



Natura Impact Statement

Nore

2018

Natura Impact Statement

For

River Basin (15) Nore Flood Risk Management Plan

Areas for Further Assessment included in the Plan:

<i>Baile Héil</i>	<i>Ballyhale</i>
<i>Béal Átha Ragad</i>	<i>Ballyragget</i>
<i>Baile Átha an Róine</i>	<i>Ballyroan</i>
<i>Callain</i>	<i>Callan</i>
<i>Cill Chainnigh (An Fheoir)</i>	<i>Kilkenny (Nore)</i>
<i>Achadh Úr</i>	<i>Freshford</i>
<i>Inis Tíog</i>	<i>Inistioge</i>
<i>Cill Chainnigh (An Bhréagach)</i>	<i>Kilkenny (Breagagh)</i>
<i>Maighean Rátha</i>	<i>Mountrath</i>
<i>Ráth Domhnaigh</i>	<i>Rathdowney</i>
<i>Baile Mhic Andáin</i>	<i>Thomastown</i>

Flood Risk Management Plans prepared by the Office of Public Works 2018

In accordance with

European Communities (Assessment and Management of Flood Risks) Regulations 2010 and 2015

Purpose of this Report

As part of the National Catchment-based Flood Risk Assessment & Management (CFRAM) programme, the Commissioners of Public Works have commissioned expert consultants to prepare Strategic Environmental Assessments, Appropriate Assessment Screening Reports and, where deemed necessary by the Commissioners of Public Works, Natura Impacts Assessments, associated with the national suite of Flood Risk Management Plans.

This is necessary to meet the requirements of both S.I. No. 435 of 2004 European Communities (Environmental Assessment of Certain Plans and Programmes) Regulations 2004 (as amended by S.I. No. 200/2011), and S.I. No. 477/2011 European Communities (Birds and Natural Habitats) Regulations 2011.

Expert Consultants have prepared these Reports on behalf of the Commissioners of Public Works to inform the Commissioners' determination as to whether the Plans are likely to have significant effects on the environment and whether an Appropriate Assessment of a plan or project is required and, if required, whether or not the plans shall adversely affect the integrity of any European site.

The Report contained in this document is specific to the Flood Risk Management Plan as indicated on the front cover.

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The OPW also acknowledges the participation of members of the public, representative organisations and other groups throughout each stage of consultation.



South Eastern CFRAM Study

UoM15 Flood Risk Management Plan

Natura Impact Statement

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The draft Flood Risk Management Plans are intended **for the purpose of consultation only**. They should not be used or relied upon for any other purpose or decision-making process. They are likely to be updated, refined or changed before finalisation. The Commissioners of Public Works in Ireland reserve the right to change the content and/or presentation of any of the information provided in the draft Flood Risk Management Plans at their sole discretion.

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- Wicklow County Council
- The Environmental Protection Agency
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- All members of the National CFRAM Steering and Stakeholder Groups

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LIST OF ABBREVIATIONS

AA	Appropriate Assessment
AFA	Area for Further Assessment
CAFE	Clean Air for Europe [Directive]
CBA	Cost Benefit Analysis
CFRAM	Catchment Flood Risk Assessment and Management
CJEU	Court of Justice of the European Union
DAFM	Department of Agriculture, Food and the Marine
DAHG	Department of Arts, Heritage and the Gaeltacht
DARD	Department of Agriculture and Rural Development (Northern Ireland)
DCENR	Department of Communications, Energy and Natural Resources
DD	Drainage District
DECLG	Department of Environment, Community and Local Government
DEHLG	Department of Environment, Heritage and Local Government
EC	European Commission
EIA	Environmental Impact Assessment
EPA	Environmental Protection Agency
ERBD	Eastern River Basin District
FEMFRAM	Fingal East Meath Flood Risk Assessment and Management Study
FPM	Freshwater Pearl Mussel
FRA	Flood Risk Assessment
FRM	Flood Risk Management
FRMP	Flood Risk Management Plan
GIS	Geographical Information System
GSI	Geological Survey Ireland
HA	Hydrometric Area
HPW	High Priority Watercourse
IFI	Inland Fisheries Ireland
IPP	Individual Property Protection
IRBD	International River Basin District
IROPI	Imperative Reasons of Overriding Public Interest
LA	Local Authority
LAP	Local Area Plan
MCA	Multi-Criteria Analysis
MIDA	Marine Irish Digital Atlas
MPA	Marine Protected Area
MPW	Medium Priority Watercourse
NBIRBD	Neagh Bann International River Basin District
NHA	Natural Heritage Area
NIEA	Northern Ireland Environment Agency
NIS	Natura Impact Statement
NPWS	National Parks and Wildlife Service
NWIRBD	North Western International River Basin District
NWNB	North Western – Neagh Bann
OD	Ordnance Datum
OPW	Office of Public Works
OSi	Ordnance Survey Ireland

OSPAR	(Oslo Paris) Convention for the Protection of the Marine Environment of the North-East Atlantic
P/P	Plan or Programme
PFRA	Preliminary Flood Risk Assessment
RB	River Basin
RBD	River Basin District
RBMP	River Basin Management Plan
SAC	Special Area of Conservation
SEA	Strategic Environmental Assessment
SERBD	South Eastern River Basin District
SI	Statutory Instrument
SOP	Standard Operating Procedure
SoP	Standard of Protection
SPA	Special Protection Area
SSA	Spatial Scale of Assessment
SuDS	Sustainable Drainage Systems
SWRBD	South Western River Basin District
UNESCO	United Nations Educational, Scientific and Cultural Organization
UoM	Unit of Management
WFD	Water Framework Directive
WHO	World Health Organisation
WRBD	Western River Basin District

1 INTRODUCTION AND BACKGROUND

1.1 THE FLOODS DIRECTIVE

The Floods Directive is being implemented in Ireland through the European Communities (Assessment and Management of Flood Risks) Regulations 2010 [S.I.122/2010] (as amended by S.I.495/2015). These Regulations appoint the Office of Public Works (OPW) as the Competent Authority for the Flood Risk Management Plans (FRMPs), which set out the measures and policies that should be pursued to achieve the most cost effective and sustainable management of flood risk. The Statutory Instrument also identifies roles for other organisations; such as the Local Authorities, Waterways Ireland, the Electricity Supply Board (ESB) and Irish Water, to undertake certain duties with respect to flood risk within their existing areas of responsibility.

In Ireland, the approach to implementing the Directive has focused on a national Catchment-based Flood Risk Assessment and Management programme. This was developed to meet the requirements of the Floods Directive, as well as to deliver on core components of the 2004 Report of the Flood Policy Review Group (OPW, 2004). Pilot Catchment-based Flood Risk Assessment and Management (CFRAM) studies have been undertaken since 2006 in the Dodder and Tolka catchments, the Lee Catchment, the Suir Catchment and in the Fingal / East Meath area.

The national CFRAM programme is being progressed via six engineering consultancy projects which are based at the scale of the Water Framework Directive (WFD) River Basin Districts (RBDs). Collectively these six projects will focus on 300 Areas for Further Assessment¹ (AFAs) countrywide.

The South Eastern CFRAM Study was the third CFRAM Study to be commissioned. The Study area covers approximately 12,857 km² and includes six Units of Management ('UoM') each comprised of a single Hydrometric Area ('HA'). They are UoM11 (Owenavorrhagh & Blackwater RB), UoM12 (Slaney RB), UoM13 (Ballyteigue-Bannow RB), UoM14 (Barrow RB), UoM15 (Nore RB) and UoM17 (Waterford South Coast RB). UoM16 (Suir) is covered by the Suir pilot CFRAM Study and covers an area of approximately 3,542 km². Additional information on each UoM is presented in section 3.1.2.

At the completion of the national CFRAM programme, each UoM will have its own FRMP.

Chapters 1-3 of this document describe the process that was undertaken to identify and screen the European sites that could be impacted by the FRMP within the context of the overall South Eastern CFRAM Study. This information was used to help inform the environmental screening aspect of the Preliminary Screening stage of the Options Assessment (discussed in more detail in Chapter 3.1.1).

Chapter 4 presents a summary of the measures that are proposed for inclusion in the FRMP for UoM15 and Chapter 5 presents the appropriate assessment of the Preferred Options that have been put forward at the AFA-scale in the Final FRMP. Avoidance and mitigation measures have been included in Chapter 6.

¹ AFAs are settlement areas which were defined as a result of the first phase of implementation of the Floods Directive, the Preliminary Flood Risk Assessment (PFRA), completed in 2011. The PFRA identified areas of existing or foreseeable future potentially significant flood risk (originally referred to as 'Areas of Potential Significant Risk', or 'APSRs') and these areas are what are now referred to in the FRMPs as 'Areas for Further Assessment', or 'AFAs'.

1.1.1 South Eastern Catchment-based Flood Risk Assessment and Management Study

The CFRAM Studies and their product – the Flood Risk Management Plans – are at the core of the national policy for flood risk management and the strategy for its implementation. The methodology featured in each CFRAM Study includes the collection of survey data and the assembly and analysis of meteorological, hydrological and tidal data, which are used to develop a suite of hydraulic computer models. Flood maps are one of the main outputs of the Study and are the way in which the model results are communicated to end users. The studies will assess a range of potential options to manage the flood risk and determine which, if any, is preferred for each area and will be recommended for implementation within the FRMPs. The CFRAM Studies will focus on areas where the risk is understood to be most significant, namely the AFAs, which are listed in Table 3.1.1 and shown in Figure 3.4.1.

The FRMPs arising from the South Eastern CFRAM Study are strategic plans and as described below in Section 2.1 are subject to the provisions of Article 6(3) of the EU Habitats Directive via the European Communities (Birds and Natural Habitats) Regulations 2011 (as amended) ('the 2011 Regulations'). The 2011 Regulations transpose the provisions of the Habitats Directive 92/43/EEC into Irish law and consolidate the European Communities (Natural Habitats) Regulations 1997 to 2005 and the European Communities (Birds and Natural Habitats) (Control of Recreational Activities) Regulations 2010, as well as addressing transposition failures identified in judgements of the Court of Justice of the European Union (CJEU).

As with Strategic Environmental Assessment (SEA), it is accepted best-practice for the Appropriate Assessment of strategic planning documents, in the context of the 2011 Regulations, to be run as an iterative process alongside the Plan development, with the emerging proposals or options continually assessed for their possible effects on European sites and modified or abandoned (as necessary) to ensure that the subsequently adopted Plan is not likely to result in significant adverse effects on any European sites, either alone or 'in combination' with other plans.

It is therefore important to recognise that the assessment of strategic plans is an important aspect in guiding the development of the Plan (and demonstrating that this has been done) as it is about (ultimately) assessing its effects.

1.2 LEGISLATIVE CONTEXT

The 'Habitats Directive' (Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora) provides legal protection for habitats and species of European importance. The main aim of the Habitats Directive is *"to contribute towards ensuring biodiversity through the conservation of natural habitats of wild fauna and flora in the European territory of the Member States to which the treaty applies"*. Actions taken in order to fulfil the Directive must be designed to: *"maintain or restore, at a favourable conservation status, natural habitats and species of wild fauna and flora of Community interest"*.

A key outcome of the Habitats Directive is the establishment of Natura 2000, an ecological infrastructure developed throughout Europe for the protection of sites that are of particular importance for rare, endangered or vulnerable habitats and species. In Ireland, Special Areas of

Conservation (SACs), together with Special Protection Areas (SPAs) designated under the 'Birds Directive' (Council Directive 2009/147/EC - codified version of Directive 79/409/EEC on the Conservation of Wild Birds, as amended), are included in the Natura 2000 network², and are hereafter referred to as 'European sites'.

A central protection mechanism of the Habitats Directive is the requirement of competent authorities to undertake Appropriate Assessment³ (AA) to consider the possible nature conservation implications of any plan or project on European sites before any decision is made to allow the plan or project to proceed.

The 2011 Regulations provide the following definition of a plan: *"subject to the exclusion, except where the contrary intention appears, of any plan that is a land use plan within the meaning of the Planning Acts 2000 to 2011, includes-*

- (a) *any plan, programme or scheme, statutory or non-statutory, that establishes public policy in relation to land use and infrastructural development in one or more specified locations or regions, including any development of land or on land, the extraction or exploitation of mineral resources or of renewable energy resources and the carrying out of land use activities, that is to be considered for adoption authorisation or approval or for the grant of a licence, consent, permission, permit, derogation or other authorisation by a public authority, or*
- (b) *a proposal to amend or extend a plan or scheme referred to in subparagraph (a)"*

Not only is every new plan or project captured by the requirements of the 2011 Regulations, but each plan or project, when being considered for approval at any stage, must take into consideration the possible effects it may have in combination with other plans and projects.

Article 6(3) of the Habitats Directive states: *"Any plan or project not directly connected with or necessary to the management of the [European] 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. In light of the conclusions of the assessment of the implications for the site and subject to the provisions of paragraph 4, the competent national authorities shall agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the site concerned and if appropriate, after having obtained the opinion of the general public."*

Article 6(4) is the procedure for allowing derogation from this strict protection, in certain restricted circumstances:

² Natura 2000 sites are protected by Article 6(3) of the Habitats Directive. Protection is given to SACs from the point at which the European Commission and the Government agree the site as a 'Site of Community Importance' (SCI). Article 6(3) of the Habitats Directive and Article 4(4) of the Birds Directive also apply (respectively) to any other site or area that the Commission believes should be considered as a SAC or SPA, until their status is determined. Under the European Communities (Birds and Natural Habitats) Regulations 2011 (as amended) the term 'European site' applies to any designated SAC or SPA; any SCI; any candidate SCI (cSCI); any candidate SAC (cSAC); and any candidate or proposed SPA (pSPA).

³ 'Appropriate Assessment' has been historically used as an umbrella term to describe the process of assessment in its entirety from screening to IROPI (Imperative Reasons of Overriding Public Interest). The assessment process is now more commonly divided into distinct stages, one of which (Stage 2) is the 'appropriate assessment' stage. The overall process is often referred to as an 'Article 6 Assessment' or 'Habitats Directive Assessment' for convenience, although these terms are not included within the legislation.

Article 6(4) of the Habitats Directive states: *"If, in spite of a negative assessment of the implications for the site and in the absence of alternative solutions, a plan or project must nevertheless be carried out for imperative reasons of overriding public interest, including those of social or economic nature, the Member State shall take all compensatory measures necessary to ensure that the overall coherence of Natura 2000 is protected. It shall inform the Commission of the compensatory measures adopted."*

The Habitats Directive promotes a hierarchy of avoidance, mitigation and compensatory measures. First, the plan should aim to avoid any impacts on European sites by identifying possible impacts early in the plan-making process and writing the plan in order to avoid such impacts. Second, mitigation measures should be applied, if necessary, during the AA process to the point where no adverse impacts on the site(s) remain. If the plan is still likely to result in impacts on European sites, and no further practicable mitigation is possible, then it must be rejected. If no alternative solutions are identified and the plan is required for imperative reasons of overriding public interest (IROPI test) under Article 6(4) of the Habitats Directive, then compensation measures are required for any remaining adverse effect.

2 APPROACH

2.1 GUIDANCE

The European Commission (EC) has produced non-mandatory methodological guidance (EC, 2000, 2002, 2007) in relation to the process of AA which suggests a four-stage process, although not all steps may necessarily be required. The process recommends an initial “test of likely significance”, or “screening” followed, if necessary, by appropriate assessment. The Department of Environment, Heritage & Local Government⁴ (DEHLG) has transposed the principles of the European Commission guidance into a document specific to Ireland entitled ‘*Appropriate Assessment of Plans and Projects in Ireland, Guidance for Planning Authorities*’ (DEHLG, 2010).

A summary of the stages is given below and additional detail on the iterative process by which each of the stages is reached and concluded is given overleaf in Figure 2.1.1.

Stage One: Screening or ‘Test of Likely Significance’ - the process which identifies the likely impacts upon a European site of a project or plan, either alone or in combination with other projects or plans, and considers whether these impacts are likely to be significant;

Stage Two: Appropriate Assessment - the consideration of the impact on the integrity of the European site of the project or plan, either alone or in combination with other projects or plans, with respect to the site’s structure and function and its conservation objectives. Additionally, where there are adverse impacts, an assessment of the potential mitigation of those impacts;

Stage Three: Assessment of Alternative Solutions - Where adverse effects remain after the inclusion of mitigation, this Stage examines alternative ways of achieving the objectives of the project or plan that avoid adverse impacts on the integrity of European Sites;

Stage Four: Assessment Where Adverse Impacts Remain - an assessment of compensatory measures where, in the light of an assessment of Imperative Reasons of Overriding Public Interest (IROPI), it is deemed that the project or plan should proceed.

⁴ Since 2011 known as the Department of Community, Environment and Local Government (DECLG)

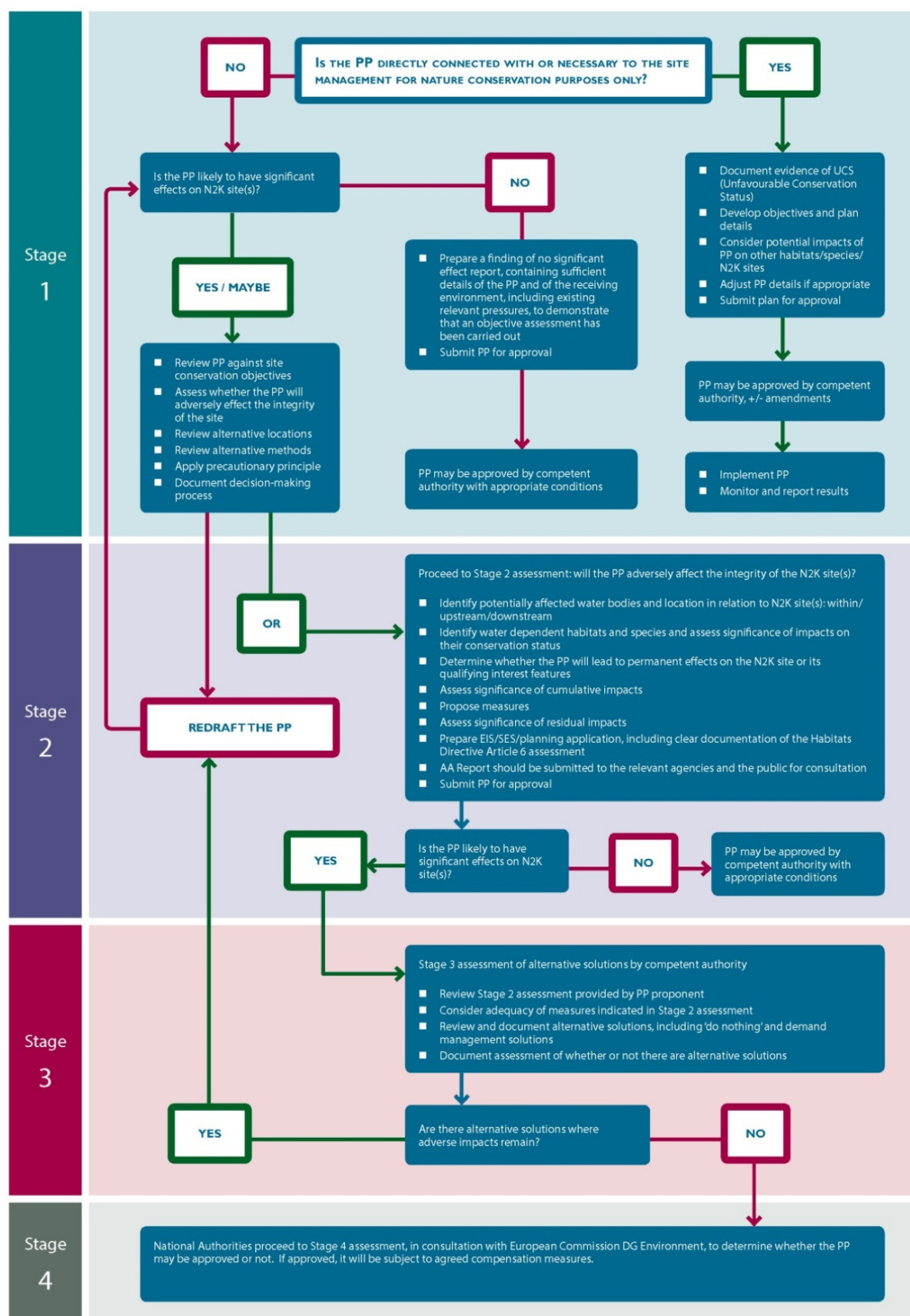


Figure 2.1.1: Schematic of the stages of Appropriate Assessment

The following guidance has been used during the preparation of this Screening Report in support of the South Eastern CFRAM Study FRMPs:

- DEHLG (2009 –rev. 2010) Appropriate Assessment of Plans and Projects in Ireland – Guidance for Planning Authorities
- EC (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
- EC (2000) Managing Natura 2000 sites: the provisions of Article 6 of the ‘Habitats’ Directive 92/43/EEC
- EC (2011) Guidelines on the Implementation of the Birds and Habitats Directives in Estuaries and Coastal Zones
- EC (2007) Guidance Document on Article 6(4) of the Habitats Directive 92/43/EEC
- EC (2013) Guidelines on Climate Change and Natura 2000 Dealing with the impact of climate change on the management of the Natura 2000 Network of areas of high biodiversity value
- EPA (2012) Integrated Biodiversity Impact Assessment best practice guidance; Streamlining AA, SEA and EIA Processes, Best Practice Guidance
- NPWS (2014) The Status of EU Protected Habitats and Species in Ireland 2013 – Overview Report
- Scottish Natural Heritage (2015) Habitats Regulation Appraisal of Plans, Guidance for Plan-Making Bodies in Scotland (version 3)

The staged approach summarised above and in Figure 2.1.1 works well at the project-level where the scheme/project design is established and possible effects on European sites can be quantitatively assessed with the benefit of detailed survey data. In contrast, the nature of the South Eastern CFRAM Study and each of its FRMPs presents a number of distinct challenges for a ‘strategic’ AA; in particular, every possible outcome of each FRMP cannot always be identified and assessed in detail, since it is not within the remit of the FRMPs to develop detailed designs for individual risk management measures.

