will result in positive impacts for biodiversity, flora and fauna, water and soil by potentially reducing the level of nutrients entering the watercourse; however, negative impacts are expected for material assets associated with costs of alterations and / or upgrades and additional conditions being imposed. Negative impacts are also possible where relocation of discharge points is required in order to comply as this may result in indirect negative impacts on cultural heritage, landscape and biodiversity if not sited sensitively. Positive impacts will be gained for population / human health and material assets through these alterations, up-grades and restrictions by ensuring adequate waste water treatment is in place to protect water quality.

**Cumulative Impacts of the Measures in the Leannan Catchment**

A reduction in the silt loading to the watercourses in this catchment as a result of implementing the Action Programme measures under Agriculture, Forestry and Physical Modifications will result in direct positive impacts to FPM populations and habitats. In addition, a reduced silt load will have direct positive impacts on salmonid spawning and nursery areas, one of the reasons for this sites SAC designation, and reduce the impacts on other flora and fauna due to sedimentation.

Further, the implementation of said measures will have direct positive impacts on soils through the reduction of soil erosion, with again direct positive influences on water quality, which in turn would have indirect positive influences on human health. The cumulative impacts of implementing these measures would be positive.

A reduction in the nutrient loading to this catchment through the implementation of the Action Programme measures under Agriculture, Forestry, Point Source and On-site wastewater treatment systems will have direct positive impacts on water quality, with indirect impacts on biodiversity, flora

and fauna by reducing the potential for the eutrophication of these waters. This will also have an indirect positive influence on human health.

The potential for direct negative impacts to material assets through the implementation of the Action Programme measures may result from a reduction in agricultural productivity, restrictions to forestry activities, restrictions to quarry activities or through restrictions to land reclamation. There is also potential for indirect negative impacts on flood defence through restrictions to drainage maintenance.

### 8.6.26 The Owencarrow Catchment

The Draft Owencarrow Sub-Basin Management Plan identified the following key and secondary pressures either within the contributing catchment or within the vicinity of the FPM populations:

- Agriculture;
- On-site Wastewater Treatment Systems;
- Forestry;
- Point Sources
- Other issues – Peat Cutting

**Agriculture**

As noted in the baseline, increased levels of silt and nutrients into the watercourses is a significant pressure on FPM populations in this catchment. To address this, site specific measures for this catchment have been developed and include detailed assessment of soil nutrient status; sediment and nutrient management plans; exclusion of sheep with improved fencing and buffer zones on a prioritisation basis beginning with those stretches containing FPM populations; encouragement of participation in agri-environmental schemes; and strict enforcement of Good Agricultural Practice Regulations 2009 and cross compliance.

Detailed assessment of soil nutrient status and sediment and nutrient management plans will have positive impacts on biodiversity, flora and fauna, water, and soils by highlighting those areas where nutrient levels are above recommended levels and allowing targeted mitigation measures to be applied on a case by case basis. Improvements in water quality will also result in indirect positive impacts for population / human health and such improvements will also impact positively on material assets such as tourism which are dependant on good water quality for fishing, leisure activities etc.

Exclusion of sheep with improved fencing and buffer zones will have positive impacts for biodiversity, flora and fauna, water and soil in particular, however, negative impacts are expected for material assets through increased costs associated with fencing and maintenance and loss of agricultural land. Based on preliminary estimates of priority stretches, which are subject to change as information becomes available, and assuming cattle are excluded from a 1.5m wide riparian strip on both sides of the river, this would result in approximately 2.05ha of land lost for grazing by sheep.

Effective and targeted implementation of the Good Agricultural Practice Regulations 2009, which are a Basic Measure, and cross compliance will address agricultural pressures, particularly where there is a focus on improved fencing, buffer zones and the provision of animal watering points on a prioritised

basis. This will have overall positive impacts for FPM and biodiversity, flora and fauna generally as well as water quality and soils by reducing the amount of erosion along the river bank, together with reducing the amount of silt and nutrients entering the watercourse. Improved fencing and provision of buffer zones will have negative impacts for material assets as stated previously; however, given the close proximity to the watercourse it is unlikely to yield high agricultural outputs. The width of buffer strip will be dependant on the slope of lands adjacent to the rivers as well as the type of farming activity being carried out on specific farms. It will be necessary to undertake a field by field inspection in advance of determining site specific requirements for fencing and buffer zones.

**On-site Wastewater Treatment Systems**

Baseline studies in this catchment have identified point and diffuse sources of nutrient input to rivers from OSWWTS and have highlighted this as a pressure. Site specific measures to deal with this pressure include prioritisation of the inspection and investigation of on-site systems in high to extreme risk categories along the main channel of the Owencarrow; and a public awareness campaign.

As noted in the baseline, there are 43 on-site systems on extreme risk and 17 on very high risk potential settings in the Owencarrow catchment. Following investigation further mitigation may be required on a case by case basis however, if it is assumed that 50% (or 32) of these systems require desludging once during the first 6-year Action Programme cycle, this would result in an estimated **154 tonnes** (based on 4.5$m^3$ sludge per tank and a density of 1.07tonnes/$m^3$) requiring transport and disposal. It is assumed that the catchment is within a 100km round trip of a suitable landfill site for appropriate disposal. Disposal of sludge to landfill may require additional landfill space, with resultant impacts identified in the previous high level strategic assessment in **Section 8.5.3**.

The potential emission of $CO_2$ associated with leaving the sludges in place is estimated to be **0.06 ktonnes** per year. If this is multiplied across the 6-year cycle, an estimated **0.36 ktonnes** of $CO_2$ will be emitted by on-site wastewater treatment systems that may be posing a threat to the designated FPM area.

The amount of $CO_2$ emitted by disposal of sludge to landfill is a combination of the $CO_2$ released by the sludge after disposal to landfill and the $C0_2$ emitted during transport. Transport of **154 tonnes** of sludge to landfill is estimated to produce less than **0.00 ktonnes** of $CO_2$, while $CO_2$ emissions once in the landfill are estimated to be **0.04 ktonnes** which rises to **0.22 ktonnes** if the tanks are desludged annually.

Comparing the estimated emissions of **0.36 ktonnes** of $CO_2$ if the sludges are left in place to the estimated **0.22 ktonnes** of $CO_2$ if they are removed and disposed of to landfill, it appears that in the context of contribution to climate change over a 6 year cycle of the Action Programme the removal of the sludges and disposal to landfill would be positive in the context of climate change.

Inspection and investigation of OSWWTS will require commitment from Local Authorities charged with carrying out this work, however, it is noted that there is likely to be significant overlap between

investigations under the River Basin Management Plans leading to opportunities to streamline and coordinate prioritisation of this work under these two distinct but complementary pieces of legislation.

A public awareness campaign is expected to result in direct positive impacts through less physical disturbance and loss to FPM populations and indirectly to improved water quality through increased public awareness.

**Forestry**

Forestry management plans aimed at minimising hydrological, sediment, nutrient and other potential impacts from forests will have direct positive impacts on biodiversity, flora and fauna, water, and soils by minimising these and other potential impacts, and allowing targeted mitigation measures to be applied on a case by case basis. Improvements in water quality will also result in indirect positive impacts for population / human health and such improvements will also impact positively on material assets such as tourism which are dependant on good water quality for fishing, leisure activities etc. Minimising hydrological, sediment, nutrient and other potential impacts may require changes to forestry management practices where such controls are not already in place resulting in negative impacts in the short to medium term on material assets. However, as these practices become the norm, this impact will become neutral over the long term.

**Point Sources**

The NPWS also have four WWTS located within Glenveagh National Park Headquarters. Site specific measures for this catchment include that all discharge licences or authorisations must comply with the EQOs set out of SI 296 of 2009; all WWTP, IPPC and Section 4 and 16 discharge licences must be reviewed to assess compliance with EQOs and additional conditions imposed as required. These measures will result in positive impacts for biodiversity, flora and fauna, water and soil by potentially reducing the level of nutrients entering the watercourse; however, negative impacts are expected for material assets associated with costs of alterations and / or upgrades and additional conditions being imposed. Negative impacts are also possible where relocation of discharge points is required in order to comply as this may result in indirect negative impacts on cultural heritage, landscape and biodiversity if not sited sensitively. Positive impacts will be gained for population / human health and material assets through these alterations, up-grades and restrictions by ensuring adequate waste water treatment is in place to protect water quality.

**Other Issues - Peat Cutting**

The baseline has identified a number of large areas of commercial peat cutting in the vicinity of the Calabber River, the Owencarrow River and the Glasnaseeragh River with the potential to impact on the FPM populations. Therefore, site specific measures for this catchment include assessment of the peat extraction operations for licensing and permitting requirements; and installation of appropriately sized silt traps to treat runoff from the identified peat operations.

Licensing and permitting of peat extraction operations and subsequent enforcement of existing legislation is considered a Basic Measure. Positive impacts are anticipated including to climate through a reduction in peat cutting and therefore a reduction in the burning of peat. However, this will impact negatively on material assets through potential restrictions on peat cutting and may also impact indirectly on cultural heritage if peat cutting has historically been undertaken in the area. Installation of silt traps will have positive impacts for biodiversity, flora and fauna, water and soil, however, maintenance of the systems will be important to prevent medium to long-term negative impacts on these receptors. Indirect positive impacts would also be expected for population / human health through improved water quality and on material assets e.g. tourism, angling, which rely on good water quality.

**Cumulative Impacts of the Measures in the Owencarrow Catchment**

A reduction in the silt loading to the watercourses in this catchment as a result of implementing the Action Programme measures under Agriculture, Forestry and Peat Cutting will result in direct positive impacts to FPM populations and habitats. In addition, a reduced silt load will have direct positive impacts on salmonid spawning and nursery areas, one of the reasons for this sites SAC designation, and reduce the impacts on other flora and fauna due to sedimentation.

Further, the implementation of said measures will have direct positive impacts on soils through the reduction of soil erosion, with again direct positive influences on water quality, which in turn would have indirect positive influences on human health. The cumulative impacts of implementing these measures would be positive.

A reduction in the nutrient loading to this catchment through the implementation of the Action Programme measures under Agriculture, Forestry, Peat Cutting and On-site wastewater treatment systems will have direct positive impacts on water quality, with indirect impacts on biodiversity, flora and fauna by reducing the potential for the eutrophication of these waters. This will also have an indirect positive influence on human health.

The potential for direct negative impacts to material assets through the implementation of the Action Programme measures may result from a reduction in agricultural productivity, restrictions to forestry activities, restrictions to peat cutting activities or through restrictions to land reclamation. There is also potential for indirect negative impacts on flood defence through restrictions to drainage maintenance.

### 8.6.27 The Owenea Catchment

The Draft Owenea Sub-Basin Management Plan identified the following key and secondary pressures either within the contributing catchment or within the vicinity of the FPM populations:

- Agriculture;
- On-site Wastewater Treatment Systems;
- Forestry;
- Physical Modifications;
- Point Source;
- Other issues – Fords;
- Other issues – Wind Farms; and
- Other issues – Fisheries.

**Agriculture**

As noted in the baseline, increased levels of silt and nutrients into the watercourses is a significant pressure on FPM populations in this catchment. To address this, site specific measures for this catchment have been developed and include detailed assessment of soil nutrient status; sediment and nutrient management plans; exclusion of sheep with improved fencing and buffer zones on a prioritisation basis beginning with those stretches containing FPM populations; encouragement of participation in agri-environmental schemes; and strict enforcement of Good Agricultural Practice Regulations 2009 and cross compliance.

Detailed assessment of soil nutrient status and sediment and nutrient management plans will have positive impacts on biodiversity, flora and fauna, water, and soils by highlighting those areas where nutrient levels are above recommended levels and allowing targeted mitigation measures to be applied on a case by case basis. Improvements in water quality will also result in indirect positive impacts for population / human health and such improvements will also impact positively on material assets such as tourism which are dependant on good water quality for fishing, leisure activities etc.

Exclusion of sheep with improved fencing and buffer zones will have positive impacts for biodiversity, flora and fauna, water and soil in particular, however, negative impacts are expected for material assets through increased costs associated with fencing and maintenance and loss of agricultural land.

Effective and targeted implementation of the Good Agricultural Practice Regulations 2009, which are a Basic Measure, and cross compliance will address agricultural pressures, particularly where there is a focus on improved fencing, buffer zones and the provision of animal watering points on a prioritised basis. This will have overall positive impacts for FPM and biodiversity, flora and fauna generally as well as water quality and soils by reducing the amount of erosion along the river bank, together with reducing the amount of silt and nutrients entering the watercourse. Improved fencing and provision of buffer zones will have negative impacts for material assets as stated previously; however, given the close proximity to the watercourse it is unlikely to yield high agricultural outputs. The width of buffer strip will be dependant on the slope of lands adjacent to the rivers as well as the type of farming activity being carried out on specific farms. It will be necessary to undertake a field by field inspection in advance of determining site specific requirements for fencing and buffer zones.

**On-site Wastewater Treatment Systems**

Baseline studies in this catchment have identified point and diffuse sources of nutrient input to rivers from OSWWTS and have highlighted this as a pressure. Site specific measures to deal with this pressure include prioritisation of the inspection and investigation of on-site systems in high to extreme risk categories along the main channel of the Owenea; and a public awareness campaign.

As noted in the baseline, there are 562 on-site systems on extreme risk and 143 on very high risk potential settings in the Owenea catchment. Following investigation further mitigation may be required on a case by case basis however, if it is assumed that 50% (or 353) of these systems require desludging once during the first 6-year Action Programme cycle, this would result in an estimated **1,697 tonnes** (based on 4.5$m^3$ sludge per tank and a density of 1.07tonnes/$m^3$) requiring transport and disposal. It is assumed that the catchment is within a 100km round trip of a suitable landfill site for appropriate disposal. Disposal of sludge to landfill may require additional landfill space, with resultant impacts identified in the previous high level strategic assessment in **Section 8.5.3**.

The potential emission of $CO_2$ associated with leaving the sludges in place is estimated to be **0.66 ktonnes** per year. If this is multiplied across the 6-year cycle, an estimated **3.93 ktonnes** of $CO_2$ will be emitted by on-site wastewater treatment systems that may be posing a threat to the designated FPM area.

The amount of $CO_2$ emitted by disposal of sludge to landfill is a combination of the $CO_2$ released by the sludge after disposal to landfill and the $C0_2$ emitted during transport. Transport of **1,697 tonnes** of sludge to landfill is estimated to produce less than **0.01 ktonnes** of $CO_2$, while $CO_2$ emissions once in the landfill are estimated to be **0.41 ktonnes** which rises to **2.46 ktonnes** if the tanks are desludged annually.

Comparing the estimated emissions of **3.93 ktonnes** of $CO_2$ if the sludges are left in place to the estimated **2.46 ktonnes** of $CO_2$ if they are removed and disposed of to landfill, it appears that in the

context of contribution to climate change over a 6 year cycle of the Action Programme the removal of the sludges and disposal to landfill would be positive in the context of climate change.

Inspection and investigation of OSWWTS will require commitment from Local Authorities charged with carrying out this work, however, it is noted that there is likely to be significant overlap between investigations under the River Basin Management Plans leading to opportunities to streamline and coordinate prioritisation of this work under these two distinct but complementary pieces of legislation.

A public awareness campaign is expected to result in direct positive impacts through less physical disturbance and loss to FPM populations and indirectly to improved water quality through increased public awareness.

**Forestry**

Forestry management plans aimed at minimising hydrological, sediment, nutrient and other potential impacts from forests will have direct positive impacts on biodiversity, flora and fauna, water, and soils by minimising these and other potential impacts, and allowing targeted mitigation measures to be applied on a case by case basis. Improvements in water quality will also result in indirect positive impacts for population / human health and such improvements will also impact positively on material assets such as tourism which are dependant on good water quality for fishing, leisure activities etc. Minimising hydrological, sediment, nutrient and other potential impacts may require changes to forestry management practices where such controls are not already in place resulting in negative impacts in the short to medium term on material assets. However, as these practices become the norm, this impact will become neutral over the long term.

**Physical Modifications**

Site specific measures for this catchment include no further reclamation permitted within the SAC without an assessment of its potential impact. This requirement is to be extended to areas outside of the SAC boundary also to take account of indirect impacts. In addition, existing and future drainage works require an Appropriate Assessment for Natura 2000 sites and this is also to be extended beyond the SAC boundary. As there will be no further reclamation or drainage works without the appropriate assessment, positive outcomes are anticipated for biodiversity, flora and fauna, water and soil in particular. However there may be indirect negative impacts on material assets in relation to land drainage if this constrains drainage and therefore the type of land use activities suitable in the area. There is also potential for indirect negative impacts on flood defence through restrictions to drainage maintenance and as a result indirect negative impacts on material assets, e.g. residential, which may be at risk from flooding. The requirement for Appropriate Assessments for Natura 2000 sites is considered enforcement of existing legislation which is a Basic Measure.

**Point Sources**

The baseline has identified the WWTP at Glenties as a point source pressure leading to the loss of the Owenea FPM population. Site specific measures for this catchment include that all discharge licences or authorisations must comply with the EQOs set out of SI 296 of 2009; all WWTP, IPPC and Section 4 and 16 discharge licences must be reviewed to assess compliance with EQOs and additional conditions imposed as required. These measures will result in positive impacts for biodiversity, flora and fauna, water and soil by potentially reducing the level of nutrients entering the watercourse; however, negative impacts are expected for material assets associated with costs of alterations and / or upgrades and additional conditions being imposed. Negative impacts are also possible where relocation of discharge points is required in order to comply as this may result in indirect negative impacts on cultural heritage, landscape and biodiversity if not sited sensitively. Positive impacts will be gained for population / human health and material assets through these alterations, up-grades and restrictions by ensuring adequate waste water treatment is in place to protect water quality.

**Other Issues - Wind Farms**

Baseline studies in this catchment have identified applications for wind farms within the catchment as a cause of concern and could cause de-stabilisation. To address this pressure site specific measures include investigation of the proposed location of the turbines, in particular, where they are located on the peat and peaty soils, together with the size and number of wind turbines. Close investigation of the proposed locations will result in positive impacts for biodiversity, flora and fauna, water and soil by reducing the potential for de-stabilisation of soils, and therefore, reduce the risk of peaty soils entering the water and, with indirect positive impacts on human health. The investigations of these proposed locations may result in negative impact to material assets as a result of additional costs associated with the investigations.

**Other Issues - Fords**

A vehicular and animal ford has been identified in the Owenea catchment. To address this pressure site specific measures include investigation of alternative access immediately or site mitigation measures implemented. Relocation of the access will result in positive impacts for FPM and biodiversity generally e.g. fish spawning areas, water and soil by controlling erosion, and silt and nutrient addition downstream of the crossing point, and relocating a direct impact (through crushing) to existing FPM populations. The relocation may result in negative impact to material assets as a result of changes in management practices necessary to reach alternative access points, increased time requirements to move livestock. It may also impact on other biodiversity and potentially cultural heritage if the alternative locations are not sited sensitively.

**Other Issues - Fisheries**

The baseline has identified bank side reinforcement associated with the fisheries works carried out within the FPM habitat as leading to erosion on the opposite bank. To address this pressure the site

specific measures have identified that any future knock on erosion resulting from fisheries associated works should be militated against. Such mitigation would result in positive impacts for biodiversity, flora and fauna, water and soil by controlling/preventing erosion, and silt and nutrient addition downstream of the fisheries works.

**Cumulative Impacts of the Measures in the Owenea Catchment**

A reduction in the silt loading to the watercourses in this catchment as a result of implementing the Action Programme measures under Agriculture, Forestry, Physical Modifications, Fords, Wind Farms and Fisheries will result in direct positive impacts to FPM populations and habitats. In addition, a reduced silt load will have direct positive impacts on salmonid spawning and nursery areas, one of the reasons for this sites SAC designation, and reduce the impacts on other flora and fauna due to sedimentation.

Further, the implementation of said measures will have direct positive impacts on soils through the reduction of soil erosion, with again direct positive influences on water quality, which in turn would have indirect positive influences on human health. The cumulative impacts of implementing these measures would be positive.

A reduction in the nutrient loading to this catchment through the implementation of the Action Programme measures under Agriculture, Forestry, Point Sources and On-site wastewater treatment systems will have direct positive impacts on water quality, with indirect impacts on biodiversity, flora and fauna by reducing the potential for the eutrophication of these waters. This will also have an indirect positive influence on human health.

The potential for direct negative impacts to material assets through the implementation of the Action Programme measures may result from a reduction in agricultural productivity, restrictions to forestry activities, restrictions to wind farm activities, or through restrictions to land reclamation. There is also potential for indirect negative impacts on flood defence through restrictions to drainage maintenance.

# 9 MITIGATION AND MONITORING

## 9.1 INTRODUCTION

Article 10 of the SEA Directive requires that monitoring be carried out in order to identify at an early stage any unforeseen adverse effects due to implementation of the Sub-basin Management Plans, with the view to taking remedial action where adverse effects are identified through monitoring. A monitoring programme is developed based on the indicators selected to track progress towards reaching the targets paired with each strategic environmental objective, thereby enabling positive and negative impacts on the environment to be measured. The environmental indicators have been developed to show changes that would be attributable to implementation of the Sub-basin Management Plans. It is useful to note that the monitoring programme will have substantial overlap with the monitoring required under both WFD and the FPM Regulations.

It should be noted that the success of the Sub-basin Management Plans in achieving the water quality parameters will be related to the speed at which the measures proposed are implemented.

## 9.2 SOURCES OF INFORMATION FOR MONITORING

Monitoring will focus on aspects of the environment that are likely to be significantly impacted by the Sub-basin Management Plans. Where possible, indicators have been chosen based on the availability of the necessary information and the degree to which the data will allow the target to be linked directly with the implementation of the Sub-basin Management Plans. **Table 9.1** shows the Environmental Monitoring Programme to track progress towards achieving strategic environmental objectives and reaching targets, and includes sources of relevant information. From **Table 9.1**, it can be seen that the majority of information required is already being actively collected (under the WFD, FPM Monitoring and other programmes), but not all of this is being gathered and reported on at a national level.

**Table 9.1: Monitoring Programme for Sub-Basin Management Plans**

| SEA Target | SEA Indicators | Data Availability, Source and Frequency |
|---|---|---|
| Halt deterioration of freshwater Pearl Mussel, their habitats or their associated species due to water quality issues in the contributing catchments by 2015. | The status of Freshwater Pearl Mussel as reported to the EU protected (report due every 6 years, first report in 2007). | The Status of EU Protected Habitats and Species in Ireland report. Published every 6 years. |
| Provide adequate wastewater treatment infrastructure capacity to all urban and suburban areas (cities, towns and villages) within the contributing catchments by 2015.* | Number of Section 140 motions under the Planning and Development Act 2001 tabled and passed for development in urban and suburban areas where adequate wastewater treatment infrastructure capacity is not in place. | Summary of Annual Planning Statistics. An Bord Pleanála. Published annually. |
| Strictly control rural development with the provision of individual wastewater treatment units in accordance with the EPA Guidelines Manual in relation to the provisions of wastewater treatment to single houses. | Number of Section 140 motions under the Planning and Development Act 2001 tabled and passed for development in rural areas where individual wastewater treatment are not provided in accordance with the EPA Guidelines Manual in relation to the provision of wastewater treatment to single houses. | Summary of Annual Planning Statistics. An Bord Pleanála. Published annually. |
| All drinking water areas (including groundwater), as identified on the register of protected areas, to achieve good status, or maintain high status, by 2015. | Interim Indicators: Compliance with Drinking Water Standards. | EPA |
| All bathing waters, as identified on the register of protected areas, to achieve good status, or maintain high status, by 2015. | Compliance with Bathing Water Standards. | EPA |
| All economic shellfish waters, as identified on the register of protected areas, to achieve good status, or maintain high status, by 2015. | Compliance with the Quality of Shellfish Waters Regulations. | EPA |
| All water bodies designated for salmonids, as identified on the register of protected areas, to achieve good status, or maintain high status, by 2015. | Water quality in designated salmonid waters. (Ire) | EPA |
| | Long Term Indicator: Parameters to be measured in accordance with the environmental quality standards to determine Good Status. (Ire and NI) | EPA<br>EPA |

| SEA Target | SEA Indicators | Data Availability, Source and Frequency |
|---|---|---|
| Interim Target: Achieve soil phosphorus levels in line with Teagasc targets for agricultural land.<br><br>Long Term Target: Achieve risk reduction targets as detailed in the Soil Directive for areas identified as at risk (not yet established). | Interim Indicator: Soil phosphorus levels.<br><br>Long Term Indicator: Monitoring programme as established under the requirements for the Soil Directive (once established). | National Soils Database. Teagasc and EPA. Updated as data becomes available.<br><br>Not yet established |
| All designated pearl mussel catchments to achieve the water quality parameters identified in the FPM Regulations by 2015. | Water quality in designated pearl mussel catchments in 2015. | Water Quality in Ireland report. EPA. Published every 1 to 2 years. |
| Use BAT, including renewable energy, to minimise GHG from new or upgraded wastewater infrastructure in line with Ireland's commitments to reduce GHG emissions under the Kyoto Protocol.<br><br>Use BAT, including renewable energy, to minimise GHG from changes in industrial practices due to Sub-basin Management Plan implementation in line with Ireland's commitments to reduce GHG emissions under the Kyoto Protocol.<br><br>No net loss of $CO_2$ sequestering vegetation due to changes in forestry practices as a result of sub-basin plan implementation. | Calculated $CO_2$ equivalent in tonnes from new or upgraded wastewater infrastructure, e.g. WWTP, including emissions associated with the digestion and / or incineration of sludge.<br><br>Calculated $CO_2$ equivalent in tonnes due to changes in industrial practices.<br><br>Calculated $CO_2$ sequestering potential of forest vegetation based on forest cover. | To be calculated based on changes in wastewater infrastructure. This could be incorporated as a requirement in the licence application process.<br><br>To be calculated based on changes in industrial practices, records of which are held as part of the IPPC licence process by the EPA.<br><br>National Council for Forest Research for sequestration potential. Corine Land Cover database for forest cover figures. |
| No increase in the amount of infrastructure at risk from flooding as a result of sub-basin plans activities. In this case the length of road and rail infrastructure at risk will be used as a proxy indicator for infrastructure in general. | Interim Indicator: Number of Flood Risk Management Plans prepared in accordance with the Floods Directive (2007/60/EC).<br><br>Long Term Indicator: Length of road and rail infrastructure at risk in contributing catchments. | Information on number of Flood Risk Management Plans prepared to be sourced from the OPW.<br><br>Information on flood risk to be sourced from the OPW. |
| Minimise impacts to economic activity due to Sub-basin Plan implementation without conflicting with the objectives of the WFD or FPM Regulations. | Percent change in land cover types due to Plan implementation. | To be calculated based on changes in land cover. Data from Northern Ireland Countryside Survey and Corine Land Cover Project |

| SEA Target | SEA Indicators | Data Availability, Source and Frequency |
|---|---|---|
| Achieve sustainable use of water in the context of maintaining its economic benefit. | Change in economic value of water relative to the baseline report, *Economic Analysis of Water Use in Ireland*, prepared in 2004 as part of the implementation of the Water Framework Directive in Ireland. | Economic studies carried out as part of the planning process during the second cycle of river basin management planning under the Water Framework Directive. |
| No physical damage or alteration of the context of cultural heritage features due to sub-basin management plan implementation. | Changes in the condition of monuments on the RMP due to sub-basin plan implementation.<br><br>Number of listed structures at risk due to sub-basin plan implementation. | The Archaeological Survey monitoring programme, Ireland. DoEHLG. Updated on an ongoing basis.<br><br>Buildings at Risk Register. Heritage Council Ireland. Updated on an ongoing basis. |
| No damage to designated landscapes as a result of sub-basin plan implementation. | Number of wastewater treatment plants sited in landscapes with a high sensitivity to change.<br><br>Percent change in land cover types in areas with a high sensitivity to change due to due to sub-basin plan implementation. | Data on number of wastewater treatment plants to be sourced from Local Authorities (not currently compiled centrally).<br><br>Land cover information to be sourced from the Corine Land Cover 2000 (CLC2000) project. |

## 9.3 MITIGATION (RECOMMENDATIONS FROM THE SEA TO FEED INTO THE SUB-BASIN MANAGEMENT PLANS)

The Environmental Report has highlighted the more significant potential positive and negative environmental impacts from the implementation of the Sub-basin Management Plans (including cumulative impacts). The following mitigation measures have been identified to reduce the negative impacts identified. It is recommended that the relevant mitigation measure (as listed in **Table 9.2**) for any alternative brought forward into the final Sub-basin Management Plans, also be brought forward into the Sub-basin Management Plans. Mitigation measures required for alternatives following the Habitats Directive Article 6 report are noted in red and are required, rather than recommended.

**Table 9.2 Mitigation Measures**

| Measure | Mitigation Measure |
|---|---|
| | **Category: Education and Awareness** |
| Complementary Measures **1 & 2** | It is noted that any public awareness campaign should be active and participatory to ensure that all relevant stakeholders are drawn into this action, bringing about behavioural changes. Awareness building should focus on what the issues are, how they can be prevented and the point of damage where they occur. |
| Municipal & Industrial Measures **6a** | This measure should be accompanied by an education and awareness campaign for commercial and industrial premises aimed at reducing pollution at source (potentially through Alternative 1) |
| Quarry Measures **7a & 7b** | These measures should be accompanied by an education and awareness campaign for quarry operators and those charged with authorisations aimed at reducing pollution at source (potentially through Alternative 1). |
| Agriculture Measures **14 & 15 - All** | It is recommended that an information and advice campaign targeted at farmers should be implemented on a national scale. This should focus on prevention first followed by best management practices as core themes. It will be important that adequate consideration is given not just to water and biodiversity but also soils and cultural heritage, as a narrowly focussed approach may lead to indirect negative impacts on these areas. It is also recommended that information campaigns highlight best practice in the sector in order to demonstrate that an economically viable farming operation is possible within such schemes. |
| OSWWTS Measure **16f** | An education programme should be carried out in relation to tank maintenance, including guidance on disposal of sludges. |
| Leisure Management Measures **21 - All** | Active awareness campaign needed to educate anglers of the issues and bring about behavioural changes in this key group. |
| | **Category: Further Environmental Assessment** |
| **WFD4** | Detailed assessment of higher risk works will include environmental considerations (based on EIA guidance). It is also recommended that lower risk work should be compelled to consider environmental issues as part of the registration process. |
| **WFD5** | It is recommended that further environmental assessment is undertaken once measures are defined. |

| | |
|---|---|
| Municipal & Industrial Measures<br>**6b**, **6d & 6e** | If additional landtake is required for these alternatives, environmental studies will be undertaken to assess the impact on the environment. |
| Quarry Measures<br>**7a & 7b** | Any relocation of discharge points should be accompanied by an environmental assessment. |
| Morphological Measures<br>**10 & 11** | A flood impact assessment should be carried out for all canalisation and barrier remediation schemes to determine whether an increased risk of flooding would occur as a result. |
| Morphological Measure<br>**11** | An archaeology, architecture and cultural heritage assessment will be required before removal of any morphological controls with potential for cultural heritage value. Mitigation measures will be in agreement with the relevant authority. This assessment should include reference to cultural heritage in the context of the existing landscape. |
| Agriculture Measures<br>**14 & 15 - All** | Fencing of water courses along certain river stretches may impact on otters. To mitigate potential impacts to otters, an otter survey would need to be carried out along the particular stretch of river prior to fencing being erected. If deemed appropriate then certain stretches of the river will have gaps in the fencing to allow for otter movements. |
| Agriculture & Forestry Measures<br>**14, 15 &17 - All** | Improving riparian zones may potentially impact on Kingfishers if present. Kingfishers have a preference for bare earth and banks. To mitigate potential impacts to Kingfishers, a Kingfisher survey will be required along stretchs of proposed riparian improvement and if present than allow certain stretches to remain bare. |
| Agriculture Measures<br>**14f** | Agricultural fencing should be of a type or location that does not impede access to breeding birds such as Red-Throated Divers, Golden Plover etc for instance in Glenveagh National Park. |
| Agriculture & Forestry Measures<br>**14, 15 &17 - All** | Measures aimed at promoting development of bank-side tree/woodland cover should undertake an environmental investigation of habitats and species associated with open bank-side and floodplain habitats. |
| Agriculture & Forestry Measures<br>**15 &17** | Carry out survey of sensitive species e.g. for Hen-Harrier in areas that have turned to scrub to ensure that such species are not present in locations proposed for conversion of agricultural land. |
| OSWWTS Measure<br>**16f** | New wastewater treatment infrastructure, including sludge disposal infrastructure, will be subject to environmental assessment at the project level to reduce indirect impacts to biodiversity, landscape, cultural heritage and climate. |
| Forestry Measures<br>**17 v** and **xii** | It is recommended that prior to any changes in forest size or species mix, a study is carried out to determine the change, if any, in the carbon dioxide sequestering capacity of the forest. Should sequestering capacity be reduced, compensation measures will be required to offset these. |
| Forestry Measure<br>**17 xv** | Detailed studies should be carried out prior to the introduction of any non-native species to be used as a biological control method. |
| | **Category: Habitats Directive** |
| Municipal & Industrial Measures<br>**6a** | This measure will require project level Habitats Directive Assessment if alternative facilities for treatment of waste are constructed, e.g. incinerator. |
| Forestry Measures<br>**17 - ALL** | A screening for AA shall be carried out on a site-by-site basis to determine potential to impact on other protected species such as hen harrier. Consultation with the local NPWS ranger shall be undertaken. |

| | **Category: Monitoring** |
|---|---|
| Unnatural Flows Measure **9** | This will require monitoring of the success of changes implemented to ascertain if modification to a natural flow benefits FPM and other biota. |
| | **Category: Other** |
| Complementary Measures **4** | Early consultation with OPW should be undertaken to identify potential conflict with drainage district maintenance programmes and catchment flood risk assessment and management plans to ensure due regard is given to the requirements for FPM. |
| Municipal & Industrial Measures **6b**, **6d** & **6e** | Negative impacts on climate associated with GHG emissions related to additional energy requirements for these measures should be offset by use of renewable energy sources or similar. |
| Agriculture Measures **14f** | A management plan for buffer strips and set aside will be required to ensure there are no detrimental impacts on locally important flora and fauna. These plans should be farm specific to take account of the locally sensitive biodiversity. |
| OSWWTS Measure **16f** | Upgraded treatment works should be required to introduce BAT, including the use of renewable energy sources, in order to reduce GHG emissions and others resulting from increased demand for treatment. |
| Forestry Measures **17 - All** | A screening for SEA shall be carried out in consultation with the relevant statutory bodies for any forestry catchment management plans. |
| Forestry Measures **17 - All** | Future guidelines for forestry should be developed through a steering group represented by bodies such as Coillte, the Forest Service, National Parks and Wildlife Service, the Central Fisheries Board, and representatives from the relevant planning authorities to ensure that the final guidelines take a holistic approach to the environment which includes biodiversity, landscape, climate and cultural heritage interests. Consideration should be given to prioritising those alternatives that can be applied to forests only starting or midway through the growth cycle. |
| Planning Measures **19a & 19b** | It is recommended that a form of words be provided to local authorities for inclusion which could be included in development plans to aid in protection of the FPM. |
| Planning Measures **19a & 19b** | Local authority planners should be invited to participate in management groups under the relevant River Basin Districts containing FPM in order to keep them informed of measures as they are added and refined in their district. |

**Note: It should be noted that in this case the term Habitats Directive Assessment refers to the assessment process as specified in Article 6 of the Habitats Directive. This starts with screening to determine whether a likely significant impact from the plan/programme is expected to occur to a Natura 2000/Ramsar site as a result of activities in/adjacent to/in the catchment of a Natura 2000/Ramsar site. If, in accordance with Habitats Directive Assessment guidance (guidance produced by the EU and DoEHLG in Ireland), it can be shown that there is no potential for impact at the screening stage, no further assessment may be required. However when the plan/programme being screened lies within or adjacent to a Natura 2000/Ramsar site then such a determination must be made in consultation with NPWS. If the plan/programme is within the catchment (surface and groundwater) of a Natura 2000/Ramsar site, such consultation with NPWS is only necessary for those water dependent Natura 2000 sites which are listed in the WFD Register of Protected Areas.*

## 9.4 SUMMARY OF MONITORING AND MITIGATION

The Strategic Environmental Assessment carried out on the draft Sub-basin Management Plans has ensured that any potential significant environmental impacts have: a) been identified and given due consideration and b) taken into account in the development of the Sub-basin Management Plans. The

proposed monitoring programme will be carried out as implementation of the Sub-basin Management Plans progresses and, depending on monitoring results, adjustments to targets and indicators may be made to ensure the continued effectiveness of the monitoring programme in the interest of optimal environmental protection.

# 10 NEXT STEPS

There is still some important work to complete before the Sub-basin Management Plans can be adopted. This will include recording, assessing and, where appropriate, taking on board comments received during consultations on the draft Sub-basin Management Plans and SEA Environmental Report. The next step in the SEA and Sub-basin Management Plan processes will be a 4-week consultation period. During this time comment on the findings of the Environmental Report, the Habitats Directive Assessment and the content of the draft Sub-basin Management Plans may be submitted for consideration. **Table 10.1** outlines the remaining steps in the Sub-basin Management Plans and SEA process.

**Table 10.1 Remaining steps in the Sub-basin Management Plan and SEA processes.**

| Date | Milestone | |
|---|---|---|
| | **Pollution Reduction Programmes** | **Strategic Environmental Assessment** |
| 16th March 2010 | Publication of the draft Sub-basin Management Plans | Publication of Environmental Report |
| 16th April 2010 | End of consultation | End of consultation |
| April 2010 | Update of Sub-basin Management Plans based on consultation | Compilation of SEA Statement |
| Mid 2010 | Publication of Final Sub-basin Management Plans | Publication of SEA Statement |

Following consultations on the draft Sub-basin Management Plans, the Habitats Directive Assessment and SEA Environmental Report, the draft Sub-basin Management Plans shall be updated, incorporating all relevant comments received. The SEA Statement shall also clearly show how comments received during consultations have been incorporated into and contributed to the Final Sub-basin Management Plans.

Written submissions or observations are now invited with respect to the draft Sub-Basin Management Plans, associated Environmental Report and Habitats Directive Assessment. Written submissions should be forwarded for the attention of **Mr Colm O'Dowd** on or before April 16, 2010 (contact details below). These submissions / observations will be taken into consideration before finalisation of the Sub-Basin Management Plans. Early responses would be appreciated to allow more time to clarify and resolve issues that may arise.