It is emphasised that the FRMP sets out the proposed strategy, actions and measures that are considered to be the most appropriate at this stage of assessment. The observations and views submitted as part of the consultation on the Draft Plan have been reviewed and taken into account before the Final Plan is submitted for comment, amendment or approval by the Minister. Some changes may have arisen as a result of the consultation process. Where changes have occurred these have been reported on and, where applicable, re-assessed in the NIS.

Further, once the FRMP is finalised, measures involving physical works (e.g., flood protection schemes) will need to be further developed at a local, project level before Exhibition or submission

for planning approval. At this stage, local information that can not be captured at the Plan-level of assessment, such as ground investigation results and project-level environmental assessments, may give rise to some amendment of the proposed measure to ensure that it is fully adapted, developed and appropriate within the local context.

While the degree of detail of the assessment undertaken to date would give confidence that any amendments should generally not be significant, the measures set out in the FRMP may be subject to some amendment prior to implementation, and in some cases may be subject to significant amendment.

In this context, it is stressed that the SEA and AA undertaken in relation to the FRMP are plan-level assessments. The FRMP will inform the progression of the preferred measures, but project-level assessments will need to be undertaken as appropriate under the relevant legislation for consenting to that project for any physical works that may progress in the future. The approval of the Final FRMP does not confer approval or permission for the installation or construction of any physical works. The requirements for AA Screening, including any particular issues such as knowledge gaps or mitigation measures that are expected to be necessary, are set out in the Natura Impact Statement (NIS) as relevant.

It is also important to note that the safeguards set out in Article 6(3) and (4) of the Habitats Directive are triggered not by certainty, but by the possibility of significant effects and that the precautionary approach to identifying the potential impacts of the plan is maintained at all levels. Chapter 3.1.3 discusses these aspects in more detail.

The processes for progression of measures involving physical flood relief works are described in section 8.1.2 of the FRMP. EIA and/or AA Screening, and, where so concluded from the screening, Environmental Impact Assessment and / or Appropriate Assessment, must be undertaken in accordance with the relevant legislation where relevant as part of the progression of measures that involve physical works. The body responsible for implementation of such measures, typically either the OPW or the relevant local authority is required to ensure that these requirements will be complied with.

Project-level assessment will take account of the potentially viable measures identified in the Plan, but will involve the consideration of alternatives at the project-level and, as appropriate, EIA and AA, including the definition of necessary mitigation measures at the project-level. Only schemes/measures confirmed to be viable following project level assessment will be brought forward for Exhibition/Planning and detailed design.

3 STAGE 1: SCREENING FOR APPROPRIATE ASSESSMENT

Screening is the process of deciding whether or not an Appropriate Assessment is required for a plan or project. It addresses and records the reasoning and conclusions in relation to the first two tests of Article 6(3) of the Habitats Directive, i.e.

- Whether a plan or project is directly connected to or necessary for the management of the site; and
- Whether a plan or project, alone or in-combination with other plans and projects, is likely to have significant effects on a European site in view of its Qualifying Interest Features and their corresponding Conservation Objectives.

The Screening Stage includes:

- Site location and description of the plan or project;
- Identification and initial screening of European sites for potential negative effects;
- Screening conclusion.

The assessment of likely significant effects is based on the likelihood and significance of any effects of the proposed plan or project on each European site's qualifying interests, particularly with reference to the relevant conservation objectives. In this context, the likelihood depends on whether there is the opportunity and pathway for the effect to occur, and the significance is regarded as the effect on the susceptible qualifying interests of the site(s). If the effects are deemed to be significant, potentially significant, or uncertain, or if the screening process becomes overly complicated, then the process must proceed to Stage 2 Appropriate Assessment.

3.1 DESCRIPTION OF THE PLAN

3.1.1 The South Eastern CFRAM Study and its associated FRMPs

The South Eastern CFRAM Study is not directly connected with or necessary to the management of any European site.

The objectives of the South Eastern CFRAM Study are to:

- Identify and map the existing and potential future flood hazard⁵ within the Study area;
- Assess and map the existing and potential future flood risk⁶ within the Study area;
- Identify viable structural and non-structural options and measures for the effective and sustainable management of flood risk in the AFAs and within the Study area as a whole, and

⁵ Potential future flood hazards and risk include those that might foreseeably arise (over the long-term) due to the projected effects of climate change, future development and other long-term developments.

⁶ Flood risk is defined as a combination of probability and degree of flooding and the adverse consequences of flooding on human health, people and society, the environment, cultural heritage and economic activity and infrastructure.

- Prepare a set of FRMPs for the Study area, and undertake associated Strategic Environmental Assessment and, as necessary, Appropriate Assessment, that sets out the policies, strategies, measures and actions that should be pursued by the relevant bodies, including the OPW, Local Authorities and other stakeholders, to achieve the most cost-effective and sustainable management of existing and potential future flood risk within the Study area, taking account of environmental plans, objectives and legislative requirements and other statutory plans and requirements.

It is not an objective of the FRMPs to develop detailed designs for individual flood risk management measures.

3.1.2 Site Location

As outlined earlier in Section 1.1, the South Eastern CFRAM Study area includes six Units of Management (UoM) / Hydrometric Areas (HAs), each of which will have its own FRMP. The UoMs constitute major catchments / river basins (typically greater than 1,000km²) and their associated coastal areas, or conglomerations of smaller river basins and their associated coastal areas. Within the South Eastern CFRAM Study area each UoM boundary, generally speaking, matches the boundary of a corresponding Hydrometric Area (HA). HAs are areas comprising a single large river catchment, or a group of smaller ones, that have been delineated across Ireland and Northern Ireland for the purposes of hydrological activities. This Natura Impact Statement (NIS) is for the UoM15 FRMP only.

3.1.2.1 UoM15

UoM15 is a predominantly rural catchment in an Irish context, with the largest urban area being Kilkenny. Smaller towns and villages include Thomastown, Callan and Castlecomer in County Kilkenny and Durrow, Rathdowney and Mountrath in County Laois. The rich soils are particularly suitable for agriculture and much of the area is given over to tillage and grassland. There are 11 AFAs in UoM15, shown in shown in Figure 3.1.1.

3.1.2.2 Projects running in Parallel with the South Eastern CFRAM Study

The National CFRAM Programme is delivering on the requirements of the Government Policy and the EU 'Floods' Directive for most of the AFAs. In some areas however, other parallel or preceding projects have delivered on these requirements. In relation to the UoM15 FRMP, these projects are:

- Kilkenny City Flood Relief Scheme [River Nore (Kilkenny City) Drainage Scheme]
- Graigueamanagh and Thomastown Community Resilience Pilot Study
- Callan Minor Works Flood Relief Scheme [Kings River]

The FRMP includes the measures undertaken or proposed through the above Projects and the NIS will take account of any potential in-combination or cumulative impacts.

3.1.3 Methodology for the Appropriate Assessment

Although the AA is being carried out on activities occurring within the functional area of the UoM15 FRMP, the likely significance of the effects of the proposed plans will be assessed on European sites

in adjacent river basins. The likely significance of effects of the proposed plan on the European sites identified and their conservation objectives have been assessed taking into account the source-pathway-receptor model. The source is defined as the individual element of the plan that has the potential to impact on a European site, its qualifying interests and its conservation objectives. The pathway is defined as the means or route by which a source can migrate to the receptor. The receptor is defined as the European site and its qualifying interests. Each element of the model may exist independently, however a potential impact is only created where there is a linkage between the source, pathway and receptor. The NIS will review and incorporate the conclusions of the other CFRAM FRMPs, where appropriate, for in-combination and cumulative impacts.

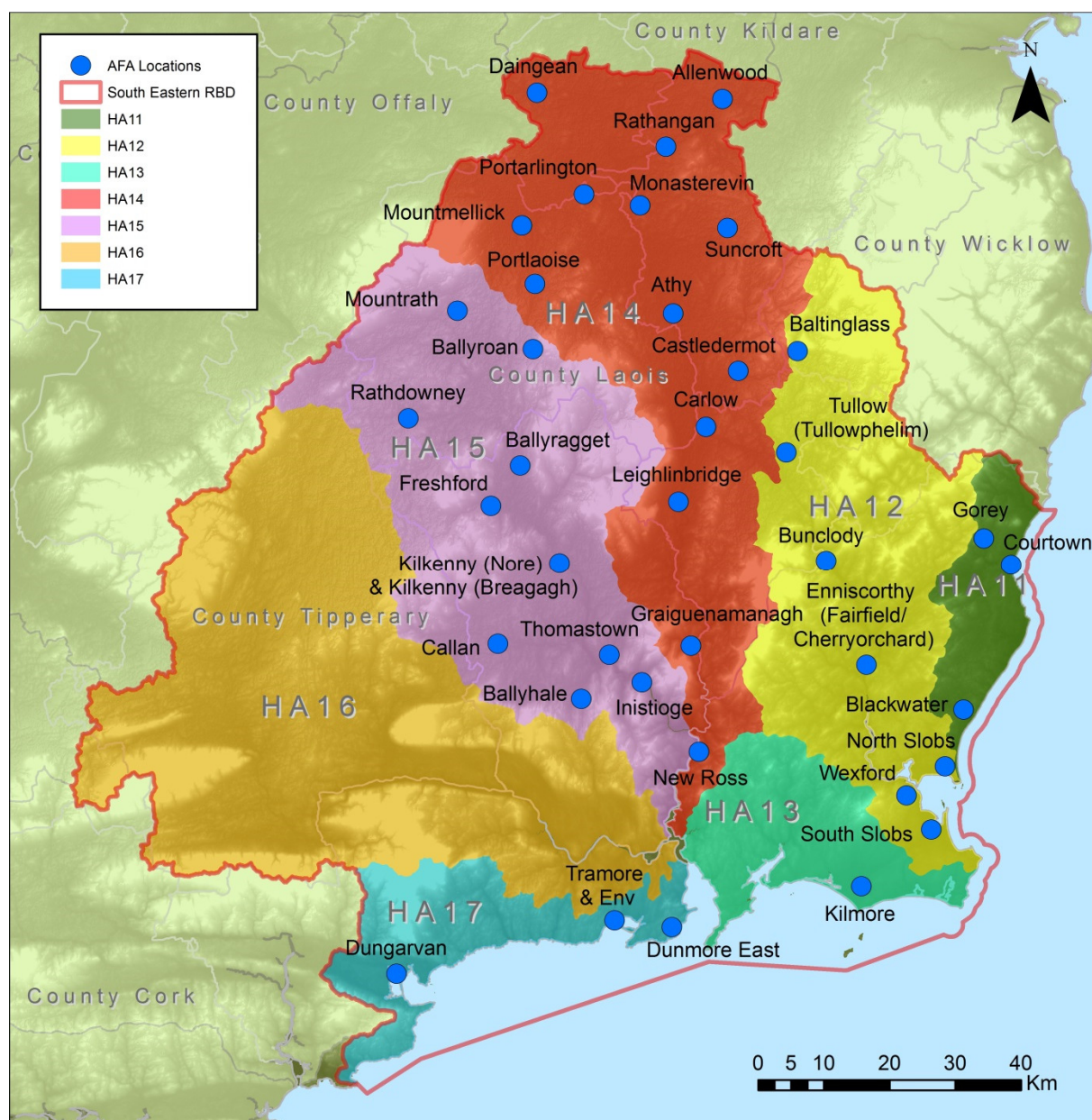


Figure 3.1.1: South Eastern CFRAM Study Area and Associated Units of Management

Figure 3.1.1 shows the extent of each UoM, for which each of the FRMPs will be prepared in the South Eastern CFRAM Study area, and also the distribution of AFAs within each UoM.

Figure 3.1.2 illustrates the structure and spatial scales of assessment of the National CFRAM programme, the South Eastern CFRAM Study, the FRMPs and the individual AFAs within each UoM.

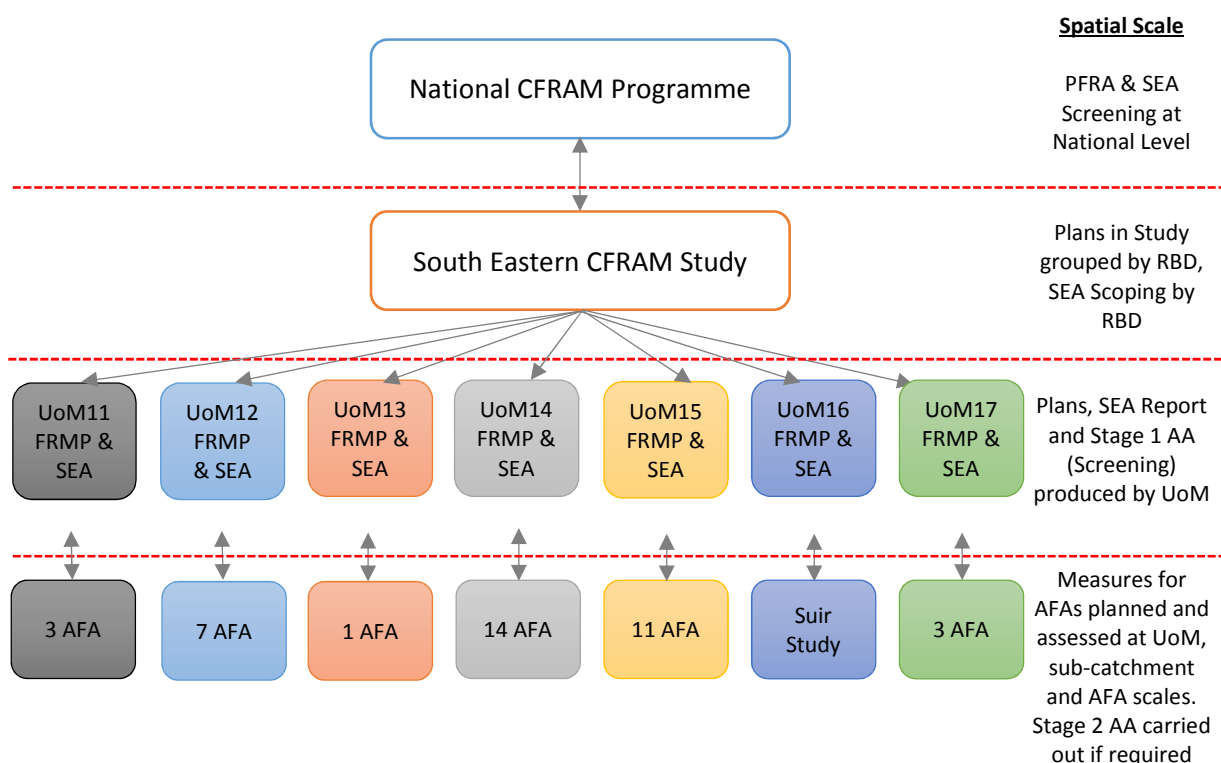


Figure 3.1.2: Spatial Scales of Assessment in the South Eastern CFRAM Study, FRMPs, SEAs and AA

A list of the AFAs being investigated as part of the South Eastern CFRAM Study is given in Table 3.1.1. Where alternate nomenclature is used for AFAs in this report, this is shown in *italics*.

Table 3.1.1: List of AFAs in the UoM15 FRMP

AFA	County	Flood Source
Ballyhale	Kilkenny	Fluvial
Ballyragget	Kilkenny	Fluvial
Ballyroan	Laois	Fluvial
Callan	Kilkenny	Fluvial
Freshford	Kilkenny	Fluvial
Inishtioge	Kilkenny	Fluvial & Coastal
Kilkenny (Nore)	Kilkenny	Fluvial
Kilkenny (Breagagh)	Kilkenny	Fluvial
Mountrath	Laois	Fluvial
Rathdowney	Laois	Fluvial
Thomastown	Kilkenny	Fluvial

As illustrated in Figure 3.1.2, a FRMP has been produced for each UoM. For each FRMP produced there is an associated SEA Environmental Report and NIS. In accordance with the 2011 Regulations, the NIS is a report comprising the scientific examination of the Plan [the FRMP] and the relevant European site (or sites), to identify and characterise any possible implications of the plan either individually or in combination with other plans or projects, in view of the conservation objectives of the site or sites. It will also include any further information including but not limited to, plans, maps or drawings, scientific data or information or data required to enable the carrying out of an appropriate assessment.

Each NIS has fed into and influenced the related SEA Environmental Report and both environmental reports have fed into and influenced the FRMPs as they have evolved. Following completion of all three draft documents, there was a consultation period to allow statutory and non-statutory consultees, along with the public, to comment on the Plans and Reports produced.

Under the 2011 Regulations, an appropriate assessment carried out shall *“include a determination by the public authority, pursuant to Article 6(3) of the Habitats Directive as to whether or not the plan...⁷ would adversely affect the integrity of a European site... before a decision is made to approve, undertake or adopt a plan”*.

Figure 3.1.3 gives an overview of the iterative process being undertaken as part of the CFRAM Study to develop the final Flood Risk Management (FRM) measures. Within each FRMP the proposed FRM *Methods* necessary at an AFA Spatial Scale of Assessment (SSA)⁸ have been considered. At this scale, methods benefitting only the particular AFA in question are considered, even if the implementation of a given method includes works or activities outside of the AFA, i.e., elsewhere in the sub-catchment or UoM. Examples of where this might apply would be storage options upstream of the AFA, or flood forecasting systems, that provide benefits to no other AFAs than the AFA under consideration.

For each AFA to be assessed, the starting point was to look at a long list of FRM methods that could be implemented. This long list of FRM methods was specified by OPW as being the policy, soft engineering and hard engineering methods to manage flood risk in Ireland.

If a FRM method was found to be technically feasible, i.e. it could completely or partially manage flood risk for an area, it was then screened for its economic viability. If the method was found to be economically viable it was then screened for potentially detrimental environmental and social impacts.

The environmental considerations in the FRMP screening were based on the potential for high level impacts on designated European sites in the first instance, with national and regional nature conservation designations also taken into consideration during the MCA. High level impacts are a generic and conservative description of potential impacts, taking into account plan-level FRM measures insofar as they are defined.

⁷ (or project)

⁸ The AFA SSA refers to an individual AFA; such areas would include towns, villages, areas where significant development is anticipated and other areas or structures for which the risk that could arise from flooding is understood to be significant.

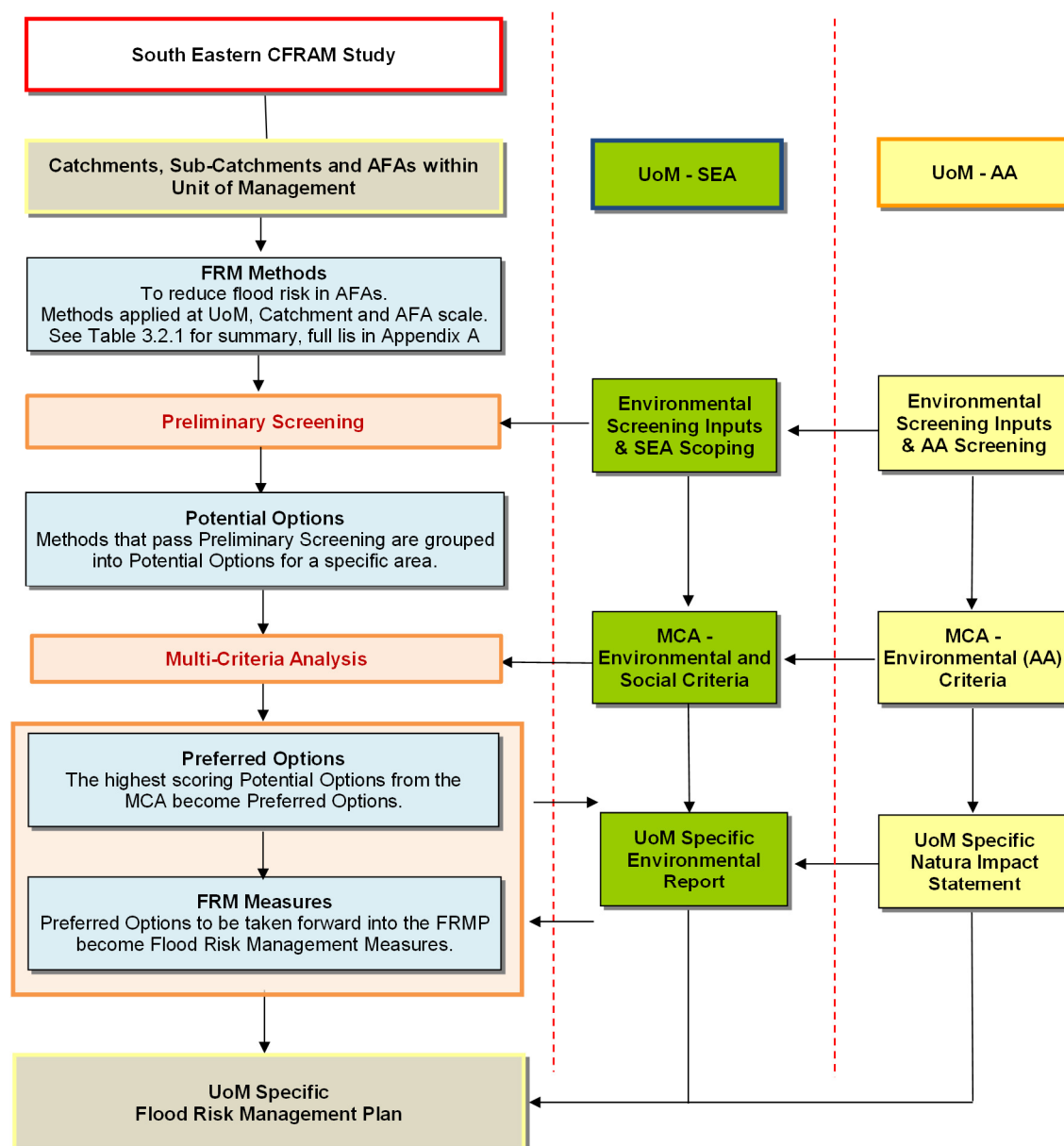


Figure 3.1.3: Interactions of the Plan and Environmental Assessments

Methods that were found to be technically, economically, socially and environmentally acceptable in the preliminary screening were then combined into groups of *Options*, which were subjected to detailed Multi-Criteria Analysis (MCA), looking at technical, economic, social and environmental criteria. The highest scoring *Option* for each AFA, while also taking into consideration feedback from public and stakeholder consultation, was put forward into the draft FRMP for consultation as the *Preferred Option*. The SEA and NIS were critical for the MCA as they provide necessary information for the environmental and social inputs.

The observations and views submitted as part of the consultation on the Draft Plan were reviewed and taken into account before the Plan is submitted for comment, amendment or approval by the Minister. Some changes may have arisen as a result of the consultation process and, where relevant, these changes have been reported on in the NIS.

It should be noted that, once the FRMP is finalised, measures involving physical works (e.g., flood protection schemes) will need to be further developed at a local, project level before Exhibition or submission for planning approval. At this stage, local information that can not be captured at the Plan-level of assessment, such as ground investigation results and project-level environmental assessments, may give rise to some amendment of the proposed measure to ensure that it is fully adapted, developed and appropriate within the local context. The measures set out in the Final FRMP may therefore be subject to some amendment prior to implementation. However, the degree of detail of the assessment undertaken to date would give confidence that such amendments should generally not be significant.

3.2 ELEMENTS OF THE FRMPs WITH POTENTIAL TO CAUSE ADVERSE IMPACTS ON EUROPEAN SITES

Table 3.2.1 overleaf summarises the long list of FRM methods that are screened for potential implementation within FRMPs. Screening is undertaken at UoM, sub-catchment, AFA (and potentially sub-AFA) level.

The methods highlighted in green are non-structural policy and administrative based and currently do not include physical works. The methods highlighted in red are considered structural methods, wherein there will be an engineered scheme with works required on the ground at a specific geographic location.

The non-structural and structural options have, in general, been retained through the screening process, even though they cannot manage flood risk as a stand-alone method. These will be incorporated later in the process to complement other methods that could manage flood risk. The 'Do Nothing' Method would have generally been screened out, as it is likely to increase the flood risk to an area, through abandonment of all FRM activities, and would therefore not be feasible on technical grounds.

A description of high-level environmental impacts that may arise from implementation of each method is provided in Appendix A. These high level impacts were provided to the statutory SEA consultees, progress and steering group members and stakeholders, for consultation as part of the South Eastern CFRAM Study SEA scoping in September / October 2015.

Table 3.2.1: Summary of Flood Risk Management Methods

Method	Description	
Do Nothing	Implement no new flood risk management measures and abandon any existing practices.	Non-structural Methods
Maintain Existing Regime	Continue with any existing flood risk management practices, such as reactive maintenance.	
Do Minimum	Implement additional minimal measures to reduce the flood risk in specific problem areas without introducing a comprehensive strategy, includes channel or flood defence maintenance works / programme.	

Method	Description	
Planning and Development Control	Zoning of land for flood risk appropriate development, prevention of inappropriate incremental development, review of existing Local Authority policies in relation to planning and development and of inter-jurisdictional co-operation within the catchment, etc.	
Building Regulations	Regulations relating to floor levels, flood-proofing, flood resilience, sustainable drainage systems, prevention of reconstruction or redevelopment in flood-risk areas, etc.	
Catchment Wide Sustainable Drainage Systems (SuDS)	Implement SuDS on a catchment wide basis.	
Land Use Management (NFM)	Creation of wetlands, riparian buffer zones, etc.	
Strategic Development Management	Necessary floodplain development (proactive integration of structural measures into development designs and zoning, regulation on developer-funded communal retention, drainage and / or protection systems, etc.)	
Flood Forecasting	Installation of a flood forecasting system and development of emergency flood response procedures.	
Public Awareness Campaign	Targeted public awareness and preparedness campaign.	
Upstream Storage	Single or multiple site flood water storage, flood retardation, etc.	Structural Methods
Improvement of Channel Conveyance	In-channel works, floodplain earthworks, removal of constraints / constrictions, channel / floodplain clearance, etc.	
Hard Defences	Construct walls, embankments, demountable defences, Rehabilitate and / or improve existing defences, etc.	
Relocation of Properties	Relocation of properties away from flood risk.	
Diversion of Flow	Full diversion / bypass channel, flood relief channel, etc.	
Other works	Minor raising of existing defences / levels, infilling gaps in defences, site specific localised protection works, etc.	
Individual Property Flood Resistance	Protection / flood-proofing and resilience.	

3.3 RELATIONSHIP WITH OTHER RELEVANT PLANS AND PROGRAMMES

The South Eastern CFRAM Study is set in a flood risk management planning context, where plans, projects and activities and their associated SEA and AA requirements are all linked.

Further examination of the UoM15 FRMP in this NIS will take account of the OPW's obligation to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies – the achievement of the objectives of the regulatory framework for environmental protection and management led by the WFD and implemented by the River Basin Management Plans (RBMPs).

Table 3.3.1 identifies the main significant environmental plans, programmes and legislation, adopted at International, European Community or Member State level, which would be expected to influence, or be influenced by, the South Eastern FRMPs. While it is recognised that there are many plans, programmes and legislation that will relate to the FRMPs, it is considered appropriate to only deal with those significant texts, to keep the assessment at a strategic level.

Table 3.3.1: List of Other Plans and Projects with potential for in-Combination Effects

Level	Plan / Programme / Legislation
EU Level	<ul style="list-style-type: none"> ▪ EU Floods Directive [2007/60/EC] ▪ A Blueprint to Safeguard Europe's Water Resources [COM(2012)673] ▪ Bathing Water Directive [2006/7/EC] ▪ Birds Directive [2009/147/EC] ▪ Bonn Convention [L210, 19/07/1982 (1983)] ▪ Drinking Water Directive [98/83/EC] ▪ EIA Directive [85/337/EEC] [2014/52/EU] ▪ Environmental Liability Directive [2004/35/EC] ▪ Environmental Quality Standards Directive [2008/105/EC] ▪ EU Biodiversity Strategy to 2020 [COM(2011)244] ▪ European Landscape Convention [ETS No. 176] ▪ Groundwater Directive [80/68/EEC] and Daughter Directive [2006/118/EC] ▪ Habitats Directive [92/43/EEC] ▪ Marine Strategy Framework Directive [2008/56/EC] ▪ Nitrates Directive [91/676/EEC] ▪ Renewable Energy Directive [2009/28/EC] ▪ SEA Directive [2001/42/EC] ▪ Second European Climate Change Programme [ECCP II] 2005. ▪ Sewage Sludge Directive [86/278/EEC] ▪ Soils Thematic Strategy [COM(2006) 231] ▪ Urban Wastewater Treatment Directive [91/271/EEC] ▪ Water Framework Directive [2000/60/EC] ▪ World Heritage Convention [WHC-2005/WS/02]
National Level	<ul style="list-style-type: none"> ▪ A Strategy for the Conservation of Freshwater Pearl Mussel in Ireland, 2011 (NPWS, 2011) ▪ Arterial Drainage Maintenance and High Risk Designation Programme 2016-2021 (OPW, 2016) ▪ Climate Change Sectoral Adaptation Plan for Flood Risk Management, 2015 (OPW, 2015) ▪ Fisheries Acts 1959 to 2007 (S.I. No. 14 of 1959 and No. 17 of 2007) ▪ Food Harvest 2020 (DAFM, 2010) ▪ Food Wise 2025 (DAFM, 2015) ▪ Capital Investment Programme 2014-2016 (Irish Water, 2014) ▪ Grid 25 Implementation Plan 2011-2016 (EIRGIRD, 2010) ▪ Harnessing Our Ocean Wealth: An Integrated Marine Plan for Ireland (Inter-Departmental Marine Coordination Group 2012) ▪ Irish Geological Heritage (IGH) Programme (GSI 1998-) ▪ Lead in Drinking Water Mitigation Plan (Irish Water, 2016) ▪ National Biodiversity Plan (2nd Revision 2011-2016) (DAHG, 2011) ▪ National Climate Change Adaptation Framework (DEHLG, 2012) ▪ National Climate Change Strategy 2007-2012 (DEHLG, 2007) ▪ National (Climate) Mitigation Plan (DECLG, 2012) ▪ National Development Plan 2007-2013 (DECLG, 2007) ▪ National Forestry Programme 2014-2020 (DAFM, 2015) ▪ National Forest Policy Review (DAFM, 2014) ▪ National Landscape Strategy for Ireland (Draft) 2014 – 2024 (DAHG, 2014) ▪ National Monuments Acts (1930 to 2004) (S.I. No. 2 of 1930 & No. 22 of 2004) ▪ National Renewable Energy Action Plan (DCENR, 2010) ▪ National Secondary Road Needs Study 2011 (NRA, 2011)

Level	Plan / Programme / Legislation
	<ul style="list-style-type: none"> ▪ National Spatial Strategy 2002-2020 (DELG, 2002) ▪ National Sludge Wastewater Sludge Management Plan (Draft) (Irish Water, 2015) ▪ National Strategic Plan for Sustainable Aquaculture Development (DAFM, 2015) ▪ Offshore Renewable Energy Development Plan (DCENR, 2014) ▪ Planning System and Flood Risk Management (OPW, 2009) ▪ Raised Bog SAC Management Plan (Draft) (DAHG, 2014), ▪ National Peatland Strategy (Draft) (NPWS, 2014) ▪ Review of Raised Bog Natural Heritage Area Network (NPWS, 2014) ▪ Report of the Flood Policy Review Group (OPW, 2004) ▪ River Basin Management Plan for Ireland (2018-2021) (Draft) (DHPCLG, 2017) ▪ Rural Development Programme 2014-2020 (DAFM, 2015) ▪ Water Services Strategic Plan (Irish Water, 2014)
Regional Level	<ul style="list-style-type: none"> ▪ UoM15 Flood Risk Management Plan ▪ South Eastern RBD River Basin Management Plan 2009-2015 (DEHLG, 2010) ▪ South Central BAU (Business Area Unit) 2016-2020 (Coillte, 2016) ▪ Southern Region Waste Management Plan 2015-2021 ▪ Regional Planning Guidelines for the Midlands 2010-2022, (Regional Planning Guidelines Office, 2010) ▪ Regional Planning Guidelines for the South-East 2010-2022, (Regional Planning Guidelines Office, 2010)
Sub-Regional	<ul style="list-style-type: none"> ▪ Carlow County Development Plan 2015-2021 (Carlow County Council, 2015) ▪ Kilkenny County Development Plan 2014-2020 (Kilkenny County Council, 2014) ▪ Laois County Development Plan 2011-2017 (Laois County Council, 2011) ▪ Kilkenny City & Environs Development Plan 2014-2020 (Kilkenny County Council, 2014) ▪ North Tipperary County Development Plan 2010 (Tipperary County Council, 2010) ▪ South Tipperary County Development Plan 2009 (Tipperary County Council, 2009) ▪ Landscape Appraisal of County Kilkenny (Kilkenny County Council, 2003) ▪ Landscape Character Assessment for County Laois 2012-2018 Appendix 6 (Laois County Council, 2010) ▪ Wind Energy Development Strategy 2007 Appendix D (Kilkenny County Council, 2007) ▪ Wind Energy Strategy for County Laois 2012-2018 Appendix 5 (Laois County Council, 2010) ▪ Kilkenny Local Economic and Community Plan 2016 – 2021 (Kilkenny County Council, 2015) ▪ Laois Local Economic and Community Plan 2016-2021 (Laois County Council, 2015) ▪ Nore Sub-Basin Management Plan (DEHLG, 2010) ▪ Balief Clomantagh Group Water Scheme (GIS, 2013) ▪ Bennettsbridge Source Protection Zones (GIS, 2000) ▪ Callan Source Protection Zone (GSI, 2000) ▪ County Kilkenny Groundwater Protection Scheme (GIS, 2002) ▪ Clomantagh Killashulan Group Water Scheme (GSI, 2013) ▪ Thomastown Source Protection Zone (GSI, 2000) ▪ Laois Heritage Plan 2014-2018 (Laois County Council, 2014) ▪ Kilkenny Population Study and Draft Housing Strategy (Kilkenny County Council, 2007) ▪ Laois Housing Strategy Draft (Laois County Council, 2010) ▪ Callan Local Area Plan 2009-2020 (Kilkenny County Council, 2009) ▪ Thomastown Local Area Plan 2009-2015 (Kilkenny County Council, 2009) ▪ Local Biodiversity Action Plan for Mountrath, Co. Laois (Laois County Council, 2015)

3.4 EUROPEAN SITES

Special Areas of Conservation (SACs) are prime wildlife conservation areas, considered to be important on a European as well as Irish level. Most SACs are in rural areas, although a few sites reach into town or city landscapes, such as Dublin Bay and Cork Harbour.

SACs are selected under the Habitats Directive for the conservation of a number of habitat types, which in Ireland includes raised bogs, blanket bogs, turloughs, sand dunes, machair (flat sandy plains on the north and west coasts), heaths, lakes, rivers, woodlands, estuaries and sea inlets. There are 25 species of flora and fauna, including Salmon, Otter, Freshwater Pearl Mussel, Bottlenose Dolphin and Killarney Fern that are also afforded protection. These are known as Annex I habitats (including priority types which are in danger of disappearance) and Annex II species (other than birds).

The areas chosen as SAC in Ireland cover an area of approximately 13,500km². Roughly 53% is land, the remainder being marine or large lakes. Across the EU, over 12,600 sites have been identified and proposed, covering 420,000km² of land and sea, an area the size of Germany.

Special Protection Areas, (SPAs) are conservation areas which are important sites for rare and vulnerable birds (as listed on Annex I of the Birds Directive), and/or for regularly occurring migratory species. SPAs are designated under the 'Birds Directive' (Council Directive 2009/147/EC - codified version of Directive 79/409/EEC on the Conservation of Wild Birds, as amended).

Ireland's SPA Network encompasses over 5,700km² of marine and terrestrial habitats. The marine areas include some of the productive intertidal zones of bays and estuaries that provide vital food resources for several wintering wader species. Marine waters adjacent to breeding seabird colonies and other important areas for seaducks, divers and grebes are also included in the network. The remaining areas of the SPA network include inland wetland sites important for wintering waterbirds and extensive areas of blanket bog and upland habitats that provide breeding and foraging resources for species including Merlin and Golden Plover. Agricultural land also represents a share of the SPA network, ranging from the extensive farmland of upland areas where its hedgerows, wet grassland and scrub offer feeding and/or breeding opportunities for Hen Harrier to the intensively farmed coastal polderland where internationally important numbers of swans and geese occur. Coastal habitats including Machair are also represented in the network, which are of high importance for Chough and breeding Dunlin.

3.4.1 Initial Screening Exercise

3.4.1.1 Capture of Sites for Screening – RBD/Study Scale

As recommended in the *Appropriate Assessment of Plans and Projects in Ireland – Guidance for Planning Authorities* (DEHLG, 2010), all European sites within the South Eastern CFRAM Study area and within a 15 kilometre buffer of the Study area were included in the initial capture for AA screening.

The DEHLG Guidance also recommends that sites beyond this distance should also be considered where there are hydrological linkages or other pathways that extend beyond 15 km thereby ensuring that all potentially affected European sites are included in the screening process.

It is acknowledged that as the nature of the FRMPs includes the potential to impact water quality and/or quantity, there is thus the potential for ecological receptors (particularly those that are water dependent) to experience potential impacts at distances even greater than 15km from the source. In the South Eastern CFRAM Study, each Unit of Management represents a single Hydrometric Area, each of which, generally speaking, has its river sources rising in an upland area and terminating at the coastline. The boundary of the Hydrometric Area represents a defined watershed, beyond which watercourses drain into a different river basin and to a different part of the coastline. The limit of the CFRAM Study Area therefore incorporates a tangible boundary for hydraulic and hydrological impacts. The OPW recognises that there are other potential impact pathways other than hydraulic/hydrological pathways for ecological receptors, such as groundwater, land and air and that mobile species, in particular birds, may range for distances beyond 15km.

As discussed in 3.1.3, for the CFRAM Study, desktop information and information received during the consultation was used in an iterative process with the AA and SEA to inform the preliminary screening of *Methods* which examines technical, economic, social and environmental aspects before subjecting the selected *Options* to detailed Multi-Criteria Analysis (MCA). In this way, *Methods* or *Options* which pose a high risk of significant adverse impacts can be ruled out in the earliest stages of *Option* development, therefore ensuring that, using the information available at plan level, *Options* which were considered likely to generate impacts that extend their influence more than 15km beyond the limits of the South Eastern CFRAM Study area were not taken forward for MCA and to the FRMPs. Thus it was not considered necessary at Study or Plan level to include sites further than 15km from the source.

The potential physical flood relief works or 'Schemes' set out in the Plans that have been developed through the CFRAM Programme are to an outline design, and are not at this point ready for construction. Further option design through a project-level of assessment will be required for such works before implementation.

At the project level, where physical measures are to be developed, local information that can not be captured at the Plan-level of assessment, such as project-level environmental surveys and assessments, will be used to inform the Appropriate Assessment of the potential physical flood relief works or 'Schemes'. The capture of additional local information may result in the identification of European sites within the Scheme's Zone of Influence that were not apparent during the plan screening process.

The initial site selection exercise was carried using the ESRI ArcMap GIS package, into which was loaded the most recently issued boundary shapefiles for all SACs and SPAs in Ireland, each respectively downloaded from the NPWS⁹ website. These were cross-referenced against the boundary shapefile for the South Eastern CFRAM Study area. A search area of 15km from the boundary of the South Eastern CFRAMs Study area was applied and all European sites either wholly or partially within this search area were captured. This exercise is illustrated in Figure 3.4, which shows the extents of the preliminary search area and the outlines of all the SAC and SPA areas within and adjacent to the South Eastern CFRAM Study area.

The initial selection exercise for the South Eastern CFRAM Study resulted in a total of 96 European sites being captured for screening.