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# 11 ACRONYMS AND ABBREVIATIONS

| | |
|---|---|
| **BAT** | Best Available Techniques |
| **BOD** | Biological Oxygen Demand |
| **°C** | Degrees Celsius |
| **$CO_2$** | Carbon Dioxide |
| **COD** | Chemical Oxygen Demand |
| **CSO** | Central Statistics Office |
| **DAFF** | Department of Agriculture, Fisheries and Food |
| **DCENR** | Department of Communications, Energy and Natural Resources |
| **DoEHLG** | Department of Environment, Heritage and Local Government |
| **EAP** | Environment Action Programme |
| **EC** | European Community |
| **EIA** | Environment Impact Assessment |
| **EPA** | Environmental Protection Agency |
| **EU** | European Union |
| **FOG** | Fats, Oils and Greases |
| **GHG** | Greenhouse Gas |
| **IPPC** | Integrated Pollution Prevention and Control |
| **IRBD** | International River Basin District |
| **ktonnes** | kilotonnes |
| **mg** | milligrams |
| **mg/L** | milligrams per litre |
| **NHA** | Natural Heritage Area |
| **NIAH** | National Inventory of Architectural Heritage |
| **NOx** | Nitrous Oxide |
| **NPWS** | National Parks and Wildlife Service |
| **OPW** | Office of Public Works |
| **OSWWTS** | ON-site Wastewater Treatment Systems |
| **P.E.** | Population Equivalent |
| **POM** | Programme of Measures |
| **POPs** | Persistent Organic Pollutants |
| **RBD** | River Basin District |
| **RBMP** | River Basin Management Plan |
| **RMP** | Records of Monuments and Places |
| **SAC** | Special Area of Conservation |
| **SEA** | Strategic Environmental Assessment |
| **SPA** | Special Protection Area |
| **UNESCO** | United Nations Educational, Scientific and Cultural Organisation |
| **WFD** | Water Framework Directive |
| **WWTP** | Waste Water Treatment Plants |

# 12 GLOSSARY

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| Acidification | The rough canopies of mature evergreen forests are efficient scavengers of particulate and gaseous contaminants in polluted air. This results in a more acidic deposition under the forest canopies than in open land. Chemical processes at the roots of trees, evergreens in particular, further acidify the soil and soil water in forest catchments. When the forests are located on poorly buffered soils, these processes can lead to a significant acidification of the run-off water and consequent damage to associated streams and lakes. |
| Alien species | Invasive alien species are non-native plants or animals that successfully establish themselves in aquatic and fringing habitats and damage our natural flora and fauna. |
| Appropriate Assessment | An assessment of the effects of a plan or project on the Natura 2000 network. The Natura 2000 network comprises Special Protection Areas under the Birds Directive, Special Areas of Conservation under the Habitats Directive and Ramsar sites designated under the Ramsar Convention (collectively referred to as European sites). |
| Aquifers: | A water bearing rock which readily transmits water to wells and springs. |
| Artificial water body: | A body of surface water created by human activity. It is known as a heavily modified water body if, as a result of physical alterations by human activity, it is changed substantially in character as designated by an individual Member State and in accordance with the provisions of Annex II of the Water Framework Directive. |
| Baseline environment**:** | A description of the present state of the environment of the P/P area. |
| Biodiversity: | Word commonly used for biological diversity and defined as assemblage of living organisms from all habitats including terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part. |
| Birds Directive (79/409/EEC): | Council Directive of 2nd April 1979 on the conservation of wild birds. |
| Business as Usual Scenario: | The Business as Usual scenario is a conceptual baseline which projects what would happen in an area if there were no changes. It assumes current land use and other policies that guide or shape development remains the same, that current market-based trends continue, and that anticipated development projects occur as planned. This scenario also assumes that current demographic trends will continue as expected and future trends in urbanization and land consumption follow past patterns. |
| Carbon Dioxide**:** | A naturally occurring gas which is also a by-product of burning fossil fuels and biomass, land-use changes and industrial processes. It is the principal anthropogenic greenhouse gas that affects the earth's radiative balance. It is the reference gas against which other greenhouse gases are measured and therefore has a Global Warming Potential of 1. |

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| Cumulative effects: | Effects on the environment that result from incremental changes caused by the strategic action together with other past, present, and reasonably foreseeable future actions. These effects can result from individually minor but collectively significant actions taking place over time or space. |
| Designated authority: | An organisation that must be consulted in accordance with the SEA Regulations. |
| Diffuse sources (of pollution)**:** | These are primarily associated with run-off and other discharges related to different land uses such as agriculture and forestry, from septic tanks associated with rural dwellings and from the land spreading of industrial, municipal and agricultural wastes. |
| Ecology: | The study of the relationship among organisms and between those organisms and their non-living environment. |
| Ecosystem: | A community of interdependent organisms together with the environment they inhabit and with which they interact, and which is distinct from adjacent communities and environments |
| Ecological status**:** | Is an expression of the structure and functioning of aquatic ecosystems associated with surface waters. Such waters are classified as being of good ecological status when they meet the requirements of the Directive. |
| Environmental assessment: | The preparation of an environmental report, the carrying out of consultations, the taking into account of the environmental report and the results of the consultations in decision-making and the provision of information on the decision (in accordance with Articles 4 to 9 of the SEA Directive). |
| Environmental indicator: | An environmental indicator is a measure of an environmental variable over time, used to measure achievements of environmental objectives and targets. |
| Environmental objective: | Environmental objectives are broad, overarching principles which should specify a desired direction of environmental change. |
| Environmental receptors: | Include biodiversity, population, human health, fauna, flora, soil, water, air, climatic factors, material assets, cultural heritage (including architectural and archaeological) and landscape as listed in the SEA Directive. This list is not exhaustive, and can include other receptors which may arise for a particular P/P. |
| Environmental report (ER): | A document required by the SEA Directive as part of a strategic environmental assessment which identifies, describes and evaluates the likely significant effects on the environment of implementing a plan or programme. |
| Eutrophic: | A eutrophic lake is a lake with high primary productivity, the result of high nutrient content. |

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| Eutrophication: | Enrichment of water by nutrients (phosphorus and nitrogen). The nutrients accelerate plant growth, which disturbs the balance of aquatic plants and animals and affects water quality. |
| Good status: | Is a general term meaning the status achieved by a surface water body when both the ecological status and its chemical status are at least good or, for groundwater, and when both its quantitative status and chemical status are at least good. |
| Groundwater: | All water which is below the surface of the ground in the saturation zone and in direct contact with the ground or subsoil. This zone is commonly referred to as an aquifer which is a subsurface layer or layers of rock or other geological strata of sufficient porosity and permeability to allow a significant flow of groundwater or the abstraction of significant quantities of groundwater. |
| Greenhouse Gas**:** | Gaseous constituents of the atmosphere that absorb/trap infrared (thermal) radiation which is mainly emitted by the earth's surface and thereby influence the earth's temperature. |
| Habitats Directive (92/43/EEC): | Council Directive of 21 May 1992 on the conservation of natural habitats and of wild flora and fauna. |
| Hierarchy of plans: | Both higher and lower level P/P relevant to the P/P being assessed. |
| Hydromorphology: | A study of the quantity and dynamics of water flow within a river/channel that has variations in its width, depth, structure and substrate of bed and riparian zone |
| Inland Surface Waters: | All standing or flowing water on the surface of the land (such reservoirs, lakes, rivers and coastal waters) and all groundwater on the landward side of the baseline from which the breadth of territorial waters is measured. |
| Interrelationships: | Associations or linkages, related to environmental impact of the proposed P/P usually on environmental receptors. |
| Key environmental issues: | Those significant environmental issues, which are of particular relevance and significance within a P/P area and/or the zone of influence of that P/P. These issues should be identified during SEA Scoping process. |
| Kyoto Protocol**:** | The 1997 protocol to the Convention on Climate Change under which industrialised countries will reduce their combined greenhouse gas emissions by at least 5 per cent compared to 1990 levels by 2008–2012. |
| Leachate**:** | The liquid produced when water percolates through any permeable material. It can contain either dissolved or suspended material, or usually both |
| Management Measures: | Procedures that are introduced from a management plan to mitigate against any impacts that occur from the implementation of project development |

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| Material Assets: | Critical infrastructure essential for the functioning of society such as: electricity generation and distribution, water supply, wastewater treatment, transportation etc |
| Mitigation measures: | Measures to avoid/prevent, minimise/reduce, or as fully as possible, offset/compensate for any significant adverse effects on the environment, as a result of implementing a P/P. |
| Monitoring: | A continuing assessment of environmental conditions at, and surrounding, the plan or programme. This determines if effects occur as predicted or if operations remain within acceptable limits, and if mitigation measures are as effective as predicted. The primary purpose of monitoring is to identify significant environmental effects which arise during the implementation stage against those predicted during the plan preparation stage. |
| Natural Heritage Area: | An area considered important for the habitats present or which holds species of plants and animals whose habitat needs protection. |
| Non-technical summary: | A summary of the findings of the ER, summarised under the headings listed in Annex 1 of the SEA Directive that can be readily understood by decision-makers and by the general public. It should accurately reflect the findings of the ER. |
| Oligotrophic: | Term applied to water bodies that are poorly nourished, unproductive. |
| Percolation: | Concerns the movement and filtering of fluids through porous materials |
| Polluter Pays Principle: | An environmental policy principle which requires that the cost of pollution be borne by those who cause it. |
| Plan or Programme: | Including those co-financed by the European Community as well as any modifications to them:<br>- which are subject to preparation and/or adoption by an authority at national, regional or local level or which are prepared by an authority for adoption, through a legislative procedure by Parliament or Government, and<br>- which are required by legislative, regulatory or administrative provisions.<br>In accordance with the SEA Directive, P/P that require SEA are those that fulfill the conditions listed in Article 2(a) and Article 3 of the SEA Directive. |
| Programme of measure: | Defines in detail those actions which are required to achieve the environmental objectives of the Directive within a river basin district. |
| Quantitative status: | An expression of the degree to which a body of groundwater is affected by direct and indirect abstractions. If this complies with WFD requirements the status is good. |

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| Ramsar sites: | Sites designated as internationally important wetland habitats under the International Convention on Wetlands of International Importance (1976) (Ramsar Convention). |
| Reasonable alternatives: | Alternatives should take into account the objectives and geographical scope of the P/P. There can be different ways of fulfilling the P/P objectives, or of dealing with environmental problems. The alternatives should be realistic, capable of implementation and should fall within the legal and geographical competence of the authority concerned. |
| River Basin: | Means the area of land from which all surface water run-off flows, through a sequence of streams, rivers and lakes into the sea at a single river mouth, estuary or delta. |
| River Basin Districts: | administrative areas for coordinated water management and are comprised of multiple river basins (or catchments), with cross-border basins (i.e. those covering the territory of more than one Member State) assigned to an international RBD. |
| Scoping: | the process of deciding the content and level of detail of an SEA, including the key environmental issues, likely significant environmental effects and alternatives which need to be considered, the assessment methods to be employed, and the structure and contents of the Environmental Report |
| Screening: | The determination of whether implementation of a P/P would be likely to have significant environmental effects on the environment. The process of deciding whether a P/P requires an SEA. |
| SEA Directive: | Directive 2001/42/EC 'on the assessment of the effects of certain plans and programmes on the environment'. |
| SEA Statement: | A statement summarising:<br><br>how environmental considerations have been integrated into the P/P<br><br>how the ER, the opinions of the public, and designated authorities, and the results of transboundary consultations have been taken into account<br><br>the reasons for choosing the P/P as adopted in the light of other reasonable alternatives. |
| Sedimentation: | The deposition by settling of a suspended material |
| Significant effects: | Effects on the environment, including on issues such as biodiversity, population, human health, fauna, flora, soil, water, air, climatic factors, material assets, cultural heritage including architectural and archaeological heritage, landscape and the interrelationship between the above factors. |
| Special Area of Conservation: | Site designated according to the habitats directive. |

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| Special Protection Area: | An area designated under the European Directive on the Conservation of Wild Birds. |
| Statutory authority: | The authority by which or on whose behalf the plan or programme is prepared. |
| Statutory Instrument: | Any order, regulation, rule, scheme or byelaw made in exercise of a power conferred by statute. |
| Surface water**:** | Means inland waters, except groundwater, which are on the land surface (such as reservoirs, lakes, rivers, transitional waters, coastal waters and, under some circumstances, territorial waters) which occur within a river basin. |
| Transboundary Consultation: | If a plan or programme is being prepared that is likely to have significant effects on the environment in another Member State, or where a Member State likely to be significantly affected so requests, the Member State in whose territory the plan or programme is being prepared shall, before the plan or programmes adoption or submission to the legislative procedure, forward a copy of the draft plan or programme and the relevant environmental report to the other Member State. |
| Water body: | A discrete and significant element of surface water such as a river, lake or reservoir, or a distinct volume of groundwater within an aquifer. |
| Water Framework Directive**:** | The WFD is European legislation that promotes a new approach to water management through river basin planning. The legislation addresses inland surface waters, estuarine waters, coastal waters and groundwater. |

# REFERENCES

Central Statistics Office (2006). Census 2006 Reports. Accessed on 27 October, 2009. Available at http://www.cso.ie/census/Census2006Results.htm

Coillte and the Irish Sports Council (2005). Economic Value of Trails and Forest Recreation in the Republic of Ireland.

Countryside Council for Wales, English Nature, the Environment Agency and the RSPB (2004). Strategic Environmental Assessment and Biodiversity: Guidance for Practitioners.

Department of Communications, Energy and Natural Resources. Guidelines on SEA. Available at: http://www.dcmnr.gov.ie/Marine/Environmental+Assessment/Environmental+Assessment.htm

Department of Environment, Heritage and Local Government. Water Services Investment Programme 2007 – 2009. Accessed on October 23, 2009. Available at http://www.environ.ie/en/Environment/Water/WaterServices/WaterServicesInvestmentProgramme

Department of Environment, Heritage and Local Government (2004). Implementation of SEA Directive (2001/42/EC). Assessment of Certain Plans and Programmes on the Environment. Guidelines for Regional Planning Authorities.

Department of the Environment, Heritage and Local Government (2001). Coastal Zone Management. DoEHLG Spatial Planning Unit, Dublin.

Environmental Protection Agency (2009). GISEA Manual. Current Practice and Potential on the Application of Geographic Information Systems as a Support Tool in Strategic Environmental Assessment of Irish Land Use Plans. Consultation Draft.

Environmental Protection Agency (2008). Ireland's Environment, State of the Environment Report.

Environmental Protection Agency (2008). Strategic Environmental Assessment (SEA) Checklist. Consultation Draft.

Environmental Protection Agency (2007). 2020 Vision – Protecting and Improving Ireland's Environment.

Environmental Protection Agency (2006). Environment in Focus.

Environmental Protection Agency (2003). Development of Strategic Environmental Assessment (SEA) Methodologies for Plans and Programmes in Ireland. Synthesis Report.

European Commission (2002). Sixth Environmental Action Programme 2002 – 2012.

National Parks and Wildlife Service (2008). *The status of EU protected habitats and species in Ireland*. Available at: http://www.npws.ie.

Office of the Deputy Prime Minister (2005). A Practical Guide to the Strategic Environmental Assessment Directive.

Scotland & Northern Ireland Forum for Environmental Research (2008). Strategic Environmental Assessment DRAFT Practical Guidance for Practitioners on How to Take Account of Water.

Scotland & Northern Ireland Forum for Environmental Research (2008). Strategic Environmental Assessment DRAFT Practical Guidance for Practitioners on How to Take Account of Air.

Scotland & Northern Ireland Forum for Environmental Research (2008). Strategic Environmental Assessment DRAFT Practical Guidance for Practitioners on How to Take Account of Soil.

Scottish Executive (2006). Strategic Environmental Assessment Toolkit (Version 1).

# APPENDIX A

# Other Plans and Programmes

**Table 1 Other Conventions, Legislation, Plans, Policies and Programmes - International**

| Topic | Title | Summary of Objectives | Links to Plan |
|---|---|---|---|
| | UN Convention on Biological Diversity (1992) | Objectives include the maintenance and enhancement of Biodiversity. | The impacts of the Sub-basin Plan on biodiversity are largely expected to be positive, with potential negative impacts likely occurring only at a site level (e.g. construction of new infrastructure). The favouring of infrastructure that carry a lower risk of damage to biodiversity could however be emphasised in the AP in order to ensure that the operations or activities are consistent with the commitment under this Convention to halt biodiversity loss by 2010. |
| | The Ramsar Convention The Convention on Wetlands of International Importance (1971 and amendments) | Objectives include protection and conservation of wetlands, particularly those of importance to waterfowl as Waterfowl Habitat. | The impacts of the Sub-basin Plan on wetlands are largely expected to be positive. There is potential for measures in the AP to improve water quality in both the designated pearl mussel waters as well as in upstream or downstream wetlands. |
| **Climate** | UN Kyoto Protocol The United Nations Framework Convention on Climate Change (UNFCCC) Kyoto Protocol 1997 | Objectives seek to alleviate the impacts of climate change and reduce global emissions of GHGs. | Impacts related to climate change should be considered during development of the Action Programme for the Plan. |
| **Cultural Heritage** | Convention for the Protection of the Archaeological Heritage of Europe (revised) (Valletta 1992) | Objective is to protect the archaeological heritage as a source of the European collective memory and as an instrument for historical and scientific study. | The impacts of the Sub-basin Plan on archaeological heritage are largely expected to be associated with site level impacts (e.g. construction of new infrastructure). The favouring of sites and measures that carry a lower risk of impacts to archaeological heritage could be emphasised in the AP. |
| | Convention for the Protection of the Architectural Heritage of Europe (Granada 1985) | Objectives seek to provide a basis for protection of architectural heritage and are a means for proclaiming conservation principles, including a definition of what is meant by architectural heritage, such as monuments, groups of buildings and sites. The Convention also seeks to define a European standard of protection for architectural heritage and to create legal obligations that the signatories undertake to implement. | The impacts of the Sub-basin Plan on architectural heritage are largely expected to be associated with site level impacts (e.g. construction of new infrastructure). The favouring of sites and measures that carry a lower risk of impacts to architectural heritage could be emphasised in the AP. |

| Topic | Title | Summary of Objectives | Links to Plan |
|---|---|---|---|
| | The World Heritage Convention<br>United Nations Convention Concerning the Protection of the World Cultural and Natural Heritage (Paris 1972) | Objectives seek to ensure the identification, protection, conservation, presentation and transmission to future generations of the cultural and natural heritage and ensure that effective and active measures are taken for these. | The impacts of the Sub-basin Plan on cultural and natural heritage are largely expected to be associated with site level impacts (e.g. construction of new infrastructure). The favouring of sites and measures that carry a lower risk of impacts to cultural and natural heritage could be emphasised in the AP. |

**Table 2 Other Legislation, Plans, Policies and Programmes – European Union**

| Topic | Title | Summary of Objectives | Links to Plan |
|---|---|---|---|
| Biodiversity | The EU Biodiversity Strategy Communication on a European Community Biodiversity Strategy | Objectives seek to prevent and eliminate the causes of biodiversity loss and maintain and enhance current levels of biodiversity. | Although the principles impacts of the EU Biodiversity Strategy will primarily be at site level, the favouring of management measures and infrastructure in the AP that carry a lower risk of damage to biodiversity could be emphasised in the AP. It should be noted that the impacts of the PRP on biodiversity are largely expected to be positive. |
| Climate | Second European Climate Change Programme (ECCP II) 2005 | Objectives seek to develop the necessary elements of a strategy to implement the Kyoto protocol. | See UN Kyoto Protocol. |
| | Adapting to climate change in Europe – options for EU action {SEC (2007) 849} | Objective is to kick-start a Europe-wide public debate and consultation on how to take forward possible avenues for action in adapting to climate change at EU level. | Impacts related to climate change both from and on implementation of the AP should be considered during its development. |
| Human Health | The EU REACH Initiative Registration, Evaluation and Authorisation of Chemicals (REACH) | Objectives seek to limit the harmful effects to the environment and human health from certain chemicals through improved analysis and data collection. | The Sub-basin Plan should aim to prevent the harmful effects of chemicals identified under REACH. The impacts of the AP on human health are largely expected to be positive due to the water quality objectives included in the AP. |
| Soils | The Soils Directive (Draft) | The proposed Directive lays down a framework for the protection and sustainable use of soil based on the principles of integration of soil issues into other policies, preservation of soil functions within the context of sustainable use, prevention of threats to soil and mitigation of their effects, as well as restoration of degraded soils to a level of functionality consistent at least with the current and approved future use of the land. | Elements of the Sub-basin Plan that could create direct and indirect impacts on soils should be included in the assessment. |

| Topic | Title | Summary of Objectives | Links to Plan |
|---|---|---|---|
| Sustainable Development | The Gothenburg Strategy (2001) Communication from the Commission on "a Sustainable Europe for a Better World" | Objectives seek to make the future development of the EU more sustainable. Informs the 6th EAP and the Irish sustainable development strategy. | Elements of the Sub-basin Plan that could create direct and indirect impacts on land use should be included in the assessment. |
| | The Sixth Environmental Action Programme (EAP) of the European Community 2002- 2012 | Objectives seek to make the future development of the EU more sustainable. | Elements of the Sub-basin Plan that could create direct and indirect impacts on land use should be included in the assessment. |
| Water | Groundwater Directive (2006/118/EC) | This Directive establishes a regime, which sets underground water quality standards and introduces measures to prevent or limit inputs of pollutants into groundwater. | Improvements in water quality realised through the implementation of this Directive will aid in achieving the water quality objectives of the Sub-basin Plan. During compilation of the AP regard should be had to the requirements of this Directive to ensure consistency of implementation. |
| | EU Floods Directive (2007/60/EC) | The Floods Directive applies to river basins and coastal areas at risk of flooding. With trends such as climate change and increased domestic and economic development in flood risk zones, this poses a threat of flooding in coastal and river basin areas. | The Sub-basin Plan should not result in an increase in flood events or severity. |
| | Bathing Water Directive (2006/7/EC) | The overall objective of the revised Directive remains the protection of public health whilst bathing, but it also offers an opportunity to improve management practices at bathing waters and to standardise the information provided to bathers across Europe. | Improvements in water quality realised through the implementation of the Sub-basin Plan will aid in achieving the water quality overall objective of this Directive. During compilation of the AP regard should be had to the requirements of this Directive to ensure consistency of implementation. |
| | Drinking Water Directive (80/778/EEC) as amended by Directive 98/83/EC | The primary objective is to protect the health of the consumers in the European Union and to make sure drinking water is wholesome and clean. | Improvements in water quality realised through the implementation of this Directive will aid in achieving the water quality objectives of the Sub-basin Plan. During compilation of the PRP regard should be had to the requirements of this Directive to ensure consistency of implementation. |

**Table 3 Other Legislation, Plans, Policies and Programmes - National**

| Topic | Title | Summary of Objectives | Links to Plan |
|---|---|---|---|

| Topic | Title | Summary of Objectives | Links to Plan |
|---|---|---|---|
| **Biodiversity** | The National Biodiversity Plan (2002) | Objectives include the enhancement and conservation of biodiversity. Although such issues would be dealt with at local or site level, the Plan should have regard to these objectives and promote such objectives where possible. | The Sub-basin Plan should aim to minimise impacts on biodiversity. However, impacts of the AP on biodiversity would be primarily at a site level (i.e. the location of a particular piece of infrastructure, etc.). The favouring of management measures that carry a lower risk of damage to biodiversity (i.e. through the appropriate siting of facilities) could be emphasised in the AP. It should be noted that overall the impacts of the AP on biodiversity are largely expected to be positive. |
| | Flora Protection Order 1999 | Objectives are to protect listed flora and their habitats from alteration, damage or interference in any way. This protection applies wherever the plants are found and is not confined to sites designated for nature conservation. | The Sub-basin Plan should aim to minimise impacts on listed flora and their habitats. However, impacts of the AP on protected flora would be primarily at a site level (i.e. the location of a particular piece of infrastructure, etc.). The favouring of management measures that carry a lower risk of damage to protected flora (i.e. through the appropriate siting of facilities) could be emphasised in the AP. |
| **Climate** | National Climate Change Strategy (2000) and National Climate Change Strategy 2007-2012 | Objectives include the reduction of national GHG emissions (including those from the water sector). The Plan should give regard to these objectives and targets for reductions in $CO_2$ equivalents from the water sector. | GHG emissions have the potential to be generated by some of the alternatives being considered as part of the SEA. Impacts associated with these need to be assessed. |
| **Cultural Heritage** | The Planning and Development Act 2000 | Under this Act the County Councils are required to compile and maintain a Record of Protected Structures (RPS) in their Development Plans. Sites included in the RPS are awarded automatic protection and may not be demolished or materially altered without grant of permission under the Planning Acts. | The impacts of the Sub-basin Plan on structures listed on the RPS are largely expected to be associated with site level impacts (e.g. construction of new infrastructure). The favouring of sites and measures that carry a lower risk of impacts to listed structures could be emphasised in the AP. |
| | National Heritage Plan (2002) | Core objective is to protect Ireland's heritage. Plan uses the "polluter pays principle" and the "precautionary principle." Sets out archaeological policies and principles that should be applied by all bodies when undertaking a development. | The impacts of the Sub-basin Plan on cultural heritage are largely expected to be associated with site level impacts (e.g. construction of new infrastructure). The favouring of sites and measures that carry a lower risk of impacts to cultural heritage could be emphasised in the AP. |
| | The National Monuments Acts (1930 to 2004) | Objectives seek to protect monuments of national importance by virtue of the historical, architectural, traditional, artistic or archaeological interest attaching to them and includes the site of the monument, the means of access to it and any land required to preserve the monument from injury or to preserve its amenities. | The impacts of the Sub-basin Plan on national monuments are largely expected to be associated with site level impacts (e.g. construction of new infrastructure). The favouring of sites and measures that carry a lower risk of impacts to national monuments could be emphasised in the AP. |

| Topic | Title | Summary of Objectives | Links to Plan |
|---|---|---|---|
| | The Architectural Heritage (National Inventory) and Historic Monuments (Miscellaneous Provisions) Act 1999 | Provides for the establishment of a National Inventory of Architectural Heritage (NIAH). The objective of the NIAH is to aid in the protection and conservation of the built heritage, especially by advising planning authorities on the inclusion of particular structures in the Record of Protected Structures (RPS). | The impacts of the Sub-basin Plan on structures listed on the NIAH are largely expected to be associated with site level impacts (e.g. construction of new infrastructure). The favouring of sites and measures that carry a lower risk of impacts to listed structures could be emphasised in the AP. |
| | Framework and Principles for the Protection of the Archaeological Heritage (1999) | Objective is to set out for all concerned parties the basic principles and approaches for the protection of the archaeological heritage. | The impacts of the Sub-basin Plan on archaeological heritage are largely expected to be associated with site level impacts (e.g. construction of new infrastructure). The favouring of sites and measures that carry a lower risk of impacts to archaeological heritage could be emphasised in the AP. |
| | Policy and Guidelines on Archaeological Excavation (1999) | Objective is to set down policy on licensing of excavations, and guidelines for licensees on strategies and method statements, reports and publications. | See above. |
| | Architectural Heritage Protection – Guidelines for Planning Authorities | Objective is to provide a practical guide for planning authorities and for all others who must comply with Part IV of the Planning and Development Act 2000 on the protection of the architectural heritage and support the effort of protecting Ireland's architectural heritage. | The impacts of the Sub-basin Plan on architectural heritage are largely expected to be associated with site level impacts (e.g. construction of new infrastructure). The favouring of sites and measures that carry a lower risk of impacts to architectural heritage could be emphasised in the AP. |
| **Energy** | White Paper on Sustainable Energy (2007) | Objectives include the increased utilisation and development of renewable energies to meet EU targets. | Increased energy usage has the potential to occur with some of the alternatives being considered as part of the SEA. Impacts associated with these need to be assessed. |
| **Planning** | National Spatial Strategy 2002-2020 (2002) | Objectives of the NSS are to achieve a better balance of social, economic and physical development across Ireland, supported by more effective planning. | Increasing demand for wastewater treatment and water supply means that adequate accessible water management infrastructure is now regarded as a necessity for certain strategic development and in certain regions. The strategic development of such infrastructure under the AP could therefore aid the objectives of the NSS and NDP and act as an incentive for development in these areas.<br>The AP should, where possible, have regard to the NSS and consider the consistency of the pollution reduction measures with the objectives of the NSS. |
| | National Development Plan from 2007 to 2013 | Objectives of the NDP are to promote more balanced spatial and economic development. | See above. |

| Topic | Title | Summary of Objectives | Links to Plan |
|---|---|---|---|
| | Planning and Development Act 2000 | Revised and consolidated the law relating to planning and development by repealing and re-enacting with amendments the Local Government (Planning and Development) Acts, 1963 to 1999; to provide, in the interests of the common good, for proper planning and sustainable development including the provision of housing; to provide for the licensing of events and control of funfairs; to amend the Environmental Protection Agency Act 1992, the Roads Act 1993, the Waste Management Act 1996, and certain other enactments. | The Sub-basin Plan must take into account the proper planning and sustainable development of the nation as a whole. |
| **Sustainable Development** | Sustainable Development: A Strategy for Ireland (1997) (DoEHLG) | Objectives are to ensure that future development in Ireland occurs in a sustainable manner. | This is informed primarily by the EU Gothenburg strategy. |
| **Water** | Arterial Drainage Acts, 1945 and 1995 | Deals with the improvement of lands by drainage and the preventing or sustainably reducing the flooding of lands. Sets up the process of Arterial Drainage Schemes and provides for the maintenance of these works. Also implements a number of drainage and flood reduction related measures such as approval procedures for bridges and weirs, and iterates reporting requirements for Drainage Districts. | The Sub-basin Plan should not result in an increase in flood events or negatively impact on existing drainage schemes. |
| | Water Quality in Ireland 2001-2003 | This document assesses the quality of Ireland's aquatic ecosystems concentrating on ambient water quality indicators. | The Sub-basin Plan must take into account Irelands aquatic ecosystems concentrating on ambient water quality. |
| | Water Quality in Ireland 2005: Key indicators of the Aquatic Environment | The quality of rivers, lakes, estuaries, coastal waters, ground waters and canals is discussed in this report. | See above. |
| | Towards setting guideline values for the protection of groundwater in Ireland (2003) | Proposals for setting environmental quality objectives and standards for groundwater through use of guideline values. | The Sub-basin Plan must take into account environmental quality objectives and standards for groundwater. |

# APPENDIX B

# Existing Environmental Pressures and Problems in Each Catchment (Grouped by River Basin District)

## Shannon International River Basin District

### 1. Cloon

The FPM population is at unfavourable Conservation Status in the Cloon catchment. It is currently ranked as 15th out of the 27 Freshwater Pearl Mussel SAC populations in the country on the basis of population status, habitat condition and current pressures. There is an absence of juveniles and rarity of small mussels throughout the Cloon catchment where suitable habitat is found. The population is failing due to the deterioration in habitat quality which is evident from the high levels of siltation and macrophyte growth. Its demographic profile is poor as there are not the numbers of juveniles present in the population to provide sustainable replacement of the current adult numbers.

The catchment fails most of the requirements as specified in The European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations 2009. The Unfavourable Conservation Status is as a result of a number of identified environmental pressures/issues in relation to the FPM population in the Cloon catchment.

**Agricultural**

Direct animal access to drinking water resulting in trampling and poaching, together with overgrazing on the river bank, has led to increased levels of silt and nutrients downstream in this catchment. Further, machinery access and the application of slurry and fertiliser close to the river bank is resulting in diffuse loads of silt and nutrients into the watercourse due to the lack of adequate buffer (riparian) zones.

**OSWWTS**

As part of the Sub-basin Management Plans simplified pathway risk maps of the Cloon catchment have been prepared to assess the potential impact from on-site wastewater treatment systems. These are based on the *WFD National Programmes of Measures* and *Standards Study on On-site Wastewater Treatment Systems*. The tributaries and the main channel indicate areas of very high pathway risk from on-site systems within the catchment in terms of pathogens and phosphorous load to surface waters. There are 146 on-site systems on extreme risk and 199 on high risk potential settings in the Cloon catchment.

**Forestry**

Forest stands in the Cloon Catchment are spread throughout the catchment and comprise of both 139ha of Coillte (State) forestry and 456ha of private forest stands. Of this, 67ha was planted pre 1990 without buffer zones on peat or highly erodible sites which represents a high risk. The remaining 526ha was planted post 1990. Forestry within the catchment was noted to be adjacent to the river channel with little or no buffer zones 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

**Physical Modifications**

Arterial drainage through straightening, deepening and widening of river channels would have disturbed sediment regimes and habitats within the watercourse. Significant works associated with field drainage, road and bridge up-grades along many of the tributaries and main channel are of significant concern.

Numerous culverts were found throughout the catchment largely associated with one-off housing and contained high levels of silt which was discharged to the river. Significant site clearance and bank side vegetation removal associated with land improvement together with the associate roads further raises concerns regarding silt and nutrient loading.

**Quarries**

The Cloon catchment contains a number of small scale private quarries. The potential risk from quarry dust, effluent or pollution incidents is a concern for FPM.

**Other issues – Peat Cutting**

Peat cutting and spreading is in operation adjacent to the river channels in this catchment and could be a significant source of organic silt.

**Other issues – Fords**

Three significant vehicular and animal fords are located in the Cloon catchment.

## 2. Owenmore

The Freshwater Pearl mussel population is at Unfavourable Conservation Status in the Owenmore. It is currently ranked as 18 out of the 27 pearl mussel catchments in terms of status. The population is failing due to the deterioration in habitat quality which is evident from the extensive coverage of filamentous green algae which was recorded at three of the five sites surveyed for *Margaritifera* on the Owenmore River. Its demographic profile is poor as no juveniles or small mussels were observed during the current monitoring exercise

The catchment fails most of the requirements as specified in The European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations 2009. The Unfavourable Conservation Status is as a result of a number of identified environmental pressures/issues in relation to the FPM population in the Owenmore catchment.

**Agricultural**

The Owenmore catchment is dominated by inland peat bogs, up to 62.31% of the total land cover in this catchment. Livestock unit density is very low indicated by the national livestock unit density data provided by Teagasc, with densities ranging up to 0.3 lu/hectare indicating that agriculture is a not a significant land use pressure in this catchment. However, localised sheep trampling and poaching, together with animal access to drinking water, has led to increased levels of silt and nutrients downstream in this catchment. Further, many improved and intensively managed field systems are resulting in diffuse loads of nutrients into the watercourse due to the lack of adequate buffer (riparian) zones. 17ha of commonage have been recorded as severely damaged or worse and of particular concern is the overgrazing of land adjacent to, or just upstream of the FPM populations.

**OSWWTS**

As part of the Sub-basin Management Plans simplified pathway risk maps of the Owenmore catchment have been prepared to assess the potential impact from on-site wastewater treatment systems. These are based on the *WFD National Programmes of Measures* and *Standards Study on On-site Wastewater Treatment Systems*. The tributaries and the main channel indicate areas of very high pathway risk from on-site systems within the catchment in terms of pathogens and phosphorous load to surface waters. There are 22 on-site systems on extreme risk and 4 on high risk potential settings in the Owenmore catchment.

**Forestry**

Forest stands in the Cloon Catchment are spread throughout the catchment and comprise of both 17ha of Coillte (State) forestry and 166ha of private forest stands. 59ha were planted Pre 1990 and

the remaining 124ha were planted Post 1990. The three main forestry areas were recorded along the main channel of the Owenmore, one of which is a large pre 1990 stand which lacks an adequate buffer zone and was planted on peat soils. Forestry in conjunction with peat extraction adjacent to the watercourse is a significant source of silt to the river.

**Physical Modifications**

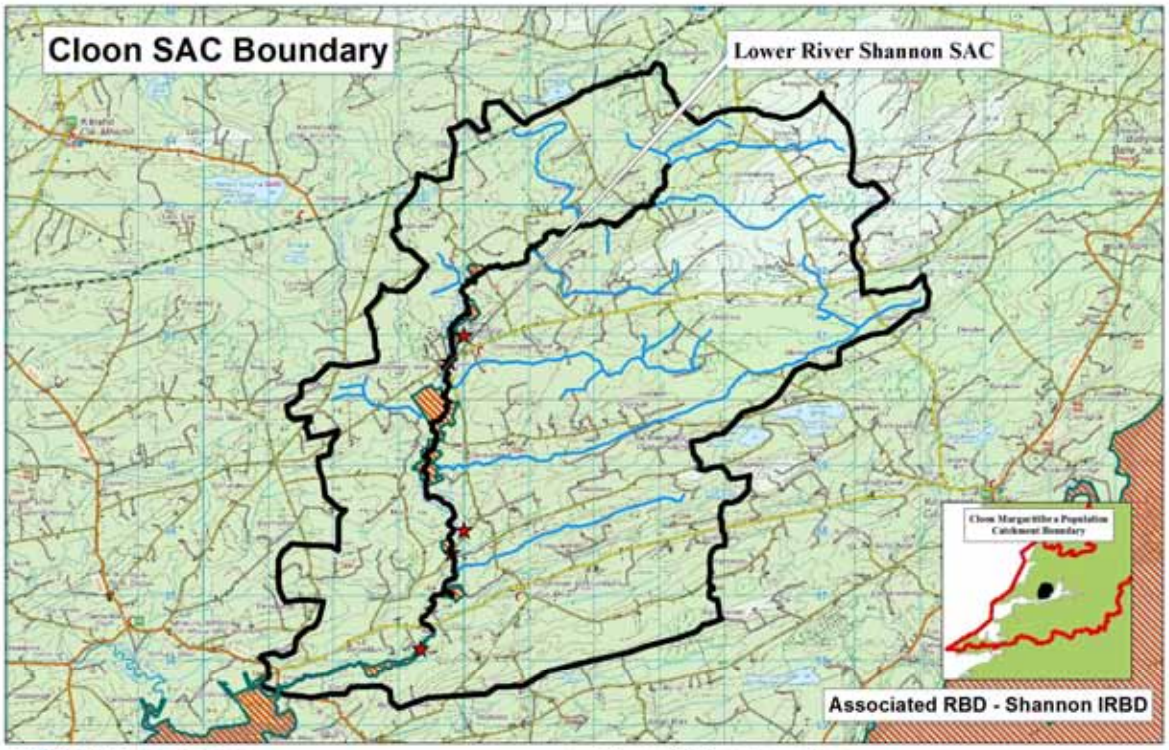
Drainage works associated with site clearance and bank works were recorded at the lower end of the catchment just upstream of the FPM population and within FPM habitat; therefore the associated impacts are of significant concern.

**Other issues – Peat Cutting**

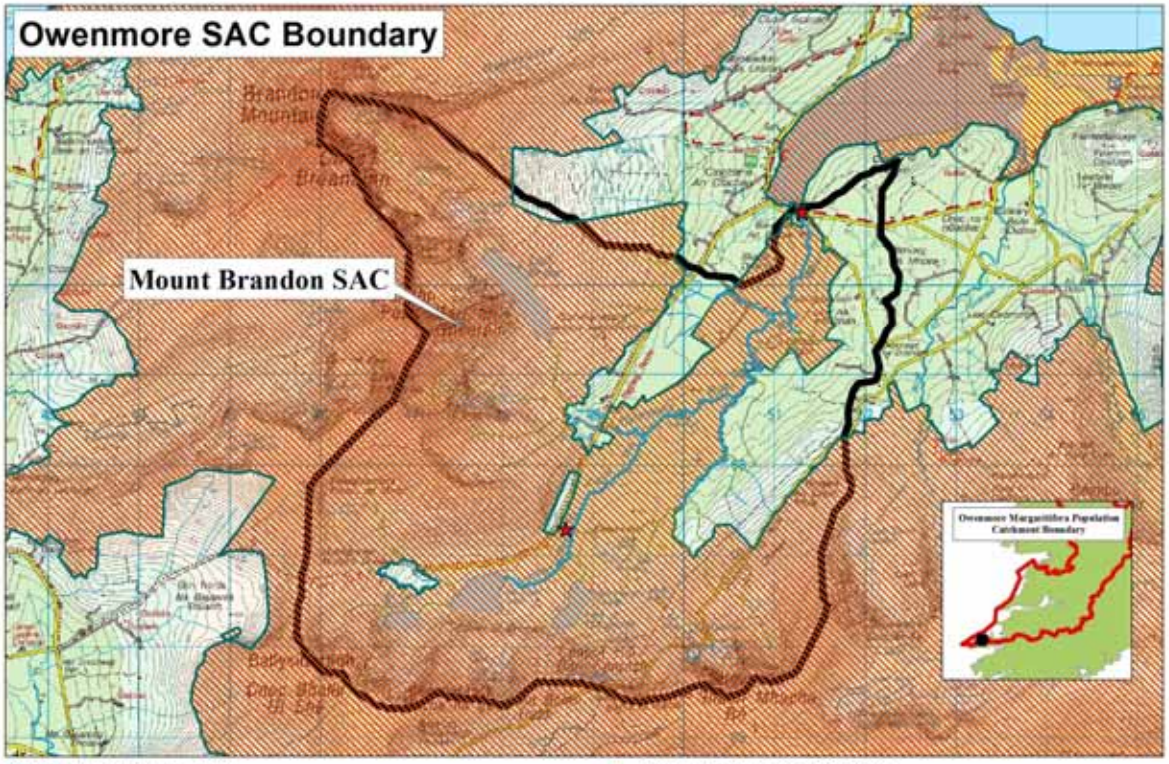
A large expanse of commercial peat cutting is in operation in the centre of the catchment adjacent to the main channel and could be a significant source of organic silt.