⁹<http://www.npws.ie/maps-and-data/designated-site-data/download-boundary-data> SPA_ITM_2015_11a.zip and SAC_ITM_WGS84_2015_11a.zip (accessed 17 November 2015)

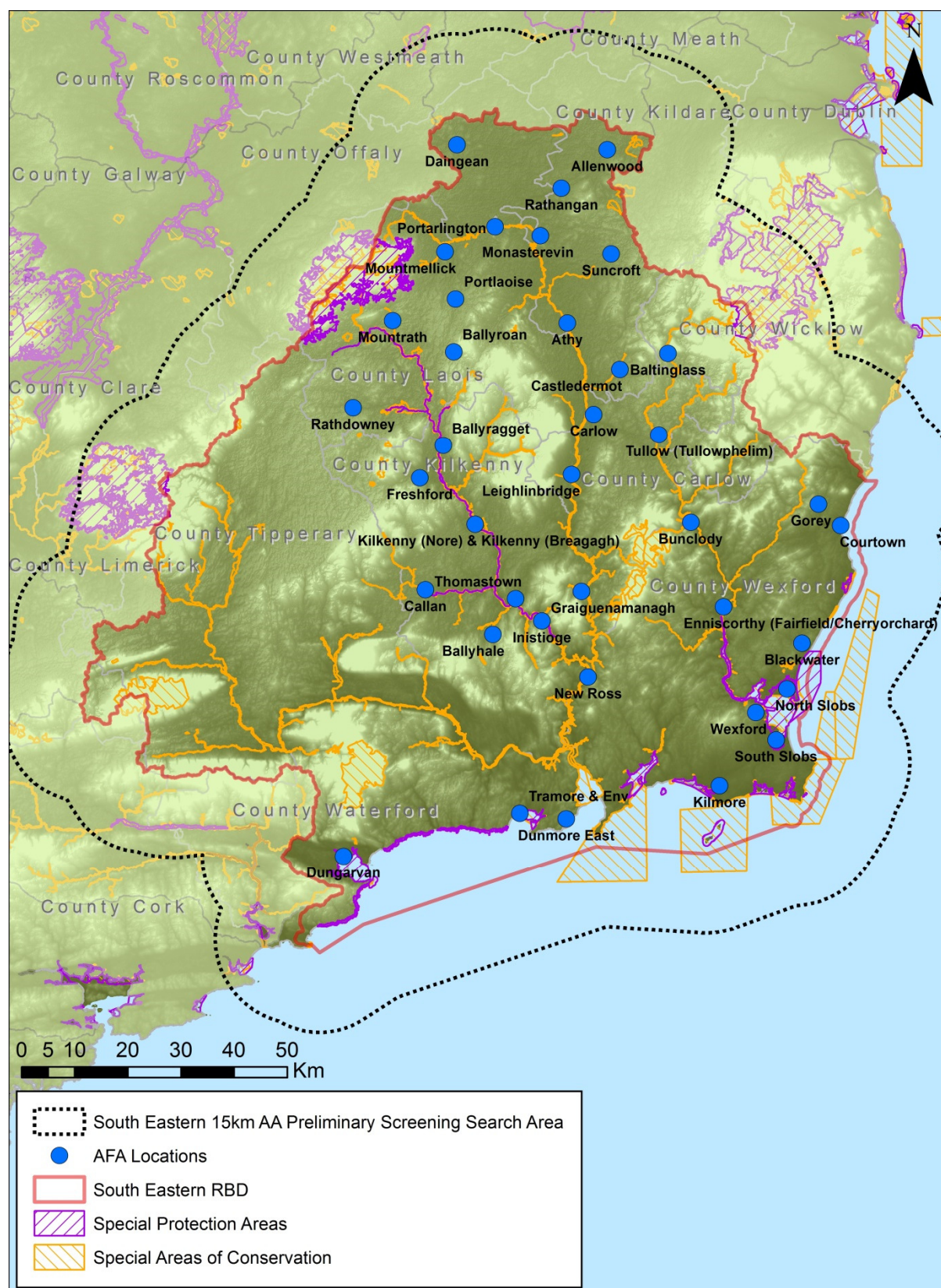


Figure 3.4.1: South Eastern CFRAM Study Area, showing AFAs and Study-Scale Search Area for European Sites

3.4.1.2 European Site Screening – Plan Scale

The UoM SSA refers to a full hydrometric area. At this scale, methods that could provide benefits to multiple (often all) AFAs within the Unit of Management and other areas were considered, along with the spatial and temporal coherence of methods being considered at smaller SSAs.

As discussed above in Section 3.1.3, each UoM has its own FRMP and thus the screening of European sites was grouped by UoM in the overall Study Scale AA Screening Report (IBE0601 Rp0022, 2016)

The capture of sites to be screened for each FRMP area was carried out the same way as the methodology for capturing the sites to be screened in the overall CFRAM Study, described above in 3.4.1.1. Each FRMP coverage area (i.e. each Unit of Management) was queried against the shapefiles for all Irish SACs and SPAs in ESRI ArcMap and all sites within 15km of each UoM were captured for screening. The rationale for limiting the scope of the FRMP-scale capture area to 15km has been previously discussed in 3.4.1.1.

3.4.1.3 European Site Screening – Establishment of the ‘Zone of Influence’

For each UoM/FRMP area, every European site captured by the GIS exercise described in 3.4.1.2 above was examined individually.

A ‘Zone of Influence’ was established for each European site. The ‘Zone of Influence’ for each site automatically comprised all areas within 15km of the European site. As hydrological impacts are a possibility, it also included all catchment areas located upstream of the European site to the top of the catchment and any watercourses downstream of the European site. This was achieved by manually examining hydraulic data, specifically EPA datasets for WFD catchment areas, sub-basin catchments and watercourses.

For the reasons listed above in 3.4.1.1, it was not considered necessary at plan level to extend the ‘Zone of Influence’ for coastal sites beyond 15km. At project level, additional data capture such as hydrographic field surveys and hydrodynamic modelling will be used in identifying the extent of the influence of any coastal Scheme and informing the project level AA.

Every AFA (regardless of distance) located within the Zone of Influence for each European site was examined for potential connectivity pathways (both hydraulic and ecological) with the European site.

For purposes of reporting, distances were calculated using the ‘near table’ tool in ArcMap which measured the distance between each European site and the nearest point of each AFA (note: not the nearest point of the AFA’s catchment, but as the AFA itself is likely to be the focus of any FRM activity this was gauged to be the most appropriate site for initiating measurements). The tool produced a spreadsheet listing the distance between each European site and each AFA boundary. All distances quoted in the screening tables have been derived from the “near table” tool.

3.4.1.4 European Sites - Selection for Preliminary Screening of Methods & Options

The risk of adverse impact on the European sites was evaluated by examining their location in relation to the AFA boundaries and, in the case of those AFAs at risk of fluvial flooding, the entire extents of their upstream catchments and downstream watercourses.

The relationship between the AFAs (including their upstream catchments and downstream reaches) and each of the European sites was individually reviewed by an experienced assessor. Consideration was given to whether any potential impact pathway between the AFA and the European Site could be identified, either by a hydraulic connection or by virtue of an ecological stepping stone or biodiversity corridor.

As this exercise took place during the 'Preliminary Screening' phase of development of the draft FRMP (see Figure 3.1.3 on page 14), the selection of European sites to be considered for assessment took into account all of the potential FRM methods included in the "long list" of FRM methods shown earlier in Table 3.2.1 (also discussed in more detail in Appendix A) and the potential for *any* of these methods to result in impacts to any of the European sites, either alone or in combination with other methods. The assessment reviewed the potential for:

- Direct Impacts, examples of which include (but are not limited to):
 - A construction footprint within the boundary of a European site, or
 - A construction footprint outside a European site but which may obstruct the passage of a qualifying interest in accessing a European Site.
- Indirect Impacts, example of which include (but are not limited to):
 - Short term water quality impacts associated with construction works, for example, suspended sediment and sedimentation impacts;
 - Changes to existing hydrological and morphological regimes.

It should be noted that the FRMP is a strategic-level study, and the exact location and design of FRM measures at each AFA has not been decided. Further assessment and quantification of potential impacts will be made at the project stage.

The likely significance of effects on the European sites from the implementation of FRM measures at each of the AFAs, or in their catchments/sub catchments, taking into account their qualifying interests and conservation objectives, was assessed taking into account the source-pathway-receptor model. Site-specific conservation objectives for designated habitats/species, which are included in Appendix C, were taken into account insofar as plan-level details allowed. The project-level assessment will be undertaken based on fully-developed outline designs and site surveys to further consider the attributes and targets of site specific conservation objectives.

The source is defined as the individual element of the plan (at this stage, the source is each/any of the *Methods*, but when each FRMP has been developed, the source will be each of the chosen *Measures*) that has the potential to impact on a European site, its qualifying interests and its conservation objectives. The pathway is defined as the means or route by which a source can migrate to the receptor. For the South Eastern CFRAM Study the pathways for potential impacts are primarily hydraulic, i.e. via watercourses and hydrological catchments, but the potential for linkages by other means (e.g. via an ecological stepping stone or biodiversity corridor) was also examined

during the screening process. The receptor is defined as the European site and its qualifying interests. Each element can exist independently, however a potential impact is created where there is a linkage between the source, pathway and receptor.

NPWS guidance recommends that appropriate assessment screening is informed by the conservation condition of the qualifying interest/s of a European site, however as this screening covers an entire plan area rather than individual projects within the plan, the condition of the qualifying interest was not considered to be relevant, as the purpose of the screening is to identify which European sites may be at risk of experiencing impacts and not, at this stage, assessing the potential significance of any potential impacts.

Each European site was individually reviewed to identify whether there were potential impact pathways, via surface water, groundwater, land or air, evident from FRM methods to be employed at any of the AFAs (or in the catchment of any AFAs) in the South Eastern CFRAM Study area. This included analysing river and stream network, topographic and catchment datasets to ascertain the presence or absence of hydraulic linkages between AFAs and European sites and also examining the potential for impacts on other areas of biodiversity value, such as NHAs (or pNHAs), wildfowl reserves or nature reserves, which may provide a stepping stone between European sites, or wider areas where mobile qualifying interests (e.g. migratory fish or birds) may be affected by changes, outside the boundary of the designated area.

A total of 73 SACs and 23 SPAs were identified as being within, or within 15km of, the South Eastern CFRAM Study area and these were consequently included in the screening process.

Where no apparent linkages or relationships were found between the European site and the AFA or its modelled catchment, a conclusion of “no identifiable impact pathway” was drawn and the site was eliminated from the screening process. Where a connectivity or linkage was possible, the precautionary principle was applied and the site was retained in the screening and was recommended for further assessment (which may include appropriate assessment).

The Preliminary Options Reports for each UoM were used to help define the upstream limits of the AFA’s influence. As part of the Optioneering process for each FRMP, Spatial Scales of Assessment (SSAs) have been developed for each UoM (see Chapter 4.2). For some UoMs, the upstream/upcatchment storage FRM method has already been ruled out at this stage and therefore it was possible to rule out potential impacts on European sites from upcatchment FRM methods during the AA screening. In UoMs where upstream/upcatchment FRM methods have not been ruled out, all upcatchment areas were retained in the screening process.

No specific distance limit was applied to downstream impacts and these were reviewed on a case-by-case basis.

The more detailed summaries of the preliminary screening exercise carried out for the European sites considered to be potentially influenced by FRM methods used in UoM15 are presented in Appendix B. The ‘Natura 2000 Standard Data Form’, ‘Conservation Objectives’ and ‘Site Synopsis’ documents for each of the European sites can be found on the National Parks & Wildlife Service website¹⁰, along with other relevant survey information and documents for each site. For each of

¹⁰ <http://www.npws.ie/protectedsites/> (accessed 5th and 6th October 2015)

the European Sites identified in the screening process, these documents were downloaded and were used to inform the screening.

3.5 PRELIMINARY SCREENING RESULTS FOR UOM15

There were 27 European sites (23 SACs and four SPAs) found within the Screening Search Area of UoM15 (see Figure 3.5.1).

All European sites in the search area were screened for possible impacts from FRM methods at all AFAs in UoM15. The results of the screening exercise are summarised in Table 3.5.1 and Table 3.5.2.

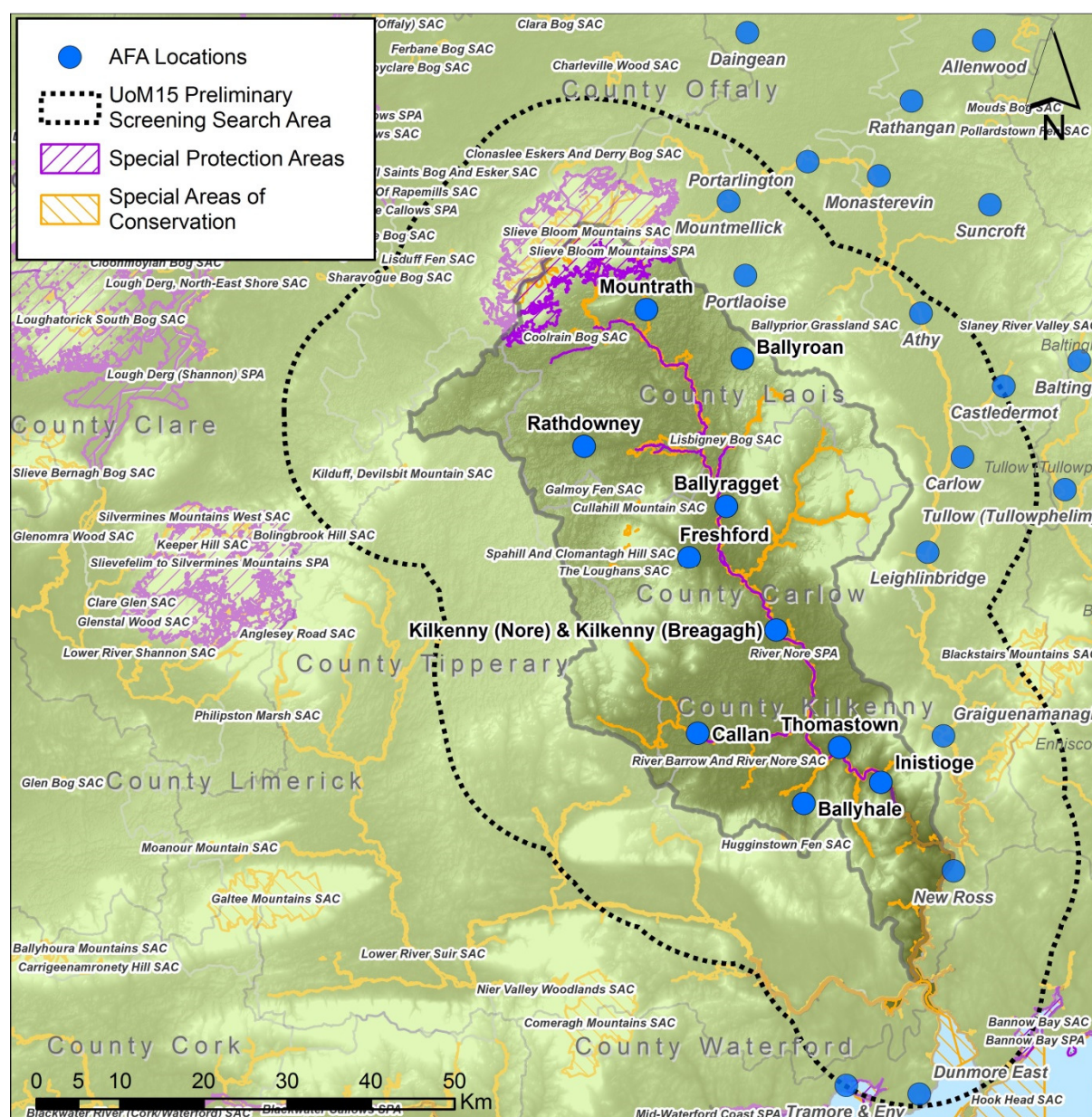


Figure 3.5.1: UoM15 European Sites incorporated in the Preliminary Screening of Methods & Options for the FRMP

Table 3.5.1: European Sites screened for UoM15

	Site Name	Site Code	County	UoM	Water Dependent	AFAs within Zone of potential Influence of European Site	AFAs that have an Identifiable Impact Pathway to European Site	Screened Out of FRMP AA for UoM15
1	Ballyprior Grassland SAC	002256	Laois	UoM14	Yes	Ballyroan (10.9km)	None	Yes
2	Bannow Bay SAC	000697	Wexford	UoM13	Yes	None	None	Yes
3	Bannow Bay SPA	004033	Wexford	UoM13	No	None	None	Yes
4	Blackstairs Mountains SAC	000770	Wexford, Carlow	UoM12 & UoM14	Yes	Inistioge (12.4km), Thomastown (16.9km)	None	Yes
5	Clonaslee Eskers and Derry Bog SAC	000859	Laois	Outside SECFRAMS Area	Yes	None	None	Yes
6	Coolrain Bog SAC	002332	Laois	UoM15	Yes	Mountrath (7.0km), Rathdowney (11.6km)	None	Yes
7	Cullahill Mountain SAC	000831	Kilkenny	UoM15	Yes	Ballyragget (9.1km), Freshford (7.1km), Rathdowney (8.2km)	None	Yes
8	Galmoy Fen SAC	001858	Kilkenny	UoM15	Yes	Ballyragget (15.0km), Freshford (12.8km), Rathdowney (4.0km)	None	Yes
9	Hugginstown Fen SAC	000404	Kilkenny	UoM16	Yes	Ballyhale (4km), Callan (14.7km), Inistioge (12.7km), Thomastown (10.9km)	None	Yes
10	Island Fen SAC	002236	Offaly	Outside SECFRAMS Area	Yes	None	None	Yes
11	Kilduff, Devilsbit Mountain SAC	000934	Tipperary	UoM16	Yes	None	None	Yes
12	Knockacoller Bog SAC	002333	Laois	UoM15	Yes	Ballyroan (14.8km), Mountrath (3.4km), Rathdowney (11.5km)	None	Yes

	Site Name	Site Code	County	UoM	Water Dependent	AFAs within Zone of potential Influence of European Site	AFAs that have an Identifiable Impact Pathway to European Site	Screened Out of FRMP AA for UoM15
13	Lisbigney Bog SAC	000869	Laois	UoM15	Yes	Ballyragget (7.1km), Ballyroan (8.8km), Freshford (13.8km), Mountrath (16.4km), Rathdowney(15.1km)	None	Yes
14	Lisduff Fen SAC	002147	Offaly	Outside SECFRAMS Area	Yes	None	None	Yes
15	Lower River Suir SAC	002137	Waterford, Tipperary, Kilkenny	UoM16	Yes	Ballyhale (12.9km), Callan (9.5km)	None	Yes
16	Mountmellick SAC	002141	Laois	UoM14	Yes	Athy (21.7km), Ballyroan (19.3km), Daingean (17.9km), Monasterevin (12.6km), Mountmellick (2.2km), Mountrath (18.2km), Portarlinton (4.8km), Portlaoise (7.6km), Rathangan (19.5km),	None	Yes
17	River Barrow and River Nore SAC	002162	Waterford, Wexford, Offaly, Laois, Kildare, Carlow, Tipperary, Kilkenny	UoM14 , UoM15, UoM16 & UoM17	Yes	Ballyhale (0.0km), Ballyragget (0.0km), Ballyroan (4.4km), Callan (0.0km), Freshford (2.8km), Inistioge (0.0km), Kilkenny (Nore) & Kilkenny (Breaghagh) (0.0km), Mountrath (0.0km), Rathdowney (3.8km), Thomastown (0.0km)	Ballyhale, Ballyragget, Callan, Inistioge, Kilkenny (Nore) & Kilkenny (Breaghagh), Mountrath, Thomastown, Ballyroan, Freshford, Rathdowney	No
18	River Nore SPA	004233	Laois, Kilkenny	UoM15	No	Ballyhale (5.3km), Ballyragget (0.0km), Ballyroan (6.0km), Callan (0.7km), Freshford (2.9km), Inistioge (0.0km), Kilkenny (Nore) & Kilkenny (Breaghagh) (0.0km), Mountrath (1.0km), Rathdowney (4.8km), Thomastown (0.0km)	Ballyhale, Ballyragget, Ballyroan, Callan, Freshford, Inistioge, Kilkenny (Nore) & Kilkenny (Breaghagh), Mountrath, Rathdowney, Thomastown	No

	Site Name	Site Code	County	UoM	Water Dependent	AFAs within Zone of potential Influence of European Site	AFAs that have an Identifiable Impact Pathway to European Site	Screened Out of FRMP AA for UoM15
19	Sharavogue Bog SAC	000585	Offaly	Outside SECFRAMS Area	Yes	None	None	Yes
20	Slaney River Valley SAC	000781	Wicklow, Carlow, Wexford	UoM12	Yes	None	None	Yes
21	Slieve Bloom Mountains SAC	000412	Laois, Offaly	Outside SECFRAMS Area	Yes	Mountrath (3.6km), Portlaoise (8.3km)	None	Yes
22	Slieve Bloom Mountains SPA	004160	Laois, Offaly	UoM14 & UoM15	No	Ballyroan (14.9km) Mountrath (3.6km), Rathdowney (13.0km)	None	Yes
23	Spahill and Clomantagh Hill SAC	000849	Kilkenny	UoM15	Yes	Ballyragget (10.2km), Freshford (5.8km), Rathdowney (9.8km)	None	Yes
24	The Loughans SAC	000407	Kilkenny	UoM15	Yes	Ballyragget (14.3km), Freshford (7.6km), Rathdowney (13.4km)	None	Yes
25	Thomastown Quarry SAC	002252	Kilkenny	UoM15	Yes	Ballyhale (7.8km), Inistioge (6.8km), Kilkenny (Nore) & Kilkenny (Breaghagh) (11.9km), Thomastown (0.0km)	Thomastown	No
26	Tramore Back Strand SPA	004027	Waterford	UoM17	No	None	None	Yes
27	Tramore Dunes and Backstrand SAC	000671	Waterford	UoM17	Yes	None	None	Yes

3.5.1 Conclusion of UoM15 Preliminary Screening Results

The likely significant effects that may arise from the UoM15 FRMP were examined in the context of all factors that could potentially affect the integrity of the European sites within the plan area and beyond.

On the basis of the findings of the Screening for Appropriate Assessment, it was concluded that the FRMP for UoM15:

- i. Is not directly connected with or necessary to the management of a European site; and
- ii. May have significant impacts on a European site

There are a total of 27 European sites (23 SACs and four SPAs) which are within the identified screening search area for UoM15 and which were used to inform the preliminary options assessment of the draft UoM15 FRMP.

A total of 24 European sites including 21 SACs and three SPAs were found to have no identifiable impact pathway associated with the implementation of FRM methods within the AFAs and were thus not at any risk of impacts. These were therefore scoped out as not requiring any further assessment in the NIS. Details of each site and the consideration of potential impacts from FRM methods are presented in Appendix B.

Three European sites (two SACs and one SPA) were assessed as having the potential to experience an impact from the implementation of FRM methods in the catchments of one or more of the ten AFAs in UoM15 - see Table 3.5.2. Further assessment was recommended to assess the significance of these impacts including, where relevant, Stage 2 Appropriate Assessment, following the establishment of the Preferred Option for the draft FRMP.