**Other issues – Fords**

One significant vehicular and animal ford is located on a tributary of the Owenmore catchment. This can cause significant direct sediment loading to the river from the vehicular/animal access and the access roads, leading to excessive siltation in the river.




SAC Boundary
Cloon Margaritifera Catchment Boundary
Margaritifera Location
Stretches where measures will be prioritised




SAC Boundary
Owenmore Margaritifera Catchment Boundary
Margaritifera Location
Associated RBD - Shannon IRBD

# SOUTH EASTERN RIVER BASIN DISTRICT

## 3 Aughavaud

The Freshwater Pearl mussel population is at Unfavourable Conservation Status in the Aughavaud. It is currently ranked last out of the 27 pearl mussel catchments in the country. There were no living mussels found in the Freshwater Pearl Mussel survey carried out in October 2008. This does not mean that there are no living mussels in the river, but gives a good indication that the population is in serious trouble, if not extinct.

It is rarely possible to say with absolute certainty that a population is entirely extinct. To make a more definite assumption of extinction, a full scale survey such as in other baseline SAC monitoring of at least a week would be needed. However, a sustainable population in the Aughavaud no longer exists. The Aughavaud River has serious problems with shifting substrate mainly sands, and may have very few or no living mussels left.

The catchment fails most of the requirements as specified in The European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations 2009. The Unfavourable Conservation Status is as a result of a number of identified environmental pressures/issues in relation to the FPM population in the Aughavaud catchment.

**Agricultural**

The Aughavaud catchment is dominated by soils which are high in organic matter and have low phosphorus retention properties. Direct animal access to drinking water resulting in trampling and poaching, together with overgrazing on the river bank, has led to increased levels of silt and nutrients downstream in this catchment. The vast majority of the Aughavaud catchment was found to have relatively intensive agriculture which ranged from re-seeded fields, intensively managed and possible drained arable lands and fertilised pastures. A lack of adequate buffer zones and fencing associated with improved grassland is a significant concern in this catchment.

**OSWWTS**

As part of the Sub-basin Management Plans simplified pathway risk maps of the Aughavaud catchment have been prepared to assess the potential impact from on-site wastewater treatment systems. These are based on the *WFD National Programmes of Measures* and *Standards Study on On-site Wastewater Treatment Systems*. The tributaries and the main channel indicate areas of very high pathway risk from on-site systems within the catchment in terms of pathogens and phosphorous load to surface waters. There are 63 on-site systems on very high risk potential settings in the Aughavaud catchment.

**Forestry**

Forest stands in the Aughavaud Catchment are spread throughout the catchment and comprise of both 167ha of Coillte (State) forestry and 71ha of private forest stands. 128ha were planted Pre 1990 and the remaining 108ha were planted Post 1990.

**Physical Modifications**

Arterial drainage through straightening, deepening and widening of river channels would have disturbed sediment regimes and habitats within the watercourse. Evidence of historical removal of boulders from the channel was noted within the catchment. Removal of bank side vegetation and significant bank alteration works associated with land improvement were also recorded. Significant site clearance and bank side vegetation removal associated with land improvement together with the associate roads further raises concerns regarding silt and nutrient additions.

**Point Sources**

One point source pumping station was recorded upstream of Turra bridge with sewage fungus evident at the discharge point.

# 4 Ballymurphy

The Freshwater Pearl mussel population is at Unfavourable Conservation Status in the Ballymurphy. It is currently ranked as 25th out of the 27 Freshwater Pearl Mussel catchments in the country. The population is failing in its habitat quality through evidence of heavy siltation in particular sand which was found to cover the river channel in places and also macrophyte growth with up to 80% *Ranunculus* cover found within the mussel habitat in places. It is also failing its population demographic profile, where it is evident that there are not the numbers of juveniles present in the population to provide sustainable replacement of the current adult numbers. It is estimated that approximately only 300 individuals remain where the habitat is found.

The catchment fails most of the requirements as specified in The European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations 2009. The Unfavourable Conservation Status is as a result of a number of identified environmental pressures/issues in relation to the FPM population in the Ballymurphy catchment.

**Agricultural**

Throughout the catchment grazing is an issue where adequate fencing is not provided. Animal trampling and poaching were also recorded at a number of locations along the river bank where bare earth was evident. Lack of adequate buffer zones and eroded banks were found along significant stretches which had previously been grazed.

**OSWWTS**

As part of the Sub-basin Management Plans simplified pathway risk maps of the Ballymurphy catchment have been prepared to assess the potential impact from on-site wastewater treatment systems. These are based on the *WFD National Programmes of Measures* and *Standards Study on On-site Wastewater Treatment Systems*. The tributaries and the main channel indicate areas of very high pathway risk from on-site systems within the catchment in terms of pathogens and phosphorous load to surface waters. There is one on-site system on extreme risk, 90 on very high risk and 34 on high risk potential settings in the Ballymurphy catchment.

**Forestry**

Forest stands in the Ballymurphy Catchment are spread throughout the catchment and comprise both 119ha of Coillte (State) forestry and 62ha of private forest stands. 82ha were planted Pre 1990 and the remaining 99ha were planted Post 1990.

**Physical Modifications**

Significant physical modifications and bank alterations were recorded along the rivers within the Ballymurphy catchment. In particular, excavation works of both the bank side and bank substrate were recorded on a significant stretch associated with land drainage. All bank side vegetation and much of the substrate was removed along this stretch. Within Ballymurphy, spoil heaps associated with housing developments remain on the bank side. Significant site clearance and bank side vegetation removal associated with land improvement together with the associate roads further raises concerns regarding silt and nutrient loading.

**Other issues – Fords**

Four ford crossings were recorded within the Ballymurphy catchment with varying degrees of use and access. Three would seem to have both vehicular and animal access with the fourth just animal.

# 5 Clodiagh

The Freshwater Pearl mussel population is at Unfavourable Conservation Status in the Clodiagh. It is currently ranked as 21 out of the 27 Freshwater Pearl Mussel catchments in the country. The population is failing in its habitat quality and is considered to be continuing inadequate since the previous survey in 2006. It is also failing on its population demographic profile, where it is evident that there are not the numbers of juveniles present in the population to provide sustainable replacement of the current adult numbers. Generally low densities of mussels were found in the Clodiagh together with an apparent absence of juveniles and small mussels.

The catchment fails most of the requirements as specified in The European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations 2009. The Unfavourable Conservation Status is as a result of a number of identified environmental pressures/issues in relation to the FPM population in the Clodiagh catchment.

**Agricultural**

Animal access with severe trampling and poaching was recorded at a number of locations within the catchment. This is a particular issue where adequate fencing is not provided along the watercourse. Lack of adequate buffer zones and drinking water troughs was also an issue. Bare earth along the banks as a result of poaching was also recorded at a number of locations. These have led to increased levels of silt and nutrients downstream in this catchment.

**OSWWTS**

As part of the Sub-basin Management Plans simplified pathway risk maps of the Clodiagh catchment have been prepared to assess the potential impact from on-site wastewater treatment systems. These are based on the *WFD National Programmes of Measures* and *Standards Study on On-site Wastewater Treatment Systems*. The tributaries and the main channel indicate areas of very high pathway risk from on-site systems within the catchment in terms of pathogens and phosphorous load to surface waters. There are 301 on-site systems on extreme risk, 30 0n very high risk and 249 on high risk potential settings in the Clodiagh catchment.

**Forestry**

Forest stands in the Clodiagh Catchment are spread throughout the catchment and comprise both 1,145ha of Coillte (State) forestry and 506ha of private forest stands. 1,067ha were planted Pre 1990 and the remaining 584ha were planted Post 1990.

**Physical Modifications**

Some stretches along the Clodiagh River were found to have been straightened and reinforced historically. Numerous culverts and outfalls were also found throughout the catchment some of which contained high levels of silt which was discharging to the river.

**Point Sources**

At Clonea Bridge, in Portlaw, sewerage discharge from the town was recorded with discolouration of the wall along the bank of the river. The system which is currently in operation appears completely inadequate with a number of un-sewered properties discharging upstream of the bridge. The WWTP in Clonea Power discharges to the River Clodiagh. The Q-rating of the River at this point was only Q2-3 in 2003 and Q3 in 2008. The apparent cause of the low Q-rating is the untreated discharge from a number of premises including a public house in the vicinity of the monitoring station.

**Other issues – Fords**

One significant vehicular and animal ford was located in the Clodiagh catchment.

## 6 Derreen

The Freshwater Pearl mussel population is at Unfavourable Conservation Status in the Derreen. It is currently ranked as 17th out of the 27 pearl mussel catchments in the country. The river Derreen population is in very poor status and has declined considerably in the 20 years since surveys began. Substantial juvenile numbers were found in 1990, but no evidence of recent recruitment was found in 2006 or 2009

The catchment fails most of the requirements as specified in The European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations 2009. The Unfavourable Conservation Status is as a result of a number of identified environmental pressures/issues in relation to the FPM population in the Derreen catchment.

**Agricultural**

Direct animal access to drinking water resulting in trampling and poaching, together with overgrazing on the river bank, has led to increased levels of silt and nutrients downstream in this catchment. Further, this catchment has large areas of arable landuse, in some instances ploughing was noted extremely close to the river channel resulting in diffuse loads of silt and nutrients into the watercourse due to the lack of adequate buffer (riparian) zones. The intensive agriculture located within the catchment is a significant pressure for which further information is required as to the extent throughout the catchment from DAFF.

**OSWWTS**

As part of the Sub-basin Management Plans simplified pathway risk maps of the Dereen catchment have been prepared to assess the potential impact from on-site wastewater treatment systems. These are based on the *WFD National Programmes of Measures* and *Standards Study on On-site Wastewater Treatment Systems*. The tributaries and the main channel indicate areas of very high pathway risk from on-site systems within the catchment in terms of pathogens and phosphorous load to surface waters. There are 52 on-site systems on extreme risk, 402 on very high risk and 385 on high risk potential settings in the Dereen catchment.

**Forestry**

Forest stands in the Derreen Catchment are spread throughout the catchment and comprise both 1,416ha of Coillte (State) forestry and 649ha of private forest stands. 1,062ha were planted Pre 1990 and the remaining 1,004ha were planted Post 1990. Forestry adjacent to river channels with no buffer zones was recorded within the catchment together with large clear felled areas near Rathgorragh Upper.

**Physical Modifications**

Arterial drainage through straightening, deepening and widening of river channels would have disturbed sediment regimes and habitats within the watercourse. Significant works associated with one-off housing, stock piles of construction and demolition waste together with excavation spoil were observed dumped along many of the tributaries and main channel. Reinforced banks with rock armour were also recorded along a large river stretch. Significant site clearance and bank side vegetation removal associated with one-off housing raises concerns regarding silt and nutrient additions to the watercourses.

**Point Sources**

The town contains two meat plants, Liffey Meats and Kepak, both situated in the town centre. Both these plants have their own treatment systems and do not discharge into the municipal sewer. Kepak operates its own WWTP and discharges to the River Dereen under an IPPC licence from the EPA. The WWTP in Hacketstown had considerable growth of macrophytes associated with the outfall. Rathdangan and Knockanna WWTPs have also been identified as potential sources of pollution by Wicklow County Council as the monitoring results indicate that both plants are failing to meet their objectives downstream.

**Quarries**

Four large sand/gravel pits were found within the Dereen catchment in close proximity to river channels which contain FPM populations. These were located in the Douglas Upper and Lower and near Hacketstown. The potential risk from dust, effluent or pollution incidents is a concern for FPM.

**Other issues – Fords**

Significant vehicular and animal fords are located in the Dereen catchment.

# 7 Mountain

The Freshwater Pearl mussel population is at Unfavourable Conservation Status in the Mountain/Aughnabrisky catchment. It is currently ranked as the 20th out of the 27 pearl mussel catchments in the country. The Mountain River population is in very poor status, it is in rapid decline, and is in danger of imminent extinction. Sediment loads in the river are exceptionally high, and recent losses of adults have occurred downstream of an area of substantial bank and in-stream works with direct connectivity to the mussel population.

The catchment fails most of the requirements as specified in The European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations 2009. The Unfavourable Conservation Status is as a result of a number of identified environmental pressures/issues in relation to the FPM population in the Mountain catchment.

**Agricultural**

Direct animal access to drinking water resulting in trampling and poaching, together with overgrazing on the river bank, has led to increased levels of silt and nutrients downstream in this catchment. Further, lack of adequate buffer zones in areas of intensive arable and pasture landuse was also recorded at a number of locations. A number of discharge points associated with land drainage were recorded with the catchment with silt and sediment deposition, and macrophyte growth also found in close proximity.

**OSWWTS**

As part of the Sub-basin Management Plans simplified pathway risk maps of the Mountain catchment have been prepared to assess the potential impact from on-site wastewater treatment systems. These are based on the *WFD National Programmes of Measures* and *Standards Study on On-site Wastewater Treatment Systems*. The tributaries and the main channel indicate areas of very high pathway risk from on-site systems within the catchment in terms of pathogens and phosphorous load to surface waters. There are 14 on-site systems on extreme risk, 266 on very high risk and 251 on high risk potential settings in the Mountain catchment.

**Forestry**

Forest stands in the Mountain Catchment were observed in the upper reaches of the catchment and comprise of both 509ha of Coillte (State) forestry and 349ha of private forest stands. 335ha were planted Pre 1990 and the remaining 523ha were planted Post 1990. New forestry coupes with adequate buffers were also recorded adjacent to one river stretch.

**Physical Modifications**

Arterial drainage through straightening, deepening and widening of river channels would have disturbed sediment regimes and habitats within the watercourse. This was particularly evident with the Glasheroge stream and the Scortreen River. Further, significant works together with a large culverted bridge were also carried out at brook lodge bridge bank. Significant site clearance and bank side vegetation removal raises concerns regarding silt and nutrient additions to the watercourses.

**Point Sources**

The WWTP at Borris was recorded discharging to the main river channel. Two WwTPs and one IPPC license are located within the catchment.

**Other issues – Fords**

Three significant vehicular and animal fords are located in the Mountain catchment.

## 8 Nore

The Freshwater Pearl mussel population is at unfavourable Conservation Status in the Munster Blackwater. It is currently ranked as 26th out of the 27 Freshwater Pearl Mussel SAC populations in the country on the basis of population status, habitat condition and current pressures.

The population of *Margaritifera durrovensis* in the Nore River is known to be critically endangered for some time with evidence that there has been no recruitment for some time. Captive breeding is likely to form an important part of the rehabilitation of the Nore pearl mussel and its habitat if it is to avoid extinction. The population is now thought to be restricted to a short section of approximately 10km of the main Nore channel in very low numbers.

The catchment fails all of the five Environmental Quality Objectives (EQOs) as specified in Schedule 4 of the European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations, S.I. 296 of 2009.

**Agricultural**

Direct animal access to drinking water resulting in trampling and poaching, together with overgrazing on the river bank, has led to increased levels of silt and nutrients downstream in this catchment due to the lack of adequate buffer (riparian) zones. A large percentage of the catchment is covered by relatively intensive pasture and silage, and also there is a significant area of tillage within the catchment with associated risks of nutrient/sediment losses. All agricultural that can lead to soil erosion (e.g. drainage, land reclamation, ploughing, poaching, overgrazing) and/or nutrient losses (e.g. slurry-spreading, fertilisation) are potential significant risks.

**OSWWTS**

As part of the Sub-basin Management Plans simplified pathway risk maps of the Nore catchment have been prepared to assess the potential impact from on-site wastewater treatment systems. These are based on the *WFD National Programmes of Measures* and *Standards Study on On-site Wastewater Treatment Systems*. The tributaries and the main channel indicate areas of very high pathway risk from on-site systems within the catchment in terms of pathogens and phosphorous load to surface waters. There are 1,396 on-site systems on extreme risk, 2,785 on very high risk and 958 on high risk potential settings in the Nore catchment.

**Forestry**

Forest stands in the Nore Catchment are spread throughout the catchment, with 6,702ha being planted pre 1990 and this is likely to have insufficient buffering.

**Physical Modifications**

Throughout the catchment there is extensive evidence that flood alleviation schemes and land improvement works (e.g. straightened channels, deepened channels, widened channels, removal of bankside vegetation and inappropriate culverts) are a significant pressure. These works appear to be undertaken along large stretches of the river channel together with large expanses of the riparian zone.

**Point Sources**

Glanbia PLC Dairy plant was found discharging just above the main pearl mussel population on the Nore with sewage fungus noted at the outlet. A large number of outfalls were also noted throughout the catchment many of which had fine sands or silts together with sewage fungus contained within them.

The catchment in total contains 40 WWTP's, 22 Section 4's and 24 IPPC licenced facilities. Five WWTP's have high risks associated with them and include Abbeyleix, Ballyroan-Mountrath, and Borris In Ossory.

**Quarries**

Carroll's Quarry is a significant pressure within this catchment. A tributary of the Nore flows along the back of this quarry and may be a source of silt to the channel.

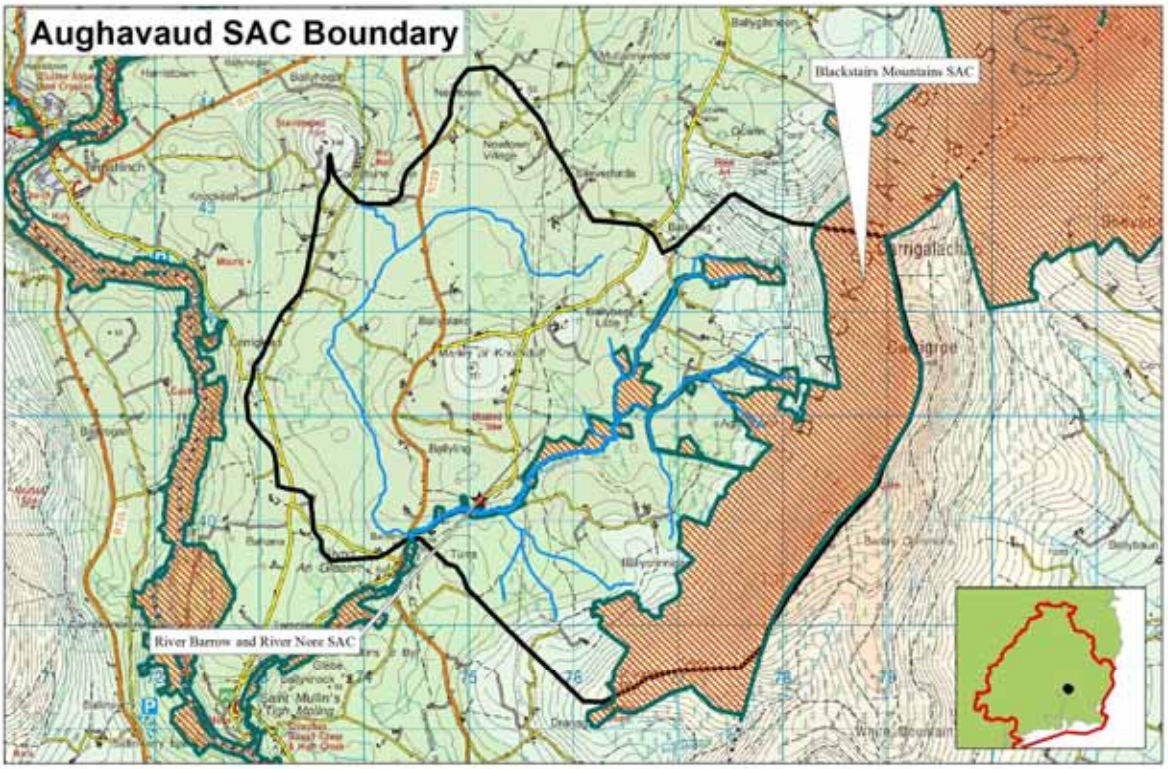
A total of 19 quarries are located throughout the catchment which potentially can cause a significant risk of sediment loss if not properly designed and managed.

**Other issues – Peat Cutting**

Operation of peat cutting activities on a commercial scale without a licence has resulted in the drainage of bogs within NHA's including the Nore Valley bog NHA and Knockacoller Bog SAC. These represent risks of siltation and raised DOC and Ammonia levels. Any further intensification of this pressure could lead to the extinction of the Nore population.

**Other issues – Barriers to Fish Migration**

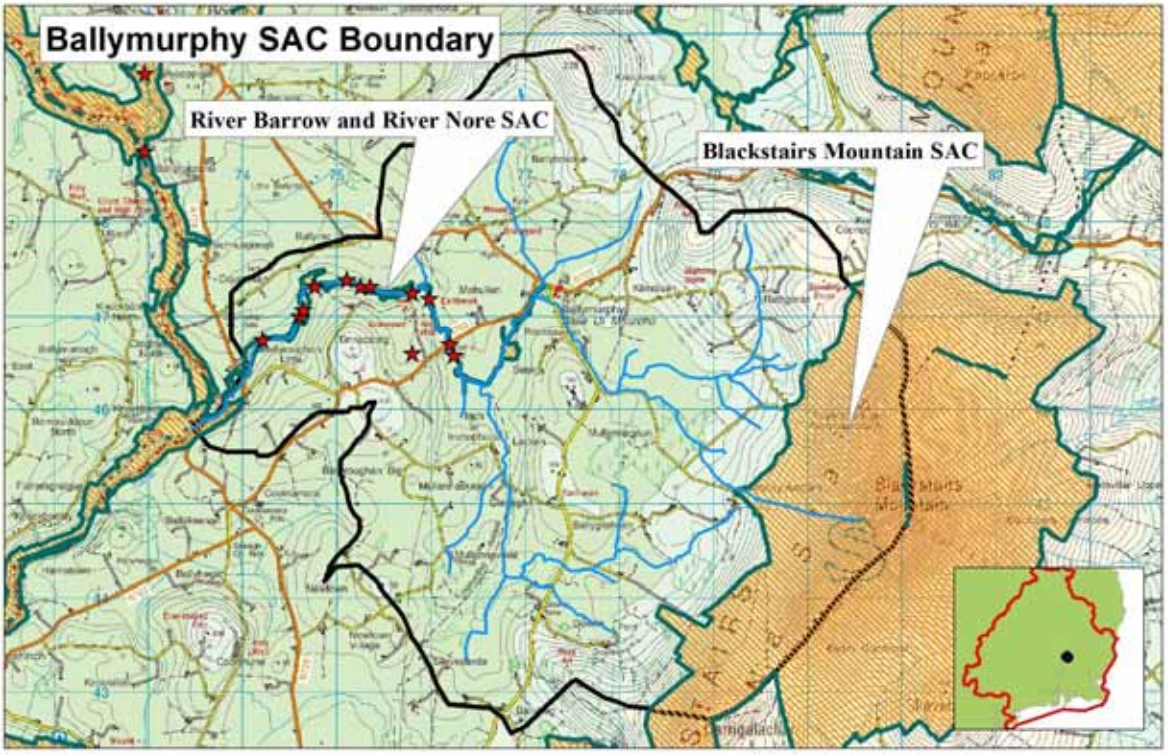
The barrier associated with the Delour Sand Trap has been identified by the Fisheries Board as non functional.




Aughavaud Margaritifera Catchment Boundary ★ Margaritifera Location

SAC Boundary

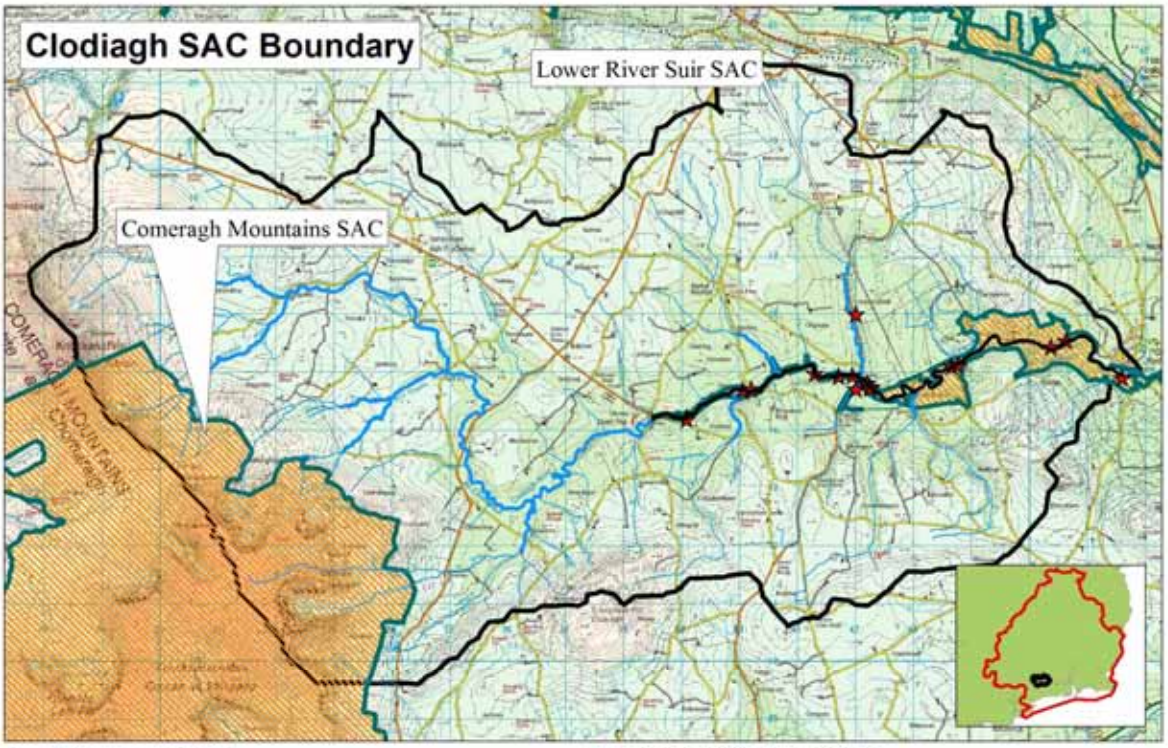
Associated RBD - South Eastern RBD

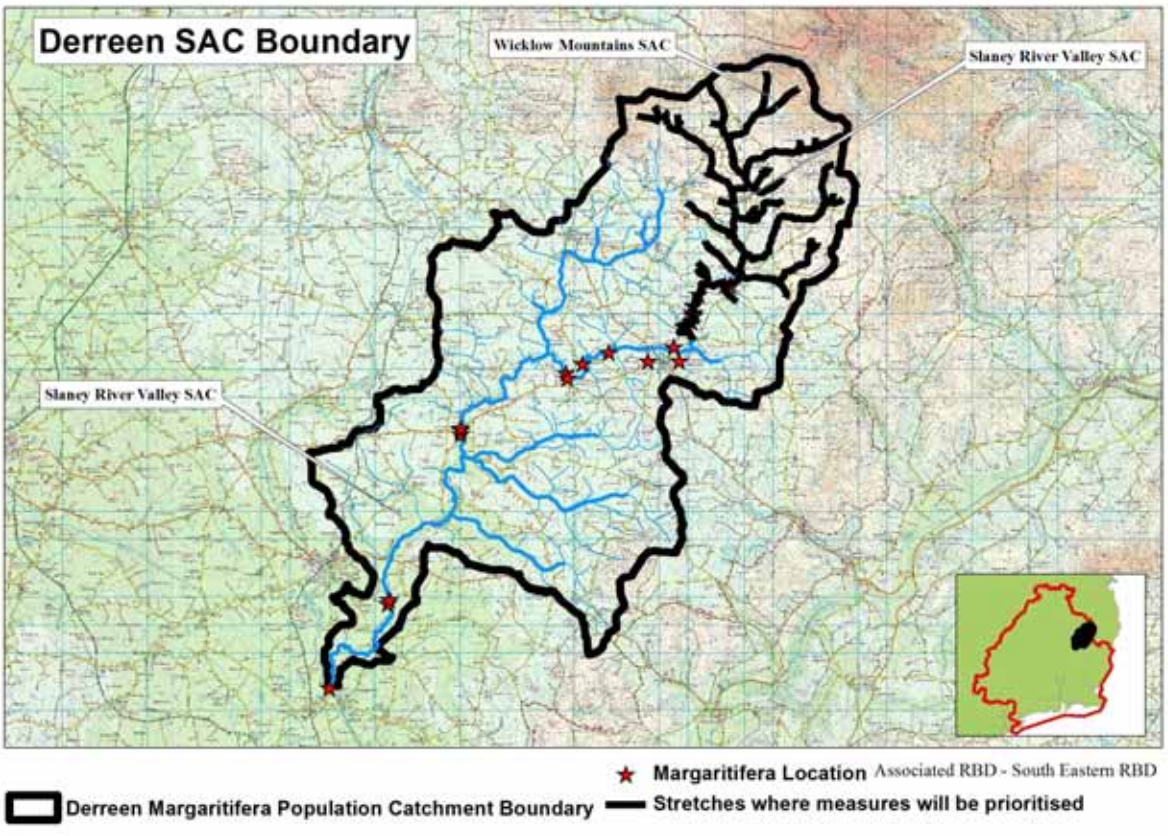


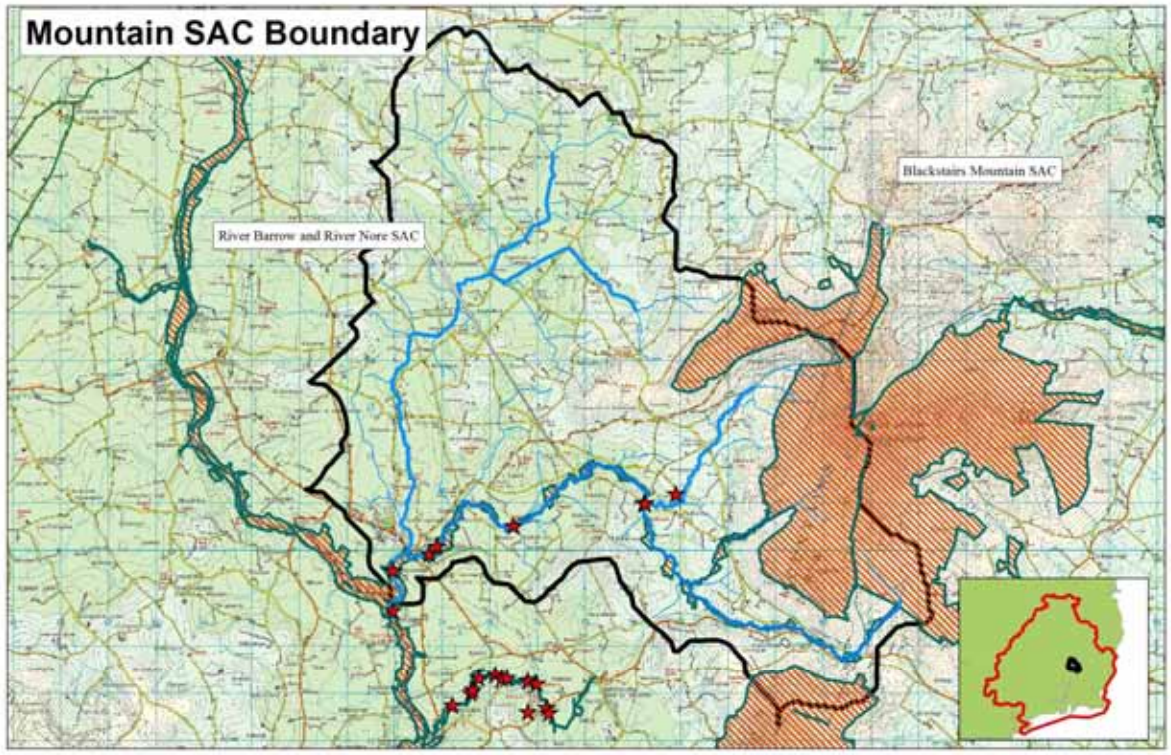

Ballymurphy Margaritifera Catchment Boundary ★ Margaritifera Location

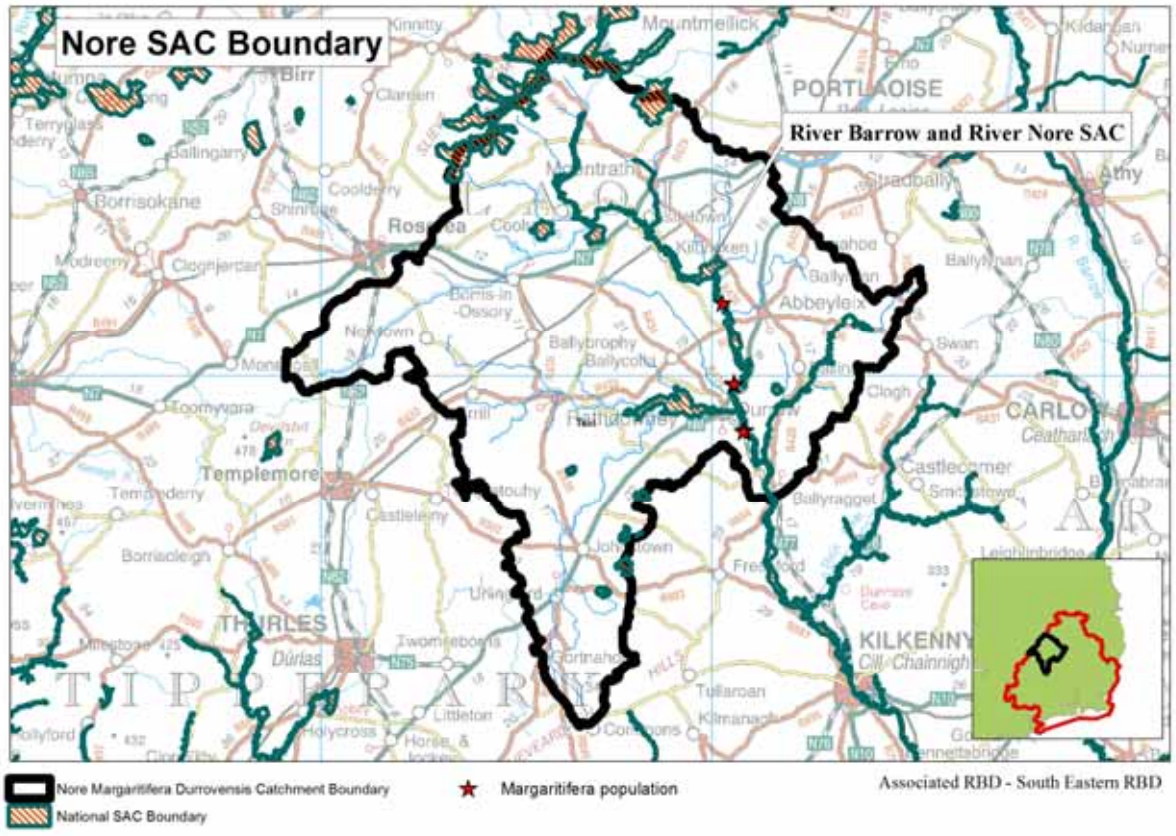
SAC Boundary

Associated RBD - South Eastern RBD


Clodiagh SAC Boundary
Lower River Suir SAC
Comeragh Mountains SAC
SAC Boundary
Clodiagh Margaritifera Catchment Boundary
Margaritifera Location
Priority stretch where measures will be applied
Associated RBD - South Eastern RBD


Derreen SAC Boundary
Wicklow Mountains SAC
Slaney River Valley SAC
Slaney River Valley SAC
Margaritifera Location
Associated RBD - South Eastern RBD
Derreen Margaritifera Population Catchment Boundary
Stretches where measures will be prioritised


Mountain SAC Boundary
Blackstairs Mountain SAC
River Barrow and River Nore SAC
SAC boundary
Margaritifera Location
Associated RBD - South Eastern RBD
Mountain Margaritera Catchment Boundary


Nore SAC Boundary
River Barrow and River Nore SAC
PORTLAOISE
Templemore
THURLES
KILKENNY
Nore Margaritifera Durrovensis Catchment Boundary
Margaritifera population
Associated RBD - South Eastern RBD
National SAC Boundary

# SOUTH WESTERN RIVER BASIN DISTRICT

## 9 Allow

The Freshwater Pearl mussel population is at Unfavourable Conservation Status in the Allow. It is currently ranked as 12th out of the 27 pearl mussel catchments in terms of status. The population is failing due to the deterioration in habitat quality which is evident from the high levels of siltation and macrophyte growth. Its demographic profile is poor as there are not the numbers of juveniles present in the population to provide sustainable replacement of the current adult numbers.

The catchment fails most of the requirements as specified in The European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations 2009. The Unfavourable Conservation Status is as a result of a number of identified environmental pressures/issues in relation to the FPM population in the Allow catchment.

**Agricultural**

Direct animal access to drinking water resulting in trampling and poaching, together with overgrazing on the river bank, has led to increased levels of silt and nutrients downstream in this catchment. Further, machinery access and the application of slurry and fertiliser close to the river bank is resulting in diffuse loads of silt and nutrients into the watercourse due to the lack of adequate buffer (riparian) zones. Intensive agriculture within the catchment is a significant pressure.

**OSWWTS**

As part of the Sub-basin Management Plans simplified pathway risk maps of the Allow catchment have been prepared to assess the potential impact from on-site wastewater treatment systems. These are based on the *WFD National Programmes of Measures* and *Standards Study on On-site Wastewater Treatment Systems*. The tributaries and the main channel indicate areas of very high pathway risk from on-site systems within the catchment in terms of pathogens and phosphorous load to surface waters. There are 189 on-site systems on extreme risk and 1,434 on very high risk and 387 on high risk potential settings in the Allow catchment.

**Forestry**

Forest stands in the Allow Catchment are spread throughout the catchment and comprise both 2,561ha of Coillte (State) forestry and 1,581ha of private forest stands. 1,558ha were planted Pre 1990 while the remaining 2,584ha were planted Post 1990. Significant site clearance and bank side vegetation removal associated with forestry and forestry roading was noted and is a risk factor for silt and nutrient loss to the watercourses.

**Physical Modifications**

Arterial drainage through straightening, deepening and widening of river channels would have disturbed sediment regimes and habitats within the watercourse. Significant works associated with field drainage, along many of the tributaries and main channel, are of significant concern.

Numerous culverts were found throughout the catchment largely associated with one-off housing and contained high levels of silt which was discharged to the river.

**Abstractions**

The Allow Regional Supply at Freemount has been identified as posing a risk to the freshwater pearl mussel population. It is located above the Allow pearl mussel population.

**Point Sources**

Three major point source pressures were observed in the catchment, Newmarket Co-Op, Kanturk Creamery and Munster Joinery. All were observed causing significant impact on the associated river stretch.

**Other issues – Peat Cutting**

A large expanse of commercial peat cutting using difco was recorded in the upper reaches of the catchment. This could be a significant source of organic silt.

**Other issues – Fords**

Four significant ford crossings were recorded within the Allow catchment.

## 10 Bandon/Caha

The Freshwater Pearl mussel population is at Unfavourable Conservation Status in the Bandon/Caha. It is currently ranked as 14th out of the 27 pearl mussel catchments in the country. The population of Margaritifera in the Bandon and Caha is not likely to be in favourable condition, based on most recent available information from surveys in 2005 and on habitat surveys in 2009. Its demographic profile is poor and there is an absence of juveniles and rarity of small mussels throughout the catchment. Three attempts were made to survey the Bandon and Caha Rivers in 2009 but all were unsuccessful due to high water levels and poor visibility. The status information is therefore based on most recent data which is from 2005.

The catchment fails most of the requirements as specified in The European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations 2009. The Unfavourable Conservation Status is as a result of a number of identified environmental pressures/issues in relation to the FPM population in the Bandon / Caha catchment.

**Agricultural**

The Bandon/Caha rivers and their tributaries are dominated by soils which are high in organic matter and have low phosphorus retention properties. Direct animal access to drinking water resulting in trampling and poaching, together with overgrazing on the river bank, has led to increased levels of silt and nutrients downstream in this catchment. Further, machinery access and the application of slurry and fertiliser close to the river bank is resulting in diffuse loads of silt and nutrients into the watercourse due to the lack of adequate buffer (riparian) zones. Some areas of commonage have been recorded as damaged within the catchment.

**OSWWTS**

As part of the Sub-basin Management Plans simplified pathway risk maps of the Bandon/Caha catchment have been prepared to assess the potential impact from on-site wastewater treatment systems. These are based on the *WFD National Programmes of Measures* and *Standards Study on On-site Wastewater Treatment Systems*. The tributaries and the main channel indicate areas of very high pathway risk from on-site systems within the catchment in terms of pathogens and phosphorous load to surface waters. There are 260 on-site systems on extreme risk, 192 on very high risk and 304 on high risk potential settings in the Bandon/Caha catchment.

**Forestry**

Forest stands in the Bandon/Caha Catchment are spread throughout the catchment and comprise both 2,049ha of Coillte (State) forestry and 1,320ha of private forest stands. 1,546ha were planted Pre 1990 and the remaining 1,823ha were planted Post 1990.

**Physical Modifications**

Arterial drainage through straightening, deepening and widening of river channels would have disturbed sediment regimes and habitats within the watercourse. The Dunmanaway Flood Relief scheme undertaken by the OPW in 2001 included an embankment and side channels. This scheme took place directly upstream of and also within the vicinity of FPM populations; therefore the associated impacts are of significant concern.

Numerous culverts were found throughout the catchment largely associated with one-off housing and contained high levels of silt which was discharged to the river. Significant site clearance and bank side vegetation removal associated with land improvement together with the associate roads further raises concerns regarding silt and nutrient loadings.

**Point Sources**

The Bandon catchment contains one WwTP located in Dunmanway which is located directly upstream of the majority of mussels.

**Quarries**

The Bandon catchment contains four quarries which are adjacent to river stretches which contain FPM populations. The potential risk from quarry dust, effluent or pollution incidents is a concern.

## 11 Caragh

The FPM population is at Unfavourable Conservation Status in the Caragh. It is currently ranked as the 2nd best catchment out of the 27 pearl mussel catchments in the country. The Caragh holds twice as many mussels as all other European countries combined, with the exception of Scotland. This illustrates its significance as a freshwater pearl mussel catchment in a European context.

While good numbers of adults are found throughout the catchment, juveniles and small mussels (≤65mm) are rare due to the unsuitable habitat conditions for them. The catchment fails most of the requirements as specified in The European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations 2009. The Unfavourable Conservation Status is as a result of a number of identified environmental pressures/issues in relation to the FPM population in the Caragh catchment.

**Agricultural**

161ha of commonage land is severely damaged or worse, and 195ha is moderately to severely damaged. In total 9% of commonage land in the catchment is damaged. There are three keys areas where damaged land is either adjacent to or just upstream of pearl mussel habitat – particularly in the lower south western and the upper north western part of the catchment.

Lack of adequate buffer zones and fencing was found throughout the catchment. Evidence of bank erosion from cattle and sheep poaching was also observed leading to increased levels of silt and nutrients downstream due to the lack of adequate buffer (riparian) zones.

Note: The Caragh is a high energy system with significant natural bank erosion taking place which is evident throughout the main channel. Bank stabilisation measures will be needed throughout this catchment to combat this issue.

**OSWWTS**

As part of the Sub-basin Management Plans simplified pathway risk maps of the Caragh catchment have been prepared to assess the potential impact from on-site wastewater treatment systems. These are based on the *WFD National Programmes of Measures* and *Standards Study on On-site Wastewater Treatment Systems*. The tributaries and the main channel indicate areas of very high pathway risk from on-site systems within the catchment in terms of pathogens and phosphorous load to surface waters. There are 156 on-site systems on extreme risk, 1 on very high risk and 110 on high risk potential settings in the Caragh catchment. High numbers of one off housing was observed in the lower part of the catchment in particular along the banks of the Caragh River.

**Forestry**

Forestry in the Caragh catchment is primarily located in the lower part of the catchment, with some situated on steep slope, and comprise of both 904ha of Coillte (State) forestry and 426ha of private forest stands. 708ha were planted Pre 1990 and the remaining 622ha were planted Post 1990. In some locations, no buffer exists between the plantation and the river, with insufficient silt traps also noted. Some of these plantations include deciduous stands, which also have no buffer zones with the river channel. Both the coniferous and deciduous plantations are a risk factor in relation to silt and nutrient loading.

**Physical Modifications**

Throughout the catchment there is extensive evidence that site clearance, excavation, in-filling and land improvement works are a significant pressure. These works appear to be undertaken along large stretches of the river channel together with large expanses of the riparian zone. Improved grassland was noted along much of the Glashawee & Caragh River in the vicinity of the pearl mussel population. Also along the steep slopes within the catchment very large fields had been reclaimed. These works are a significant source of silt and nutrient additions to the river channel.

**Point Sources**

The catchment contains one Section 4 licensed discharge.

**Other issues – Peat Cutting**

Difco cutting was observed west of the bridge at on the Owenroe River, where the plot was within 30m of the river channel. The difco machine (also known as sausage machines) was also noted to have crossed the river immediately downstream of the bridge and the peat from the machine's caterpillar-tracks was distributed along the road and the river margin. Gravel was also dumped along the river banks and into the river at the entry and exit points of the machine. A small number of crushed shells were observed. Such direct pressure can cause loss of habitat, pearl mussel mortality together with the release of high levels of silt to the channel.

## 12 Currane

The FPM population is at Unfavourable Conservation Status in the Currane. It is currently ranked as the 8th best catchment out of the 27 pearl mussel catchments in the country. Although a complete survey of the entire river has not yet been completed, an initial rapid assessment was carried out during July 2007. That rapid assessment found that a very large and significant population of *Margaritifera* is present in the Cummeragh River between the salmon hatchery at Clodragh and Lough Currane.

The current investigation (2009) relates to a stretch of approximately 800m upstream of Dromkeare Bridge, and the installation of one permanent monitoring transect downstream of Drumkeare Bridge. *Margaritifera* is widely distributed throughout the Cummeragh River downstream of Lough Derriana, but a comprehensive survey is required to gather detailed data on the distribution and demography of the population present.

The catchment fails most of the requirements as specified in The European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations 2009. The Unfavourable Conservation Status is as a result of a number of identified environmental pressures/issues in relation to the FPM population in the Currane catchment.

**Agricultural**

Areas of commonage were identified at the upstream end of the catchment. These areas are largely undamaged and are not within the vicinity of the FPM populations, which are located at the downstream end of the catchment.

Direct animal trampling and poaching on the river bank was noted at a number of locations within the catchment where inadequate fencing was provided. This has led to increased levels of silt and nutrients downstream in this catchment due to the lack of adequate buffer (riparian) zones.

Observed impacts in relation to the damaged commonage areas are based on the Commonage Frameworks Plans through the Rural Environmental Schemes and Programmes (REPS 3, 1999) and catchment walkover risk assessments. Further investigation of potential overgrazing damage is required.

**OSWWTS**

As part of the Sub-basin Management Plans simplified pathway risk maps of the Currane catchment have been prepared to assess the potential impact from on-site wastewater treatment systems. These are based on the *WFD National Programmes of Measures* and *Standards Study on On-site*

*Wastewater Treatment Systems*. The tributaries and the main channel indicate areas of very high pathway risk from on-site systems within the catchment in terms of pathogens and phosphorous load to surface waters. There are 119 on-site systems on extreme risk, 2 on very high risk and 27 on very high risk potential settings in the Currane catchment. The number of one off housing which was observed within the catchment was not significant. However, the number of one-off housing and associated on site systems should be kept to a minimum.

**Forestry**

Only small stands of forestry were observed within the Currane catchment and comprise of both 318.22ha of Coillte (State) forestry and 53.22ha of private forest stands. 325.61ha were planted Pre 1990 and the remaining 45.83ha were planted Post 1990. Some of the forestry stands are within or upstream of pearl mussel populations and is a risk factor for silt and nutrient additions.

**Physical Modifications**

Throughout the catchment there is extensive evidence that site clearance, excavation, in-filling and land improvement works are a significant pressure. These works appear to be undertaken along large stretches of the river channel. Such works lead to increased sediment loading to the channel.

**Point Sources**

A very large Mink farm (Willow Herb Ltd.) was noted on the banks of the Currane in the vicinity of a pearl mussel population with associated truck washing and land spreading facilities. The mink farm was observed to be having a significant impact on the river channel. A fish farm at Clodragh was also recorded and has the potential to impact on the suitable pearl mussel habitat.

## 13 Gearhameen

The Freshwater Pearl mussel population is at Unfavourable Conservation Status in the Caragh. It is currently ranked as the 13th best catchment out of the 27 pearl mussel catchments in the country. Initial baseline monitoring has not yet taken place in the Gearhameen catchment, so the work carried out in 2009 represents the best expert judgement on the current status of the river, without the benefit of comprehensive past survey information.

Due to the apparent absence of juveniles and the scarcity of small mussels, at the sites investigated, the unfavourable status recorded previously remains unchanged.

The catchment fails most of the requirements as specified in The European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations 2009. The Unfavourable Conservation Status is as a result of a number of identified environmental pressures/issues in relation to the FPM population in the Gearhameen catchment.

**Agricultural**

Direct animal access to drinking water resulting in trampling and poaching, particularly in the upper reaches of the Owenreagh River, together with overgrazing along the slopes of the mountains near the Gearhameen River, has led to increased levels of silt and nutrients downstream in this catchment. Lack of fencing was also noted within these areas were heavy silt loading was observed.

**OSWWTS**

As part of the Sub-basin Management Plans simplified pathway risk maps of the Gearhameen catchment have been prepared to assess the potential impact from on-site wastewater treatment systems. These are based on the *WFD National Programmes of Measures* and *Standards Study on On-site Wastewater Treatment Systems*. The tributaries and the main channel indicate areas of very high pathway risk from on-site systems within the catchment in terms of pathogens and phosphorous load to surface waters. There are 25 on-site systems on extreme risk and 31 on very high risk potential settings in the Gearhameen catchment. One commercial facility is located at Molls Gap (Avoca), and numerous one-off housing was also recorded within this catchment. These may be a source of nutrient input within the catchment.

**Forestry**

Forestry in the Gearhameen catchment is primarily located along the Owenreagh River and comprise of both 207ha of Coillte (State) forestry and 79ha of private forest stands. 282ha were planted Pre 1990 and the remaining 4ha were planted Post 1990. In some locations, particularly along the

Gearhameen River, no buffer zones exist between the plantation and the river. Some of the plantations along the Owenreagh include deciduous stands, which also have no buffer zones with the river channel. Both the coniferous and deciduous plantations are a risk factor in relation to silt loading.

**Abstractions**

One small scale abstraction was noted at Lord Brandon's cottage in association with the restaurant and historical site. As the main pearl mussel population is located along this river stretch it could prove problematic in low flows.

**Physical Modifications**

Some limited reinforcement, straightening and embankment on river banks along the upper reaches of the Owenreagh were recorded. Land drainage works were also observed along the upper reaches of Gearhameen. Significant works associated with field drainage along many of the tributaries and main channel are of significant concern.

Numerous culverts were noted in the catchment, particularly along the smaller tributaries of the Owenreagh. Downstream of these culverts, abundant filamentous green algal growth was observed, and it was also noted the sill of the culverts were above water levels at low flows and therefore impassable for fish. Again such works are a significant concern.

**Quarries**

One quarry was observed at the top of the catchment – Moll's Gap Quarry. Moll's Gap Quarry is currently registered by Kerry County Council. An inspection has been carried out and they have imposed conditions which Kerry County Council is enforcing.

**Other issues – Peat Cutting**

Large areas of peat cutting were recorded along the banks of the Owenreagh and could be a significant source of organic silt.

**Other issues – Fords**

One significant ford was observed downstream of Lord Brandon's cottage in the Gearhameen catchment.

## 14 Kerry Blackwater

The FPM population is at Unfavourable Conservation Status in the Kerry Blackwater. It is currently ranked as the 7th best catchment out of the 27 pearl mussel catchments in the country. There has been an observed reduction of mussel numbers at all sites investigated in 2009 with an apparent absence of juveniles and rarity of small mussels. The catchment fails most of the requirements as specified in The European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations 2009. The Unfavourable Conservation Status is as a result of a number of identified environmental pressures/issues in relation to the FPM population in the Kerry Blackwater catchment.

**Agricultural**

Direct animal access to drinking water resulting in trampling and poaching, together with overgrazing and bank erosion, has resulted in increased levels of silt and nutrients downstream in this catchment. A lack of adequate buffer zones and fencing was found throughout the catchment.

Note: The Kerry Blackwater is a high energy system with significant natural bank erosion taking place which is evident throughout the main channel. Bank stabilisation measures will be needed throughout this catchment, in conjunction with the control of poaching and grazing pressures to combat this issue.

**OSWWTS**

As part of the Sub-basin Management Plans simplified pathway risk maps of the Kerry Blackwater catchment have been prepared to assess the potential impact from on-site wastewater treatment systems. These are based on the *WFD National Programmes of Measures* and *Standards Study on On-site Wastewater Treatment Systems*. The tributaries and the main channel indicate areas of very high pathway risk from on-site systems within the catchment in terms of pathogens and phosphorous load to surface waters. There are 205 on-site systems on extreme risk, 3 on very high risk and 40 on high risk potential settings in the Kerry Blackwater catchment. High numbers of one off housing were recorded in the lower part of the catchment.

**Forestry**

Forest stands in the Kerry Blackwater Catchment are spread throughout the catchment and comprise both 633ha of Coillte (State) forestry and 381ha of private forest stands. 611ha were planted Pre 1990 and the remaining 402ha were planted Post 1990.

**Other issues – Peat Cutting**

Peat cutting is evident within the catchment and most significantly it occurs within the vicinity of the FPM populations. This could be a significant source of organic silt.

## 15 Licky

The Freshwater Pearl mussel population is at Unfavourable Conservation Status in the Licky. It is currently ranked as 19th out of the 27 pearl mussel catchments in the country. It has small numbers of adults from historical records, and very few juveniles. The catchment fails all requirements as specified in The European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations 2009. The Unfavourable Conservation Status is as a result of a number of identified environmental pressures/issues in relation to the FPM population in the Licky catchment.

### Agricultural

Direct animal access to drinking water resulting in trampling and poaching, together with overgrazing on the river bank, has led to increased levels of silt and nutrients downstream in this catchment. Further, machinery access and the application of slurry and fertiliser close to the river bank is resulting in diffuse loads of silt and nutrients into the watercourse due to the lack of adequate buffer (riparian) zones.

### OSWWTS

As part of the Sub-basin Management Plans simplified pathway risk maps of the Licky catchment have been prepared to assess the potential impact from on-site wastewater treatment systems. These are based on the *WFD National Programmes of Measures* and *Standards Study on On-site Wastewater Treatment Systems*. The tributaries and the main channel indicate areas of very high pathway risk from on-site systems within the catchment in terms of pathogens and phosphorous load to surface waters. There are 48 on-site systems on very high risk and 76 on high risk potential settings in the Licky catchment and 3 commercial facilities are located within the catchment also. These may be a source of nutrient input within the catchment.

### Forestry

Forest stands in the Licky Catchment are spread throughout the catchment and comprise both 1,402ha of Coillte (State) forestry and 244ha of private forest stands. 752ha were planted per 1990 and the remaining 894ha were planted post 1990. The observed impacts include tunnelling effect; lack of buffer zone; leaf litter build up; brash decay post felling; and associated roading all adding to an increased sediment loading and eutrophication.

### Quarries

One small non-commercial quarry was recorded within the catchment. This quarry has been investigated by Waterford County Council and does not require a licence. Should the quarry be

developed further in the future and used commercially the landowner is aware he will need to seek planning permission and a licence from Waterford County Council.

**Other issues – Fords**

Two significant fords were observed within the Licky catchment.

## 16 Ownagappul

The FPM population is at Unfavourable Conservation Status in the Ownagappul. It is currently ranked as the 5th out of the 27 Freshwater Pearl Mussel populations in the country. It has very large populations of adults, all ages of juveniles, and some juveniles in more than one area. However there are not the numbers of juveniles under 30mm present in the population to provide sustainable replacement of the current adult numbers. The catchment fails most of the requirements as specified in The European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations 2009. The Unfavourable Conservation Status is as a result of a number of identified environmental pressures/issues in relation to the FPM population in the Ownagappul catchment.

### Agricultural

Areas of agricultural land have been improved in pockets throughout this catchment e.g. upstream of Glenbeg Lough and in the upper catchment of the Barrees, where in addition to the improved land, the course of a tributary of the Barrees has also been altered resulting in sediment loading downstream.

Further investigation of agricultural pressures in the catchment is required. Overgrazing from sheep is potentially an issue on the slopes surrounding Glenbeg Lough and this may be causing a nutrient issue in Glenbeg Lough, and that needs to be investigated further. Some overgrazing along the Barrees also requires investigation.

### OSWWTS

As part of the Sub-basin Management Plans simplified pathway risk maps of the Ownagappul catchment have been prepared to assess the potential impact from on-site wastewater treatment systems. These are based on the *WFD National Programmes of Measures* and *Standards Study on On-site Wastewater Treatment Systems*. The tributaries and the main channel indicate areas of very high pathway risk from on-site systems within the catchment in terms of pathogens and phosphorous load to surface waters. There are 36 on-site systems on extreme risk, 12 on very high risk and 31 on high risk potential settings in the Ownagappul catchment. The new holiday home development in Ardgroom also consisted of a new WWTP which has now been completed and connected. The plans for this development include the connection of Ardgroom village to the new plant. To date this has not been completed and requires further investigation. Until this WWTP comes on line, there is a direct discharge from the current septic tank system in operation in to the FPM habitat located at Ardgroom.

**Forestry**

Forest stands in the Ownagappul Catchment are spread throughout the catchment and comprise of 143ha of private forest stands. 22ha were planted per 1990 and the remaining 121ha were planted post 1990.

**Abstractions**

There is a large abstraction from Glenbeg Lough, and currently Cork County Council abstract from this lake up to 2,200 $m^3$/day. Cork County Council has plans to intensifying this level of abstraction to 6,500 $m^3$/day plus a compensation flow of 1,926 m3/day. The proposed abstraction is to serve the western end of the Beara peninsula. There is potential that the lake itself may be a source of nutrients, and that further intensification of the abstraction would lead to reduced river flows in the Ownagappul. Any intensification would require an EIA and an Appropriate Assessment for Natura 2000 sites.

## 17 Munster Blackwater

The Freshwater Pearl mussel population is at unfavourable Conservation Status in the Munster Blackwater. It is currently ranked as 24th out of the 27 Freshwater Pearl Mussel SAC populations in the country on the basis of population status, habitat condition and current pressures. Monitoring of this catchment is incomplete. Three sites investigated on the main channel of the Munster Blackwater upstream of Rathmore were surveyed and no evidence of *Margaritifera* was observed at any of these three sites. Heavy siltation was observed at all three locations investigated, indicating that conditions are inimical to the survival of juvenile mussels in this part of the Munster Blackwater system.

The catchment fails all of the five Environmental Quality Objectives (EQOs) as specified in Schedule 4 of the European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations, S.I. 296 of 2009.

### Agricultural

Direct animal access to drinking water resulting in trampling and poaching, together with overgrazing on the river bank, has led to increased levels of silt and nutrients downstream in this catchment due to the lack of adequate buffer (riparian) zones. A large percentage of the catchment is covered by relatively intensive pasture and also there is a significant area of tillage within the catchment with associated risks of nutrient/sediment losses. All agricultural that can lead to soil erosion (e.g. drainage, land reclamation, ploughing, poaching, overgrazing) and/or nutrient losses (e.g. slurry-spreading, fertilisation) are potential significant risks.

### OSWWTS

As part of the Sub-basin Management Plans simplified pathway risk maps of the Munster Blackwater catchment have been prepared to assess the potential impact from on-site wastewater treatment systems. These are based on the *WFD National Programmes of Measures* and *Standards Study on On-site Wastewater Treatment Systems*. The tributaries and the main channel indicate areas of very high pathway risk from on-site systems within the catchment in terms of pathogens and phosphorous load to surface waters. There are 7,557 on-site systems on extreme risk, 4,724 on very high risk and 2,625 on high risk potential settings in the Munster Blackwater catchment.

### Forestry

Forest stands in the Munster Blackwater Catchment are spread throughout the catchment 15,777ha being planted pre 1990 and a further 16,813ha were planted post 1990.

**Physical Modifications**

Throughout the catchment there is extensive evidence that flood alleviation schemes and land improvement works (e.g. cleared banks, reinforced banks, straightened channels and removal of bankside vegetation) are a significant pressure. These works appear to be undertaken along large stretches of the river channel together with large expanses of the riparian zone.

**Abstractions**

Mallow racecource has a small scale abstraction for sprinklers which are operated 2-3 days prior to a race meeting. This is in close proximity to the freshwater pearl mussel population.

**Point Sources**

Within the Munster Blackwater there are approximately 40 WWTP's. Eighteen of which have been prioritised through the sub-basin management plan due to their risk to the freshwater pearl mussel. The catchment also contains 22 Section 4's and 24 IPPC licenced facilities.

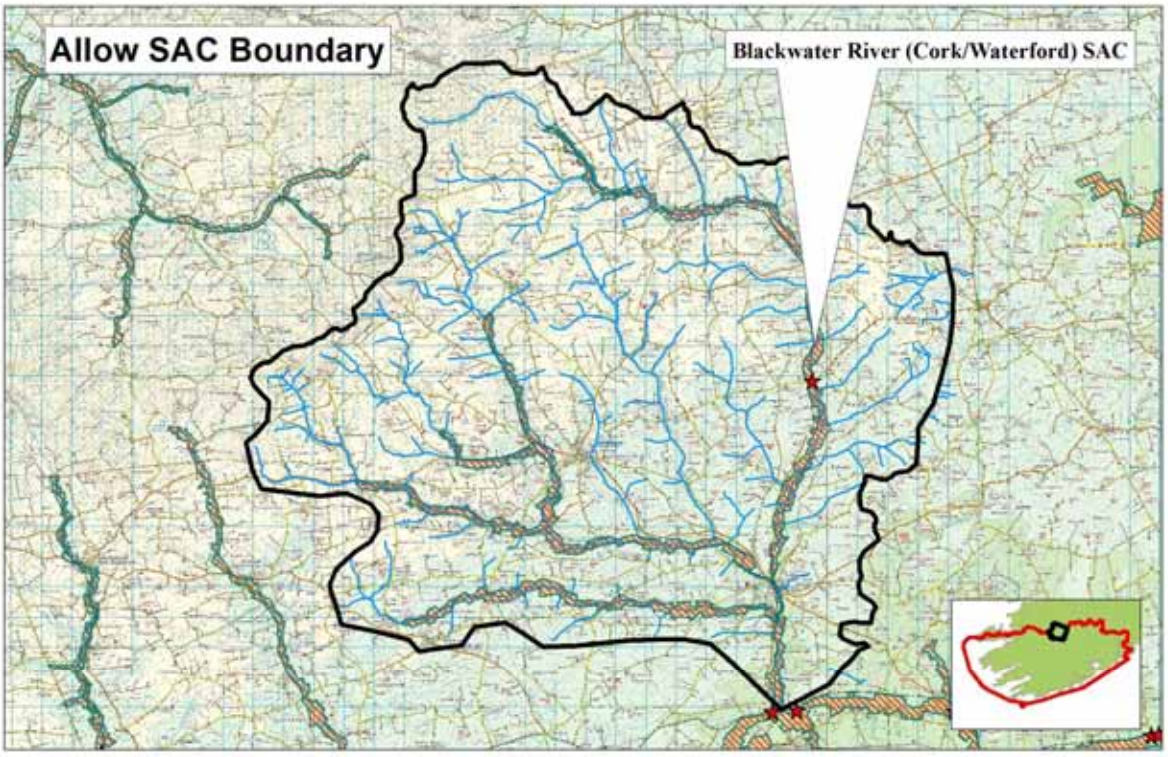
Part of the Irish Sugar PLC site contains contaminated lands where lagoons are being filled in and the land return to a greenfield site for farmland. Other point sources include Munster Joinery and Cadbury Ireland – Rathmore – IPPC.

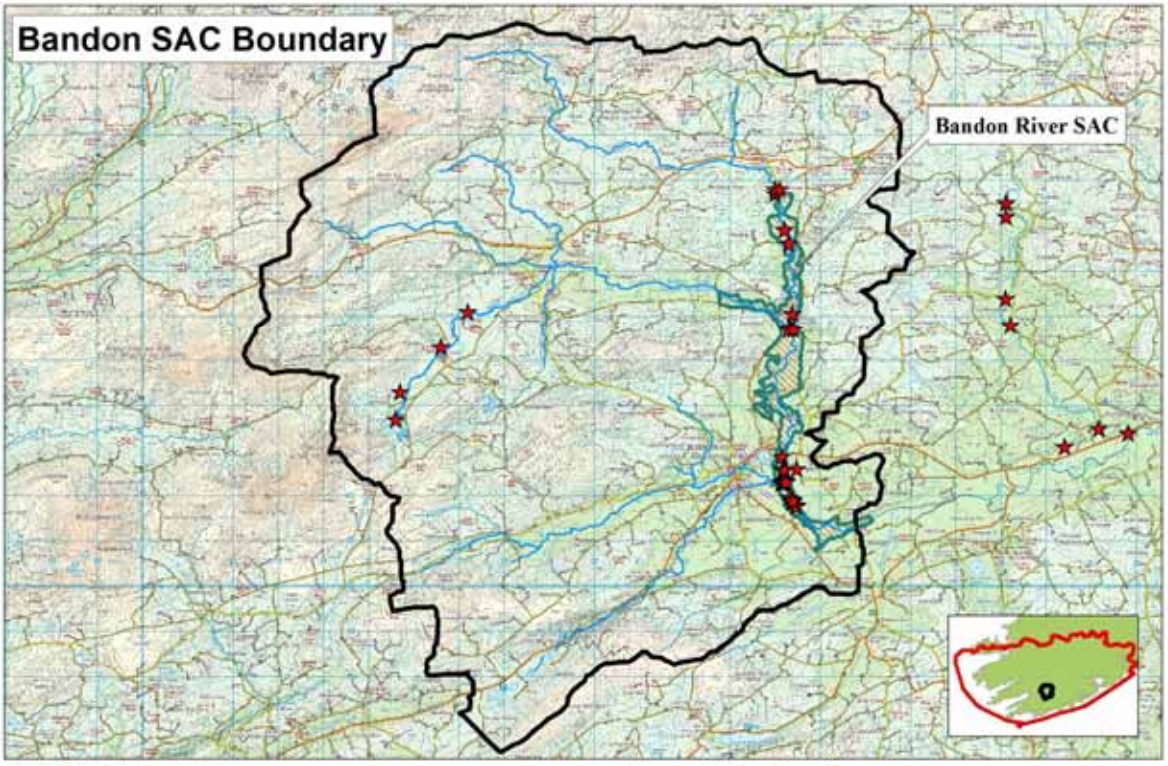
**Quarries**

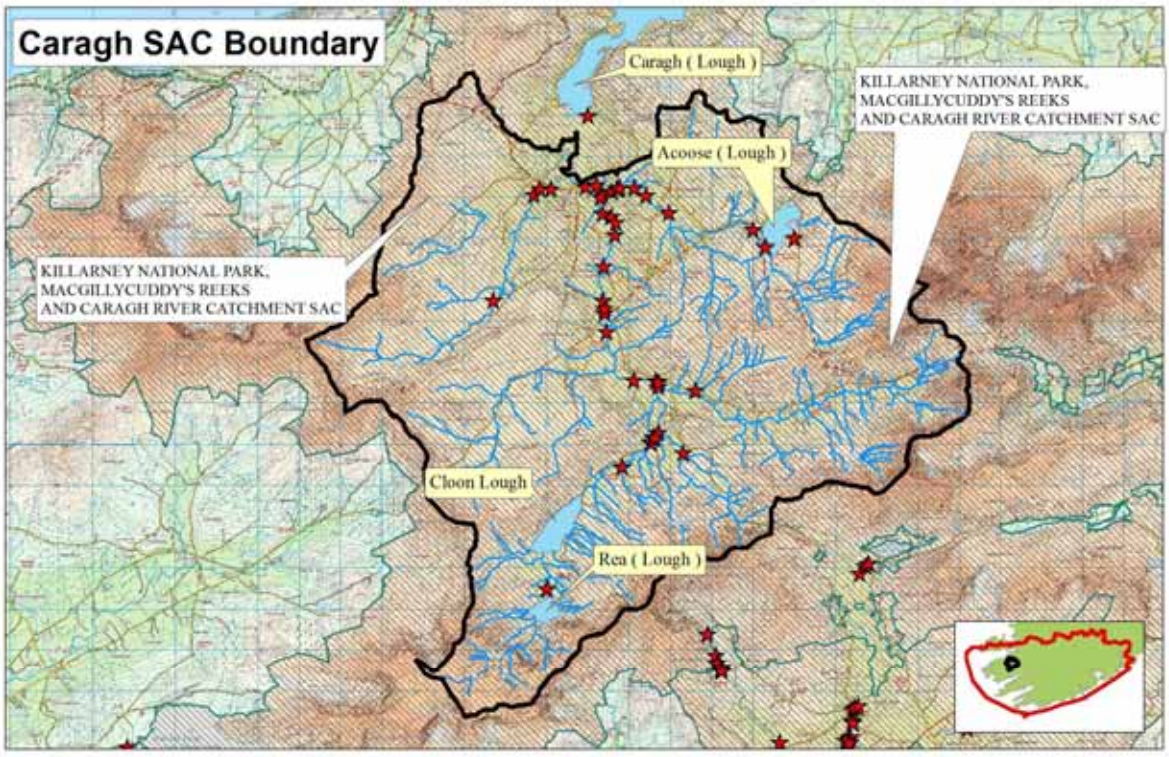
One large quarry is located directly beside a pearl mussel population. This is the J.A. Wood at Lackanamona in Mallow. This is an extremely large quarry which extracts rock and runs adjacent to a pearl mussel stretch. Nineteen quarries are located within the catchment with the potential to have significant risk of sediment loss if not properly designed and managed.

**Other issues – Fords**

Forded crossings were recorded within the Munster Blackwater Catchment.


Allow SAC Boundary
Blackwater River (Cork/Waterford) SAC
SAC Boundary
Allow Margaritifera Catchment Boundary
Margaritifera Location
Associated RBD - South Western RBD


Bandon SAC Boundary
Bandon River SAC
SAC Boundary
Bandon Margaritifera Catchment Boundary
Margaritifera Location
Associated RBD - South Western RBD

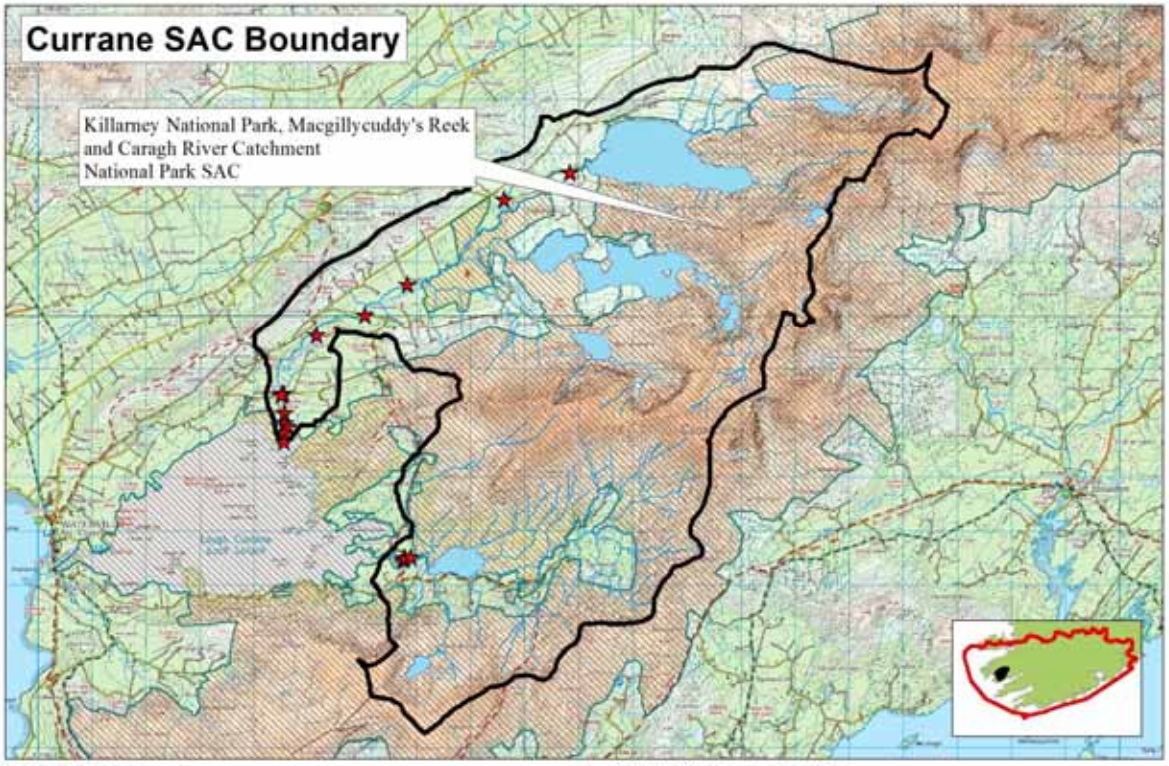



Caragh Margaritifera Population Catchment Boundary

SAC Boundary

Margaritifera Location

Measures will need to be applied on all reaches within the catchment

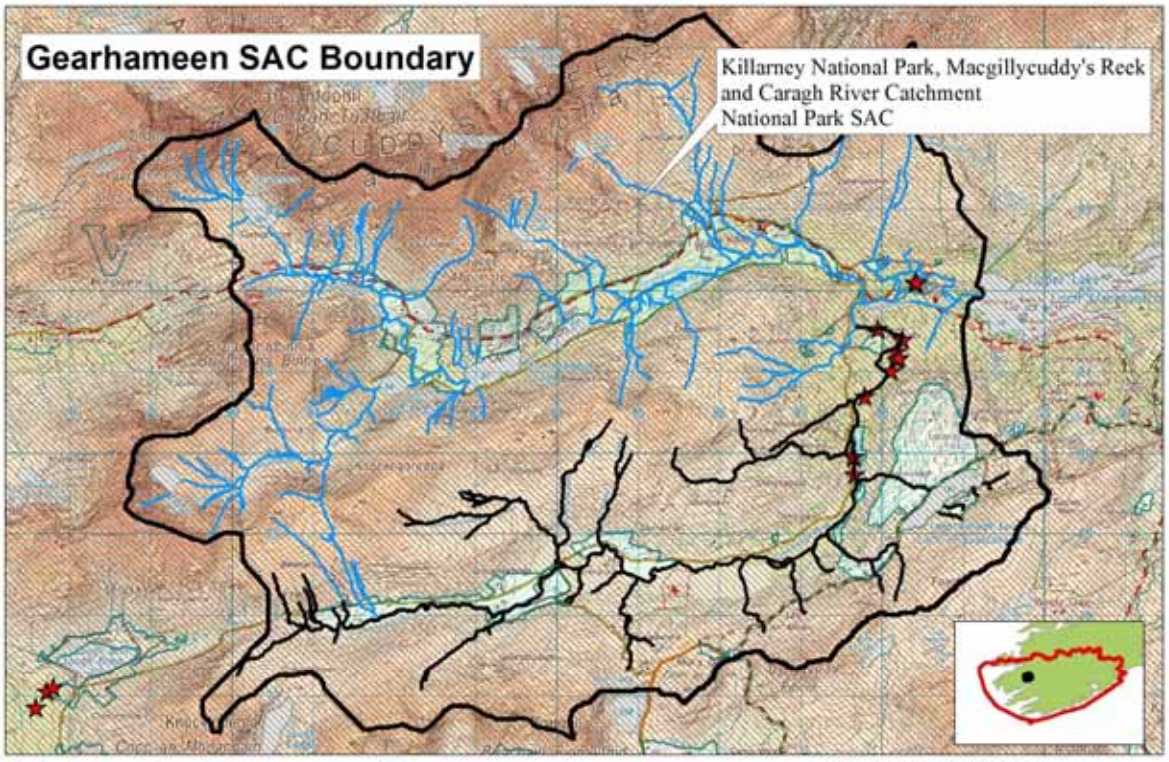



SAC Boundary

Currane Margaritifera Catchment Boundary

Margaritifera Location

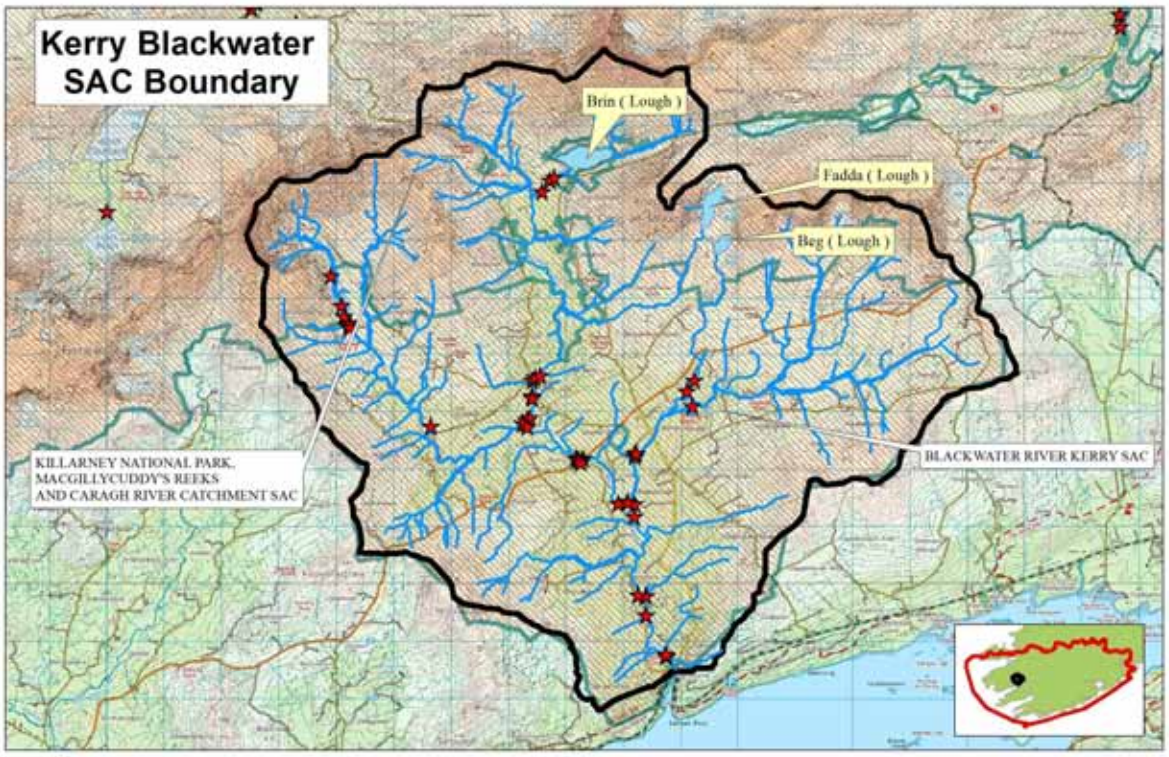
Associated RBD - South Western RBD




Gearhameen Margaitifera Catchment Boundary
SAC Boundary
Associated RBD - South Western RBD