Table 3.5.2: UoM15 AFAs requiring Further Assessment (Appropriate Assessment) at FRMP stage

AFA with Identifiable Impact Pathway to European Site	European Site	Site Code
Ballyhale	River Barrow and River Nore SAC River Nore SPA	002162 004233
*Ballyragget	River Barrow and River Nore SAC River Nore SPA	002162 004233
*Ballyroan	River Barrow and River Nore SAC River Nore SPA	002162 004233
Callan	River Barrow and River Nore SAC River Nore SPA	002162 004233
Freshford	River Barrow and River Nore SAC River Nore SPA	002162 004233

AFA with Identifiable Impact Pathway to European Site	European Site	Site Code
Inistioge	River Barrow and River Nore SAC River Nore SPA	002162 004233
**Kilkenny (Nore) & Kilkenny (Breagagh)	River Barrow and River Nore SAC River Nore SPA	002162 004233
Mountrath	River Barrow and River Nore SAC River Nore SPA	002162 004233
Rathdowney	River Barrow and River Nore SAC River Nore SPA	002162 004233
Thomastown	River Barrow and River Nore SAC River Nore SPA Thomastown Quarry SAC	002162 004233 002252

*subsequently determined during South Eastern CFRAM Study as an AFA of Low Risk and/or where FRM measures have not been pursued within the UoM15 FRMP (see Section 4.3.1.)

**was not pursued in the draft FRMP as per reason above, however following consultation on the draft FRMP, as there are reasonable event damages and risks associated with Kilkenny (Breagagh) AFA, it was subsequently agreed that it should be included as part of the South Eastern CFRAM Study and was therefore recommended for inclusion to the UoM15 Final FRMP.

4 SUMMARY OF PROPOSED MEASURES

This Chapter provides a summary of the measures that are proposed for inclusion in the FRMP for UoM15.

4.1 UOM-SCALE FLOOD MANAGEMENT MEASURES

There are certain prevention and preparedness measures related to flood risk management that form part of wider Government policy. These measures should be applied across the whole UoM, including all AFAs. These methods are summarised below and described in Sections 4.1.1 to 4.1.13. These strategic alternatives that will be implemented on a national scale are non-structural, with no actual physical action to take place in a specific geographic location following implementation of the FRMP.

Those non-structural, policy-based measures shown below will have no physical outcome or are an existing process and so they cannot be assessed for impacts in this NIS. The next stage of development of these future plans and policies would be environmentally neutral, however in some cases they may need taken into account for in-combination and cumulative impacts.

- Sustainable Planning and Development Management - Proper application of the Guidelines on the Planning System and Flood Risk Management by the planning authorities;
- Sustainable Urban Drainage Systems (SuDS);
- Voluntary Home Relocation;
- Local Adaptation Planning;
- Land Use Management and Natural Flood Risk Management Measures;
- Maintenance of Arterial Drainage Schemes and Existing Flood Schemes;
- Maintenance of Drainage Districts and Existing Flood Schemes;
- Maintenance of Channels Not Part of a Scheme
- Flood Forecasting;
- Review of Emergency Response Plans for Severe Weather;
- Individual and Community Resilience;
- Individual Property Protection;
- Flood-Related Data Collection, and
- Minor Works Scheme.

As described in Chapter 3.2 the 'Do-Nothing' scenario was considered from the outset as one of the FRM methods considered. Each area to be assessed from UoM to AFA scale has therefore had the Do-Nothing method assessed as a potential alternative to the Plan. In general, 'do nothing' has been ruled out as an option, as it would not achieve the stated objectives of the FRMP to manage flood risk within the UoM.

4.1.1 Sustainable Planning and Development Management

The proper application of the Guidelines on the Planning System and Flood Risk Management by the planning authorities is essential to avoid inappropriate development in flood prone areas, and hence avoid unnecessary increases in flood risk into the future. The flood mapping provided as part of the FRMP will facilitate the application of the Guidelines. The Planning Authorities will ensure proper application of the Guidelines on the Planning System and Flood Risk Management (DECLG/OPW,

2009) in all planning and development management processes and decisions in order to support sustainable development. In UoM15 this option is considered environmentally neutral as it is a policy option to prevent inappropriate development. This policy cannot be assessed for impacts.

4.1.2 Sustainable Urban Drainage Systems (SuDS)

Sustainable Urban Drainage Systems (SuDS) can play a role in reducing and managing run-off from new developments to surface water drainage systems, reducing the impact of such developments on flood risk downstream, as well as improving water quality and contributing to local amenity. In accordance with the Guidelines on the Planning System and Flood Risk Management (DECLG/OPW, 2009), planning authorities should seek to reduce the extent of hard surfacing and paving and require the use of sustainable drainage techniques. In UoM15 this option is considered environmentally neutral as it is a policy option to improve the sustainability of future development. This policy cannot be assessed for impacts.

4.1.3 Voluntary Home Relocation

In extreme circumstances, the flood risk to an area where there is already some development may be such that continuing to live in the area is not acceptable to the owners, and it may not be viable or acceptable to take measures to reduce the flooding of the area. The home-owner may choose to relocate.

The Inter-Departmental Flood Policy Coordination Group will consider the policy options around voluntary home relocation for consideration by Government.

This method is applicable throughout UoM15. This option is considered environmentally neutral as it is a potential assessment of policy options. This policy cannot be assessed for impacts in the NIS.

4.1.4 Local Adaptation Planning

The consultation document on the NCCAF recognises that local authorities also have an important role to play in Ireland's response to climate adaptation. Given the potential impacts of climate change on flooding and flood risk, the local authorities should take fully into account these potential impacts in the performance of their functions, in particular in the consideration of spatial planning and the planning and design of infrastructure, in line with the Local Authority Adaptation Strategy Development Guidelines (EPA, 2016).

This method is applicable throughout UoM15. The option is considered environmentally neutral as it is a policy option to prepare Adaptation Plans at local scale. This option is therefore not included in the appropriate assessment. This policy cannot be assessed for impacts in the NIS.

4.1.5 Land Use Management and Natural Flood Risk Management Measures

The OPW is liaising with the EPA on the potential impact of WFD measures on flood risk, which are typically neutral (no impact), or may have some benefit in reducing runoff rates and volumes (e.g., through agricultural measures such as minimising soil compaction, contour farming or planting, or the installation of field drain interception ponds). The OPW will continue to work with the EPA and

other agencies implementing the WFD to identify, where possible, measures that will have benefits for both WFD and flood risk management objectives, such as natural water retention measures, and also biodiversity and potentially other objectives. It is anticipated that this is most likely to be achieved in areas where phosphorous loading is a pressure on ecological status in a sub-catchment where there is also an identified potentially significant flood risk (i.e., an AFA). This coordination will also address measures that may otherwise cause conflict between the objectives of the two Directives.

This method is applicable throughout UoM15. The option has the potential for both positive and negative environmental impacts; however the next stage of implementation of land use management and natural flood management following from the FRMP will be further assessment and feasibility studies. At this early stage in its development the policy cannot be assessed for impacts in the NIS.

4.1.6 Maintenance of Arterial Drainage Schemes and Existing Flood Relief Schemes

Within UoM15 the OPW has implemented and maintains the Kilkenny City Flood Relief Scheme which was undertaken by the OPW between 2001 and 2005, under the 1945 Arterial Drainage Act. The OPW continues to have statutory responsibility for inspection and maintenance of the Scheme, which includes the main River Nore channel thorough Kilkenny and part of the lower reaches of the River Breaghagh.

As discussed in Section 3.1.2.2, there are two other existing flood relief schemes in UoM14. Local Authorities should also maintain those flood relief schemes for which they have maintenance responsibility.

Separate environmental and appropriate assessments are required for maintenance activities for flood relief schemes. Where relevant, the maintenance of existing flood relief schemes in the UoM has been taken into account for cumulative or in-combination impacts with the FRMP.

4.1.7 Maintenance of Drainage Districts and Existing Flood Relief Schemes

Drainage Districts (DD) represent areas where the Local Authorities have responsibilities to maintain watercourse channels and therefore contribute to maintaining the existing regime. There are ten Drainage Districts located within UoM15:

- | | |
|-----------------------|--------------------------|
| ▪ Boleybeg DD | ▪ Kilbride DD |
| ▪ Borris in Ossory DD | ▪ Kilmaganny DD |
| ▪ Erkina DD | ▪ Loughans DD |
| ▪ Goul River DD | ▪ Rathdowney DD |
| ▪ Gully DD | ▪ Sugartown & Kilfane DD |

The Local Authorities have a statutory duty to maintain the Drainage Districts, and the Final FRMP does not amend these responsibilities to provide additional flood relief. The local authorities shall maintain the Drainage Districts in their jurisdictional area in accordance with legislation. Where relevant, the maintenance of drainage districts in the UoM will be taken into consideration for cumulative or in combination impacts with measures proposed in the FRMP in the appropriate assessment.

Local Authorities should also maintain those flood relief schemes for which they have maintenance responsibility.

Within UoM15 the Local Authority has implemented and maintains the Callan Minor Works Flood Relief Scheme.

4.1.8 Flood Forecasting

A Government decision was taken on the 5th January 2016 to establish a national flood forecasting service. Flood Forecasting was assessed as a method of flood risk management throughout UoM15. This method would utilise data from the existing hydrometric and meteorological networks to develop predictive models enabling alerts/warnings to be issued in sufficient time to flood prone receptors for action to be taken to manage the consequences of the flood event.

The FRMP recommends progression of a Flood Forecasting System, comprising a forecasting model system and the use of gauging stations, to project-level development and assessment for refinement and preparation for planning / Exhibition and, as appropriate, implementation. This policy cannot be assessed for impacts in the NIS.

4.1.9 Review of Emergency Response Plans for Severe Weather

The local authorities should review their severe weather emergency response plans with respect to flood events, making use of the information on flood hazards and risks provided through the CFRAM Programme and this FRMP, once finalised, and then regularly review the plans taking account of any changes or additional information, as appropriate. The local authorities should update and then regularly review their severe weather emergency response plans with respect to flood events, making use of all available information on flood hazards and risks.

This method is applicable throughout UoM15. The option is considered environmentally neutral as it is a policy option to review Emergency Response Plans. This policy cannot be assessed for impacts in the NIS.

4.1.10 Individual and Community Resilience

While the State, through the OPW, local authorities and other public bodies can take certain actions to reduce and manage the risk of flooding, individual home-owners, businesses and farmers also have a responsibility to manage the flood risk to themselves and their property and other assets to reduce damages and the risk to personal health in the event of a flood. All people at flood risk should make themselves aware of the potential for flooding in their area, and take long-term and short-term preparatory actions to manage and reduce the risk to themselves and their properties and other assets.

This method is applicable throughout UoM15. The option is considered environmentally neutral as it is a policy option to promote resilience to flooding. This policy cannot be assessed for impacts in the NIS.

4.1.11 Individual Property Protection

Individual Property Protection can be effective in reducing the damage to the contents, furniture and fittings in a house or business, but are not applicable in all situations (for example, they may not be suitable in areas of deep or prolonged flooding, or for some types of property with pervious foundations and flooring). Property owners considering the use of such method should seek the advice of an appropriately qualified expert on the suitability of the measures for their property. The Inter-Departmental Flood Policy Review Group will consider the policy options around installation of Individual Property Protection measures for consideration by Government.

The FRMP does not specifically address the management of local flood problems outside of the AFAs. Where this option is applicable within an AFA, appropriate assessment has been carried out.

4.1.12 Flood-Related Data Collection

Ongoing collection of hydrometric and meteorological data, and data on flood events as they occur, will help us to continually improve our preparation for, and response, to flooding. The OPW, local authorities / EPA and other organisations collecting hydro-meteorological data should continue to do so, and post-event event flood data should continue to be collected, to improve future flood risk management.

At this early stage in its development the policy cannot be assessed for impacts in the NIS. Best practice must be undertaken in the planning and installation of new gauges including, where relevant, appropriate assessment of new gauge installations at the project planning stage.

4.1.13 Minor Works Scheme

The Minor Flood Mitigation Works and Coastal Protection Scheme (the 'Minor Works Scheme') is an administrative scheme operated by the OPW under its general powers and functions to support the local authorities through funding of up to €750k (subject to review) to address qualifying local flood problems with local solutions. The OPW will continue the Minor Works Scheme until such time as it is deemed no longer necessary or appropriate.

This method is applicable throughout UoM15. This option has the potential for both positive and negative environmental impacts; however the next stage of implementation of minor works will be outside the FRMP and the CFRAM studies. Where available, information on projects being currently progressed on the minor works scheme will be taken into consideration for cumulative or in combination impacts with measures proposed in the FRMP in the appropriate assessment. Where relevant, future schemes undertaken under the Minor Works Scheme during the lifetime of the FRMP should be assessed for cumulative or in-combination impacts with the FRMP.

4.2 SUB-CATCHMENT MEASURES

The sub-catchment spatial scale of assessment refers to the catchment of the principal river on which multiple AFAs sit. No sub-catchment SSA has been identified in UoM15 FRMP. .

4.3 AFA-SCALE MEASURES

4.3.1 Communities (AFAs) at Low Risk

The AFAs in each UoM were originally determined through the Preliminary Flood Risk Assessment (PFRA), as described in Chapter 1.1.1. The flood hazard and risk analysis undertaken through the South Eastern CFRAM Project has been significantly more detailed than the analysis undertaken for the PFRA. For certain AFAs, this more detailed analysis has determined that there is in fact currently a low level of flood risk from rivers and/or the sea. In such cases, the development of flood risk management measures aimed specifically at managing the risk in such AFAs has not been pursued. The UoM-level measures will however typically still be relevant and applicable.

During the CFRAM study it was determined that the level of risk is low at three AFAs in UoM15. As a consequence, Optioneering was not carried out for these AFAs and no preferred measures have been put forward in the FRMP. Consequently, it is not necessary to conduct an appropriate assessment for these AFAs. The AFAs that have not been taken forward in the FRMP are summarised in Chapter 4.3.1.1 to 4.3.1.3.

The level of risk in the AFAs where the CFRAM process has determined that there is currently a low level of flood risk will be reviewed, along with all areas, as part of the review of the PFRA (see Chapter 1.1.1). This includes AFAs where the current level of risk may be low, but where the level of risk may increase in the future due to the potential impacts of climate change and so action in the future may be required to manage such impacts.

4.3.1.1 Ballyragget

Ballyragget AFA is at low risk from flooding during a 1% AEP fluvial event with no properties or risk receptors at risk of flooding during such an event. Ballyragget AFA is considered to be at low risk during the present day 1%AEP fluvial event and optioneering has not been undertaken for the FRMP; consequently, the existing maintenance regime should continue in order to maintain the current Standard of Protection.

4.3.1.2 Ballyroan

Ballyroan AFA is at low risk from flooding during a 1% AEP fluvial event. The only risk receptors that would be affected during such an event are two national roads. Ballyroan AFA is considered to be at low risk during the present day 1%AEP fluvial event and optioneering has not been undertaken for the FRMP. Consequently, the existing maintenance regime should continue in order to maintain the current Standard of Protection.

4.3.1.3 Kilkenny (Nore)

There are a number of residential and non-residential properties, Social Infrastructural Assets and Social Amenity Sites in addition to one regional road and several local roads at risk of flooding within Kilkenny during a 1% AEP fluvial event. A Flood Relief Scheme for Kilkenny (Nore) was completed in 2005 and consequently the Kilkenny (Nore) AFA has been evaluated in the FRMP as having a low level of flood risk.

Following consultation on the draft FRMP, as there are reasonable event damages and risks associated with Kilkenny (Breaghagh) AFA, it was agreed that this AFA should be included under the South Eastern CFRAM Study and a measure in this AFA was added to the UoM15 Final FRMP. This measure has therefore been added to the final NIS in Section 4.3.2.8 and has been assessed in Section 5.8.

4.3.2 AFAs with Measures Put Forward in in FRMP

In total, eight AFAs have FRM measures incorporating physical works proposed in the UoM15 Final FRMP. Following consultation on the draft FRMP, FRM measures for Kilkenny (Breaghagh) AFA were subsequently recommended for inclusion in the FRMP. The AFAs with measures proposed are summarised in Table 4.3.1 below and the preferred methods described in Chapter 4.3.2. Full details can be found in Chapter 7.4 and Appendix G of the UoM15 FRMP.

It should be noted that for Callan, Kilkenny and Mountrath AFAs no economically viable measure (i.e., a measure with a benefit - cost ratio of greater than 1.0) was found through the analysis undertaken to date, but a technically viable measure has been identified with a benefit - cost ratio of between 0.5 and 1.0. These AFAs have therefore been assessed in the NIS as there is the potential for physical works to be progressed; however as further discussed in the FRMP these AFAs will require a more detailed assessment of the costs to be carried out before it is able to progress to full project-level assessment.

Table 4.3.1: Summary of FRM Options advanced in Final FRMP for UoM15

Spatial Scale	Name	Option Number	Description
UoM15			
Sub-Catchment	-	-	No sub-catchment SSA identified
AFA	Ballyhale	1	Storage and Hard Defences
AFA	Ballyhale	2	Hard Defences (new line)
AFA	Ballyhale	3	Diversion of Flow and Hard Defences (new line)
AFA	Ballyraggett	0	No Options Technically and Economically feasible
AFA	Ballyroan	0	No Options Technically and Economically feasible
AFA	Callan	1	Improvement of Channel Conveyance
AFA	Callan	2	Hard Defences (existing line and new line)
AFA	Freshford	1	Diversion of Flow & Improvement of Channel Conveyance
AFA	Freshford	2	Diversion of Flow
AFA	Freshford	3	Storage and Improvement of Channel Conveyance
AFA	Freshford	4	Storage and Flow Diversion
AFA	Inistioge	1	Hard Defences (new line)
AFA	Kilkenny*	1	Hard Defences
AFA	Kilkenny	2	Hard Defences & Land Use Management
AFA	Mountrath	1	Hard Defences & Improvement of Channel Conveyance (Shannon Stream)
AFA	Mountrath	2	Hard Defences & Improvement of Channel Conveyance (Shannon Stream & Coles River)
AFA	Rathdowney	1	Storage and Hard Defences
AFA	Thomastown	1	Hard Defences

*added to FRMP following draft FRMP stage.

4.3.2.1 Ballyhale

Preferred Measure: Progress the development of a Flood Relief Scheme for Ballyhale

Description: Progress the project-level development and assessment of a Flood Relief Scheme for Ballyhale, including environmental assessment as necessary and further public consultation, for refinement and preparation for planning / Exhibition and, if and as appropriate, implementation.

At risk properties would be protected by an embankment and a flow diversion channel from the Ballyhale watercourse to the Little Arrigal River (Figure 4.3.1). The embankment would protect to the 1% AEP flood event with an average height of 0.9m and a total length of 53m. A weir structure would also be required to regulate the flow between the proposed diversion channel and the existing channel.

The works presented herein are not the final and definitive works. Potential flood relief works set out herein will need to be further developed at a local, project level before Exhibition or submission for planning approval.

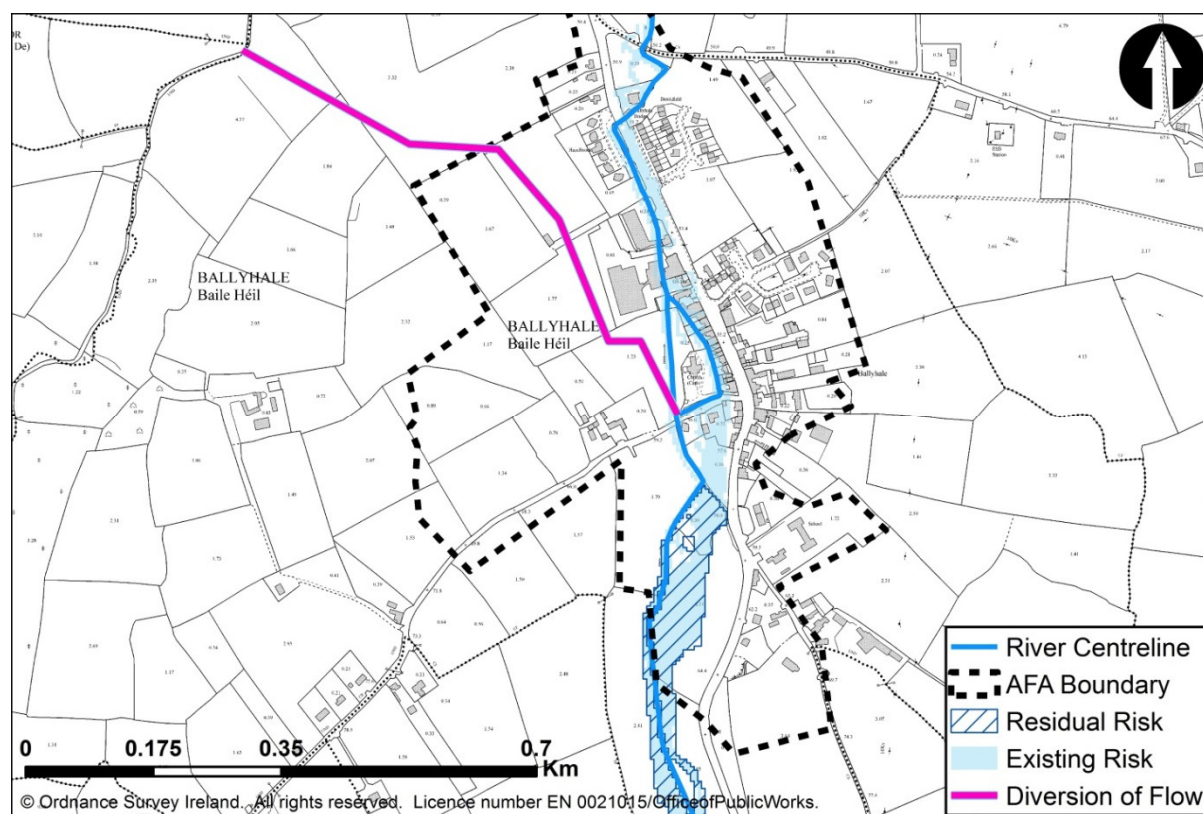


Figure 4.3.1: Ballyhale Preferred Measures

4.3.2.2 Callan

Preferred Measure: Undertake a Detailed Assessment of the Costs of the Potential Measure for Callan

Description: Undertake a detailed assessment of the costs to determine if an economically viable measure may exist that could justify the progression to full project-level assessment.

At risk properties in Callan would be protected by a series of walls, embankments and tanking of two properties where the gable walls form part of the river channel (Figure 4.3.2). These hard defences would be set back from the river channel where possible. These hard defences would protect to the 1%AEP fluvial event with an average height of 1.6m and a total length of 733m.

The works presented herein are not the final and definitive works. Potential flood relief works set out herein will need to be further developed at a local, project level before Exhibition or submission for planning approval.

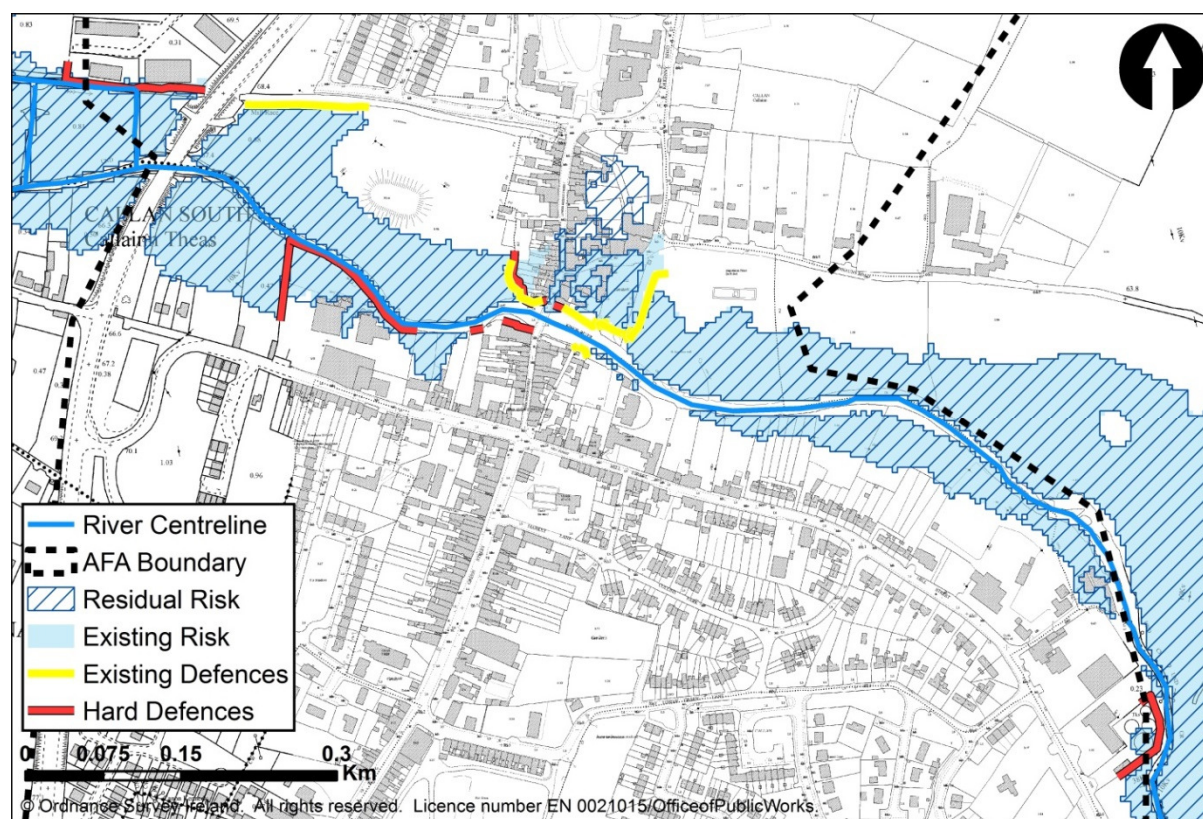


Figure 4.3.2: Callan Preferred Measures

4.3.2.3 Freshford

Preferred Measure: Progress the development of a Flood Relief Scheme for Freshford

Description: Progress the project-level development and assessment of a Flood Relief Scheme for Freshford, including environmental assessment as necessary and further public consultation, for refinement and preparation for planning / Exhibition and, if and as appropriate, implementation.

At risk properties would be protected by the construction of two flow diversion channels including seven new 2x1m box culverts and a weir control at the confluence with the Upperwood watercourse. (Figure 4.3.3). Channel 1 being 3.12km long, 3m wide and 1.5m deep and Channel 2 being 2.6km long, 3.5m wide for the first 878m and 3m wide for the remainder and 1.5m deep. Two weirs would also be removed on the Nuenna River. Improvement of Channel conveyance of the Upperwood River would involve the lowering of 216m of channel by 0.4m.

The works presented herein are not the final and definitive works. Potential flood relief works set out herein will need to be further developed at a local, project level before Exhibition or submission for planning approval

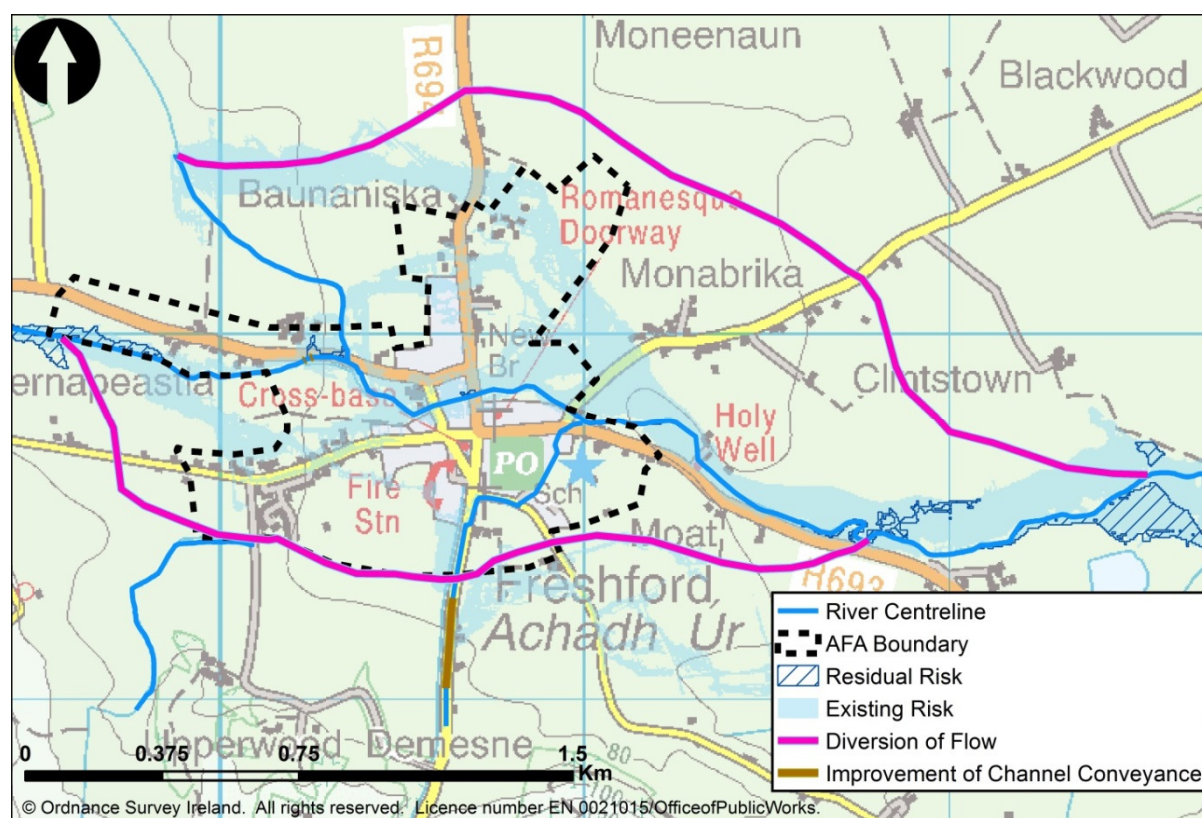


Figure 4.3.3: Freshford Preferred Measures

4.3.2.4 Inistioge

Preferred Measure: Progress the development of a Flood Relief Scheme for Inistioge

Description: Progress the project-level development and assessment of a Flood Relief Scheme for Inistioge, including environmental assessment as necessary and further public consultation, for refinement and preparation for planning / Exhibition and, if and as appropriate, implementation.

At risk properties would be protected by a series of walls and embankments. These hard defences would protect to the 0.5% tidal event and the 1% AEP fluvial event with an average height of 1.7m and a total length of 870m (Figure 4.3.4).

The works presented herein are not the final and definitive works. Potential flood relief works set out herein will need to be further developed at a local, project level before Exhibition or submission for planning approval.

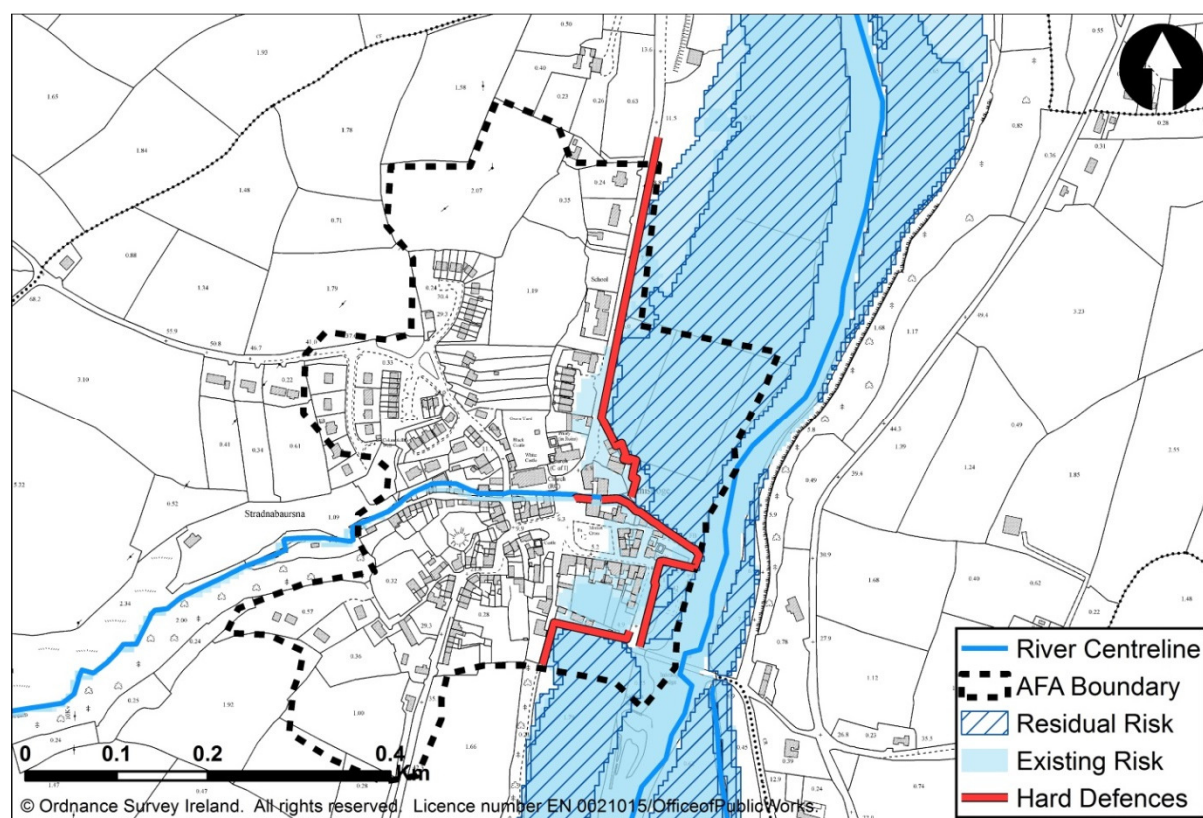


Figure 4.3.4: Inistioge Preferred Measures

4.3.2.5 Mountrath

Preferred Measure: Undertake a Detailed Assessment of the Costs of the Potential Measure for Mountrath

Description: Undertake a detailed assessment of the costs to determine if an economically viable measure may exist that could justify the progression to full project-level assessment.

At risk properties would be protected by a series of flood walls and embankments, along with culverting of an open section of watercourse at the downstream end of the Shannon Stream River (Figure 4.3.5). The hard defences will require an average height of 1.0m and a total length of 910m. A new 2.0m x 0.9m box culvert of 110m length will be constructed at the downstream end of the Shannon Stream in order to culvert the existing open section of watercourse and connect the Shannon Stream to the Mountrath River.

The works presented herein are not the final and definitive works. Potential flood relief works set out herein will need to be further developed at a local, project level before Exhibition or submission for planning approval.

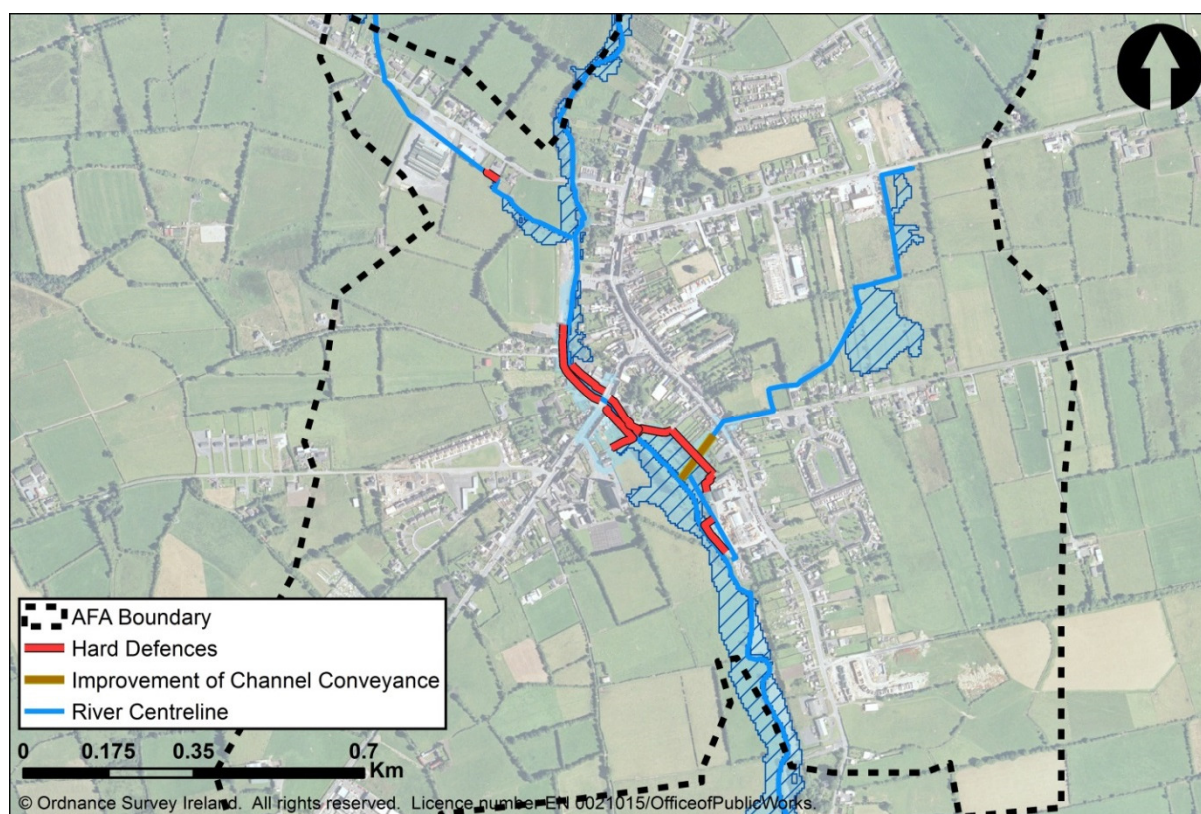


Figure 4.3.5: Mountrath Preferred Measures

4.3.2.6 Rathdowney

Preferred Measure: Progress the development of a Flood Relief Scheme for Rathdowney

Description: Progress the project-level development and assessment of a Flood Relief Scheme for Rathdowney, including environmental assessment as necessary and further public consultation, for refinement and preparation for planning / Exhibition and, if and as appropriate, implementation.

At risk properties would be protected by a combination of upstream flood storage along the Glasha River and the Kilcoran watercourses and hard defences. The total storage volume required is 135,014m³ which reduced flood flows in the Glasha River, and in combination with hard defences provides protection against the 1%AEP fluvial event. The Hard Defences have an average height of 1.5m and a total length of 0.7km (Figure 4.3.6).

The works presented herein are not the final and definitive works. Potential flood relief works set out herein will need to be further developed at a local, project level before Exhibition or submission for planning approval.

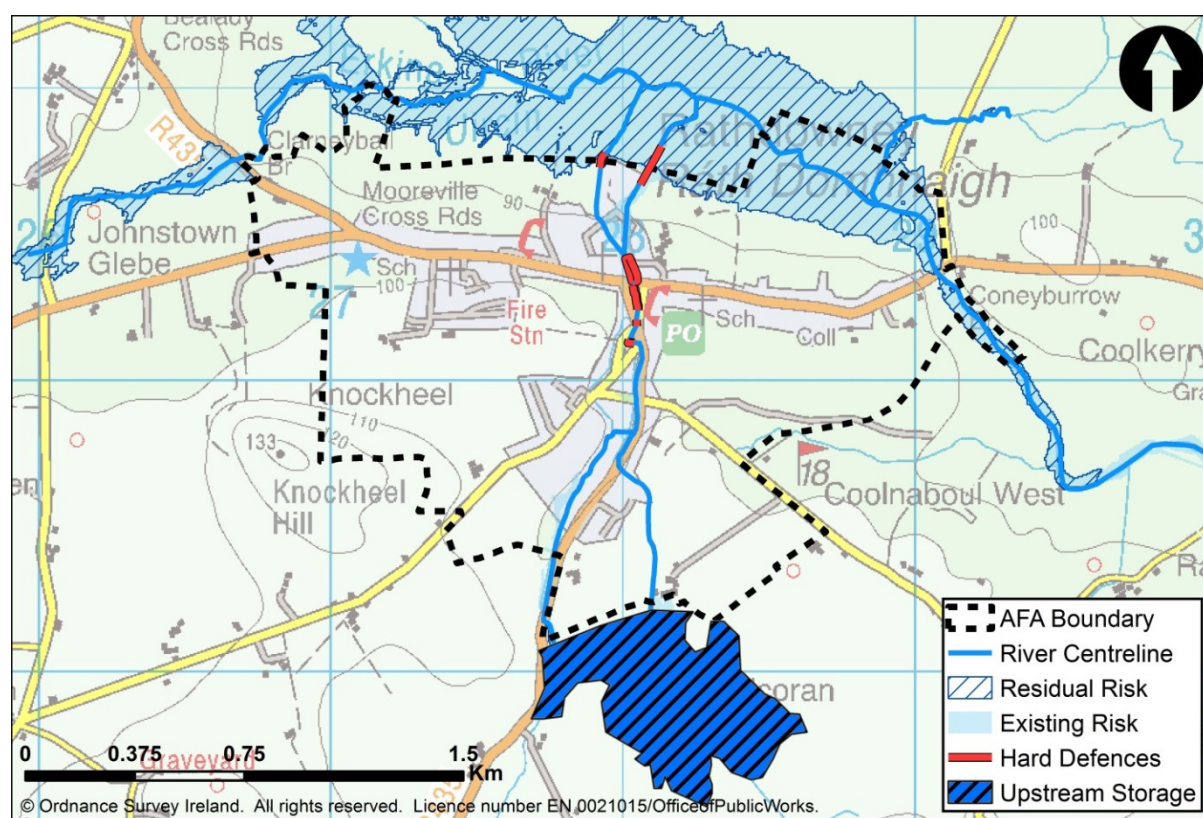


Figure 4.3.6: Rathdowney Preferred Measures

4.3.2.7 Thomastown

Preferred Measure: Progress the development of a Flood Relief Scheme for Thomastown

Description: Progress the project-level development and assessment of a Flood Relief Scheme for Thomastown, including environmental assessment as necessary and further public consultation, for refinement and preparation for planning / Exhibition and, if and as appropriate, implementation.

At risk properties would be protected by hard defences which would protect to the 1% AEP flood event, with an average height of 1.9m and a total length of 2.7km (Figure 4.3.7).

The works presented herein are not the final and definitive works. Potential flood relief works set out herein will need to be further developed at a local, project level before Exhibition or submission for planning approval.