Margaritifera Location
River stretches where measures will be prioritised

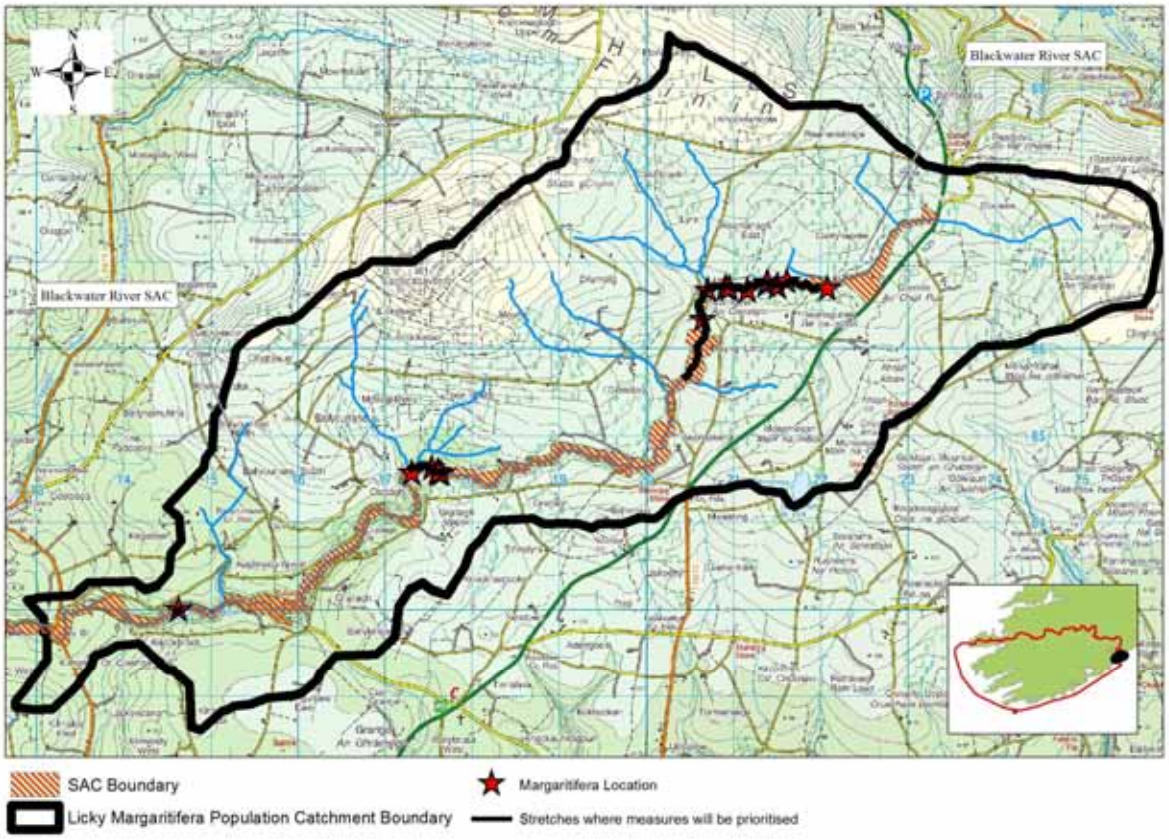
Measures will be prioritised along the main channel of the Owenreagh and subsequently the Gearhameen

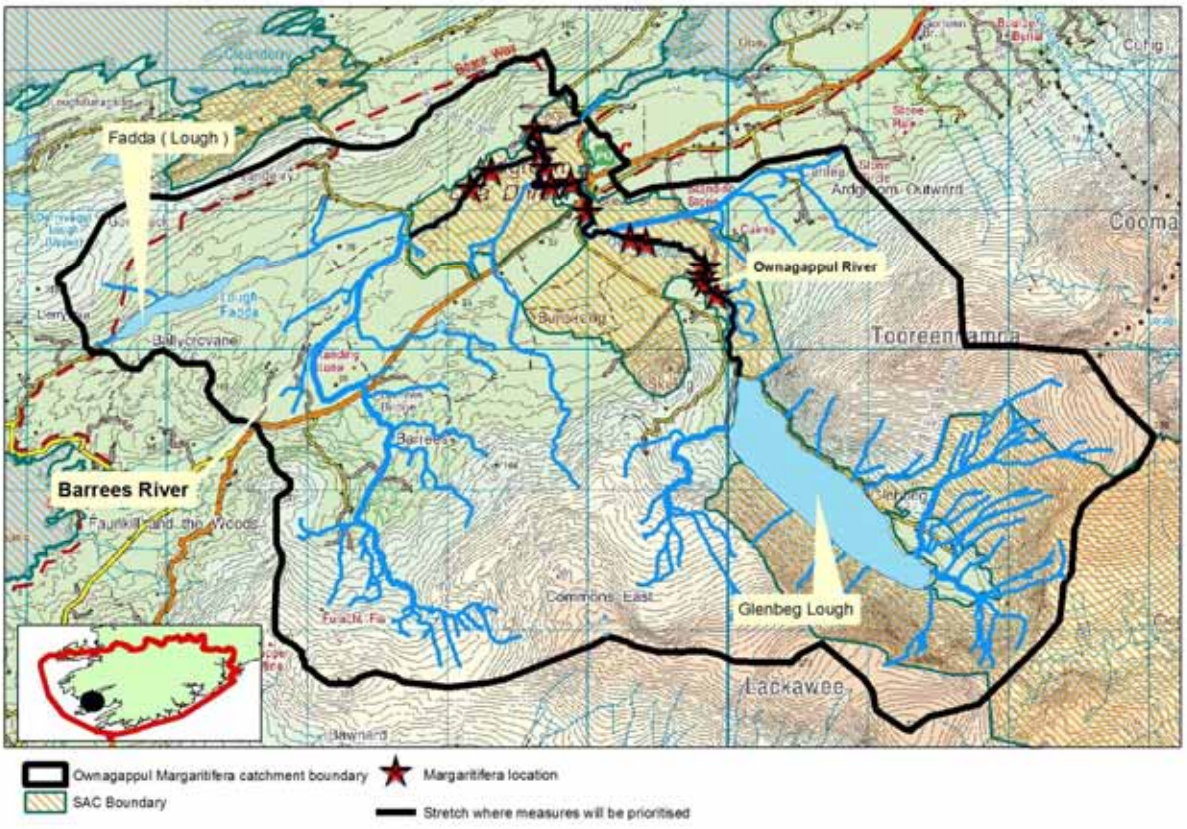


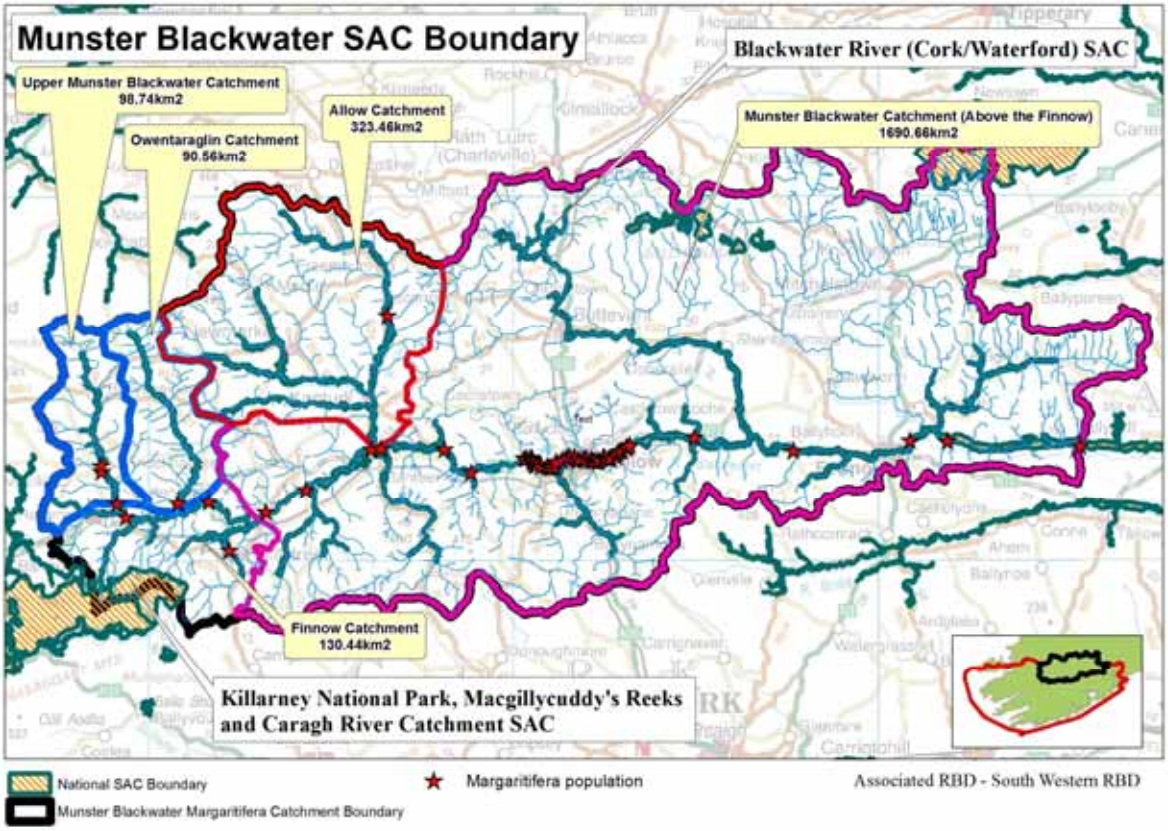

Kerry Blackwater Margaritifera Population Catchment Boundary
SAC Boundary

Margaritifera Location

Measures will need to be applied to all reaches within the catchment


Blackwater River SAC
Blackwater River SAC
SAC Boundary
Licky Margaritifera Population Catchment Boundary
Margaritifera Location
Stretches where measures will be prioritised


Fadda ( Lough )
Ownagappul River
Barrees River
Glenbeg Lough
Ownagappul Margaritifera catchment boundary
SAC Boundary
Margaritifera location
Stretch where measures will be prioritised


Munster Blackwater SAC Boundary
Blackwater River (Cork/Waterford) SAC
Upper Munster Blackwater Catchment
98.74km2
Owentaraglin Catchment
90.56km2
Allow Catchment
323.46km2
Munster Blackwater Catchment (Above the Finnow)
1690.66km2
Finnow Catchment
130.44km2
Killarney National Park, Macgillycuddy's Reeks
and Caragh River Catchment SAC
National SAC Boundary
Munster Blackwater Margaritifera Catchment Boundary
Margaritifera population
Associated RBD - South Western RBD

# WESTERN RIVER BASIN DISTRICT

## 17 Bundorragha

The FPM population is currently at Favourable Conservation Status following the 2009 survey in the Bundorragha. This improvement in status, since the previous survey, is primarily attributable to reduction in siltation and macrophyte abundance on the Bundorragha River. It is currently ranked as the best catchment out of the 27 Freshwater Pearl Mussel populations in the country. It has very large populations of adults, all ages of juveniles, and some juveniles in more than one area. The catchment meets all requirements as specified in The European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations 2009. However, a number of environmental pressures/issues in relation to the FPM population in the Bundorragha catchment have been identified.

### Agricultural

Poaching along the river banks of the Bundorragha is evident. Overgrazing by sheep has been a significant issue in the catchment, and requires further investigation to ensure vegetation has recovered sufficiently to prevent further soil erosion. Any increase in agricultural activity in the catchment could have a negative impact on the catchment through the introduction of silt and nutrients to the water courses.

### OSWWTS

As part of the Sub-basin Management Plans simplified pathway risk maps of the Bundorragha catchment have been prepared to assess the potential impact from on-site wastewater treatment systems. These are based on the *WFD National Programmes of Measures* and *Standards Study on On-site Wastewater Treatment Systems*. The tributaries and the main channel indicate areas of very high pathway risk from on-site systems within the catchment in terms of pathogens and phosphorous load to surface waters. There are 23 on-site systems on extreme risk and 1 on very high risk potential settings in the Bundorragha catchment. 22 systems are domestic on-site systems, whereas, two service large and seasonally variable numbers of visitors; the Delphi Mountain Resort and Spa, and the Delphi Lodge. These two premises are considered the highest current risk to the FPM population given their location and the risk potential.

### Forestry

Forest stands in the Bundorragha Catchment are spread throughout the catchment and comprise both 188ha of Coillte (State) forestry and 262ha of private forest stands. 262 ha were planted pre 1990 and the remaining 13 ha were planted post 1990. Forestry felling was evident along the banks and slopes surrounding the Glenummera River and heavy silt additions were found within the river channel

upstream of Doo Lough. Current felling along the Glenumera catchment requires investigation for potential impacts.

**Other issues – Peat Cutting**

Peat cutting operations were recorded upstream of Glencullin Lough and this could be a significant source of organic silt.

**Other issues – Recreation**

Recreational activities within watercourses can have direct disturbance impacts on FPM populations through crushing or the disturbance of silt and sediment in the watercourse. The use of the Bundrorragha River for water sports needs to be investigated for any potentially damaging impacts.

**Other issues – Weirs**

Numerous stone weirs have been constructed on the Bundorragha River to create pools and rapids. Such structures will have a significant influence over the sediment load in the river and in particular, influence where the sediment load drops out of suspension, which may be detrimental if the sediments drop out of suspension over FMP populations.

**Other issues – Sheep Dipping**

Five sheep dipping facilities are located within the catchment adjacent to both rivers and lakes. It is highly likely that the chemicals associated with sheep dipping could enter nearby watercourses if they are in close proximity to the sheep dipping facilities. This could be detrimental to FPM populations.

## 18 Dawros

The FPM population is at Unfavourable Conservation Status in the Dawros. It is currently ranked as 3rd out of the 27 Freshwater Pearl Mussel populations in the country. Initial baseline monitoring has not yet taken place in the Dawros River, therefore the work carried out in 2008 (as part of rapid assessments of non-monitored rivers) represents the best expert judgement on the current status of the river, without the benefit of comprehensive past survey information.

Densities of adults remain relatively good. The population is failing in its habitat quality (through evidence of siltation), and its population demographic profile, where it is evident that there are not the numbers of juveniles present in the population to provide sustainable replacement of the current adult numbers. The catchment fails most of the requirements as specified in The European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations 2009. The Unfavourable Conservation Status is as a result of a number of identified environmental pressures/issues in relation to the FPM population in the Dawros catchment.

**Agricultural**

The Commonage Framework Plans indicate that 382ha of commonage land is severely damaged or worse, and 594ha is moderately to severely damaged. In total 50% of commonage land in the catchment is damaged. There is one key area where damaged land is either adjacent to or just upstream of FPM locations and within an SAC – in lower north western part of the catchment.

Evidence of erosion and sheep poaching were recorded, together with a lack of fencing leading to increased silt and nutrient loads to the channels and widening of the river upstream of Kylemore Lough.

**OSWWTS**

As part of the Sub-basin Management Plans simplified pathway risk maps of the Dawros catchment have been prepared to assess the potential impact from on-site wastewater treatment systems. These are based on the *WFD National Programmes of Measures* and *Standards Study on On-site Wastewater Treatment Systems*. The tributaries and the main channel indicate areas of very high pathway risk from on-site systems within the catchment in terms of pathogens and phosphorous load to surface waters. There are 33 on-site systems on extreme risk, 71 on very high risk and 1 on high risk potential settings in the Dawros catchment.

Monitoring results indicate high levels of filamentous green algae and macrophytes downstream of Kylemore Abbey. This may be associated with the existing waste water treatment system at the Abbey.

**Forestry**

Forest stands in the Dawros Catchment are spread throughout the catchment and comprise both 340ha of Coillte (State) forestry and 40ha of private forest stands. . 310ha were planted pre 1990 and the remaining 70ha were planted post 1990. Inadequate buffer zones were recorded in association with the forested areas above Kylemore Lough.

**Point Sources**

The catchment contains one Section 4 licensed facility.

**Physical Modifications**

Roading was recorded encroaching on the banks of the Polladirk tributary following total removal of all bank-side vegetation and the riparian zone by Galway County Council. Such works would have disturbed sediment regimes and habitats within the watercourse.

**Quarries**

Guys Quarry site (formerly Connemara sand and gravel) is a large quarry site adjacent to Tullywee Bridge. High levels of silt run-off were recorded from this site entering the main channel of the Dawros. Associated site works have also led to the removal of natural road side vegetation, and the spread of the invasive alien species Gunnera was recorded. The potential risk from quarry dust, effluent or pollution incidents is a concern for FPM.

**Other issues – Peat Cutting**

Commercial peat extraction of approximately 46 hectares was recorded on the banks of the Bunnaboghec Lough and along the banks of the Dawros River which contains FPM habitat. This could be a significant source of organic silt.

**Other issues – Fisheries**

Bank side fishing, associated with Kylemore Fishery, between Tullywee and Dawros Bridge have led to the degradation and crumbling of the banks along the Dawros, and is a source of silt and nutrient loading.

## 19 Newport

The FPM population is at Unfavourable Conservation Status in the Newport. The Newport catchment is currently ranked as 11th out of the 27 SAC Freshwater Pearl Mussel Populations in the country The population is failing in its habitat quality (through evidence of siltation, with average redox losses at 5cm up to 30%, even following scouring conditions), and it its population demographic profile, where it is evident that there are not the numbers of juveniles present in the population to provide sustainable replacement of the current adult numbers.

The catchment fails most of the requirements as specified in The European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations 2009. The Unfavourable Conservation Status is as a result of a number of identified environmental pressures/issues in relation to the FPM population in the Newport catchment.

### Agricultural

Direct animal access to drinking water resulting in trampling and poaching, together with overgrazing along the slopes of commonage land, has led to increased levels of silt and nutrients downstream in this catchment. 3712ha of the Newport catchment area is commonage land. This is 25% of the overall catchment area. 1084ha of the commonage land is severely damaged or worse.

### OSWWTS

As part of the Sub-basin Management Plans simplified pathway risk maps of the Newport catchment have been prepared to assess the potential impact from on-site wastewater treatment systems. These are based on the *WFD National Programmes of Measures* and *Standards Study on On-site Wastewater Treatment Systems*. The tributaries and the main channel indicate areas of very high pathway risk from on-site systems within the catchment in terms of pathogens and phosphorous load to surface waters. There are 364 on-site systems on extreme risk, 36 on very high risk and 10 on high risk potential settings in the Newport catchment. Due to the significant numbers of one-off housing on the very high to extreme risk settings within the vicinity of the FPM populations there is s significant risk of eutrophication.

### Forestry

Forest stands in the Newport Catchment are spread throughout the catchment and comprise both 2,652ha of Coillte (State) forestry and 644ha of private forest stands. 1,467 ha were planted pre 1990 and the remaining 1,829 ha were planted post 1990.

**Point Sources**

The site of the Derrinumera Recycling Amenity Centre was previously a landfill site which is now a recycling centre. It has been noted that some landfilling is still going on within the site. This site is adjacent to the Glaishwy River which has historically had low macroinvertebrate Q scores.

**Quarries**

One quarry is located on the Crumpaun River - Matt Forrestal & Sons Ltd

**Abstractions**

The Local Authority abstract water for a group scheme along the Skerdagh River.

**Other issues – Peat Cutting**

Peat cutting adjacent to watercourses was recorded at a number of locations throughout the catchment with the potential to release silt into the river channel.

## 20 Owenriff

The Freshwater Pearl mussel population is at Unfavourable Conservation Status in the Owenriff. It is currently ranked as 4th out of the 27 SAC Freshwater Pearl Mussel populations in the country. Results show that adult mussels remain in relatively intact numbers in the best habitats, while losses are still occurring in the poorer habitats. However, juvenile numbers are much lower than those considered to be sustainable. The catchment fails most of the requirements as specified in The European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations 2009. The Unfavourable Conservation Status is as a result of a number of identified environmental pressures/issues in relation to the FPM population in the Owenriff catchment.

### Agricultural

A complete lack of fencing or insufficient fencing on agricultural land was common within this catchment. This has resulted in increased erosion and nutrient enrichment from extensive animal trampling within and near the channel. Patches of bare sediment along the banks of the channel caused by trampling has led to increased levels of silt within the river channel.

In relation to commonage land; 43ha is severely damaged and 304ha is moderately to severely damaged. This has resulted in 22% of commonage land in the catchment being damaged. Of particular concern is the damaged land adjacent to the pearl mussel population beside Agraffard Lough. This is an area of 11ha of which all land is moderately damaged.

Intensive agriculture within the catchment is a significant pressure. Further information from DAFF is required to allow us to accurately focus the agricultural measures.

### OSWWTS

As part of the Sub-basin Management Plans simplified pathway risk maps of the Owenriff catchment have been prepared to assess the potential impact from on-site wastewater treatment systems. These are based on the *WFD National Programmes of Measures* and *Standards Study on On-site Wastewater Treatment Systems*. The tributaries and the main channel indicate areas of very high pathway risk from on-site systems within the catchment in terms of pathogens and phosphorous load to surface waters. There are 124 on-site systems on extreme risk and 91 on very high risk and 40 on high risk potential settings in the Owenriff catchment.

The high number of unsewered properties within Oughterard town, in particular the significant new developments observed, represent a significant pressure in the catchment. Galway County Council were interviewing in November 2009 for consultants for the purposes of drawing up the contract

drawings for the upgrade to Oughterard WWTP. Consultants to complete the design process in 2010 and then submit to DEHLG for funding in 2011.

**Forestry**

Forest stands in the Owenriff Catchment are spread throughout the catchment and comprise both 996ha of Coillte (State) forestry and 132ha of private forest stands. 773ha were planted pre 1990 and the remaining 356ha were planted post 1990. Monitoring of streams and drains of clearfelled sites in the Lettercraffroe catchment demonstrated high losses of phosphorus, however the relative contribution of these losses to the eutrophication impacts observed at the mussel habitat cannot be elucidated. Future felling within the catchment, particularly of those forests directly connected to the main channel and not buffered by lakes is considered a significant risk

**Physical Modifications**

Urbanisation on the banks of the river in the vicinity of Oughterard is significant and has led to the removal of the natural buffer zone along the river. Although some tree-line still exists it is not sufficient to deal with pressures from such an urbanized area. Also recorded along this stretch were a significant number of outfalls from the town and high levels of filamentous algae. The bed of the Owenriff River was lowered by the OPW and series of low level weirs installed along the channel during the 1960́s to accommodate fishery interests. Approximately 7 weirs were recorded along a 500m stretch in Oughterard.

**Point Sources**

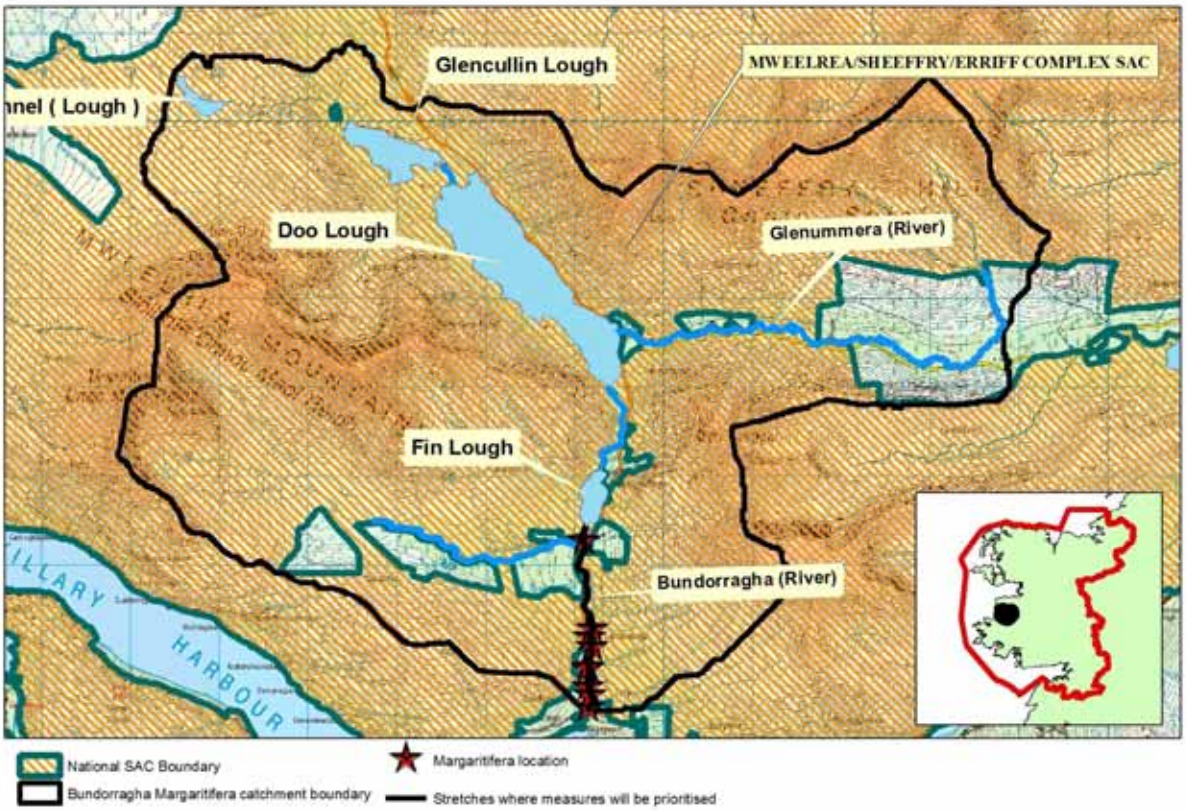
Oughterard WwTP is currently exceeding its capacity with a very high density of mussels currently under threat from the plant. The catchment contains 1 closed landfill, 1 WwTP and 1 Section 4.

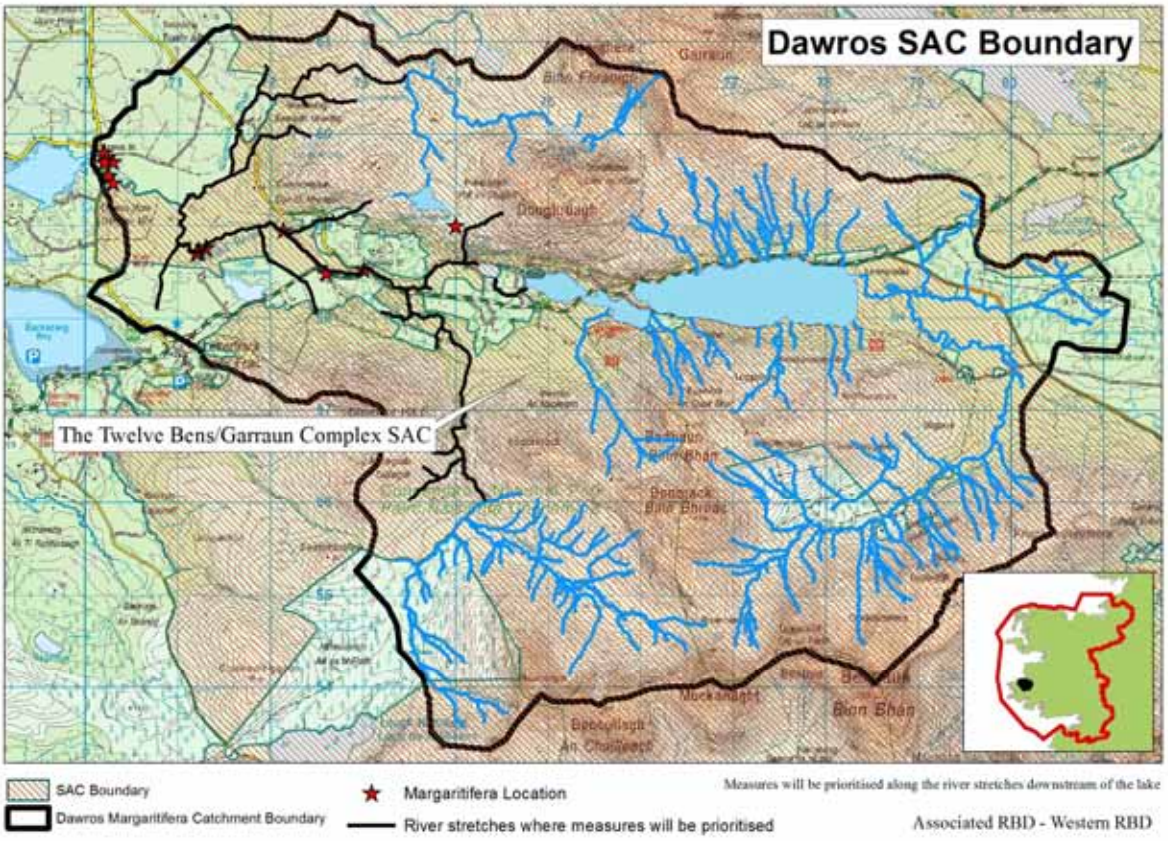
**Other issues – Peat Cutting**

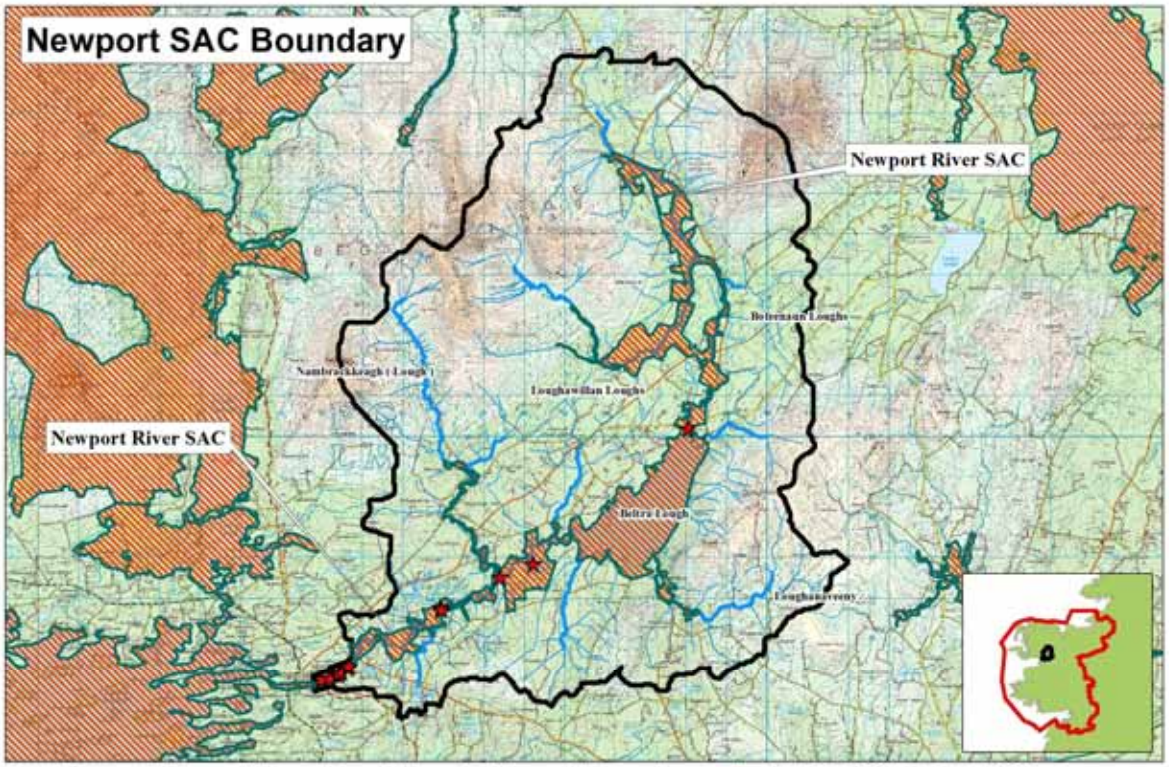
Peat cutting is evident throughout the Owenriff catchment, but most significantly large areas of commercial peat were observed around Lough Agraffard and the surrounding inflowing tributaries within the vicinity of the FPM population.

**Other issues – Fords**

Significant ford crossings were recorded within the Owenriff catchment.


Glencullin Lough
MWEELREA/SHEEFFRY/ERRIFF COMPLEX SAC
nel ( Lough )
Doo Lough
Glenummera (River)
Fin Lough
Bundorragha (River)
HARBOUR
National SAC Boundary
Bundorragha Margaritifera catchment boundary
Margaritifera location
Stretches where measures will be prioritised

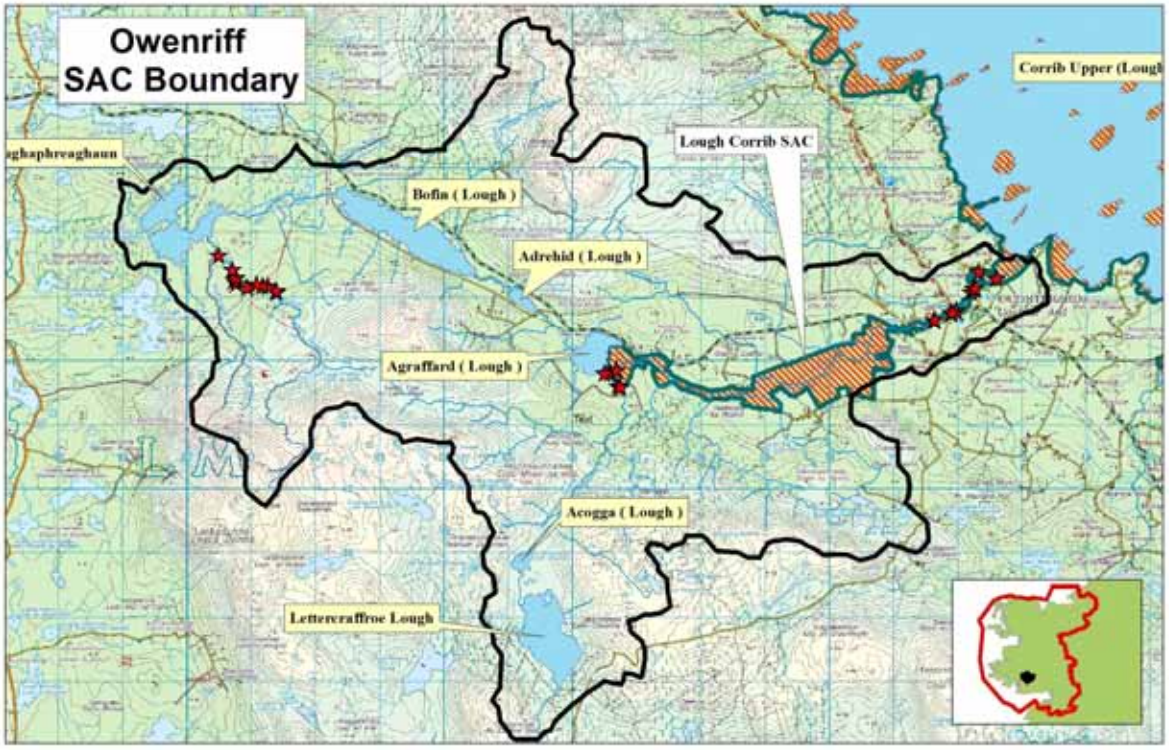

Dawros SAC Boundary
The Twelve Bens/Garraun Complex SAC
SAC Boundary
Dawros Margaritifera Catchment Boundary
Margaritifera Location
River stretches where measures will be prioritised
Measures will be prioritised along the river stretches downstream of the lake
Associated RBD - Western RBD




Newport Margaritifera Population Catchment Boundary ★ Margaritifera population

SAC Boundary

Associated RBD - Western RBD




Owenriff Margaritifera Population Catchment Boundary ★ Margaritifera Location

SAC Boundary

Measures will need to be applied to all reaches within the catchment

# NORTH WESTERN RIVER BASIN DISTRICTS

## 21 Clady

The FPM population is at Unfavourable Conservation Status in the Clady. It is currently ranked as 10th best out of the 27 pearl mussel catchments in the country. The population is failing in its habitat quality through the presence in high quantities of macrophytes and filamentous green algae showing excessive nutrient loading in the Clady compared with ideal pearl mussel habitat.

Its population demographic profile also indicates that there are not the numbers of juveniles present in the population to provide sustainable replacement of the current adult numbers.

The catchment fails most of the requirements as specified in The European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations 2009. The Unfavourable Conservation Status is as a result of a number of identified environmental pressures/issues in relation to the FPM population in the Clady catchment.

**Agricultural**

Direct animal access to drinking water resulting in trampling and poaching, together with overgrazing on the river bank, has led to increased levels of silt and nutrients downstream in this catchment. Diffuse loads of silt and nutrients into the watercourse are due to the lack of adequate buffer (riparian) zones.

**OSWWTS**

As part of the Sub-basin Management Plans simplified pathway risk maps of the Clady catchment have been prepared to assess the potential impact from on-site wastewater treatment systems. These are based on the *WFD National Programmes of Measures* and *Standards Study on On-site Wastewater Treatment Systems*. The tributaries and the main channel indicate areas of very high pathway risk from on-site systems within the catchment in terms of pathogens and phosphorous load to surface waters. There are 335 on-site systems on extreme risk and 52 on very high risk potential settings in the Clady catchment. Due to the significant numbers of one off housing on very-high to extreme risk settings within the vicinity of the pearl mussel populations there is a significant risk of eutrophication.

**Forestry**

Forest stands in the Clady Catchment are spread throughout the catchment and comprise both 287ha of Coillte (State) forestry and 76ha of private forest stands. 289ha were planted pre 1990 and the remaining 273ha were planted post 1990.

**Physical Modifications**

The Clady catchment contains two Heavily Modified Water Bodies (HMWB) and one Artificial Water Body (AWB) which have been designated under the Water Framework Directive due to the impounding structures which are present to facilitate power generation. These are:

Lough Nacung (HMWB)

Lough Dunlewy (HMWB)

Clady Headrace (AWB)

Impacts on the Clady River include unnatural flow and modified lake dynamics upstream due to impoundments. Site clearance works associated with one-off housing in the vicinity of watercourses were also recorded.

**Point Sources**

The catchment contains one WWTP and two Section 4's.

**Quarries**

The Clady catchment contains three large quarries upstream of the FPM populations; Gillespie's quarry, Greens quarry and Campbells quarry. The potential risk from quarry dust, effluent or pollution incidents is a concern for FPM.

**Other issues – Peat Cutting**

A large expanse of commercial peat cutting and spreading is in operation in the upper reaches of the catchment and this could be a significant source of organic silt.

## 22 Eske

The FPM population is at Unfavourable Conservation Status in the Eske. It is currently ranked as 9th out of the 27 pearl mussel catchments in the country. The population is failing in its habitat quality through evidence of macrophyte abundance and also from its population demographic profile, where it is evident that there are not the numbers of juveniles present in the population to provide sustainable replacement of the current adult numbers.

The catchment fails most of the requirements as specified in The European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations 2009. The Unfavourable Conservation Status is as a result of a number of identified environmental pressures/issues in relation to the FPM population in the Eske catchment.

**Agricultural**

Direct sheep access to drinking water resulting in trampling and poaching, together with overgrazing on the river bank, has led to increased levels of silt and nutrients downstream in this catchment. The intensification of landuse, land clearance and liming of lands have also been recorded as pressures within this catchment.

**OSWWTS**

As part of the Sub-basin Management Plans simplified pathway risk maps of the Eske catchment have been prepared to assess the potential impact from on-site wastewater treatment systems. These are based on the *WFD National Programmes of Measures* and *Standards Study on On-site Wastewater Treatment Systems*. The tributaries and the main channel indicate areas of very high pathway risk from on-site systems within the catchment in terms of pathogens and phosphorous load to surface waters. There are 711 on-site systems on extreme risk, 66 on very high risk and 3 on high risk potential settings in the Eske catchment. Due to the significant numbers of one off housing on extreme risk settings within the vicinity of the pearl mussel populations there is a significant risk of eutrophication.

**Forestry**

Forest stands in the Eske Catchment are spread throughout the catchment and comprise both 727ha of Coillte (State) forestry and 191ha of private forest stands. 630ha were planted pre 1990 and the remaining 288ha were planted post 1990.

**Physical Modifications**

Reinforced banks using gabion baskets and rock armour were noted at a number of locations within the catchment. The deposition of silt and sediment was also observed associated with these physical modifications. The removal of bankside vegetation associated with road works and improvements were also recorded. Within Donegal Town significant stretches of the river have concrete walls on both banks.

**Other issues – Point Sources**

One major point source pressure was observed in the catchment, Harvey's Point Hotel located on the shores of Lough Eske.

## 23 Glaskeelan

The FPM population is at Unfavourable Conservation Status in the Glaskeelan. It is currently ranked as the 6th best catchment out of the 27 pearl mussel catchments in the country. In the absence of prior total section counts or permanent transects, the number of mussels in the population is estimated at 10,000, but it is not possible to estimate how many mussels were present in the past

While good numbers of adults are found throughout the catchment, juveniles and small mussels (≤65mm) are rare due to the unsuitable habitat conditions for them. The catchment fails most of the requirements as specified in The European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations 2009. The Unfavourable Conservation Status is as a result of a number of identified environmental pressures/issues in relation to the FPM population in the Glaskeelan catchment.

**Agricultural**

Direct animal access to drinking water resulting in trampling and poaching, together with overgrazing on the river bank, has led to increased levels of silt and nutrients downstream in this catchment. Diffuse loads of silt and nutrients into the watercourse are due to the lack of adequate buffer (riparian) zones. Future re-stocking of the slopes in the vicinity of the pearl mussel populations may cause impact.

**OSWWTS**

As part of the Sub-basin Management Plans simplified pathway risk maps of the Glaskeelan catchment have been prepared to assess the potential impact from on-site wastewater treatment systems. These are based on the *WFD National Programmes of Measures* and *Standards Study on On-site Wastewater Treatment Systems*. The tributaries and the main channel indicate areas of very high pathway risk from on-site systems within the catchment in terms of pathogens and phosphorous load to surface waters. There are 6 on-site systems on extreme risk and 1 on very high risk potential settings in the Glaskeelan catchment.

**Forestry**

Forest stands in the Cloon Catchment are spread throughout the catchment and comprise both 119ha of Coillte (State) forestry and 0.3ha of private forest stands. 86ha were planted pre 1990 and the remaining 33ha were planted Post 1990.

**Other issues – Peat Cutting**

Four locations where peat cutting has been undertaken were recorded. Three of these locations appear in-active and well re-generated with one currently active.

## 24 Leannan

The FPM population is at Unfavourable Conservation Status in the Leannan. It is currently ranked as 16th out of the 27 pearl mussel catchments in the country. Initial baseline monitoring has not yet taken place in the Leannan River, so the work carried out in 2009 represents the best expert judgement on the current status of the river, without the benefit of comprehensive past survey information.

The population is failing in its habitat quality (through evidence of severe siltation), and its population demographic profile, where there is no evidence of sustainable replacement of the current adult numbers. The catchment fails most of the requirements as specified in The European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations 2009. The Unfavourable Conservation Status is as a result of a number of identified environmental pressures/issues in relation to the FPM population in the Leannan catchment.

**Agricultural**

The lack of adequate buffer (riparian) zones and fencing was the norm within this catchment. Direct animal access to drinking water resulting in trampling and poaching, together with overgrazing on the river bank, has led to increased levels of erosion and silt and nutrients downstream in this catchment. A significant number of cleared drains were recorded within the catchment leading to the loss of bank-side vegetation and habitat.

**OSWWTS**

As part of the Sub-basin Management Plans simplified pathway risk maps of the Leannan catchment have been prepared to assess the potential impact from on-site wastewater treatment systems. These are based on the *WFD National Programmes of Measures* and *Standards Study on On-site Wastewater Treatment Systems*. The tributaries and the main channel indicate areas of very high pathway risk from on-site systems within the catchment in terms of pathogens and phosphorous load to surface waters. There are 2080 on-site systems on extreme risk and 689 on high risk potential settings in the Cloon catchment.

**Forestry**

Forest stands in the Leannan Catchment are spread throughout the catchment and comprise both 1,688ha of Coillte (State) forestry and 1,074ha of private forest stands. 1472ha were planted pre 1990 and the remaining 1290ha were planted post 1990.

**Physical Modifications**

Throughout the catchment there is extensive evidence that site clearance and land improvement works are a significant pressure. These works appear to be undertaken along large stretches of the river channel together with large expanses of the riparian zone. Two areas in particular were noted: Near Bellaned Bridge at Maghernagran, and at Milltown Bridge in Kilmacrenan (Kilmac Foamworks Ltd. Site works). Significant site clearance and bank side vegetation removal associated with land improvement together with the associate roads further raises concerns regarding silt and nutrients entering the watercourses.

**Quarries**

The Leannan catchment contains two large commercial quarries – Churchill Quarry and Barnes Limestone Quarry Ltd. A significant pollution incident occurred in November 2008 due to activities associated with Churchill Quarry. The impacts, silt and nutrient addition to the watercourse, from this incident were still evident during survey work in May 2009. In addition, dirty water was also noted along the tributary which flows out of Barnes Quarry.

**Point Sources**

Effluent discharging in to the Leannan from Kilmacrenan WWTP was recorded. If Kilmacrenan WWTP is not upgraded, significant damage will continue to be caused to the FPM population and habitat.

Two WWTPs and four Section 4's are located within the catchment.

## 26 Owencarrow

The Freshwater Pearl mussel population is at Unfavourable Conservation Status in the Owencarrow. It is currently ranked as 23rd out of the 27 pearl mussel catchments in the country. The population is failing due to the deterioration in habitat quality which is evident from the high levels of siltation and macrophyte growth. Its population demographic profile indicates there are not the numbers of juveniles present in the population to provide sustainable replacement of the current adult numbers. The lack of extent of suitable habitat suggests that the river may not have been able to support a very large population even when habitat conditions were better. The habitat that was identified has a very low capacity compared to its potential, and 57% of all the mussels surveyed were dead.

The catchment fails most of the requirements as specified in The European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations 2009. The Unfavourable Conservation Status is as a result of a number of identified environmental pressures/issues in relation to the FPM population in the Owencarrow catchment.

**Agricultural**

Direct animal access to drinking water resulting in trampling and poaching, together with overgrazing on the river bank, has led to increased levels of silt and nutrients downstream in this catchment due to the lack of adequate buffer (riparian) zones. A small number of moderate to severely damaged areas were noted from the commonage framework plans.

**OSWWTS**

As part of the Sub-basin Management Plans simplified pathway risk maps of the Owencarrow catchment have been prepared to assess the potential impact from on-site wastewater treatment systems. These are based on the *WFD National Programmes of Measures* and *Standards Study on On-site Wastewater Treatment Systems*. The tributaries and the main channel indicate areas of very high pathway risk from on-site systems within the catchment in terms of pathogens and phosphorous load to surface waters. There are 43 on-site systems on extreme risk and 17 on very high risk potential settings in the Owencarrow catchment. The NPWS also have four WWTS located within the Glenveagh National Park Headquarters. One or more of these systems may be responsible for poor status in the upper reaches of the catchment.

**Forestry**

Forest stands in the Owencarrow Catchment are spread throughout the catchment and comprise both 542ha of Coillte (State) forestry and 107ha of private forest stands. 636ha were planted pre 1990 and

the remaining 12ha were planted post 1990. A number of recently clear felled areas were recorded within the catchment adjacent to river stretches which is of concern.

**Point Sources**

NPWS have four WWTS located within Glenveagh National Park Headquarters. One or more of these systems may be responsible for the poor status which was recorded through field investigations in the upper reaches of the catchment.

**Other issues – Peat Cutting**

Large areas of commercial peat cutting were recorded in the vicinity of the Calabber River, the Owencarrow River and the Glasnaseeragh River. These could be a significant source of organic silt.

## 27 Owenea

The Freshwater Pearl mussel population is at Unfavourable Conservation Status in the Owenea. It is currently ranked as 22nd out of the 27 pearl mussel catchments in the country. The population is failing in its habitat quality (through evidence of heavy siltation and macrophyte growth), and its population demographic profile, where it is evident that there are not the numbers of juveniles present in the population to provide sustainable replacement of the current adult numbers. A full river habitat survey is also needed within this catchment in order to establish a baseline of where the best pearl mussel habitat it located.

The catchment fails most of the requirements as specified in The European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations 2009. The Unfavourable Conservation Status is as a result of a number of identified environmental pressures/issues in relation to the FPM population in the Owenea catchment.

**Agricultural**

Direct animal access to drinking water resulting in trampling and poaching, together with overgrazing on the river bank, has led to increased levels of silt and nutrients downstream in this catchment due to the lack of adequate buffer (riparian) zones. A high concentration of farms was recorded along the rivers within the Owenea catchment.

**OSWWTS**

As part of the Sub-basin Management Plans simplified pathway risk maps of the Owenea catchment have been prepared to assess the potential impact from on-site wastewater treatment systems. These are based on the *WFD National Programmes of Measures* and *Standards Study on On-site Wastewater Treatment Systems*. The tributaries and the main channel indicate areas of very high pathway risk from on-site systems within the catchment in terms of pathogens and phosphorous load to surface waters. There are 562 on-site systems on extreme risk and 143 on very high risk potential settings in the Owenea catchment.

**Forestry**

Forest stands in the Owenea Catchment are spread throughout the catchment and comprise both 1,723ha of Coillte (State) forestry and 472ha of private forest stands. 1,289ha were planted pre 1990 and the remaining 906ha were planted post 1990. Areas of forestry were noted adjacent to river stretches with no buffer zones.

**Physical Modifications**

Reinforced banks, deepened and widened channels, bank side clearance and drainage works were all recorded on a number of river stretches throughout the catchment. Such works would have disturbed sediment regimes and habitats within the watercourse. Significant works together with numerous curvets and outfalls were also found within the catchment, largely associated with one-off housing and contained high levels of silt which was discharging to the river. The new bridge on the Owenea River is a large clear span bridge with a large central pier embedded in concrete with end piers at each side also encroaching into the natural bank area. Armouring upstream and downstream of the bridge has been placed in front of the river banks and there is evidence of the loss of FPM as a result.

**Other issues – Point Sources**

One point source was located within the catchment, this is for the Tazetta Ltd. Mink Farm which can hold up to 40,000 individuals during the breeding season. Glenties WWTP is a significant factor leading to the loss of the Owenea FPM population.

**Other issues – Fords**

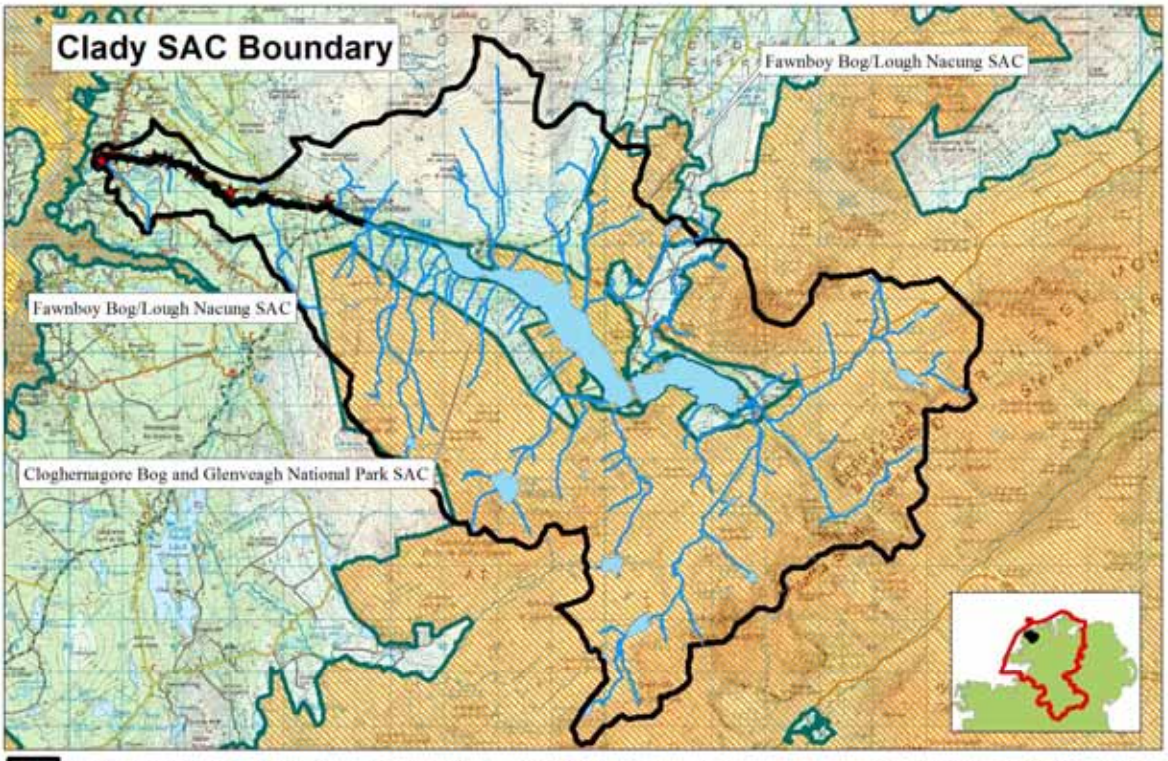
One ford crossing was recorded within the Owenea catchment. This had a concrete substrate which may indicate it is used for vehicular access.

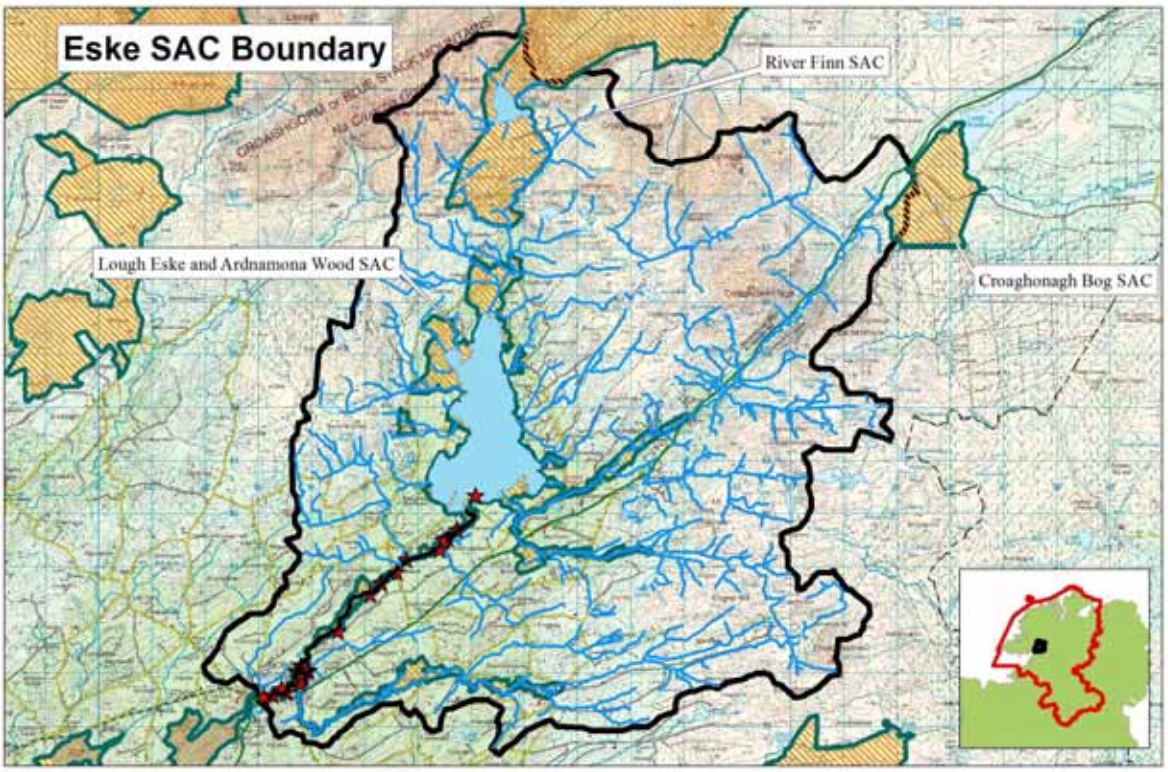
**Other issues – Wind Farms**

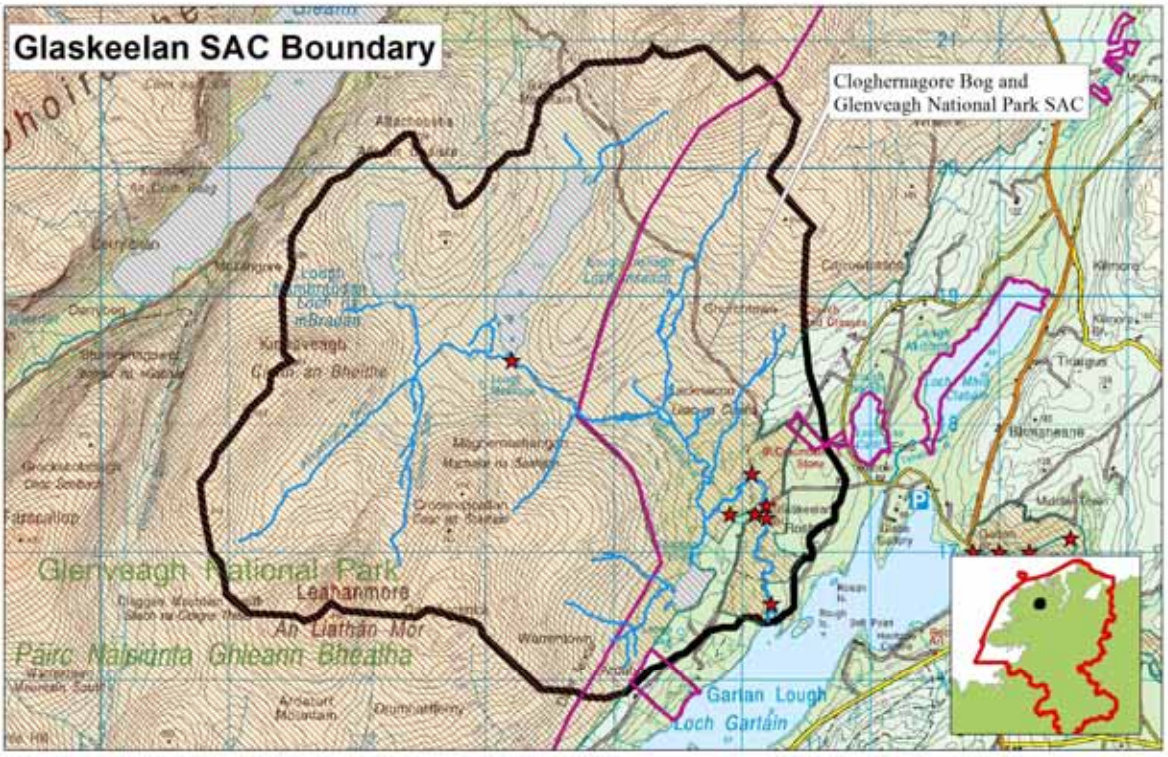
A number of applications for wind farms were observed within the catchment and submissions made to NPWS. Some applications are for a large number of turbines. The number and size of the wind farms are a cause of concern and could cause de-stabilisation.

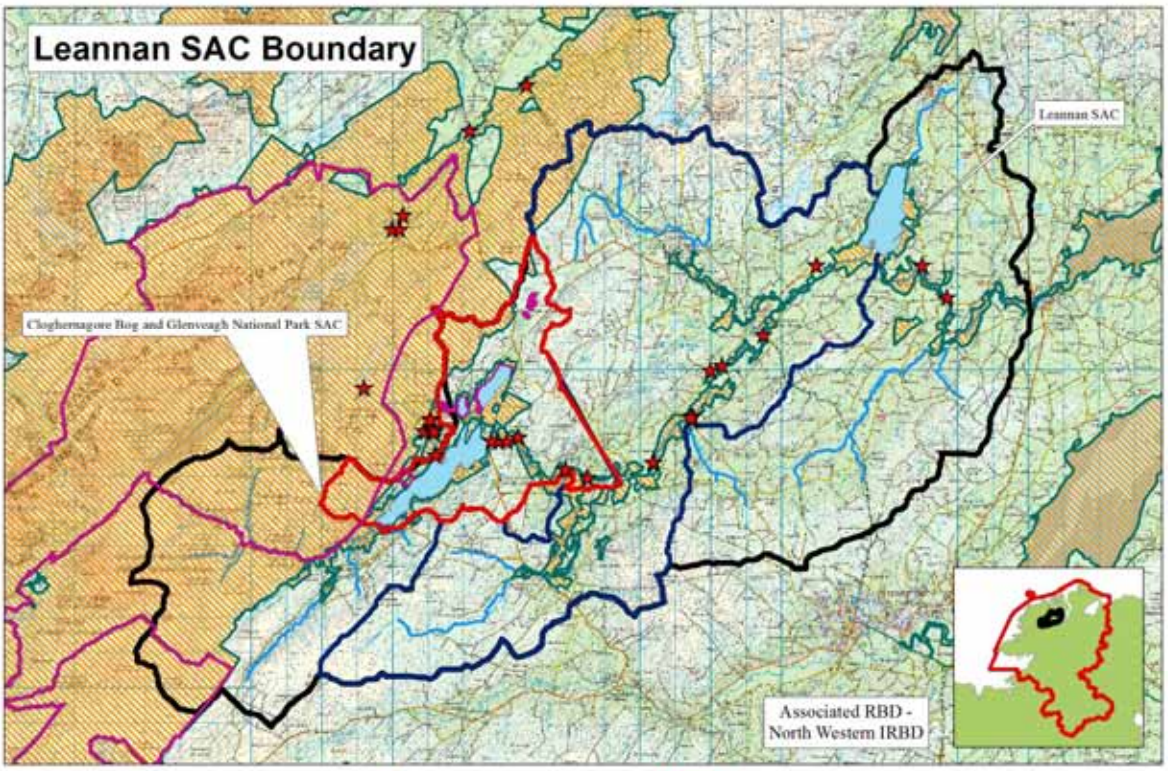
**Other issues – Fisheries**

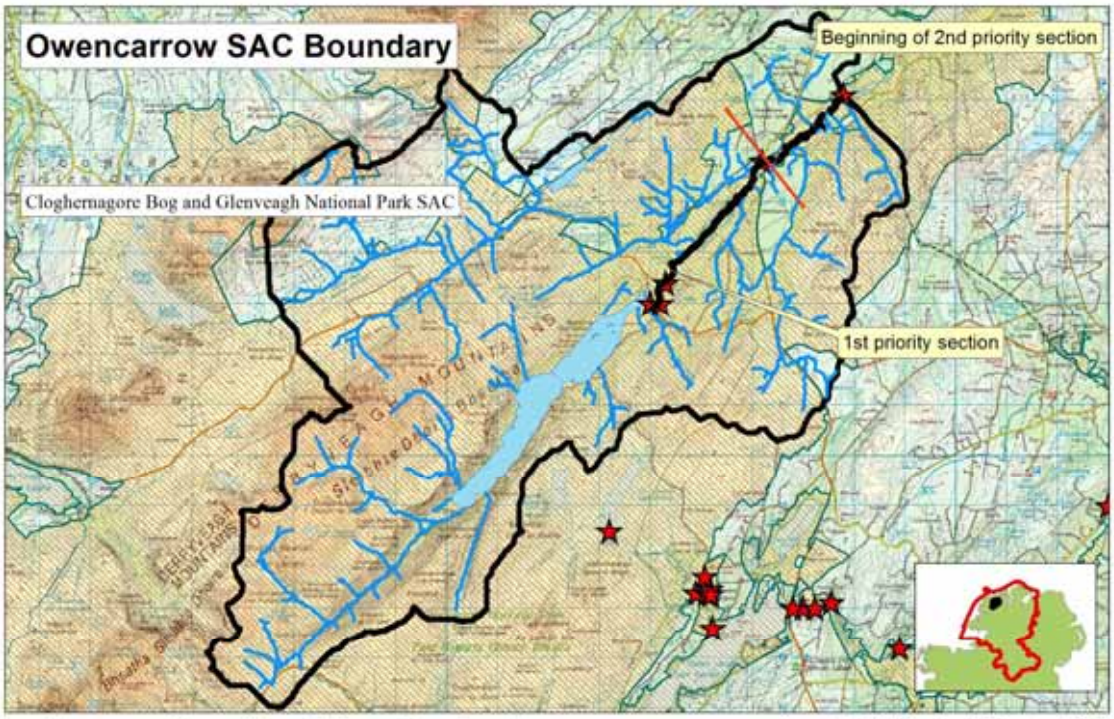
The bank side reinforcement associated with the fisheries works carried out within the pearl mussel habitat has led to erosion on the opposite bank.

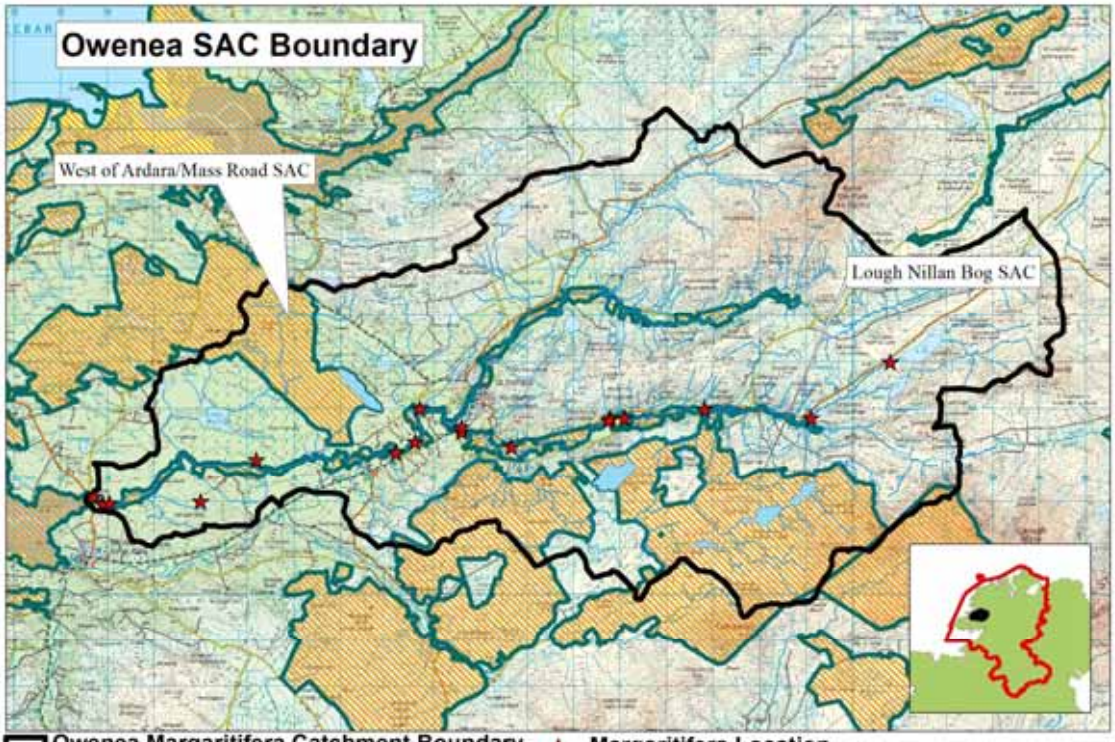

Clady SAC Boundary
Fawnboy Bog/Lough Nacung SAC
Fawnboy Bog/Lough Nacung SAC
Cloghernagore Bog and Glenveagh National Park SAC
Clady Margaritifera Catchment Boundary
SAC Boundary
Margaritifera Location
Priority stretch where measures will be applied
Associated RBD - North Western IRBD


Eske SAC Boundary
River Finn SAC
Lough Eske and Ardnamona Wood SAC
Croaghonagh Bog SAC
SAC Boundary
Eske Margaritifera Catchment Boundary
Margaritifera Location
Priority stretch for where OSWWTS measures will be applied
Associated RBD - North Western IRBD


Glaskeelan SAC Boundary
Cloghernagore Bog and Glenveagh National Park SAC
Glenveagh National Park
Leahanmore
An Liathán Mór
Pairc Náisiúnta Ghleann Bheatha
Garlan Lough
Loch Gartáin
Glenveagh National Park Boundary
Glaskeelan Margaritifera Catchment Boundary
Margaritifera Location
SAC Boundary
Associated RBD - North Western IRBD


Leannan SAC Boundary
Leannan SAC
Cloghernagore Bog and Glenveagh National Park SAC
Associated RBD - North Western IRBD
Leannan Margaritifera Catchment Boundary
SAC boundary
Margaritifera Location
Glenveagh National Park Boundary
Leannan Top Priority Sub-Catchment where measures will be applied
Leannan Second Priority Sub-Catchment


Owencarrow SAC Boundary
Beginning of 2nd priority section
Cloghernagore Bog and Glenveagh National Park SAC
1st priority section
Owencarrow Margaritifera Catchment Boundary
SAC Boundary
Margaritifera Location
Stretches where measures will be prioritised
Associated RBD - North Western IRBD


Owenea SAC Boundary
West of Ardara/Mass Road SAC
Lough Nillan Bog SAC
Owenea Margaritifera Catchment Boundary
SAC Boundary
Margaritifera Location
Associated RBD - North Western IRBD

# APPENDIX C

# Full List of Basic Measures

## BASIC MEASURES.

Programmes of measures have been set out in all River Basin Management Plans (RBMP) and these RBMP measures also apply to the freshwater pearl mussel catchments. Many of the measures are already provided for in national legislation and are being implemented. These include, for example, the Urban Waste Water Treatment Regulations 2001 to 2010 and the Good Agricultural Practice for the Protection of Waters Regulations of 2009. Others measures are under preparation (for example proposed authorisation regulations for abstractions and physical modifications). A full and detailed list of measures is provided below and there is more information about the measures in the national programme of measures background document and also the suite of programme of measures - technical studies background documents where the specific measures for key water management issues are explained (available on www.wfdireland.ie).

| **BASIC MEASURES** | | |
|---|---|---|
| **What will happen** | **Who Leads** | **When & Where** |
| **CO-ORDINATING ACTIONS** | | |
| **Water Policy Regulations (SI 722 of 2003) as amended in 2005:**<br>**Purpose**: provide statutory basis for the provisions of the Water Framework Directive<br><br>**Relevant Actions:** | | |
| Each public authority must exercise its functions in a manner which is consistent with, and contributes to, achieving the objectives of the plan. | Public authorities in Regulations | 2009–2015<br>National |
| Coordinate activities for the purposes of Articles 4, 5, 7, 10, 11 and 13 of the Directive and report to the European Commission. Maintain a register of protected areas | EPA | 2009–2015<br>National |
| Coordinate plan implementation at district level | Local authorities | 2009–2015<br>Whole RBD |
| Support ongoing public participation and RBD Advisory Councils | Local & public authorities | 2009–2015<br>Whole RBD |
| Coordinate with Northern Ireland authorities and participation groups on shared waters | DEHLG, EPA, local authorities | 2009–2015<br>Shared waters |
| Conduct public awareness and targeted education campaigns, including disseminating information using tools such as Water Maps | DEHLG, local authorities | 2009–2015<br>National |
| **Surface Water Objectives Regulations (SI 272 of 2009) and Groundwater Objectives Regulations (SI 9 of 2010):**<br>**Purpose:** to give effect to the measures needed to achieve the environmental objectives under Water Framework Directive and the Dangerous Substances Directive | | 2009–2015<br>National |

| BASIC MEASURES | | |
|---|---|---|
| **What will happen** | **Who Leads** | **When & Where** |
| **Relevant Actions:**<br>Where necessary align the following plans and programmes with river basin management plans:<br>• land use and spatial plans<br>• conservation and heritage plans<br>• water services strategic plans<br>• pollution reduction plans including national action plan, IPPC programme, local authority discharge authorisation programmes, groundwater and surface water pollution reduction programmes, shellfish waters pollution reduction programmes, bathing waters management plans, waste management plans, freshwater pearl mussel sub-basin plans, groundwater protection schemes, eel and salmon fishery conservation plans<br>• waste and sludge management plans<br>• major accident emergency plans<br>• forest management plans<br>• flood risk management plans (forthcoming) | Local authorities, DEHLG-NPWS, DEHLG, EPA, Coillte, OPW | |
| Other potential measures which are being considered but which require further development as outlined in Section 5.3. Agreed measures in relation to these issues can be introduced through update of Water Management Unit Action Plans during the implementation process:<br>• Protection of high quality waters:<br>• Mines and Contaminated Sites:<br>• Physical impact of channelisation on river status:<br>• Control of Abstractions, Impoundments and Physical modifications:<br>• Estuarine and Coastal (Marine) Monitoring:<br>• Integration of Water Quality and Planning:<br>• Further research. | To be confirmed | 2009–2015<br>National |
| Develop guidance and training for local authorities as required | Environmental Services National Training Group | 2009–2015<br>National |
| **BATHING WATERS DIRECTIVE (2006/7/EC)** | | |
| **Bathing Water Quality Regulations (SI 79 of 2008):**<br>**Purpose:** to ensure that the quality of bathing water is maintained or improved to comply with bathing water standards in order to protect public health and the environment.<br><br>**Relevant actions:**<br>Identify bathing waters. Monitor and classify bathing water quality status. Develop Bathing Waters Management Plans, including any necessary measures, to achieve bathing water quality standards. Disseminate bathing water quality information to the public. | Local authorities | 2009–2015<br>Designated sites |

| BASIC MEASURES | | |
|---|---|---|
| **What will happen** | **Who Leads** | **When & Where** |
| Cooperate on cross border bathing waters including exchange of information and joint action. | Local authorities, DEHLG, EPA | |
| **BIRDS AND HABITATS DIRECTIVES (79/409/EEC and 92/43/EEC)** | | |
| **European Communities (Natural Habitats) Regulations (SI 94 of 1997) as amended in 1998 and 2005:**<br>**Purpose:** to ensure the protection of habitats and species of European importance.<br><br>**Relevant actions:**<br>Designate sites hosting habitats and species of European importance for inclusion in the Natura 2000 network as needed. Establish appropriate conservation measures, and management plans where necessary, to ensure achievement of favourable conservation status.<br><br>Ensure that appropriate assessment is carried out in relation to activities which are likely to impact on designated sites and, where necessary, regulate activities. Introduce compensatory measures to ensure the coherence of the Natura 2000 network if damaging activities are allowed to go ahead.<br><br>Promote education on the need to protect species and habitats, encourage research necessary to achieve the aims of the regulations.<br><br>**Environmental Objectives (Freshwater Pearl Mussel) Regulations (SI 296 of 2009):**<br>**Purpose:** To set legally binding objectives for water quality in rivers, or parts of rivers, inhabited by freshwater pearl mussels Margaritifera and designated as Special Area of Conservation (SAC) so as to protect this species. The regulations also require steps to be taken to attain those objectives.<br><br>**Relevant actions:**<br>Establish environmental quality objectives. Undertake monitoring, assess conservation status and investigate pollution. Develop management plans (sub-basin plans of River Basin Management Plans), including any necessary measures, to ensure achievement of environmental quality objectives.<br><br>Examine discharge authorisations to designated areas and establish if they require review.<br><br>Monitor the implementation of the sub-basin management plans and ensure their implementation. | DEHLG-NPWS, DEHLG<br><br>Relevant parties<br>DEHLG-NPWS, DEHLG,<br><br>DEHLG<br><br>DEHLG-NPWS<br><br>Public authorities<br><br>DEHLG | 2009–2015<br>Designated sites |
| **DRINKING WATER DIRECTIVE (98/83/EC)** | | |
| **European Communities (Drinking Water) (No. 2) Regulations (SI 278 of 2007):**<br>**Purpose:** to ensure that drinking water intended for human consumption is wholesome and clean. | | 2009–2015<br>Designated sites |

| BASIC MEASURES | | |
|---|---|---|
| **What will happen** | **Who Leads** | **When & Where** |
| **Relevant actions:**<br>Monitor for compliance with drinking water quality standards. Maintain a register of water supplies. Immediately investigate non-compliances and inform consumers. Prepare Action Programmes where the drinking water quality standards are not met. | Local authorities | |
| Prohibit water supplies considered to pose a potential danger to human health. | Local authorities, HSE | |
| Ensure compliance with the regulations and supervise group water schemes. | EPA | |
| **Water Services Act (No 30 of 2007):**<br>**Purpose:** to facilitate the provision of safe and efficient water services and water service infrastructure for domestic and non-domestic requirements. | | |
| **Relevant actions:**<br>Monitor public water supplies and monitor and supervise private drinking water supplies. Develop Water Services Strategic Plans, including measures, to meet the Act's requirements including achievement of drinking water standards. Prohibit or restrict water supplies that pose a potential threat to human health or the environment. Inform consumers of non-compliances and ensure that remedial actions are taken where necessary. Prohibit or restrict certain water uses if there is a deficiency of supply. Implement a Rural Water Programme and a licensing system for the Group Water Scheme sector. | Local authorities | |
| Supervise and monitor water services authorities and issue compliance notices in relation to non-compliances. Plan and supervise investment under the Water Services Investment Programme. | DEHLG | |
| Supervise public water supplies | EPA | |
| **MAJOR ACCIDENTS AND EMERGENCY DIRECTIVE (96/82/EC)** | | |
| **European Communities (Control of Major Accident Hazards Involving Dangerous Substances) Regulations (SI 74 of 2006):**<br>**Purpose:** to ensure that operators of establishments where dangerous substances are present take all necessary measures to prevent the occurrence of major accidents and to limit the consequences of accidents for people and the environment. | | 2009–2015<br>Qualifying sites |
| **Relevant actions:**<br>Prepare on-site emergency plans identifying major hazards and specifying prevention and mitigation measures. | Operators | |
| Prepare off-site emergency plans for action outside the establishment in the event of a major accident. | Local authorities | |

| BASIC MEASURES | | |
|---|---|---|
| **What will happen** | **Who Leads** | **When & Where** |
| Require written notification of activities involving specified dangerous substances. Require operators to demonstrate safe operation and storage and to investigate their operations in the event of a major accident. Organise inspections and measures where necessary. Supply information on major accidents to public authorities.<br><br>**Planning and Development Act (No. 30 of 2000) as amended in 2002:**<br>**Purpose:** to provide for the proper planning and development of urban and rural areas.<br><br>**Relevant actions:**<br>Ensure that adequate controls are in place for relevant new developments. | DETE<br><br>Local authorities | 2009–2015<br>Qualifying sites |
| **ENVIRONMENTAL IMPACT ASSESSMENT DIRECTIVE (85/337/EEC)** | | |
| **Environmental Impact Assessment Regulations (SI 349 of 1989) as amended from 1994 to 2006:**<br>**Purpose:** require that certain developments be assessed for likely environmental effects before planning permission is granted.<br><br>**Relevant actions:**<br>Require certain developments, by either the private or the public sector, to prepare Environmental Impact Assessments for consideration before planning permission is granted (taking account of objectives established in river basin management plans) and make them available to the public. Notify authorities in Northern Ireland of any planning application which is likely to have significant effects on the environment in Northern Ireland. | Planning authorities | 2009–2015<br>National |
| **SEWAGE SLUDGE DIRECTIVE (86/278/EEC)** | | |
| **Use of Sewage Sludge in Agriculture Regulations (SI 148 of 1998) as amended in 2001**:<br>**Purpose:** require that sewage sludge is used in accordance with a nutrient management plan.<br><br>**Relevant actions:**<br>Supervise the supply and use of sewage sludge in agriculture and ensure that it is used in accordance with nutrient management plans. Maintain a register of sludge biosolids movements and use and make it available to the public. Ensure adherence to the code of practice in relation to the use of biosolids in agriculture.<br><br>**Waste Management Act (No. 10 of 1996):**<br>**Purpose:** to regulate waste management in order to protect human health and the environment.<br><br>**Relevant actions:**<br>Prepare sludge management plans for the management of wastewater sludge (taking account of WFD objectives). Require measures to be taken in relation to the holding, recovery or disposal of waste in order to prevent or limit environmental pollution, where necessary. Require land owners to prepare nutrient management plans where necessary. | Local authorities<br><br>Local authorities | 2009–2015<br>National<br><br>2009–2015<br>National |