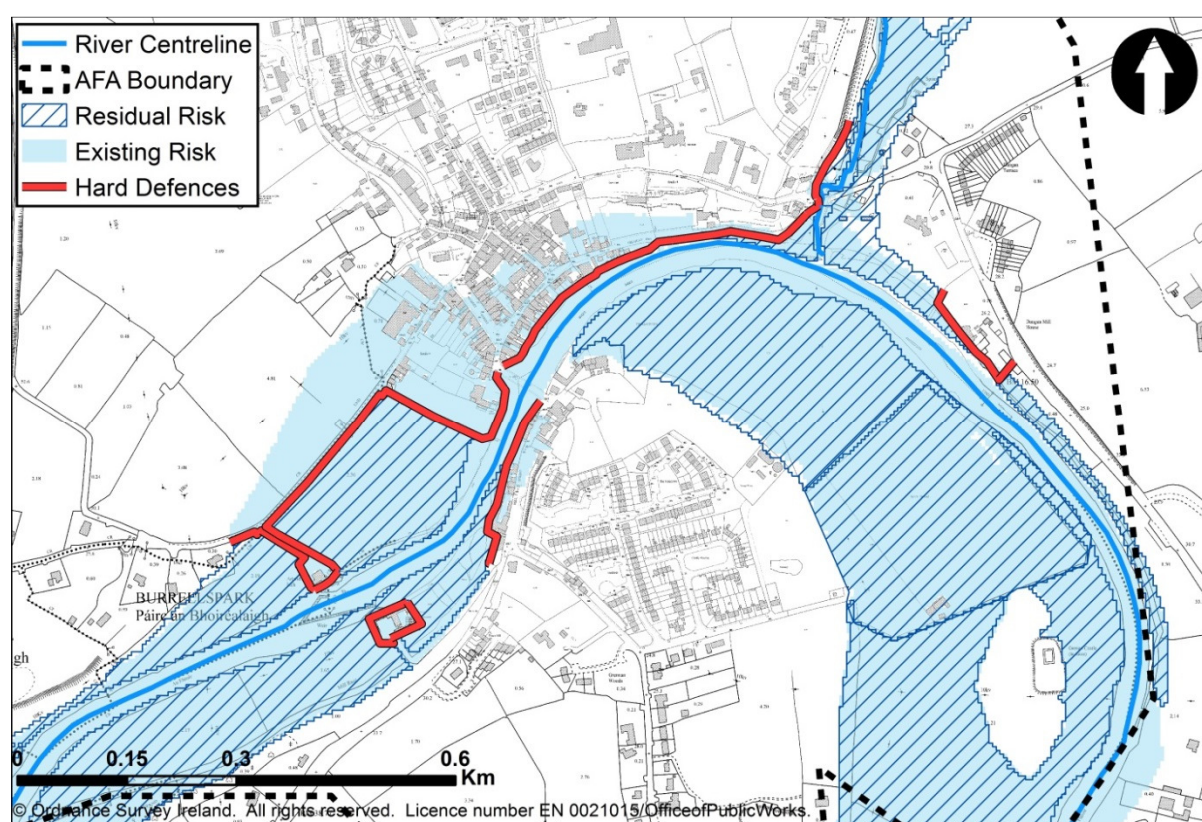


Figure 4.3.7: Thomastown Preferred Measures

4.3.2.8 Kilkenny (Breagagh)

Preferred Measure: Undertake a Detailed Assessment of the Costs of the Potential Measure for Kilkenny (Breagagh)

Description: Undertake a detailed assessment of the costs to determine if an economically viable measure may exist that could justify the progression to full project-level assessment.

At risk properties would be protected by a series of flood walls and embankments located along the Breagagh River. The hard defences will provide a SoP of 1% AEP for fluvial flood events with an average height of 0.97m and a total length of 0.46km. (Figure 4.3.7).

The works presented herein are not the final and definitive works. Potential flood relief works set out herein will need to be further developed at a local, project level before Exhibition or submission for planning approval.



Figure 4.3.8: Kilkenny (Breagagh) Preferred Measures

5 APPROPRIATE ASSESSMENT of AFA-SCALE MEASURES

5.1 BALLYHALE AFA

All European sites in the zone of influence of Ballyhale AFA were screened for possible impacts from FRM methods (See Chapter 3.5). Screening assessed the potential for impact at five European sites (see Figure 5.1.1):

- Hugginstown Fen SAC (000404)
- Lower River Suir SAC (002137)
- River Barrow and Nore SAC (002162)
- River Nore SPA (004233)
- Thomastown Quarry SAC (002252)

Three sites were found to have no identifiable impact pathway arising from the implementation of FRM methods within the Ballyhale catchment and were therefore screened out as not requiring any further assessment. Two sites were identified as potentially being impacted upon through FRM activities at Ballyhale AFA; River Barrow and Nore SAC (002162) and River Nore SPA (004233). The following section assesses the proposed FRM measures described in Chapter 4.3.2.1 in relation to the screened-in European sites.

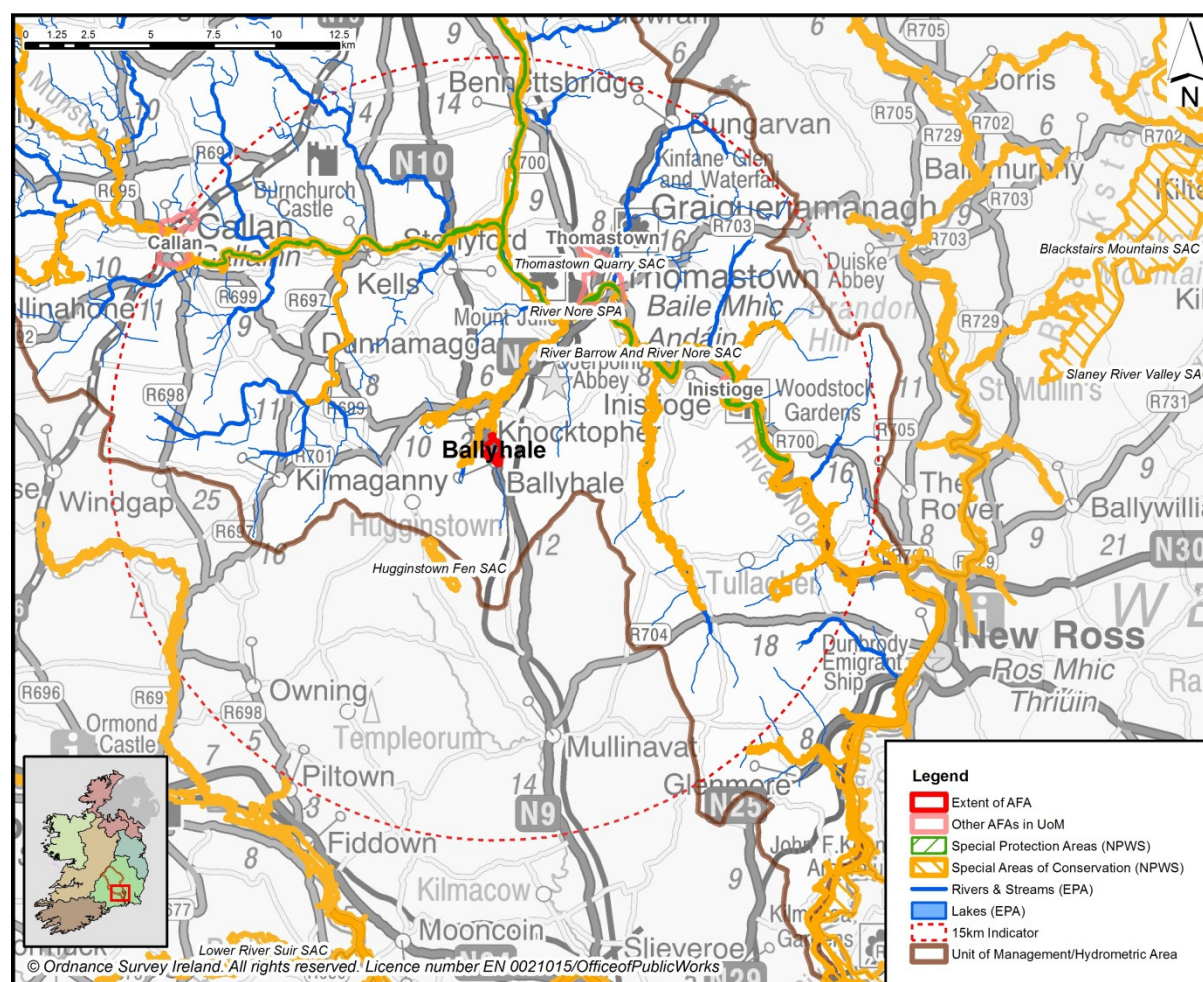


Figure 5.1.1: Ballyhale AFA in context of catchment and surrounding European sites

5.1.1 Identification of Potential Sources of Impact

This section further examines the source > pathway > receptor linkages that could potentially result in adverse impacts arising from FRM measures at Ballyhale AFA on the screened in European sites.

The qualifying interest(s) of the site(s) at risk from surface water pathways are identified in Table 5.1.1 and from land and air pathways in Table 5.1.2. Additional detail on the attributes and targets of the qualifying interests has been included in Appendix C. These have been consulted in order to assess the potential impacts of the proposed flood relief measures on the designated habitats and species insofar as plan-level details allowed.

5.1.1.1 Potential Sources of Impact via Surface Water Pathways

Two European sites were identified as potentially being impacted upon via surface water pathways; River Barrow and Nore SAC (002162) and River Nore SPA (004233). Qualifying interests of these sites at risk from surface water pathways are identified in Table 5.1.1. Additional detail on the qualifying interests has been included in Appendix C.

Table 5.1.1: Qualifying Interests of the screened in European sites likely to be impacted upon via surface water pathways from FRM measures undertaken at Ballyhale AFA.

European Site (Site code)	Qualifying Interests
River Barrow and Nore SAC (002162)	<p>Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i>, <i>Alnion incanae</i>, <i>Salicion albae</i>) [91E0]</p> <p>Water courses of plain to montane levels with the <i>Ranunculon fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation [3260]</p> <p><i>Vertigo moulinsiana</i> (Desmoulin's Whorl Snail) [1016]</p> <p><i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) [1029]</p> <p><i>Austropotamobius pallipes</i> (White-clawed Crayfish) [1092]</p> <p><i>Petromyzon marinus</i> (Sea Lamprey) [1095]</p> <p><i>Lampetra planeri</i> (Brook Lamprey) [1096]</p> <p>River Lamprey (<i>Lampetra fluviatilis</i>) [1099]</p> <p><i>Alosa fallax fallax</i> (Twaite Shad) [1103]</p> <p>Salmon (<i>Salmo salar</i>) [1106]</p> <p>Otter (<i>Lutra lutra</i>) [1355]</p> <p><i>Margaritifera durrovensis</i> (Nore Pearl Mussel) [1990]</p>
River Nore SPA (004233)	Kingfisher (<i>Alcedo atthis</i>) [A229]

The following sources of impact arising from FRM measures at Ballyhale AFA could potentially impact upon the European sites detailed above through surface water pathways:

- **Suspended sediments** – There may be indirect negative downstream impacts from sedimentation during construction. Construction activities within or adjacent to surface waters and in-channel works to create flow diversion channels can result in the release of suspended sediments into those waters. This can lead to increased turbidity of surface waters, and an associated reduction in photosynthesis, which can impact on surface water dependent habitats. Impacts on aquatic species can occur through loss of suitable habitat

(e.g. salmon spawning habitat), changes to or reduction in food supply (e.g. aquatic invertebrate density or diversity), or increased difficulty in feeding (e.g. otters will find greater difficulty hunting in turbid surface waters).

- **Changes in nutrient levels/pollutants** – Construction activities in or adjacent to surface waters and in-channel works to create flow diversion channels can result in the release of nutrients into those waters, and can lead to reduced water quality and eutrophication. Hard defences can interfere with natural process, by causing some or all of the floodplain to be disconnected from the river, which can lead to the loss of natural habitat to capture, filter and recycle nutrients or pollutants. This can lead to a reduction in water quality. Spillages of hydrocarbons or other contaminants during FRM works can also result in a reduction in water quality. Reduced water quality and eutrophication can adversely impact on surface water dependent habitats, and on aquatic species through loss of suitable habitat, changes to or reduction in food supply, or increased difficulty in feeding.
- **Changes in water levels/channel morphology** – Changes to channel morphology through the use of flood walls and embankments and through the creation of new flow diversion channels can lead to changes in capacity and flow of surface waters. This can lead to hydrological impacts on surface water dependent habitats and to aquatic species through habitat loss and changes to or reduction in food supply.

5.1.1.2 Potential Sources of Impact via Land and Air Pathways

One European site was identified as potentially being impacted upon via land and air pathways; River Barrow and Nore SAC (002162). Qualifying interests of this site at risk from land and air pathways are identified in Table 5.1.2: Qualifying Interests of the screened in European site likely to be impacted upon via land and air pathways from FRM measures undertaken at Ballyhale AFA. Additional detail on the qualifying interests has been included in Appendix C.

Table 5.1.2: Qualifying Interests of the screened in European site likely to be impacted upon via land and air pathways from FRM measures undertaken at Ballyhale AFA.

European Site (Site code)	Qualifying interests
River Barrow and Nore SAC (002162)	<p>Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i>, <i>Alnion incanae</i>, <i>Salicion albae</i>) [91E0]</p> <p>Water courses of plain to montane levels with the <i>Ranunculon fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation [3260]</p> <p><i>Vertigo moulinsiana</i> (Desmoulin's Whorl Snail) [1016]</p> <p><i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) [1029]</p> <p><i>Austropotamobius pallipes</i> (White-clawed Crayfish) [1092]</p> <p><i>Petromyzon marinus</i> (Sea Lamprey) [1095]</p> <p><i>Lampetra planeri</i> (Brook Lamprey) [1096]</p> <p>River Lamprey (<i>Lampetra fluviatilis</i>) [1099]</p> <p><i>Alosa fallax fallax</i> (Twaite Shad) [1103]</p> <p>Salmon (<i>Salmo salar</i>) [1106]</p> <p>Otter (<i>Lutra lutra</i>) [1355]</p> <p><i>Margaritifera durrovensis</i> (Nore Pearl Mussel) [1990]</p>
River Nore SPA (004233)	Kingfisher (<i>Alcedo atthis</i>)[A229]

The following sources of impact arising from FRM measures at Ballyhale AFA could potentially impact upon the European site detailed above through land and air pathways:

- **Physical habitat disturbance and loss of woody vegetation cover** – There is likely to be a direct loss of natural and semi-natural habitat in the direct footprint and vicinity of the defences. Construction of flood walls and embankments adjacent to surface waters and in-channel works to create flow diversion channels can result in a direct loss of or disturbance to aquatic, marginal and riparian habitats. This can indirectly impact on species through loss of habitat or changes in food supply, thereby negatively affecting conservation objectives.
- **Noise and visual disturbance** – The use of construction machinery and the presence of construction and maintenance workers can result in avoidance of suitable habitat by sensitive species.

5.1.2 Impact Assessment

Table 5.1.3 assesses the screened in European sites in more detail and examines the ways in which the identified sources and pathways could adversely impact on habitats or species. Avoidance and mitigation measures are proposed to mitigate any significant adverse impacts. The potential for cumulative impacts was considered throughout the process of option development. Engagement with stakeholders ensured that the potential for in-combination and cumulative impacts at plan level was minimised. In combination and cumulative effects will be re-assessed at the project stage when project-specific information has been captured.

5.1.2.1 In-combination Effects

Appropriate Assessment requires consideration of the impacts on European sites of FRM measures at Ballyhale AFA, in combination with other plans or projects that may impact on the sites resulting in cumulative negative impacts. Potential sources of in-combination effects identified as part of this assessment include:

- The Ballyhale watercourses are maintained by Kilkenny County Council. Inspections and maintenance works in these areas are carried as and when necessitated.
- Drainage maintenance activities in the Nore catchment. The OPW carry out regular maintenance on those channels altered through schemes implemented following the 1945 Arterial Drainage Act. Ongoing maintenance activities that result in the release of suspended sediments are currently adversely impacting on salmon spawning grounds, therefore these activities could potentially result in adverse cumulative impacts on this species. All scheduled maintenance operations in the vicinity of a European Site will require Screening for Appropriate Assessment and Stage II Appropriate Assessment where required. It is recommended that no arterial drainage maintenance is carried out in the channels where FRM work is being undertaken during the construction phase.
- The Freshwater pearl mussel Nore sub-basin management plan (Second Draft, NS2, 2010) recognises that it is the combination of the negative effects of a number of pressures that are acting together to leave the freshwater pearl mussel habitat in unfavourable condition. These include peat exploitation, agricultural activities (overgrazing, direct access to

watercourses, nutrient addition through slurry or fertiliser additions), forestry activities and wastewater treatment. Existing pressures in the catchment that can result in an increased sediment load can be considered as cumulative impacts with the potential sediment load from FRM measures, owing to the unfavourable status of the species and its sensitivity to sedimentation.

- The Kilkenny County Development Plan 2014-2020 has the potential for in-combination or cumulative impacts on the River Barrow and Nore SAC and the River Nore SPA in relation to planned new infrastructure. No significant in-combination effects with the FRMP are predicted at plan level. The potential for impacts should however be re-examined at the project level where additional detail on potential interactions between infrastructure and FRM schemes may be assessed once project-specific design information is available.
- In-combination effects may occur with FRM works, parallel projects or drainage schemes (see sections 3.1.2.2 and 4.1.7), carried out at other AFAs or locations in the UoM. There may be cumulative impacts on habitats or species from schemes constructed or undergoing maintenance simultaneously. Generic mitigation and monitoring measures have been developed in the FRMP, including the avoidance of undertaking FRM work on adjoining reaches of rivers for different AFAs or other parallel projects simultaneously. Provided the timing of FRM works is planned and managed correctly, no significant in-combination impacts are anticipated.

There are no other plans/projects ongoing or proposed (at the time of this study) which may give rise to any form of cumulative impact on the European sites.

Table 5.1.3: Impact assessment for FRM measures at Ballyhale AFA (flow diversion and hard defences)

Site name (site code)	Qualifying interests	Potential source of impact	Pathway	Potential Impact	Avoidance/mitigation measures	Residual impact
River Barrow and Nore SAC (002162)	<p>Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i>, <i>Alnion incanae</i>, <i>Salicion albae</i>) [91E0]</p> <p>Water courses of plain to montane levels with the <i>Ranunculum fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation [3260]</p> <p><i>Vertigo moulinsiana</i> (Desmoulin's Whorl Snail) [1016]</p> <p><i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) [1029]</p> <p><i>Austropotamobius pallipes</i> (White-clawed Crayfish) [1092]</p> <p><i>Petromyzon marinus</i> (Sea Lamprey) [1095]</p> <p><i>Lampetra planeri</i> (Brook Lamprey) [1096]</p> <p>River Lamprey (<i>Lampetra fluviatilis</i>) [1099]</p> <p><i>Alosa fallax fallax</i> (Twaite Shad) [1103]</p> <p>Salmon (<i>Salmo salar</i>) [1106]</p> <p>Otter (<i>Lutra lutra</i>) [1355]</p> <p><i>Margaritifera durrovensis</i> (Nore Pearl Mussel) [1990]</p>	<p>Suspended sediments</p> <p>Changes to nutrient levels/pollutant release</p>	Surface water	<p>The habitats and species for which the Barrow and Nore SAC was designated require particular water quality conditions. The favourable conservation conditions of Salmon, freshwater pearl mussel, and Nore pearl mussel are directly measured by water quality attributes, and the conservation status of other species are measured by attributes indirectly linked to water quality and sediment loadings, such as the extent and distribution of spawning habitats and the extent of freshwater habitat.</p> <p>Construction activities in or adjacent to the water could result in a release of suspended sediments and associated nutrients and/or pollution incidents from machinery. This could lead to a reduction in water quality, and result in adverse effects on the designated habitats and species of the SAC 3.8km downstream through loss of habitat or changes to food supply. Salmon spawning grounds and freshwater and Nore pearl mussel juvenile habitat will be particularly susceptible to adverse impacts from the release of suspended solids. Disconnecting areas of floodplain from the river can lead to a reduction in water quality owing to a reduction in habitat area to attenuate nutrients or other pollutants.</p> <p>Otter may be impacted by sedimentation, should visibility be impaired or food supply be affected.</p> <p>In the absence of mitigation, there are likely to be indirect, negative downstream impacts from sedimentation during construction of hard defences and creation of flow diversion. These impacts are expected to be short-term and local in scale but may have long-term impacts if salmon spawning beds or</p>	<p>A designated environmental officer should be appointed to oversee environmental management of the project.</p> <p>Strictly adhere to best practice protocols and SOPs during design, construction and maintenance.</p> <p>Follow Lamprey and Otter SOPs.</p> <p>Set hard defences back from the river channel wherever possible to minimise sediment loss into the river channel.</p> <p>Assess the need for silt management procedures and implement in consultation with a suitably-qualified FPM expert.</p> <p>Avoid arterial drainage and existing flood scheme maintenance works while FRM works are being undertaken.</p>	No