| BASIC MEASURES | | |
|---|---|---|
| **What will happen** | **Who Leads** | **When & Where** |
| **URBAN WASTEWATER TREATMENT DIRECTIVE (91/271/EEC)** | | |
| **Urban Wastewater Treatment Regulations (SI 254 of 2001) as amended in 2004 and 2010:**<br>**Purpose:** to ensure that the environment is not adversely affected by the disposal of inadequately treated urban waste water through the provision of urban wastewater collection systems and treatment plants.<br><br>**Relevant actions:**<br>Design, construct, operate, maintain and monitor treatment plants to achieve requirements in relation to treatment standards, nutrient sensitive areas and WFD objectives. Choose discharge points so as to minimise impact on the environment. Ensure that sewage sludge can be disposed of safely. Financial investments can be made under the Water Services Investment Programme. | Local authorities, DEHLG | 2009–2015<br>National |
| **Water Services Act (No 30 of 2007):**<br>**Purpose:** to facilitate the provision of safe and efficient water services and water service infrastructure for domestic and non-domestic requirements.<br><br>**Relevant actions:**<br>Plan and supervise provision of wastewater services under the Water Services Investment Programme. Prepare and implement Water Services Strategic Plans to support sustainable provision of wastewater services. | Local authorities | 2009–2015<br>National |
| **PLANT PROTECTION PRODUCTS DIRECTIVE (91/414/EEC)** | | |
| **Authorisation, Placing on the Market, Use & Control of Plant Protection Products Regulations (SI 83 of 2003) as amended from 2003 to 2009:**<br>**Purpose:** to authorise plant protection product for use or placing on the market to ensure that no harmful effects arise for human and animal health and that there is no unacceptable impact on the environment<br><br>**Relevant actions:**<br>Notify the DEHLG of all new information on potentially dangerous effects of authorised plant protection products on the environment or groundwater.<br><br>The conditions of authorisation are selected to minimise risks for consumers, workers and the environment. The use of a plant protection product in a manner other than specified on its approved label is illegal. | Relevant persons | 2009–2015<br>National |
| **NITRATES DIRECTIVE (91/676/EEC)** | | |
| **Good Agricultural Practice for the Protection of Waters Regulations (SI 101 of 2009):**<br>**Purpose:** provide statutory support for good agricultural practice to protect waters against pollution from agricultural sources and give further effect to several EU Directives including the Nitrates Directive, dangerous substances in water, waste management, protection of groundwater, public participation in policy development and water policy (the | | 2009–2015<br>National |

| BASIC MEASURES | | |
|---|---|---|
| **What will happen** | **Who Leads** | **When & Where** |
| Water Framework Directive).<br><br>**Relevant actions:**<br>Review the nitrates National Action Programme to determine its effectiveness, including Agricultural Catchment Programme studies, in consultation with all interested parties. Ensure implementation of the National Action Programme.<br><br>Monitor as necessary for the purposes of the Regulations. Provide recommendations and direction to local authorities with respect to monitoring, inspections and measures.<br><br>Carry out monitoring to establish the extent of pollution in surface and groundwaters attributable to agriculture and determine trends in the occurrence and extent of such pollution. Carry out farm inspections (to coordinate with other farm inspection programmes).<br><br>**Additional actions: Agriculture:**<br>Consider increasing farm inspections in karst areas with turloughs and piloting of environmentally friendly farming scheme Map turloughs' zones of contribution. | <br><br><br>DEHLG, DAFF<br><br>EPA<br><br>Local authorities, DAFF<br><br>DAFF, DEHLG-NPWS | |
| **INTEGRATED POLLUTION PREVENTION CONTROL DIRECTIVE (2008/1/EC)** | | |
| **Environmental Protection Agency Acts (No 7 of 1992; No 27 of 2003) and Environmental Protection Agency (Licensing) Regulations (SI 85 of 1994) as amended in 1995, 1996, 2004 and 2008:**<br>**Purpose:** to prevent or reduce emissions to water, land and air, to reduce waste and to use energy and resources efficiently.<br><br>**Relevant actions:**<br>Ensure that operators of certain industrial and agricultural installations obtain IPPC licenses with conditions and ELVs based on BAT and relevant national and European legislation. Enforce licence conditions including monitoring. Maintain a register of licences and make available to the Commission and to the public. Undertake reviews of existing licences as required (taking account of WFD and Environmental Quality Objectives). Ensure cross border consultation where necessary.<br><br>Obtain the consent of sanitary authorities for discharges to sewers | <br><br><br>EPA<br><br>Operator | 2009–2015<br>National |
| **COST RECOVERY FOR WATER SERVICES** | | |
| **Water Pricing Policy:**<br>**Purpose:** to promote the conservation and efficient use of water resources in accordance with the Water Framework Directive<br><br>**Relevant actions:** | | 2009–2015<br>National |

| BASIC MEASURES | | |
|---|---|---|
| **What will happen** | **Who Leads** | **When & Where** |
| Develop and implement strategy to achieve water metering of domestic users connected to public water supplies.<br><br>Introduce legislation to allow local authorities to charge domestic users for water services.<br><br>Develop charging methodology for water services and introduce water charges for domestic users. | DEHLG<br><br>DEHLG<br><br>Local Authorities | |
| **PROMOTION OF EFFICIENT AND SUSTAINABLE WATER USE** | | |
| **Water Services Act (No. 30 of 2007):**<br>**Purpose:** to facilitate the provision of safe and efficient water services and water service infrastructure for domestic and non-domestic requirements.<br><br>**Relevant actions:**<br>Develop and implement strategy to achieve water metering of domestic users connected to public water supplies.<br>Facilitate the provision of efficient water services.<br><br>Rehabilitate and repair water works.<br><br>Ensure that water distribution systems are in a fit state and free from leaks.<br><br>**National Water Conservation (Leakage Reduction) Programme:**<br>**Purpose:** to establish water conservation and leakage control strategies.<br><br>**Relevant actions:**<br>Establish and maintain GIS-based water management systems. Establish an ongoing leakage control programme. Rehabilitate and replace defective water supply networks. Develop water conservation public awareness campaigns. Provide project-specific funding designed to meet specific leakage reduction targets. | <br><br><br><br>DEHLG<br><br>Local Authorities<br><br>Premises owner/occupier<br><br><br><br>Local authorities, DEHLG | 2009–2015<br>National<br><br><br><br><br><br><br><br><br><br>2009–2015<br>National |
| **PROTECTION OF DRINKING WATER SOURCES** | | |
| **Groundwater Protection Schemes:**<br>**Purpose:** to protect groundwater sources by enabling regulatory authorities to take account of the potential risks to groundwater when considering the control and location of potentially polluting activities.<br><br>**Relevant actions:**<br>Control the location and nature of developments and activities in accordance with groundwater protection schemes.<br><br>**Good Agricultural Practice for the Protection of Waters Regulations (SI 101 of 2009):**<br>**Purpose:** the protection of waters against pollution caused by nitrates from agricultural sources.<br><br>**Relevant actions:** | <br><br><br><br><br>Local authorities<br><br><br><br> | 2009–2015<br>National<br><br><br><br><br><br>2009–2015<br>National |

| BASIC MEASURES | | |
|---|---|---|
| **What will happen** | **Who Leads** | **When & Where** |
| Exclude chemical and organic fertilisers and farm manures from within specified distances of wells, boreholes, springs or abstractions points | Farmers | |
| **Planning and Development Act (No. 30 of 2000):**<br>**Purpose:** to provide for the proper planning and development of urban and rural areas. | | 2009–2015<br>National |
| **Relevant actions:**<br>Control of developments and activities in order to protect water resources. | Local authorities,<br>An Bord Pleanála<br>DEHLG | |
| **Water Policy Regulations (SI 722 of 2003) as amended in 2005:**<br>**Purpose**: to provide a statutory basis for the provisions of the Water Framework Directive including the establishment and maintenance of a Register of Protected Areas. | | 2009–2015<br>Designated sites |
| **Relevant actions:**<br>Keep Register of Protected Areas, which includes protected drinking waters, updated. | EPA | |
| Also, identify and protect all surface and groundwater bodies that are used, or may be used in the future, as sources of drinking water for more than 50 people or where the rate of abstraction is > $10m^3$ per day. Establish monitoring programmes for bodies of water providing >100 cubic metres as an average. Ensure that there is no deterioration of quality in identified bodies of water so as to reduce the level of purification treatment required. | To be assigned | |
| Consideration is also being given to the designation of safeguard zones around current and future abstractions under the Drinking Water Regulations. | To be assigned | |
| **ABSTRACTION AND IMPOUNDMENTS** | | |
| **Environmental Impact Assessment Regulations (SI 349 of 1989) as amended from 1994 to 2006:**<br>**Purpose:** require that certain developments be assessed for likely environmental effects before planning permission can be granted. | | 2012–2015<br>National |
| **Relevant actions:**<br>Undertake environmental impact assessment for drilling for water supplies above specified thresholds, groundwater abstraction and artificial groundwater recharge schemes above specified thresholds and works for the transfer of water resources between river basins above specified thresholds. | Local authorities | |
| **Water Pollution Act (No 1 of 1977) as amended in 1990:**<br>**Purpose:** to provide for the control of water pollution thereby protecting possible drinking water sources | | 2012–2015<br>National |

| BASIC MEASURES | | |
|---|---|---|
| **What will happen** | **Who Leads** | **When & Where** |
| **Relevant actions:**<br>Maintain registers of abstractions and make available to the public. | Local authorities | |
| **Water Supplies Act (SI 1 of 1942):**<br>**Purpose:** require that provisional orders be obtained by local authorities abstracting drinking water supplies. | | 2009–2015<br>Prioritised sites |
| **Relevant actions:**<br>Local authorities must adhere to conditions set down in provisional orders when abstracting drinking water from a water source. | Local authorities, DEHLG | |
| **Planning and Development Act (No. 30 of 2000) as amended in 2002:**<br>**Purpose:** to provide for the proper planning and development of urban and rural areas. | | 2009–2015<br>Prioritised sites |
| **Relevant actions:**<br>Local authorities must obtain planning permission for groundwater abstractions for public drinking water supplies. | Local authorities, An Bord Pleanála | |
| **Additional actions: Abstractions:**<br>Good practice measures are available in the Programmes of Measures – technical studies – Abstractions and National Summary Programme of Measures background documents. | | |
| **POINT SOURCE DISCHARGES** | | |
| **Environmental Objectives (Surface Water) Regulations (SI 272 of 2009):**<br>**Purpose:** The establishment of legally binding quality objectives for all surface waters and environmental quality standards for pollutants. Public authorities are required to examine and where appropriate, review existing discharge authorisations to ensure that the emission limits laid down in authorisations support compliance with the new water quality objectives/standards. . | | 2009–2015<br>National |
| **Relevant actions:**<br>Establish measures to achieve the quality objectives and standards. Where necessary, consult with other public authorities and with relevant competent authorities in Northern Ireland. | Public authorities | |
| Set emission limits based on BAT when authorising new discharges to ensure achievement of the quality objectives. Review all existing discharge authorisations to take into account the new quality standards. Prepare programmes for the monitoring and inspection of farm installations to verify compliance. | Local authorities, EPA, DEHLG | |
| Classify waters and make the classification available in GIS. Establish an inventory of emissions discharges and | EPA | |

| BASIC MEASURES | | |
|---|---|---|
| **What will happen** | **Who Leads** | **When & Where** |
| losses of priority substances, priority hazardous substances and other pollutants. | | |
| Prepare a plan for the progressive reduction of pollution by priority substances and the ceasing or phasing out emissions, discharges and losses of priority hazardous substances. | Coordinating local authority | |
| **Environmental Objectives (Groundwater) Regulations (SI 9 of 2010):**<br>**Purpose:** The establishment of legally binding quality objectives for all bodies of groundwater and environmental quality standards for pollutants. Public authorities are required to examine and where appropriate, review existing discharge authorisations to ensure that the emission limits laid down in authorisations support compliance with the new water quality objectives/standards. | | 2009–2015<br>National |
| **Relevant actions:**<br>All direct discharges of pollutants into groundwater are prohibited subject to certain exemptions. | Local authorities | |
| Point source discharges and diffuse sources liable to cause groundwater pollution must be controlled so as to prevent or limit the input of pollutants into groundwater. | EPA | |
| Identify hazardous and non-hazardous substances for the purpose of preventing and limiting pollutant inputs | EPA | |
| Where necessary or appropriate, issue advice and/or give directions to a public authority or authorities concerned on the measures to be taken to prevent and limit inputs of pollutants into groundwater. | EPA | |
| Where necessary or appropriate, issue advice and/or give directions to a public authority or authorities concerned on the measures to be taken to prevent and limit inputs of pollutants into groundwater. | EPA | |
| Where necessary or appropriate:<br>(a) review, or cause to have reviewed, existing codes of practice including other such mechanisms and controls already in place for the purpose of preventing or limiting the input of pollutants into groundwater;<br>(b) identify such other areas and/or activities requiring the introduction of similar type controls so as to prevent or limit the input of pollutants into groundwater ;<br>(c) direct a public authority to undertake a review and, where necessary, update a code of practice, or in the case of an activity requiring the introduction of new controls, prepare a new code of practice or system of control for the activity in question. A public authority must comply with the direction given by the Agency within the timeframe prescribed; | EPA | |
| Examine and if necessary review all existing discharge authorisations to groundwater to take into account the new | Relevant authorities | |

| BASIC MEASURES | | |
|---|---|---|
| **What will happen** | **Who Leads** | **When & Where** |
| quality standards and to prevent or limit inputs of pollutants to groundwater. | | |
| **Water Pollution Act (No 1 of 1977) as amended in 1990 and Water Pollution Regulations (SI 108 of 1978) as amended in 1992 and 1996:**<br>**Purpose:** to provide for the control of water pollution through prosecution for water pollution offences; use of pollution control conditions in the licensing of effluent discharges; issue of notices specifying measures to prevent water pollution. | | 2009–2015<br>National |
| **Relevant actions:**<br>License discharges to surface waters and sewers from small scale industrial and commercial sources. Review licenses at intervals of not less than 3 years. Keep registers of discharge licenses and make them available to the public. | Local authorities | |
| Prosecute for water pollution offences; attach appropriate pollution control conditions in the licensing of effluent discharges from industry, etc., made to waters or to sewers; issue notices specifying measures to be taken within a prescribed period to prevent water pollution; Issue notices to stop pollution of waters and requiring the mitigation or remedying within a period specified; seek court orders, including High Court injunctions. | Local authorities, Fisheries Boards, DEHLG-NPWS | |
| Notify local authorities of accidental discharges and spillages of polluting materials which enter, or are likely to enter, waters. | Relevant persons | |
| **Wastewater Discharge Authorisation Regulations (SI 684 of 2007):**<br>**Purpose:** to provide for the authorisation by the EPA of urban waste water discharges by local authorities. | | 2009–2015<br>National |
| **Relevant actions:**<br>Authorise Local Authority WWTPs (taking account of WFD objectives). Review licenses at intervals not less than 6 years. Enforce compliance with WWTP licensing conditions. Maintain a register of WWTP licences and certificates and make available on request. | EPA | |
| **Water Services Act (No 30 of 2007):**<br>**Purpose:** to facilitate the provision of safe and efficient water services and water service infrastructure for domestic and non-domestic requirements. | | 2009–2015<br>National |
| **Relevant actions:**<br>Prepare and implement Water Services Strategic Plans. | Local Authorities | |
| Duty of care on owners of premises to ensure that treatment systems for wastewater are kept in good condition. | Relevant Persons | 2009–2015 |

| BASIC MEASURES | | |
|---|---|---|
| **What will happen** | **Who Leads** | **When & Where** |
| **Additional actions: Urban Wastewater Treatment Plants:**<br>Measures for improved management: keep register of plant capacity and update annually; install facilities to monitor influent loads and effluent discharges in accordance with EPA guidelines and best practice; put auditable procedures in place to monitor compliance of licensed discharges; implement training procedures for staff involved with licensing of discharges; monitor receiving water quality upstream and downstream of the point of discharge. | Local Authorities | Prioritised Sites |
| Optimise treatment plant performance by the implementation of a performance management system supported by the use of decision making tools. | Local Authorities | |
| Actions have been identified for certain categories of treatment plant:<br>• Category 1 - Agglomerations with treatment plants requiring identifiable Capital Works.<br>• Category 2 - Agglomerations with treatment plants requiring further investigation prior to Capital Works.<br>• Category 3 - Agglomerations requiring the implementation of actions identified in Pollution Reduction Plans for Shellfish Waters designated under the Shellfish Water Regulations.<br>• Category 4 - Agglomerations with treatment plants requiring improved operational performance through the implementation of Performance Management Systems.<br>• Category 5 - Agglomerations requiring investigation of Combined Storm Overflows (CSOs).<br>• Category 6 - Agglomerations where existing waste water treatment capacity is currently adequate but predicted loadings (based on assumed 3% growth in load per annum) would result in overloading requiring management of development. | | |
| Good practice measures are available in the Programmes of Measures – technical studies – Municipal and Industrial Regulations, Urban Pressures and National Summary Programme of Measures background documents. | | 2009–2015<br>National |
| **Minerals Development Act (No 31 of 1940) as amended from 1960 to 1999:**<br>**Purpose:** to provide for the development and working of the mineral resources of the State whilst managing potential impact on the water environment | | |
| **Relevant actions:**<br>Grant Prospecting Licenses for exploration of specified minerals in specified areas subject to conditions. Grant Minerals or Mining Licenses with respect to State owned minerals. Grant Mining Permissions to work substances in small quantities. Grant Unworked Minerals Licenses with respect to unworked minerals. | DCENR | 2009–2015<br>Prioritised Sites |
| **Energy Act (No. 40 of 2006):**<br>**Purpose:** to regulate the energy industry whilst managing potential impact on the water environment | | |
| **Relevant actions:** | DCENR | |

| BASIC MEASURES | | |
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| **What will happen** | **Who Leads** | **When & Where** |
| Prepare Mine Rehabilitations Plans for the long-term rehabilitation of mine sites where it is considered necessary for the purposes of public or animal health or the environment.<br><br>**Waste Management Act (No 10 of 1996) as amended in 2001:**<br>**Purpose:** to regulate waste management in order to protect human health and the environment.<br><br>**Relevant actions:**<br>Prepare an inventory of closed waste disposal or recovery sites.<br><br>**European Communities (Quality of Shellfish Waters) Regulations (SI 268 of 2006) as amended in 2009:**<br>**Purpose:** to protect or improve shellfish waters in order to support shellfish life and growth by setting water quality requirements to be met.<br><br>**Relevant actions:**<br>Undertake monitoring and investigate pollution. Develop and implement Shellfish Pollution Reduction Programmes, including any necessary measures, to achieve shellfish water quality standards.<br><br>**European Communities (Freshwater Pearl Mussel) Regulations (SI 296 of 2009):**<br>**Purpose:** For the purpose of achieving the water quality objectives established for designated sites for the protection of freshwater pearl mussel populations.<br><br>**Relevant actions:**<br>Public authorities that authorise discharge to any of the listed rivers to set down emission limit values that aim to achieve the prescribed ecological quality targets; and to examine existing authorisations within a set time and review them as appropriate. | Local authorities,<br><br>EPA, GSI<br><br>DEHLG, Local authorities<br><br>Public authorities | 2009–2015<br>Prioritised Sites<br><br>2009–2015<br>Designated sites<br><br>2009–2015<br>Designated sites |
| **DIFFUSE SOURCE DISCHARGES** | | |
| **Water Pollution Act (No 1 of 1977) as amended in 1990 and Water Pollution Regulations (SI 108 of 1978) as amended in 1992 and 1996:**<br>**Purpose:** to provide for the control of water pollution through prosecution for water pollution offences; use of pollution control conditions in the licensing of effluent discharges made to waters or to sewers; issue of notices specifying measures to be taken to prevent water pollution.<br><br>**Relevant actions:**<br>Serve notices or directions on persons requiring measures to be taken in order to prevent or control pollution of waters, where necessary.<br><br>Notify local authorities of accidental discharges and spillages of polluting materials which enter, or are likely to enter, | Local authorities, Fisheries Boards, DEHLG-NPWS | 2009–2015<br>National |

| BASIC MEASURES | | |
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| **What will happen** | **Who Leads** | **When & Where** |
| waters.<br><br>**Planning and Development Act (No 30 of 2000) as amended in 2002:**<br>**Purpose:** to provide for the proper planning and development of urban and rural areas.<br><br>**Relevant actions:**<br>Grant permission for on-site waste water treatment systems subject to site suitability assessment.<br><br>**EPA Code of Practice for Wastewater Treatment Systems serving Single Houses (2009)**<br>**Purpose:** to provide guidance on the provision of wastewater treatment and disposal systems for new single houses.<br><br>**Relevant actions:** the guidance addresses the following<br>Assess site suitability for on-site wastewater treatment systems and identify minimum environmental protection requirements<br>Select suitable wastewater treatment systems for sites in un-sewered rural areas<br>Design and install septic tank systems, filter systems, packaged treatment systems and tertiary treatment systems,<br>Maintenance requirements for on-site wastewater treatment systems.<br><br>The guidance is supported by DEHLG circular letter (Reference PSSP 1/10) and Planning Guidelines on Sustainable Rural Housing (2005)<br><br>Amend the Technical Guidance Document supporting the 1997 Building Regulations (SI 497 of 1997) relating to standards for “drainage and waste water disposal” (TGD-H of 2005) and issue a supporting Circular Letter to all Local Building Control Authorities.<br><br>For existing unsewered properties, bring forward and consult on proposals for legislation to provide standards for the performance, operation and maintenance of septic tanks and similar on-site wastewater treatment systems and also for the monitoring and inspection of the performance of such treatment systems and set out the responsibilities of households served by those systems, including requirements to carry out remedial actions where necessary.<br><br>**Additional actions: On-site systems:**<br>Good practice measures are available in the Programmes of Measures – technical studies – On-site wastewater treatment systems and National Summary Programme of Measures background documents. | Relevant persons<br><br>Local authorities<br><br>Planning authorities, developers, manufacturers designers, installers and operators<br>Planning authorities & An Bord Pleanála<br><br>DEHLG<br><br>Minister for the Environment, Heritage and Local Government | 2009–2015 National<br><br>2009–2015 National<br><br>2010 |

| BASIC MEASURES | | |
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| **What will happen** | **Who Leads** | **When & Where** |
| **Forestry Act (No 13 of 1946) as amended in 1976 and 1988 and Aerial Fertilisation Regulations (SI 592 of 2006) as amended in 2007 and codes of practice, guidance documents administered through a grant support system:**<br>**Purpose:** to provide for the development and regulation of forestry.<br><br>**Relevant actions:**<br>Promote forestry with financial incentives. License forestry activity and where necessary, attach additional conditions in sensitive areas.<br><br>Encourage sustainable, commercial afforestation. Ensure compliance with guidance and codes of practice.<br><br>A new Forestry Bill, replacing the 1946 Forestry Act, has been drafted to strengthen sustainable forestry management. Provisions relating to water protection are;<br>• All forestry operations must be carried out in accordance with any guidelines and regulations issued by the Minister for Agriculture, Fisheries and Food.<br>• Allowing for change of land use from forestry to other sustainable uses.<br><br>In acid sensitive catchments apply a protocol agreed between the Department of Environment, Heritage and Local Government, the Forest Service, the EPA and COFORD for dealing with grant-aid applications in acid sensitive areas. All relevant applications received by the Forest Service are checked for alkalinity levels in run-off water. Borderline cases are referred to the Environmental Protection Agency for recommendations.<br><br>2008 guidelines for the protection of Natura 2000 sites designated for the protection Freshwater Pearl Mussel populations from forestry activities are intended to ensure that forest operations such as afforestation, forest road construction, harvesting and forest planning are compatible with the protection of this particularly sensitive species. The guidelines describe a range of measures intended to reduce any potential negative impacts on the species arising from forest operations.<br><br>**Strategic Plan for the Development of Forestry:**<br>**Purpose:** to provide for the development and regulation of forestry.<br><br>**Relevant actions:**<br>Adhere to forest management plans and the principles of sustainable forest management.<br><br>Ensure implementation of the National Forestry Standard and adherence to the code of best forest practice. | Forest Service<br><br>Forest Service<br><br>Minister for the Department of Agriculture, Fisheries and Food<br><br>Forest Service, EPA<br><br>Forest Service<br><br>All stakeholders<br><br>Forest Service | 2009–2015 National<br><br>2009–2015 National |

| BASIC MEASURES | | |
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| **What will happen** | **Who Leads** | **When & Where** |
| **Additional actions: Forestry:**<br>Good practice measures are available in the Programmes of Measures – technical studies – Forest and Water and National Summary Programme of Measures background documents.<br><br>**Environmental Objectives (Freshwater Pearl Mussel) Regulations (SI 296 of 2009)**<br>**Purpose:** For the purpose of achieving the water quality objectives established for designated sites for the protection of freshwater pearl mussel populations.<br><br>**Relevant actions:**<br>Develop management plans (sub-basin plans of River Basin Management Plans), including any necessary measures, to ensure achievement of environmental quality objectives. | DEHLG-NPWS, relevant public authorities | 2009–2015<br>Designated sites |
| **AUTHORISATION OF DISCHARGES TO GROUNDWATERS** | | |
| **Environmental Objectives (Groundwater) Regulations (SI 9 of 2010):**<br>**Purpose:** to provide for specifying the criteria for classifying groundwater status and identifying significant increasing pollution trends; provide for a proportionate risk–based response to groundwater protection.<br><br>**Relevant actions:**<br>Review all existing discharge authorisations to take into account the new quality standards.<br><br>**Wastewater Discharge Authorisation Regulations (SI 684 of 2007):**<br>**Purpose:** Where a local authority proposes to discharge urban waste water effluent to groundwater an authorisation by the Environmental Protection Agency is required.<br><br>**Relevant actions:**<br>Authorisation of Local Authority WWTPs effluent discharges discharging to groundwater.<br><br>**Water Pollution Act (No 1 of 1977) as amended in 1990:**<br>**Purpose:** to provide for the control of water pollution**.**<br><br>**Relevant actions:**<br>License discharges to groundwaters from small scale industrial and commercial sources. Review licenses at intervals of not less than 3 years. Keep registers of discharge licenses and make them available to the public. | Local authorities<br><br>EPA<br><br>Local authorities | 2009–2015<br>National<br><br>2009–2015<br>National<br><br>2009–2015<br>National |
| **PRIORITY SUBSTANCES** | | |
| **Environmental Objectives (Surface Water) Regulations (SI 272 of 2009):**<br>**Purpose:** to provide for quality objectives for surface waters, EQSs for pollutants, review of discharge authorisations, classification of surface waters, inventories of priority substances. | | 2009–2015<br>National |

| BASIC MEASURES | | |
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| **What will happen** | **Who Leads** | **When & Where** |
| **Relevant actions:**<br>Prepare a plan for the progressive reduction of pollution by priority substances and the ceasing or phasing out of emissions, discharges and losses of priority hazardous substances. Establish an inventory of emissions discharges and losses of priority substances, priority hazardous substances and other pollutants and publish a summary of the inventory. | EPA, coordinating local authority | |
| **Chemicals Act (No. 13 of 2008):**<br>**Purpose:** to provide for the regulation of certain dangerous chemicals. | | 2009–2015<br>National |
| **Relevant actions:**<br>Administration and enforcement of the European Registration, Evaluation and Authorisation of Chemicals regulations (REACH). | Health and Safety Authority | |
| Identify and manage risks linked to the chemicals manufactured or imported and registration of chemicals produced or imported in quantities greater than 1 tonne. | Manufacturers or importers of chemicals | |
| **European Pollutant Release and Transfer Register Regulations (SI 123 of 2007):**<br>**Purpose:** the prevention and reduction of pollution by the establishment of a publicly accessible pollutant release and transfer register. | | 2009–2015<br>National |
| **Relevant actions:**<br>Submit required data in relation to releases of pollutants and off-site transfers of pollutants and waste. | Operators | |
| Provide for electronic collection, assessment of data and report data to the EU Commission in relation to releases of pollutants and off-site transfers of pollutants and waste. Enforce regulations. | EPA | |
| **PHYSICAL MODIFICATIONS** | | |
| **Planning and Development Act (No 30 of 2000) as amended in 2002; Environmental Impact Assessment Regulations (SI 349 of 1989) as amended from 1994 to 2006:**<br>**Purpose:** to provide for the proper planning and development of urban and rural areas. Require that certain developments be assessed for likely environmental effects before planning permission is granted. | | 2009–2015<br>National |
| **Relevant actions:**<br>Consider the environmental impacts of developments as part of the planning process. | Local authorities | |
| **Additional actions: Physical modifications:**<br>Good practice measures are available in the Programmes of Measures – technical studies – Freshwater Morphology, | | |

| BASIC MEASURES | | |
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| **What will happen** | **Who Leads** | **When & Where** |
| Marine Morphology and National Summary Programme of Measures background documents.<br><br>Investigate the ecological potential of heavily modified waters and implement identified mitigation measures. | Relevant public authorities | 2009–2015<br>Prioritised sites |
| **OTHER ACTIVITIES IMPACTING ON WATER STATUS** | | |
| **Alien species:**<br>Introduce new regulations under the Wildlife Act to control introduction or possession of any species of flora or fauna which may be detrimental to native species. | DEHLG | 2009–2015<br>National |
| **PREVENTION OR REDUCTION OF THE IMPACT OF ACCIDENTAL POLLUTION INCIDENTS** | | |
| **Framework of Major Emergency Management**<br>**Purpose:** framework for emergency preparedness and response capability identifying hazards and risk to society, the economy, but also the environment including our natural water resource.<br><br>**Relevant actions:**<br>Prepare Major Emergency Plans with supporting plans, procedures and arrangements. Initiate a major emergency development programme for the implementation of the Major Emergency Plans. Co-ordinate the inter-agency aspects of major emergency preparedness and management in assigned regions.<br><br>Ensure and promote implementation of the Framework. | Local authorities, An Garda Síochána, HSE<br><br>Dept of Justice, Equality & Law Reform, Dept of Health & Children, DEHLG | 2009–2015<br>National |

# APPENDIX D

# Full List of Freshwater Pearl Mussel Measures and Suitability for Assessment

**FRESHWATER PEARL MUSSEL MEASURES.**

The following is the full national list of measures to address all pressures impacting on the freshwater pearl mussel and its habitat in the 27 SAC catchments. These measures will only be implemented if and where required, subject to resource availability, on a prioritized basis and at those sites where investigations and risk assessment show that specific pressures need to be remediated to restore pearl mussels to favourable conservation status. To reiterate, not all of the measures listed below will apply in a FPM catchment and any measures that do apply may only be implemented in restricted areas.

| | FRESHWATER PEARL MUSSEL MEASURE | Suitable for Assessment |
|---|---|---|
| **1** | **Public Awareness** | |
| 1 | An education and awareness campaign shall include, farm visits, public meetings, clinics, talks (to schools, etc.) and the distribution of leaflets. Topics covered will include the biology and ecology of pearl mussels and damage caused by pearl fishing, in-stream activities, sedimentation and nutrient enrichment. The measures necessary for their conservation shall be explained. Other issues such as litter prevention, the use of low phosphate detergent, correct disposal of domestic wastewater and disposal of oil shall be included in the campaign. | √ |
| **2** | **Stakeholder Involvement** | |
| 2 | Stakeholder assistance in the further development and design of measures will be encouraged, through meetings with relevant individuals and organisations. | √ |
| **3** | **Guidance** | |
| 3 | Appropriate guidance will be provided to different sectors to assist with their compliance with the Freshwater Pearl Mussel Regulations (S.I. 296 of 2009) and Article 6 of the Habitats Directive (i.e. Appropriate Assessment). | √ |
| **4** | **Appropriate Assessment Under Article 6 of the Habitats Directive** | |
| 4 | All plans, programmes and projects with the potential to impact on the pearl mussel SAC population, or any other Natura 2000 sites and their qualifying features, must be screened for Appropriate Assessment in accordance with Article 6 of the Habitats Directive, and, where judged necessary, an Appropriate Assessment must be conducted. In addition, all plans (e.g. Development Plans, forestry catchment management plans) and programmes (e.g. agri-environmental schemes) are likely to require Strategic Environmental Assessment (SEA). | √ |
| **5** | **Habitats Directive Controls** | |
| 5a | Notify stakeholders of measures required under the Sub-basin Management Plan. | **X** |
| 5b | Certain operations or activities within SACs require the consent of the Minister for the Environment Heritage and Local Government under the Habitats Regulations (S.I. 94 of 1997). This list is currently being revised. Once the list of these operations or activities (activities requiring consent/ notifiable actions) has been revised, it shall be formally notified to the relevant owners, occupiers or users in the pearl mussel SACs. | **X** |

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| **6** | **Municipal and Industrial Discharges** | |
| 6a | Examine and review all authorizations to discharge to waters within Freshwater Pearl Mussel SAC catchments, and revise those authorizations to comply with Schedule Four of S.I. 296 of 2009. | √ |
| 6b | Upgrade treatment to ensure compliance with any revised discharge standards set by the Regulatory Authority to ensure achievement of objectives set out in Schedule Four of S.I. 296 of 2009. | √ |
| 6c | Municipal wastewater. Conduct investigations into and mitigate as required:<br>i) The condition of the sewerage network and containment areas,<br>ii) The extent of the sewerage network and connection of peripheral properties,<br>iii) Storm overflows,<br>iv) Wastewater Treatment Plant (WwTP) performance,<br>v) Discharge quality,<br>vi) Impacts on receiving waters. | **X** |
| 6d | Municipal wastewater. Upgrade municipal wastewater treatment through:<br>i) Provision of appropriate WwTP,<br>ii) Connection of additional unsewered/sewered properties to WwTP,<br>iii) Repair of damaged collecting systems,<br>iv) Upgrade of WwTP capacity,<br>v) Upgrade of treatment level,<br>vi) Improvements in operational performance,<br>vii) Additional monitoring. | √ |
| 6e | Municipal wastewater. Prioritise investment in WwTPs within pearl mussel SAC catchments under the Water Services Investment Programme (WSIP). | √ |
| **7** | **Quarries** | |
| 7a | Examine and review all authorizations to discharge from quarries to waters within pearl mussel SAC catchments, and revise those authorizations to comply with Schedule Four of S.I. 296 of 2009. | √ |
| 7b | Upgrade treatment and mitigation measures to ensure compliance with any revised discharge standards set by the Local Authority to achieve of the objectives set out in Schedule Four of S.I. 296 of 2009. Mitigation measures will be designed to reduce sediment loss at source and/or intercept sediment along the pathway to the river. | √ |
| **8** | **Abstractions - Implementation of these measures will only occur at the specific sites where they are required.** | |

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| 8a | An Appropriate Assessment, under Article 6 of the Habitats Directive, shall be conducted for each abstraction identified as a significant potential risk in this Sub-basin Management Plan. | **X** |
| 8b | Further investigation and screening for Appropriate Assessment shall be conducted of other existing or future abstractions identified in this Sub-basin Management Plan or within the life-cycle of this plan to assess potential significant impacts on the pearl mussel. Appropriate Assessments shall be conducted where necessary. | **X** |
| 8c | Introduce reduction and remediation measures as appropriate to mitigate the impacts on pearl mussels from abstractions. | **X** |
| **9** | **Unnatural flows** | |
| 9 | Conduct further investigations and, where necessary, an Appropriate Assessment under Article 6 of the Habitats Directive into the impacts of any flow regulation identified in this Sub-basin Management Plan on the pearl mussel population. Where necessary, a plan shall be made and implemented to control flows in a manner that supports the sustainable reproduction of the pearl mussel. Monitoring of the success of changes implemented shall be carried out. | √ |
| **10** | **Morphological alterations – appropriate control** | |
| 10 | Enact necessary legislative change to control morphological alterations of surface waters. (Note: this measure is linked to measure 19 below, as developments such as alteration of the bed and banks of a river are currently exempted). | √ |
| **11** | **Morphological alterations - remediation of morphological pressures** | |
| 11 | Undertake the required morphological remediation measures at locations identified under this Sub-basin Management Plan, or through further investigation during the life-cycle of the plan (up to 2015). | √ |
| **12** | **Morphological alterations - sand and gravel extraction** | |
| 12 | No sand, gravel or stone shall be removed from rivers designated for freshwater pearl mussel, unless an appropriate assessment determines that there will be no significant negative impacts on the pearl mussel. (Note: sand and gravel extraction should be controlled under measure 10 above). | √ |
| **13** | **Catchment Modeling** | |
| 13 | Model/predict sediment, nutrient, and dangerous substance losses in pearl mussel SAC catchments to assist in developing and targeting measures for diffuse pollution. | **X** |
| | **Agricultural Measures**<br>**(Note:** Appropriate agricultural measures shall be implemented in areas that have been identified as presenting significant actual or potential risks of sediment and/or nutrient loss, hydrological pressures and/or dangerous substances loss and are, therefore, likely to impact upon the pearl mussel population.) | |
| **14** | **Agri-environmental Scheme** | |
| 14a | Develop and roll-out an agri-environmental scheme, which could, if appropriate, be incorporated into other existing schemes, for target areas within pearl mussel SAC catchments to achieve the objectives of this plan. (Work is ongoing to identify the | √ |

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| | target areas). | |
| 14b | The overall objective would be that all farms within the target areas in pearl mussel SAC catchments would have a farm plan under Measure 14a. | √ |
| 14c | The specific measures for each farm, required under the agri-environmental scheme (14a), will be produced with the assistance of appropriately trained advisers/planners. | **X** |
| 14d | Production of the farm plans under the agri-environmental scheme (14a) will require a comprehensive farm walk-over survey and risk assessment. | **X** |
| 14e | Appropriate training in risk assessment and management responses shall be provided to all farm advisers. | **X** |
| 14f | Farm plans in the target areas may include any of the following measures, but only if they are found, under Measure 14d, to be required: | √ |
| 14f | i) Fence livestock from watercourses to avoid direct damage to and trampling on pearl mussels. | √ |
| 14f | ii) Nutrient and sediment management plans are required for all farms. | √ |
| 14f | iii) Soil testing for phosphorus, pH, organic content, aluminium, iron and calcium, on a field by field basis, shall inform the nutrient management plan. | √ |
| 14f | iv) Fence drains, streams and rivers to prevent bank and channel disturbance/erosion. | √ |
| 14f | v) Prevent or mitigate machinery and/or livestock access to and through watercourses (ramps and fords) | √ |
| 14f | vi) Locate drinking water troughs away from watercourses (>30 m), steep slopes adjacent to watercourses and waterlogged land. | √ |
| 14f | vii) Reduce soil disturbance (tillage, ploughing, digging, cultivation, etc.), in critical source areas for sediment. | √ |
| 14f | viii) Reduce stocking rates to sustainable levels where there is significant risk of erosion due to overgrazing. | √ |
| 14f | ix) Install appropriately sized, designed and located sediment traps/barriers where required, e.g. in drainage ditches. | √ |
| 14f | x) Locate or relocate gateways away from high-risk areas, in order to prevent sediment loss to watercourses. Where risks to watercourses remain, mitigate by providing gravel hardcore around gateway. | √ |
| 14f | xi) Locate trackways away from drains and river margins. Prevent direct connectivity and sediment loss from tracks to watercourses. | √ |
| 14f | xii) Develop measures to increase infiltration and slow surface run-off, e.g. through tree planting. | **X** |
| 14f | xiii) Reduce application of fertiliser, slurry or farmyard manure, particularly within critical source areas for nutrients. | √ |

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| 14f | xiv) Establish site-specific buffer zones along drains and watercourses to intercept sediment and nutrients. Design of these buffer zones will factor-in precipitation, run-off, slope, soil type (including erodability, current phosphorus concentration and P-retention capacity), adjacent land use, stocking densities etc. (Options for buffer zones include grass, trees or Native Woodland Scheme) | √ |
| 14f | xv) Create artificial wetlands or filter beds in target areas to address point sources e.g. farmyards or eroding drains. | √ |
| 14f | xvi) Strict adherence to guidelines on pesticide usage (See measures 15 d and i and 22b). Pesticides, herbicides and veterinary products should not be applied near watercourses, on waterlogged land or on steeply sloping land adjacent to watercourses. | √ |
| 14f | xvii) Reduce application of lime, if required. | √ |
| 14g | Inspect implementation of all pearl mussel measures required by farm plans. | **X** |
| 14h | Apply weighting to farms in agri-environmental scheme in the farm selection process for cross-compliance monitoring, in order to increase likelihood of inspection. | **X** |
| 14i | Train agricultural inspectors in the risk assessment and pearl mussel measures required under the agri-environmental scheme. | **X** |
| 14j | Monitor the effectiveness of pearl mussel measures implemented under agri-environmental schemes | **X** |
| 14k | Make all data provided and collected under the agri-environmental scheme available to the relevant public authorities e.g. LA, DAFF, EPA, DEHLG. | **X** |
| **15** | **General Agricultural Measures – to be applied only when and where necessary throughout all freshwater pearl mussel SAC catchments** | |
| 15a | Locate supplementary feeding stations away from watercourses (>30 m), steep slopes adjacent to watercourses and waterlogged land. Move such stations regularly to avoid nutrient build-up and excessive poaching. | √ |
| 15b | Avoid removal or disturbance of bank side/ riparian vegetation and maintain all existing buffer zones along watercourses. | √ |
| 15c | Assess possible impacts of drain maintenance works, and take appropriate steps to avoid or mitigate. | **X** |
| 15d | Locate sheep dipping stations or other livestock treatment facilities away from watercourses. | √ |
| 15e | Include and promote measures for pearl mussel as options in other agri-environmental schemes that can be taken-up in non-target areas in the mussel SAC catchments. (Work is ongoing to identify the target areas). | √ |
| 15f | Utilise Native Woodland Scheme for conversion of agricultural land along riparian corridors and within identified critical | √ |

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| | source areas for sediment and nutrients. | |
| 15g | Prioritise GAP Regulation (S.I. 101 of 2009) farm inspections within pearl mussel SAC catchments. | √ |
| 15h | Increase farmer awareness of Freshwater Pearl Mussel Sub-basin Management Plans through informal farm visits. | **See 1 above** |
| 15i | Provide advice and training to farmers in relation to the use (location, frequency of application, volume, weather etc.), storage and disposal of sheep-dips toxic to freshwater pearl mussels. | **See 1 above** |
| 15j | Provide agricultural land-use data to relevant public authorities, including agriculture type, livestock density, soil phosphorus concentrations, fertiliser use, slurry spread grounds and application rates, to allow identification and mapping of target areas, etc. | √ |
| **16** | **On-site Wastewater treatment Systems** | |
| 16a | Prioritise the monitoring and inspection of on-site systems in pearl mussel SAC catchments. | **X** |
| 16b | Within the pearl mussel SAC catchment, prioritise the monitoring and inspection of on-site wastewater treatment systems in accordance with this Sub-basin Management Plan, i.e. within priority sub-catchments, priority stretches and/or on extreme and very high risk potentials. | **X** |
| 16c | Install new, and upgrade older, on-site wastewater treatment systems to comply with all standards issued by DEHLG and codes of practice issued by the EPA, e.g. Code of Practice Wastewater Treatment and Disposal Systems serving Single Houses. | √ |
| 16d | Operate and maintain all on-site wastewater treatment systems in accordance with any standards issued by DEHLG. | √ |
| 16e | Where appropriate, use constructed wetlands for treating/polishing household effluent from unsewered properties. | √ |
| 16f | Where an on-site wastewater treatment system is impacting the pearl mussel population, remove by tanker as a temporary measure until system is upgraded/ connected to municipal systems. | √ |
| **17** | **Forestry** | |
| 17a | Develop a long-term, forestry catchment management plan, with key stakeholders, with the aim of minimising hydrological, sediment, nutrient and other potential impacts from forests and all forestry operations. The potential significant risks will be identified through detailed, site-specific risk assessment. Particular attention must be paid to sensitive areas. The target areas identified for Measure 14a above should be used to inform the definition of sensitive areas. The forestry catchment management plan will recognize that site specific measures for forest stands within the pearl mussel catchment are required and will identify, to the extent possible, the most appropriate measures for each site from the following suite of measures, which shall be implemented as and where appropriate: | **X** |
| 17a | i) The option of not felling to be considered in sensitive areas, on a site-by-site basis. | √ |
| 17a | ii) Coniferous plantations within sensitive areas of the catchment will be subject to final felling and replacement with | √ |

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| | | continuous-cover native woodland or semi-natural bog/moor, where it is demonstrated to be technically feasible and silviculturally possible, and where adverse impacts on the protected area will not occur as a result of the measure. | |
| 17a | iii) | Establish riparian zone management prior to clearfelling, where technically feasible and following specific site-by-site assessment to determine the most appropriate buffer width and vegetative cover. The establishment of such management should not result in adverse impacts on water status. | √ |
| 17a | iv) | Change the tree species mix (for example to broadleaves) on replanting where soil-type permits and it is technically feasible and silviculturally possible. This measure will be site-specific. On sensitive sites, restocking with less nutrient demanding conifer species should also be considered. | √ |
| 17a | v) | Limit felling coupe size where it is technically feasible and where a risk assessment indicates that wind-throw is not likely to occur. The measure is also site-specific and the coup size should be linked to a multi-year felling plan for a given waterbody that would indicate the percentage of forest area to be felled and the expected nutrient and sediment release. | √ |
| 17a | vi) | Felling coup size shall be determined through a multi-year forest management plan that will predict nutrient and sediment loading and identify acceptable annual felling as a percentage of the catchment. The measure shall take account of the potential for adverse impacts such as wind-throw and overall forest stand stability in the design of the coupe sizes to be felled. Strict adherence to the Forestry and Freshwater Pearl Mussel Requirements and any other appropriate requirements/guidance is also required. | √ |
| 17a | vii) | Following felling of existing forest-stands, restore blanket bog and wet heath through drain blocking and appropriate site management, where it is demonstrated to be technically feasible and where adverse impacts on the protected areas will not occur as a result of the measure. The sites where this measure is to be applied must be agreed with NPWS. | √ |
| 17a | viii) | Following site-specific assessment, remove bank-side trees by motor mechanical means and as whole trees where technically feasible and where the potential to impact on the protected species is identified as being less by these means than that by standard harvester and forwarder. | √ |
| 17a | ix) | Eutrophication and sedimentation - enhance sediment control through improved design of sediment traps, increased numbers and wider distribution of sediment traps and blankets. | √ |
| 17a | x) | Main silt traps will be large enough for *Margaritifera* conservation purposes. In the design of silt traps reference shall be made to Altmüller & Dettmer, 2006. Ensure that the sediment management system is capable of blocking sediment in preferential flow paths to watercourse. | √ |
| 17a | xi) | Prohibition of fertilisation on sensitive sites | √ |
| 17a | xii) | Avoid or limit planting on un-enclosed peatland sites (blanket bog, raised bog, fen peat and heathland) and limit forest cover on less sensitive peatland sites such as cutaway, enclosed and improved peats. The latter should be based on a site-by-site assessment. | √ |

| | | |
|---|---|---|
| 17a | xiii) Ensure the audit of existing drainage networks in forest catchments is undertaken as per Best Management Practice prior to any felling | **X** |
| 17a | xiv) Enhanced drainage network management – minimize drainage in peat soils to reduce potential for nutrient entry to surface waters, where technically feasible. | √ |
| 17a | xv) Pesticide use – reduce and monitor pesticide usage in forests. Reduce usage through allowing forest stands to lay fallow by delaying any restocking by 3-5 years, using pre-dipped plants from nurseries and by developing alternate biological control methods. Where feasible, a register of pesticide use should be maintained. | √ |
| 17a | xvi) Establish native riparian woodland as a buffer including the establishment of continuous-cover, native bank-side tress at mussel habitat locations to produce dappled shade with no tunnelling of the river, where appropriate, technically feasible and silviculturally possible | √ |
| 17a | xvii) Roading associated with forestry should be subject to risk assessment and carried out strictly in accordance with existing national guidelines. | √ |
| 17a | xviii) Establishment of continuous-cover, native bank-side trees at mussel habitat locations to produce dappled shade with no tunnelling of the river. | √ |
| 17a | xix) Trees that are at risk of falling into the river shall be removed or partly removed (e.g. where some boughs are falling into the river) by suitably trained and experienced forestry personnel at mussel locations and, where necessary and technically feasible, be replaced by appropriate native species. | √ |
| 17a | xx) Undertake further research into buffer zones to identify optimum buffer zone design and establishment methods to enhance nutrient and sediment interception | **X** |
| 17a | xxi) Where the continued development of young forest stands is judged to pose a significant future threat to the pearl mussel population due to their location, stand size or being situated on blanket peats, fen peats, raised bogs or heath peats, then such immature forest stands shall be removed through felling-to-waste and any drainage system installed should be blocked and the natural hydrology restored, to the extent possible. | √ |
| 17a | xxii) Where the risk of felling-to-waste of immature forest stands on sensitive sites is regarded as high for the pearl mussel population, consideration shall be given to abandoning such stands and restoring the natural hydrology, where technically feasible. | √ |
| 17b | A monitoring programme to assess the effectiveness of the forestry measures will be developed. | **X** |
| 17c | Produce guidance, including mitigation measures, for forest tracks and brash mats, especially in relation to crossings of drains, streams and other watercourses. Review the Forest Road Manual to update mitigation measures for all water crossings by forest machinery. | **X** |
| **18** | **Peat Cutting - Implementation of these measures will only occur at specific sites where they are required.** | |

| | | |
|---|---|---|
| 18a | Where turf-cutting and associated drainage have been identified as a significant silt source, drains shall be filled or effectively silt trapped, and an effective buffer zone established to trap overland-movement of peat silt before it reaches the rivers. | √ |
| 18b | Where impacts from peat cutting (e.g.. hydrological & siltation) are identified and cannot be mitigated along the pathway, reduction and/or cessation of peat cutting will be required. | √ |
| **19** | **Planning** | |
| 19a | Activities such as field drainage, land reclamation, site/land clearance should be made subject to further planning control in sensitive areas of the catchment. | √ |
| 19b | Areas where further development represents a significant risk to pearl mussel conservation shall be identified and development restrictions implemented, as necessary. | √ |
| **20** | **Infrastructure (roads and bridge) impacting on the river - Implementation of these measures will only occur at the specific sites where they are required.** | |
| 20a | All planned future roads or bridges of any size shall be assessed for potential negative impacts on mussel populations during construction and operation. Future roads or bridges of any size should be subject to morphological controls (see Measure 10). | √ |
| 20b | Remediate hydromorphological damage caused by temporary or permanent roads and bridges, where such remediation work has been judged necessary and, through Appropriate Assessment and/or EIA, unlikely to significantly impact on the environment. | √ |
| 20c | Remediate hardcore or surfacing that includes substantial limestone content, where such work has been judged necessary and, through Appropriate Assessment and/or EIA, unlikely to significantly impact on the environment. | √ |
| **21** | **Leisure management - Implementation of these measures will only occur at the specific sites where they are required.** | |
| 21a | Angling – conduct surveys to determine whether fishing access is contributing to destabilising river banks and develop remedial measures, as necessary. | **X** |
| 21b | Angling – avoid trampling on pearl mussels by fishing from the bank. | √ |
| 21c | Angling - provide notices and leaflets advising anglers of the sensitivity of pearl mussels, the areas where care is necessary to avoid trampling on mussels and/or disturbing river banks and bed, and the penalties for causing damage to the species and its habitat. | √ |
| 21d | River morphological works shall comply with any new guidance for *Margaritifera* and fisheries enhancement to ensure that any works are beneficial to both. These shall be subject to morphological controls under Measure 10. | √ |
| 21e | Kayaking/canoeing – liaise with kayaking/canoeing clubs using pearl mussel rivers, enforce restrictions on use where | √ |

| | | |
|---|---|---|
| | necessary and provide information to kayakers/canoeists and other recreational users through signs, leaflets etc. | |
| **22** | **Dangerous Substances - Implementation of these measures will only occur at the specific sites where they are required.** | |
| 22a | Review the substances approved for use in sheep-dip and other pesticides in use in freshwater pearl mussel catchments. Incorporate findings of a review of *Margaritifera* toxicity research into such a review. | **X** |
| 22b | Provide advice and training to pesticide users, e.g. public authorities and farmers, in relation to the use (location, frequency of application, volume, weather etc.), storage and disposal of pesticides toxic to freshwater pearl mussels. | **X** |
| **23** | **Pearl fishing** | |
| 23 | Facilitate the early detection of pearl fishing incidents and ensure the prosecution of pearl fishing crimes | **X** |
| **24** | **Assisted breeding programmes** | |
| 24 | If and when necessary, augment freshwater pearl mussel population through assisted breeding and release programmes. | **X** |

**Example calculation for carbon dioxide (equivalent) emissions resulting from implementation of Freshwater Pearl Mussel Measures (16) – Munster Blackwater Catchment**

Total number of OSWWTS in catchment = 18,867

Total number of OSWWTS on high to extreme potential risk settings = 14,906

Percent of OSWWTS which will require desludging once during the first 6-year Action Programme cycle = 50%

Number of OSWWTS affected by measure: 14,906 * 50% **= 7,453 OSWWTS**

Amount of sludge assumed to be present in each tank (based on Northern Ireland Water Septic Tank, Domestic Treatment Plant and Cesspool Services Leaflet) = 4.5 $m^3$

Assumed density of sludge = 1.07 tonnes / $m^3$

Tonnes sludge removed annually: 7,453 OSWWTS * 4.5$m^3$ / OSWWTS * 1.07 tonnes / $m^3$ **= 35,886 tonnes annually**

Household Emissions Factor (tonnes $CO_2$ (equivalent) per tonne left in place per year) = 0.386

$CO_2$ (equivalent) emitted per year: 35,886 tonnes sludge * 0.386 tonnes $CO_2$ / 1000 **= 13.85 ktonnes $CO_2$ (equivalent)**

$CO_2$ (equivalent) emitted over life of plan: 35,886 tonnes sludge * 0.386 tonnes $CO_2$ * 6 years **= 83.11 ktonnes $CO_2$ (equivalent)**

Tonnes per trip of transport = 20 tonnes

Estimated distance per round trip = 100km

Transport Emission Factor (tonnes $CO_2$ (equivalent) per round trip) = 0.115[2]

Annual Transport Emissions: 35,886 tonnes sludge / 20 tonnes per trip * 0.115 tonnes $CO_2$ / 1000 = **0.20 ktonnes $CO_2$ (equivalent)**

Landfill Emissions Factor (tonnes $CO_2$ (equivalent) per tonne landfilled) = 0.2415[1]

$CO_2$ (equivalent) emitted per year: 35,886 tonnes sludge * 0.2415 tonnes $CO_2$ / 1000 **= 8.67 ktonnes $CO_2$ (equivalent)**

$CO_2$ (equivalent) emitted over life of plan: 35,886 tonnes sludge * 0.2415 tonnes $CO_2$ / 1000 * 6 years **= 52.00 ktonnes $CO_2$ (equivalent)**

[1] Based on IPCC 2006 Guidelines for Country Emissions, Volume 5, Waste

2 Irish Department of Transport, Amalgamated Emission Factor for 32 tonne truck

Dr. Antonia Gaughran
SEA Project Manager
Freshwater Pearl Mussel SBMPs SEA
RPS Group
West Pier Business Campus
Dun Laoghaire
County Dublin
Ireland

28th February 2010 Our Ref: SCP091004.1

**Re: Freshwater Pearl Mussels Sub - Basin Management Plans (FWPM SBMPs) - SEA Scoping Report - EPA Submission**

Dear Dr .Gaughran

I refer to and acknowledge your correspondence, dated 3RD November 2010, in relation to the Strategic Environmental Assessment Scoping for the Freshwater Pearl Mussels Sub - Basin Management Plans (FWPM SBMPs).

Please find enclosed the EPA's submission to assist you in undertaking an environmental assessment as per *the European Communities (Certain Plans and Programmes) Regulations 2004 (S.I No. 435 of 2004)*. It contains both specific and general issued to be addressed during the SEA and incorporated into the Plan. The attached is in addition to ongoing scoping consultation feedback during the SEA process.

The assessment of the FWPM SBMP measures should focus on those measures that are required to meet the more demanding requirements of Favourable Conservation Status for FWPM populations and that have not already been addressed in previous assessments such as WFD –RBMP SEAs. It may be appropriate to group the FWPM SBMPs by RBDs. However, if individual sub-basins have particularly distinctive characteristics (such as the Munster Blackwater and Nore sub-basins), then their SBMPs would benefit from separate assessment need to be assessed separately.

Each FWPM SBMP SEA should focus specifically on the issues relevant to the sub-basin(s) included in the SEA. The FWPM measures should be reviewed and only those relevant to the sub-basin(s) involved should be included in the assessment. The impact of the FWPM measures should be assessed with specific reference to the characteristics of the specific sub-basin(s) involved. The targets and indicators and the monitoring programmes in the FWPM SBMP SEAs should also be specific to the sub-basin(s) which are the subject of the assessment.

Should you have any queries or require further information in relation to the above please contact the undersigned.

Yours Sincerely,

_____

**Tadhg O'Mahony**
*Senior Scientific Officer*
*SEA Section - Environmental Research Centre*
*Office of Environmental Assessment*
*Environmental Protection Agency*
*Regional Inspectorate, Inniscarra, County Cork*
***email: t.omahony@epa.ie***

To: Antonia Gaughran

From: Various

Re: Freshwater Pearl Mussel Sub-basin Management Plans

Date: 01/12/2009

(1) Amendment highlighted by Water Adviser, NCWG Member

Page 18 - 2nd column

Where the document refers to: Water - Drinking Water Regulations SI 439 of 2000.

These regulations have been updated by the new regulations made in 2007 - S.I. 278 of 2007. I have attached a copy for information.

(2) Feedback from OPW

Overall the SEA Scoping is a good document and we wish to add the following comments for consideration:

* There are a series of Drainage Districts (DDs) nationwide and it would be prudent to integrate them with the Env Report. Some GIS analysis could confirm or denie if any future DD maintenance would possibly conflict with FPM populations. Where an overlap occurs, the SEA may have to consider options for a sustainable approach in attaining FPM conservation status and the flood risk management requirements.
* OPW have commenced implementing requirements under the Floods Directive and it is recommended to consult with Flood Risk Management Section as part of the next more detailed stages of the SEA. The latest information on Areas of Potentially Significant Risk and proposals for Catchment Flood Risk Assessment & Management Plans would be beneficial to cross reference with the FPM locations. Any potential overlaps could be identified, and similar to the DDs above, where potential conflict is identified, the SEA could try to develop recommendations to ensure a sustainable solution.
* While Flood Risk Management (FRM) is stitched into the SEA Scoping, there are no Objectives in regard to FRM. It may not be warranted but we uggest the requirement for FRM to be considered. As an overall observation, in light of the recent flood events in the State and the high public profile of flooding issues, it would be prudent for all water sector management plans to have due regard to FRM and how it can balance the same.

To: Antonia Gaughran

From: Seána McGearty
Co-ordination Unit, Dept. Communications, Energy & Natural Resources

Re: Freshwater Pearl Mussel Sub-basin Management Plans

Date: 09/12/2009

Dear Dr. Gaughran,

With reference to your correspondence dated 3rd November 2009.

The Department of Communications, Energy and Natural Resources have no comments to make on these proposed plans. This is without prejudice to any comments the Regional Fisheries Boards may have in this regard.

# EPA SEA SCOPING SUBMISSION -
## Freshwater Pearl Mussels Sub - Basin Management Plans (FWPM SBMPs)

## EPA SEA Process Guidance and SEA Submission

**EPA SEA Pack**
The EPA's SEA Pack is issued as a separate file electronically. This Pack has been compiled by the EPA and is based on our experience to date as a statutory SEA Environmental Authority and on current best practice in the SEA process particularly for Land Use Plans. The SEA Pack is issued as part of statutory SEA Scoping consultation in relation to the Freshwater Pearl Mussels Sub –basin Management Plans (FWPM SBMPs)
. It is a matter for the relevant Plan –making authorities to ensure that the relevant contents of the Pack are taken into account and followed as appropriate during the SEA process.

**Up-to-date Environmental Monitoring Data etc.**
The current state of the environment within the FWPM SBMPs study area should be described using most recent and up-to-date environmental data, information and reports. Where updating of significant environmental data and associated reports become available during the SEA process, where possible, this information should be incorporated into the description of the current state of the environment and where relevant related environmental problems. In addition the current state of drinking water quality and treatment, along with waste water effluent quality and treatment infrastructure, should be described using the most recent and up-to-date data, information and reports.

You are referred in this regard to the full range of Water and Air Quality Reports prepared by the EPA.
(See www.epa.ie https://www.epa.ie/downloads/pubs/)

**Geographical Information Systems**
You are referred to the EPA's web based Environmental Mapping / Geographical Information System (GIS) ENVision, which can be found at:
http://maps.epa.ie/InternetMapViewer/MapViewer.aspx

The use, and application, of GIS should be considered where possible at the various key stages in the SEA process. GIS could, along with other methodologies, and depending on the availability of relevant spatial data, assist in determining the cumulative vulnerability of various environmental resources within the FWPM SBMPs study area. GIS could also demonstrate visually how the outputs form the FWPM SBMPs might impact on these resources. In undertaking the SEA, all the environmental data and information presented on these GIS based maps should be taken into account.

You are referred to the updated version of the EPA GISEA Manual, which has recently been posted as a Consultation Document on the EPA's SEA WebPage. This document can be downloaded via the following link:
http://www.epa.ie/downloads/consultation/name,25835,en.html

***Section 3.2 Scoping of SEA topics***
In Table 5 (page 23) concerning "Water", WFD status should include both ecological and chemical status of surface waters. In addition, consideration should be given to preventing any significant damage to groundwater dependent terrestrial ecosystems (GWDTEs). Concerning "Climate" (page 24) both floods and droughts should be considered.

***Section 4.1 Environmental conditions suitable for FWPM***

In the final paragraph on page 26 the point should be made that in the absence of suitable EQOs for other water-borne pollutants in FPM catchments the Environmental Quality Standards set out in the EC Environmental Objectives (Surface Water) Regulations (S.I. 272 of 2009), which apply to all water bodies, will act as default objectives.

***Section 4.2 Current Pressures***

The Scoping Report should indicate what sources of data will be used for the preparation of the Environmental Report concerning the baseline assessment. This is recommended by EPA Guidance on SEA (Page 17 of Scott and Marsden, 2003[1]). The most up to date data should be used and at a scale of most relevant to the FPM sub-basins.

***Section 4.2.2 Diffuse Pressures***

*Forestry:* Acidification should be identified as a potential impact from forestry-related activities in vulnerable sub-basins.

*Agriculture:* Where available soil phosphorus levels should be examined, which deal better with legacy issues of intensification compared with stocking density or fertiliser usage values.

*On-Site Wastewater Treatment Systems:* It is recommended that the Environmental Report consider not just density of OSWWTS across the FWPM sub-basins but also other indicators such as distance of an OSWWTS to a water course and identification of high density OSWWTS clusters within individual river water body catchments.

***Section 4.2.3 point Pressures***

The Environmental Report should also consider industrial point sources and combined sewer overflows where they exist within FWPM sub-basins.

**Appropriate Assessment**

You are referred to the requirements of Article 6 of *Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora*, the Habitats Directive. Appropriate Assessment, in accordance with the Directive, is required for:

"*Any plan or project not directly connected with or necessary to the management of the site (Natura 2000 sites) but likely to have significant effect thereon, either individually or in combination with other plans or projects, shall be subject to Appropriate Assessment of its implications for the site in view of the sites conservation Objectives…*"

The Plan making authorities for FWPM SBMPs should consult with the National Parks and Wildlife Service (NPWS) with regard to screening for Appropriate Assessment. Where Appropriate Assessment is required, any findings or recommendations should be incorporated into the SEA Environmental Report and FWPM SBMPs outputs, as appropriate.

In order to determine the requirement for an Appropriate Assessment the following Guidance is referenced.

*European Commission, 2000. Managing Natura 2000 Sites – The provisions of Article 6 of the 'Habitats' Directive 92/43/EEC*
http://ec.europa.eu/environment/nature/natura2000/management/docs/art6/provision_of_art6_en.pdf

*European Commission, 2002. Assessment of plans and projects significantly affecting Natura 2000 sites - Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC*

[1] Scott, P. and Marsden, P. (2003) Development of Strategic Environmental Assessment (SEA) Methodologies for Plans and Programmes in Ireland. Synthesis Report. Environmental Protection Agency, Wexford.

http://ec.europa.eu/environment/nature/natura2000/management/docs/art6/natura_2000_assess_en.pdf

*National Parks and Wildlife Service*, 2009. *Appropriate Assessment of Plans and Projects in Ireland*
http://www.npws.ie/en/media/NPWS/Publications/CodesofPractice/AA%20Guidance.pdf

*National Parks and Wildlife Service, Natura 2000 Screening Protocol – Water Service Plans and Projects*
http://www.npws.ie/en/

**Scoping Meetings/Workshops**
As part of the SEA Scoping process, we would suggest that the convening of a Scoping Meeting / Workshop with key staff within the FWPM SBMPs making authority be arranged. There would also be merits in having relevant personnel from Department of Communications, Energy and National Resources (DCENR), and Environmental Protection Agency, as appropriate, at this meeting. Such an approach should continue where appropriate throughout the SEA process. The development and consideration of alternatives could also benefit from such an approach.

For any environmental issue(s) determined to be scoped out of the SEA process, clear justification should be included in the Environmental Report as to why the specific environmental issues were not considered likely to be potentially affected by the outputs of the FWPM SBMPs.

***Scope of the SEA- some specific comments / suggestions***
The assessment of the FWPM SBMP measures should focus on those measures that are required to meet the more demanding requirements of Favourable Conservation Status for FWPM populations and that have not already been addressed in previous assessments such as WFD –RBMP SEAs. The FWPM SBMP SEAs should only assess in detail impacts arising from measures included in the RBMPs if they have either not been already been adequately assessed in the RBMP SEAs, or if they refer to specific characteristics of individual catchments.

In addition, the objectives, targets and indicators of basic measures and associated monitoring in the RBMPs will apply to all water bodies in each RBD, including water bodies in FPM sub-basins. Therefore, it is a recommended that the Environmental Report focus more on measures relevant to achieving the objectives for FWPM SBMPs.

It may be appropriate to group the FWPM SBMPs by RBDs. However, if individual sub-basins have particularly distinctive characteristics (such as the Munster Blackwater and Nore sub-basins), then their SBMPs would benefit from separate assessment need to be assessed separately.

Each FWPM SBMP SEA should focus specifically on the issues relevant to the sub-basin(s) included in the SEA. The FWPM measures should be reviewed and only those relevant to the sub-basin(s) involved should be included in the assessment.

The impact of the FWPM measures should be assessed with specific reference to the characteristics of the specific sub-basin(s) involved. The targets and indicators and the monitoring programmes in the FWPM SBMP SEAs should also be specific to the sub-basin(s) which are the subject of the assessment.

The scoping document states that "the likely significant effects" will be assessed. In order to do so, relevant environmental topic specific "significance criteria" should be applied in determining the relative significance of impacts identified.

Further consideration should be given to the positioning of the FWPM SBMPs as higher level regional planning within the planning hierarchy. This may not be appropriate, at least in a spatial context.

The FWPM SBMPs SEAs should consider interactions with the relevant County Biodiversity Action Plan(s), where available, particularly in relation to habitats and species of particular significance at a county scale and objectives and actions that interact with the objectives and measures of the FWPM SBMPs. W here SAXC/ SPA Management Plans exist these should also be considered in detail in terms of both synergies and likely conflicts.

The FWPM SBMP SEAs should also consider important habitats outside designated sites and other species of conservation concern that are not formally protected. The SEAs should in particular highlight significant potential negative impacts on habitats and species of conservation interest. Specific topics where there is potential for conflict between FWPM objectives and other sensitive habitats and species include for instance:

- *The Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation annexed habitat type.*
- *Potential impacts of the forestry measures on Hen Harrier populations.*
- *Potential impacts on measures aimed at promoting development of bankside tree/woodland cover on important habitats and species associated with open bankside and floodplain habitats.*

The assessment criteria for the biodiversity related objective should include criteria related to undesignated sites that are of conservation importance, and species of conservation importance that occur in dispersed populations across the wider landscape.

The assessment of potential cumulative impacts should be an important focus of the FPMSBMP SEAs.

For compliance with the Habitats Directive it is necessary to carry out an Appropriate Assessment screening exercise for any FWPM SBMP that includes a sub-basin that contains, or is immediately upstream of a SAC or SPA for which Freshwater Pearl Mussel is not a qualifying interest.

In Table 5 (page 23) concerning "Water", WFD status should include both ecological and chemical status of surface waters. In addition, consideration should be given to preventing any significant damage to groundwater dependent terrestrial ecosystems (GWDTEs). Concerning "Climate" (page 24) both floods and droughts should be considered.

**Alternatives**

The approach to assessing the alternatives will need to include cumulative, synergistic, direct/indirect and temporal issues. In Table 8 the alternatives proposed could be described in more detail, in particular the inter-linkages with each other. It is possible that, rather than a single option being identified in the Plan as suitable, a suite of options may be chosen. This possibility will need to be reflected in the assessment approach. Again if the RBMP approach to alternatives is followed the emphasis will need to be on the more demanding measures required to achieve the equivalent of WFD High Status in water bodies.

In considering and assessing alternatives, the alternatives proposed should be reasonable and realistic and should be set at the appropriate strategic level at which the outputs from the FWPM SBMPs will be implemented. They should be assessed against the relevant environmental objectives established for the key environmental aspects of the environment likely to be significantly affected. Clear justification should be provided for the selection of the preferred alternative/ combination of alternatives.

Where relevant, the development of alternatives should be clearly described. In addition, the methodology applied in the assessment of alternatives along with any assumptions made should be described.

**Consultation**
In order to promote 'Best Practice' in SEA in the context of consultation, it is recommended that the public be given an opportunity to make submissions on the issues to be addressed in the SEA process for the FWPM SBMPs. To this effect consideration should be given to the publication of relevant and appropriate notices etc. to inform and engage the wider public in the SEA process.

Following completion of the Draft Scoping Report consideration should be given to the making available of this document on the relevant LA websites and other relevant websites.

**Water Framework Directive (WFD)**
The FWPM SBMPs should promote the protection of surface water, groundwater coastal and estuarine water resources and their associated habitats and species, including fisheries.

Provisions should be made in the outputs from the FWPM SBMPs for the incorporation of the specific relevant objectives and measures for individual water bodies set out in the relevant River Basin Management Plan (RBMP) and associated Programme of Measures (POM). The outputs form the FWPM SBMPs should not hinder, and where possible should promote the achievement of these specific objective at water body level. In addition, the outputs form the FWPM SBMPs should outline the current water quality status and the status to be achieved by 2015 in any receiving waters within the FWPM SBMPs area.

While the above is the case at the same time, it should be ensured that the SEA for the FWPMs as far as possible adopts a catchment-based focus particularly concerning baseline environment, pressure/impacts, monitoring and the development of locally appropriate measures that are reflective of the intrinsic vulnerability of each sub-basin.

Reference should be made in the outputs from FWPM SBMPs to the proposed surface water environmental quality standards set out in the Draft European Communities Environmental Objectives (Surface Waters) Regulations 2008, which address the WFD (2000/60/EC) and the Dangerous Substances Directive (2006/11/EC). A consultation paper on these regulations is available at:
http://www.environ.ie/en/Environment/Water/WaterQuality/ConsultationDraftSurfaceWaterRegulations/. When these regulations are made, the outputs from the FWPM SBMPs should ensure that these environmental quality standards are taken into account and their achievement is not compromised by the outputs.

You are in particular referred to the Water Maps GIS Tool within the WFD weblink:
http://www.wfdireland.ie/maps.html

You are referred to the recently published DoEHLG Planning Guidelines on flooding in "*The Planning System and Flood Risk Management - Guidelines for Planning Authorities (Environment, Heritage and Local Government – OPW, November 2009* which can be consulted at:

http://www.environ.ie/en/Publications/DevelopmentandHousing/Planning/NationalSpatialStrategy/Flood%20Risk%20Management/

You are also referred to the full range of Protected Areas within each of the River Basin Districts (RBDs) as set out in Annex IV 1(i) – (v) inclusive of the Water Framework Directive. These should be taken into account in undertaking the FWPM SBMPs.

**Interactions with other relevant plans and programmes**

In Table 3, page 15 concerning "Climate", consideration should be given to the recent (April 2009) European Commission White Paper on *Adapting to climate change: Towards a European framework for action* (COM (2009) 147). The accompanying paper on *Climate Change and Water, Coasts and Marine Issues* should also be consulted (SEC(2009)386/2).

In Table 4, page 17 concerning "Climate", consideration will need to be given, if available, to the National Adaptation Strategy for climate change. This strategy is due to the published by DEHLG in 2009 and may be available for inclusion in the Environmental Report.

In Table 4, page 18 concerning "Water", the EPA reports cited, although useful, do not represent legislation, policies, plans or programmes. A more relevant citation is the WFD monitoring programme available at the EPA website. Where EPA reports are used, the most recent should be cited; in this case the most appropriate is the recently published report titled *EPA (2009) Water Quality in Ireland 2007-2008: key Indicators of the Aquatic Environment. EPA, Ireland.*

In Table 4 the Phosphorus Regulations should be removed as they were revoked by European Communities Environmental Objectives (Surface Waters) Regulations 2009 (S.I. No. 272 of 2009).

In Table 4 the most recent Regulations for Good Agricultural Practice for the Nitrates Directive should be included (S.I. No. 101 of 2009). Similarly, in Table 4 the latest Drinking Water Regulations should be included (S.I. No. 278 of 2007).

In Table 4 the European Communities (Quality of Shellfish Waters) Regulations 2006 (S.I. No. 268 of 2006) should be included. These regulations include the development of Pollution Reduction Programmes to improve water quality in catchments draining to shellfish waters and therefore will be relevant where they coincide with FPM catchments.

Although mentioned later in Figure 4 (page 21), Table 4 and the Environmental Report should also include County Groundwater Protection Schemes and Biodiversity/Conservation Plans where they overlap with the FPM sub-basins.

**Objectives, Indicators and Targets**

Section 5.1 Draft SEA objectives -In Table 7 (page 30) the detailed assessment criteria for Objective 1 should include criteria (where available) to meet Favourable Conservation Status. Objective 2 (page 31) should also consider water conservation measures within each sub-basin. Objective 7 (page 31) should also consider whether the Draft SBMPs will support mitigation and adaptation to climate change as this area is scoped in and listed in Table 5.

Section 5.2 Draft Indicators and Targets -Where indicators and targets are derived from the RBMPs the emphasis will need to be on the more demanding end of the spectrum. For example, as indicated in the FWPM Regulations (and in Table 6 of the Scoping Report) the equivalent of High Status biological elements are required to sustain FWPM populations.

**Assessment of Likely significant effects**
In assessing the likely significant effects of implementation of the outputs from the FWPM SBMPs on the full range of environmental issues likely to be significantly affected, the full range of effects as set out in Annex I of the SEA Directive - likely significant effects should include- secondary, cumulative, synergistic, short, medium and long term, permanent, temporary, positive and negative effects, should be assessed and reported on.

Particular reference should be made to the potential for cumulative effects associated with the implementation of the outputs of the FWPM SBMPs in association with other relevant Plans / Programmes and projects within the FWPM SBMPs area and adjoining areas.

The methodology applied in the assessment of the preferred alternative along with any assumptions made should be described. Where possible and practical, quantitative assessments should be undertaken of the assessment of the preferred alternative/ combination of alternatives.

**Mitigation of significant effects**
Where significant adverse effects are identified associated with the implementation of the outputs from the FWPM SBMPs, there should be a clear link with relevant and appropriate mitigation measure(s). The emphasis should, in the first instance, be on avoidance of significant adverse effects.

**Monitoring Proposals**
The section on monitoring seems to indicate that new monitoring will be provided. There may be cases were this is necessary, however, the emphasis should be on integrating existing monitoring programmes to avoid duplication and any unnecessary additional monitoring burden. Consideration to the merits of inclusion of monitoring of "Habitat Quality" should be considered as appropriate.

Monitoring arrangements should be clearly set out along with responsibilities, frequency of monitoring, analysis, and reporting on monitoring. Monitoring arrangements should be sufficiently flexible so as to be able to react to unforeseen / unexpected events. Maximum use should be made of existing environmental monitoring programmes. To this effect, the significant environmental monitoring required under the Water Framework Directive should fulfill most if not all of the requirements with respect to water quality.

The monitoring arrangements and related monitoring programme for the implementation of the outputs of the FWPM SBMPs should include relevant and appropriate thresholds which should trigger when remedial action should be undertaken for the particular aspect of the environment being monitored.

**Process and SEA-Environmental Report Compliance**
The SEA Process for the FWPM SBMPs should comply fully with the procedural and output requirements set out in the SEA Directive, and the relevant national SEA Regulations. The Environmental Report should be prepared in accordance with the specific information specified in Article 5 - Environmental Report, Paragraphs 1 – 3 and Annex I of the SEA Directive.

**Integration of SEA and FWPM SBMPs outputs**
Particular emphasis should be given during the SEA and the FWPM SBMPs process to ensuring that both processes are fully integrated from the outset. Appropriate SEA Team /FWPM SBMPs Team Workshops should be held at key stages during both processes to ensure full engagement, interaction, and sharing of information with key members of both teams and to ensure full integration of environmental considerations in the outputs of the FWPM SBMPs.

**Documentation of the SEA Process**
Where key decisions are made during the SEA process e.g. Scoping In/Out environmental topics, selection of preferred alternative (s) etc. these decisions should be documented as part of an overall SEA/ FWPM SBMPs processes.

**Possible Proposed Amendments to the outputs of the Draft FWPM SBMPs**
You are referred to the requirement for any amendments proposed to the outputs of the Draft FWPM SBMPs, to be assessed for likely significant effects. This assessment should take account of the SEA Regulations Schedule 1 Criteria (S.I 435 of 2004) and should be subject to the same method of assessment as undertaken in the "environmental assessment" of the outputs of the Draft FWPM SBMPs.

**Information on the Decision/ SEA Statement**
Following adoption of the outputs of the FWPM SBMPs the competent authority is required to make available, as appropriate the adopted outputs from the FWPM SBMPs and a statement setting out relevant "Information on the Decision" as set out in Article 9 of the SEA Directive.

You are referred to the requirement to prepare an SEA Statement outlining "Information on the Decision" as required by Article 16 (1) of European Communities (Environmental Assessment of Certain Plans and Programmes) Regulations 2004, S.I No. 435 of 2004.

This SEA Statement should summarise the following:

- how environmental considerations have been integrated into the FWPM SBMPs and associated outputs;
- how the Environmental Report, submissions, observations and consultations have been taken into account during the preparation of the FWPM SBMPs and associated outputs;
- the reasons for choosing the outputs of the FWPM SBMPs adopted in the light of other reasonable alternatives dealt with; and,
- the measures decided upon to monitor the significant environmental effects of implementation of the outputs of the FWPM SBMPs.

A copy of the SEA Statement with the above information should be sent to any environmental authority consulted during the SEA process.

While not a mandatory requirement consideration should be given at the Draft FWPM SBMPs outputs stage to providing summary key information on the key findings of the environmental assessment and how these findings have been integrated within the outputs of the FWPM SBMPs.

**SEA Guidance /Methodology**
You are referred to the following Guidance/ Methodology, which should be referred to along with other relevant and appropriate SEA and related Guidance during the SEA process:

- EPA –Development of Strategic Environmental Assessment (SEA) Methodologies for Plans and Programmes in Ireland –Synthesis report (EPA, 2003) http://www.epa.ie/downloads/advice/ea/name,13547,en.html

- The Department of Environment Heritage and Local Government Guidelines: "Implementation of SEA Directive 92001/42/EC): Assessment of the Effects of Certain Plans and Programmes on the Environment –Guidelines for Regional Authorities and Planning Authorities" (DoEH&LG, November 2004) While the focus is on Land use Planning, this SEA guidance is of relevance.

http://www.environ.ie/en/Publications/DevelopmentandHousing/Planning/FileDownLoad,1616,en.pdf

In addition, to the above, it is brought to your attention that a Draft Consultation SEA Process Checklist has been published on the EPA website. The Checklist can be accessed at the following link:
http://www.epa.ie/downloads/consultation/name,24012,en.html

You are also referred to Appendix B -SEA Process Checklist in EPA –Development of Strategic Environmental Assessment (SEA) Methodologies for Plans and Programmes in Ireland –Synthesis report (EPA, 2003).

**Environmental Authorities**
You are referred to the requirement, where appropriate under the SEA Regulations, to give notice to the following:

- The Minister for the Environment, Heritage & Local Government where it appears to the Planning Authority that the outputs form the FWPM SBMPs might have significant effects in relation to architectural or archaeological heritage or to nature conservation, and

- The Minister for Communications, Energy and Natural Resource (formerly Communications, Marine and Natural Resource), where it appears to the Planning Authority that the outputs form the FWPM SBMPs might have significant effects on fisheries or the marine environment.