Site name (site code)	Qualifying interests	Potential source of impact	Pathway	Potential Impact	Avoidance/mitigation measures	Residual impact
				<p>important Freshwater pearl mussel juvenile habitat are present directly downstream.</p> <p>This AFA is within the Nore Lower Freshwater Pearl Mussel sensitive area, and is in a catchment with previous records of <i>Margaritifera</i>, but current status unknown. The UoM is covered by the second draft Nore sub-Basin Management Plan of 2010. There is potential for impacts on the conservation objectives for this species, including potential 'habitat extent' and 'substratum quality'.</p> <p>There is potential for impacts on 'Water courses of plain to montane levels with the <i>Ranunculus fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation', in particular on the conservation objective for this habitat to 'maintain a substratum that is dominated by large particles and free from fine sediments'.</p>	<p>Avoid working in-channel whenever possible to ensure salmon and lamprey habitat is not disturbed. No in-channel working where a suitable sand/gravel Lamprey spawning habitat exists from April-May (King et al, 2008), subject to adjustment owing to local knowledge of IFI.</p> <p>No in-channel working during the salmonid spawning season. Instream works should only be carried out during the period July to September inclusive, following consultation and agreement with IFI.</p> <p>An otter survey should be undertaken by an appropriately qualified ecologist with otter surveying experience. The survey should inform option design and design-specific mitigation.</p> <p>Surveys should be undertaken by appropriately qualified ecologists prior to commencement of the</p>	

Site name (site code)	Qualifying interests	Potential source of impact	Pathway	Potential Impact	Avoidance/mitigation measures	Residual impact
					<p>FRM work, to identify any important salmon, lamprey, twaite shad or crayfish habitat, or 'Water courses of plain to montane levels with the <i>Ranunculus fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation' in the vicinity of FRM works or directly downstream of the AFA, and any potentially significant impacts on these areas. Surveys should inform option design and design-specific mitigation.</p> <p>An appropriate freshwater pearl mussel expert should be appointed, to identify potential impacts on this species and provide appropriate mitigation advice. Should sedimentation impacts be possible on this species and/or its potential habitat, the detailed FRM option design and sediment mitigation must prevent additional sediment from entering the watercourse.</p> <p>See also measures in Chapter 6.</p>	

Site name (site code)	Qualifying interests	Potential source of impact	Pathway	Potential Impact	Avoidance/mitigation measures	Residual impact
		Water level changes		<p>The designated habitats and species depend on specific hydrological regimes. Construction of flood walls and embankments, as well as diversion of flow can result in changes in channel hydrology. This could lead to a reduction of suitable habitat and adverse effects on the conservation objectives for the species (population size and range).</p> <p>However, significant changes to the hydrological regime are unlikely, as the works will be local in nature, and are therefore unlikely to impact significantly on attributes used to define conservation status.</p> <p>Construction of new weir structure may impede passage of otters.</p> <p>Construction of new weir structure may impede the passage of fish.</p>	<p>Strictly adhere to best practice protocols and SOPs during design, construction and maintenance.</p> <p>An otter survey should be undertaken by an appropriately qualified ecologist with otter surveying experience. The survey should inform option design and design-specific mitigation. It may be necessary to include an otter pass in the design.</p> <p>Weir design should take account of best practice, design and Method Statement should be agreed with IFI prior to construction.</p> <p>See also measures in Chapter 6</p>	No
		Physical habitat disturbance/loss of woody vegetation cover	Land and air	<p>Construction activities that remove vegetation or otherwise disturb habitats could adversely affect the habitat area, vegetation structure and composition of designated habitats.</p> <p>Destruction or alteration of aquatic or riparian habitats could adversely affect designated species through loss of cover for otter or damage to lamprey or salmon spawning areas.</p>	<p>Strictly adhere to best practice protocols and SOPs including Lamprey and Otter SOPs during design, construction and maintenance in order to minimise physical disturbance.</p>	No

Site name (site code)	Qualifying interests	Potential source of impact	Pathway	Potential Impact	Avoidance/mitigation measures	Residual impact
				There is likely to be a direct loss of natural and semi-natural habitat in the direct footprint and vicinity of hard defences. These impacts are expected to be local in scale.	<p>Avoid working in-channel unless essential.</p> <p>Survey by a qualified ecologist prior to commencement of the FRM work, to identify any important salmon or lamprey habitat, or otter resting sites/holts in the vicinity of FRM works.</p> <p>No in-channel working where a suitable sand/gravel Lamprey spawning habitat exists from April-May (King et al, 2008), subject to adjustment owing to local knowledge of IFI.</p> <p>No in-channel working during the salmonid spawning season. Instream works should only be carried out during the period July to September inclusive, following consultation and agreement with IFI.</p> <p>No in-channel or bankside works to be conducted within 50m of a known or potential Otter holt/ resting site.</p> <p>Rehabilitate any areas</p>	

Site name (site code)	Qualifying interests	Potential source of impact	Pathway	Potential Impact	Avoidance/mitigation measures	Residual impact
					where riparian habitat has been damaged. See also measures in Chapter 6	
		Noise and visual disturbance		The species for which this SAC is designated are sensitive to disturbance by maintenance workers and noise from machinery and may avoid areas where works are being undertaken. This could adversely affect habitat use by otter, which require lying up areas throughout their territory.	Strictly adhere to best practice protocols and SOPs including Lamprey and Otter SOPs during design, construction and maintenance in order to minimise physical disturbance. Avoid working in-channel unless essential. No in-channel or bankside works to be conducted within 50m of a known or potential otter holt/ resting site. See also measures in Chapter 6	No
		Introduction or spreading of alien invasive species	Land and surface water	Invasive species can spread rapidly through habitats, form dense thickets which can out-compete native plants and cause problems with soil erosion	Carry out invasive species surveys and follow SOPs (see Table 6.1.1) See general mitigation in Chapter 6	No
River Nore SPA (004233)	Kingfisher (<i>Alcedo atthis</i>)[A229]	Suspended sediments Changes to nutrient levels/pollutant release	Surface water	Kingfisher populations are dependent on river channels and their associated marginal and riparian habitats. Construction activities in or adjacent to the water and clearance of in-channel vegetation could result in a release of suspended sediments and associated nutrients and/or pollution incidents from	Strictly adhere to best practice protocols and SOPs during design, construction and maintenance.	No

Site name (site code)	Qualifying interests	Potential source of impact	Pathway	Potential Impact	Avoidance/mitigation measures	Residual impact
				<p>machinery. This could lead to a reduction in water quality, affecting the habitats and food supply (macroinvertebrates and fish) of the Kingfisher and adversely affecting the distribution of the species within the SPA and long-term population trends.</p> <p>There are likely to be indirect, negative downstream impacts from sedimentation during construction. These impacts are expected to be short-term and local in scale, and are unlikely to impact significantly on attributes used to define conservation status of the Kingfisher population 5.3km downstream.</p>	See also measures in Chapter 6	
		Water level changes		<p>The habitats on which Kingfisher populations depend require specific hydrological regimes. Construction of flood walls and embankments, as well as in-channel vegetation clearance can result in changes in channel hydrology, by increasing capacity and flow rates. This can adversely impact on Kingfisher populations through habitat loss and changes to/reduction in food supply, possibly affecting distribution of the species within the SPA and long-term population trends.</p> <p>However, significant changes to the hydrological regime are unlikely, as the works will be local in nature, and are therefore unlikely to impact significantly on attributes used to define conservation status of the Kingfisher population 5.3km downstream.</p>	<p>Strictly adhere to best practice protocols and SOPs during design, construction and maintenance.</p> <p>See also measures in Chapter 6</p>	No
		Physical Habitat Loss Noise and visual disturbance	Land and air	Kingfisher populations are dependent on marginal and riparian habitats of river channels, and nest in burrows on vertical river banks. Construction of flood walls and embankments and associated removal of vegetation and disturbance of banks could adversely affect the range area, foraging/perching habitat and distribution of the	<p>Leave bankside vegetation intact wherever possible.</p> <p>Survey by a qualified ornithologist prior to commencement of the</p>	No

Site name (site code)	Qualifying interests	Potential source of impact	Pathway	Potential Impact	Avoidance/mitigation measures	Residual impact
				<p>species within the SPA as well as long-term population trends.</p> <p>Kingfishers are sensitive to disturbance by maintenance workers and noise from machinery and may avoid areas where works are being undertaken. This could adversely affect its distribution within the SPA.</p> <p>However, the FRM work will be very local in nature, and is therefore unlikely to impact significantly on attributes used to define conservation status of the Kingfisher population of the SPA 5.3km downstream of the AFA.</p>	<p>FRM work, to assess use of the channel by kingfisher in the vicinity of FRM works and look presence of burrows. Surveys will inform mitigation in design / construction.</p> <p>See also measures in Chapter 6</p>	

5.1.3 Conclusions

This NIS details the findings of the Stage 2 Appropriate Assessment conducted to further examine the potential direct and indirect impacts of proposed FRM works at Ballyhale AFA on the following European sites:

- River Barrow and Nore SAC (002162)
- River Nore SPA (004233)

The Appropriate Assessment investigated the potential direct and indirect impacts of the proposed works on the integrity and interest features of the above European sites, alone and in-combination with other plans and projects, taking into account the sites' structure, function and conservation objectives. Where potentially significant adverse impacts were identified, a range of mitigation and avoidance measures have been suggested to help offset them. As a result of this Appropriate Assessment it has been concluded that, following the avoidance and mitigation measures suggested, the FRM measures at Ballyhale AFA will not have a significant adverse impact on the above European sites.

All lower level plans arising through the implementation of the FRMP which require the progression of physical works will themselves be subject to Appropriate Assessment, when details of design and location are known and potential effects on the attributes and targets of site specific conservation objectives can be fully evaluated.

5.2 CALLAN AFA

All European sites in the zone of influence of Callan AFA were screened for possible impacts from FRM methods (see Chapter 3.5). Screening assessed the potential for impact at four European sites (see Figure 5.2.1):

- Hugginstown Fen SAC (000404)
- Lower River Suir SAC (002137)
- River Barrow and Nore SAC (002162)
- River Nore SPA (004233)

Two sites were found to have no identifiable impact pathway arising from the implementation of FRM methods within the Callan catchment and were therefore screened out as not requiring any further assessment. Two sites were identified as potentially being impacted upon through FRM activities at Callan AFA; River Barrow and Nore SAC (002162) and River Nore SPA (004233). The following section assesses the proposed FRM measures described in 4.3.2.2 in relation to the screened- in European sites.

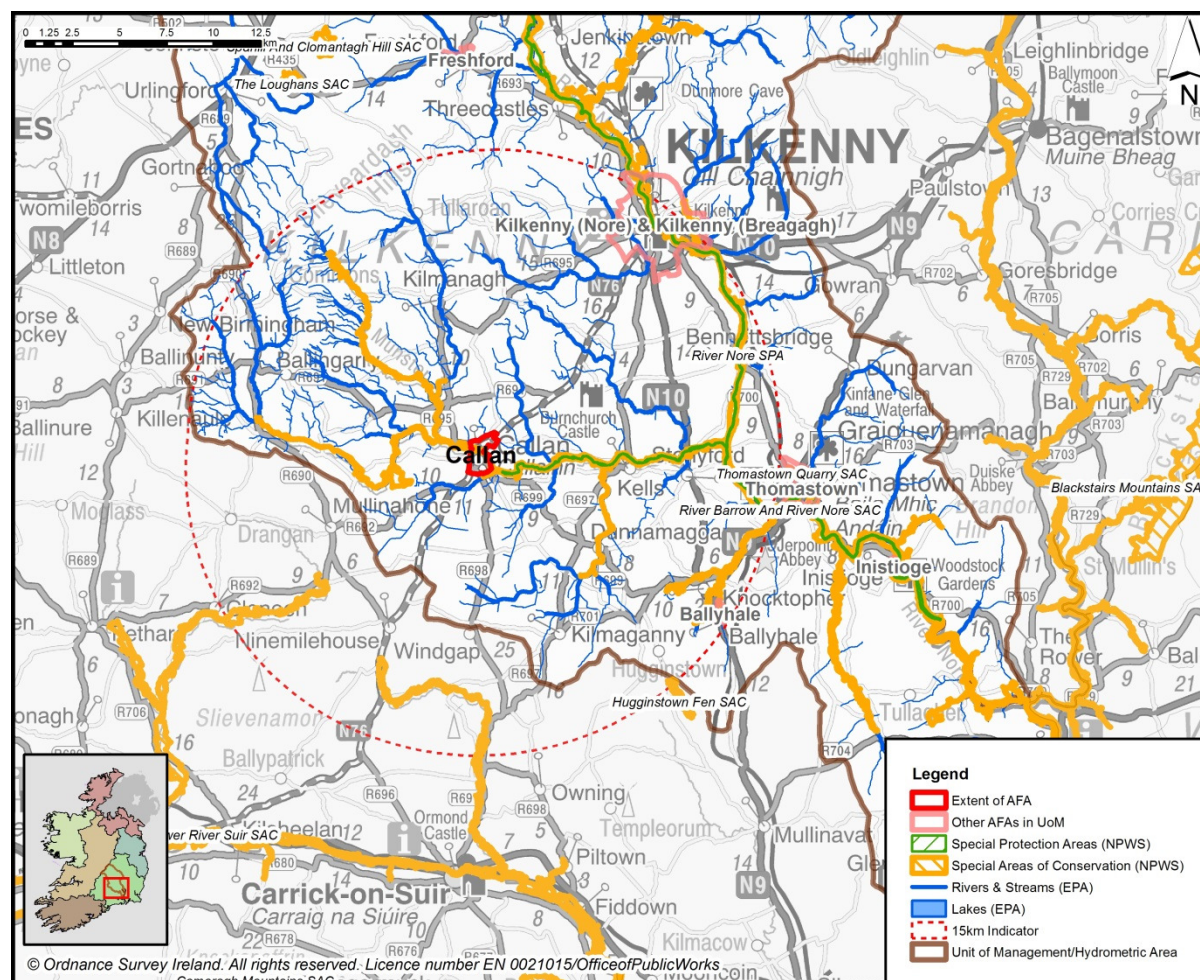


Figure 5.2.1: Callan AFA in context of catchment and surrounding European sites

5.2.1 Identification of Potential Sources of Impact

This section further examines the source > pathway > receptor linkages that could potentially result in adverse impacts arising from FRM measures at Callan AFA on the screened in European sites. The qualifying interest(s) of the site(s) at risk from surface water pathways are identified in Table 5.2.1 and from land and air pathways in Table 5.2.2. Additional detail on the attributes and targets of the qualifying interests has been included in Appendix C. These have been consulted in order to assess the potential impacts of the proposed flood relief measures on the designated habitats and species insofar as plan-level details allowed.

5.2.1.1 Potential Sources of Impact via Surface Water Pathways

Two European sites were identified as potentially being impacted upon via surface water pathways; River Barrow and Nore SAC (002162) and River Nore SPA (004233). Qualifying interests of these sites at risk from surface water pathways are identified in Table 5.2.1. Additional detail on the qualifying interests has been included in Appendix C.

Table 5.2.1: Qualifying Interests of the screened in European sites likely to be impacted upon via surface water pathways from FRM measures undertaken at Callan AFA.

European Site (Site code)	Qualifying interests
River Barrow and Nore SAC (002162)	<p>Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i>, <i>Alnion incanae</i>, <i>Salicion albae</i>) [91E0]</p> <p>Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation [3260]</p> <p><i>Vertigo moulinsiana</i> (Desmoulin's Whorl Snail) [1016]</p> <p><i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) [1029]</p> <p><i>Austropotamobius pallipes</i> (White-clawed Crayfish) [1092]</p> <p><i>Petromyzon marinus</i> (Sea Lamprey) [1095]</p> <p><i>Lampetra planeri</i> (Brook Lamprey) [1096]</p> <p>River Lamprey (<i>Lampetra fluviatilis</i>) [1099]</p> <p><i>Alosa fallax fallax</i> (Twaiite Shad) [1103]</p> <p>Salmon (<i>Salmo salar</i>) [1106]</p> <p>Otter (<i>Lutra lutra</i>) [1355]</p> <p><i>Margaritifera durrovensis</i> (Nore Pearl Mussel) [1990]</p>
River Nore SPA (004233)	Kingfisher (<i>Alcedo atthis</i>) [A229]

The following sources of impact arising from FRM measures at Callan AFA could potentially impact upon the European sites detailed above through surface water pathways:

- **Suspended sediments** – There may be indirect negative downstream impacts from sedimentation during construction. Construction activities within or adjacent to surface waters and in-channel works to create flow diversion channels can result in the release of suspended sediments into those waters. This can lead to increased turbidity of surface waters, and an associated reduction in photosynthesis, which can impact on surface water dependent habitats. Impacts on aquatic species can occur through loss of suitable habitat (e.g. salmon spawning habitat), changes to or reduction in food supply (e.g. aquatic

invertebrate density or diversity), or increased difficulty in feeding (e.g. otters will find greater difficulty hunting in turbid surface waters).

- **Changes in nutrient levels/pollutants** – Construction activities in or adjacent to surface waters and in-channel works to create flow diversion channels can result in the release of nutrients into those waters, and can lead to reduced water quality and eutrophication. Hard defences can interfere with natural process, by causing some or all of the floodplain to be disconnected from the river, which can lead to the loss of natural habitat to capture, filter and recycle nutrients or pollutants. This can lead to a reduction in water quality. Spillages of hydrocarbons or other contaminants during FRM works can also result in a reduction in water quality. Reduced water quality and eutrophication can adversely impact on surface water dependent habitats, and on aquatic species through loss of suitable habitat, changes to or reduction in food supply, or increased difficulty in feeding.
- **Changes in water levels/channel morphology** – Changes to channel morphology through the use of flood walls and embankments and through the creation of new flow diversion channels can lead to changes in capacity and flow of surface waters. This can lead to hydrological impacts on surface water dependent habitats and to aquatic species through habitat loss and changes to or reduction in food supply.

5.2.1.2 Potential Sources of Impact via Land and Air Pathways

Two European sites were identified as potentially being impacted upon via land and air pathways; River Barrow and Nore SAC (002162) and River Nore SPA (004233). Qualifying interests of these sites at risk from land and air pathways are identified in Table 5.2.1. Additional detail on the qualifying interests has been included in Appendix C.

Table 5.2.1: Qualifying Interests of the screened in European sites likely to be impacted upon via land and air pathways from FRM measures undertaken at Callan AFA.

European Site (Site code)	Qualifying interests
River Barrow and Nore SAC (002162)	<p>Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i>, <i>Alnion incanae</i>, <i>Salicion albae</i>) [91E0]</p> <p>Water courses of plain to montane levels with the <i>Ranunculon fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation [3260]</p> <p><i>Vertigo moulinsiana</i> (Desmoulin's Whorl Snail) [1016]</p> <p><i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) [1029]</p> <p><i>Austropotamobius pallipes</i> (White-clawed Crayfish) [1092]</p> <p><i>Petromyzon marinus</i> (Sea Lamprey) [1095]</p> <p><i>Lampetra planeri</i> (Brook Lamprey) [1096]</p> <p>River Lamprey (<i>Lampetra fluviatilis</i>) [1099]</p> <p><i>Alosa fallax fallax</i> (Twaite Shad) [1103]</p> <p>Salmon (<i>Salmo salar</i>) [1106]</p> <p>Otter (<i>Lutra lutra</i>) [1355]</p> <p><i>Margaritifera durrovensis</i> (Nore Pearl Mussel) [1990]</p>
River Nore SPA (004233)	Kingfisher (<i>Alcedo atthis</i>) [A229]

The following sources of impact arising from FRM measures at Callan AFA could potentially impact upon the European sites detailed above through land and air pathways:

- **Physical habitat disturbance and loss of woody vegetation cover** – There is likely to be a direct loss of natural and semi-natural habitat in the direct footprint and vicinity of the defences. Construction of flood walls and embankments adjacent to surface waters and in-channel works to create flow diversion channels can result in a direct loss of or disturbance to aquatic, marginal and riparian habitats. This can indirectly impact on species through loss of habitat or changes in food supply, thereby negatively affecting conservation objectives.
- **Noise and visual disturbance** – The use of construction machinery and the presence of construction and maintenance workers can result in avoidance of suitable habitat by sensitive species.

5.2.2 Impact Assessment

Table 5.2.2 assesses the screened in European sites in more detail and examines the ways in which the identified sources and pathways could adversely impact on habitats or species. Avoidance and mitigation measures are proposed to mitigate any significant adverse impacts. The potential for cumulative impacts was considered throughout the process of option development. Engagement with stakeholders ensured that the potential for in-combination and cumulative impacts at plan level was minimised. In combination and cumulative effects will be re-assessed at the project stage when project-specific information has been captured.

5.2.2.1 In-combination Effects

Appropriate Assessment requires consideration of the impacts on European sites of FRM measures at Callan AFA, in combination with other plans or projects that may impact on the sites resulting in cumulative negative impacts. Potential sources of in-combination effects identified as part of this assessment include:

- Drainage maintenance activities in the Nore catchment. The OPW carry out regular maintenance on those channels altered through schemes implemented following the 1945 Arterial Drainage Act. Ongoing maintenance activities that result in the release of suspended sediments are currently adversely impacting on salmon spawning grounds, therefore these activities could potentially result in adverse cumulative impacts on this species. All scheduled maintenance operations in the vicinity of a European Site will require Screening for Appropriate Assessment and Stage II Appropriate Assessment where required. It is recommended that no arterial drainage or existing flood scheme maintenance is carried out in the channels where FRM work is being undertaken during the construction phase.
- The Freshwater pearl mussel Nore sub-basin management plan (Second Draft, NS2, 2010) recognises that it is the combination of the negative effects of a number of pressures that are acting together to leave the freshwater pearl mussel habitat in unfavourable condition. These include peat exploitation, agricultural activities (overgrazing, direct access to watercourses, nutrient addition through slurry or fertiliser additions), forestry activities and wastewater treatment. Existing pressures in the catchment that can result in an increased sediment load can be considered as cumulative impacts with the potential sediment load

from FRM measures, owing to the unfavourable status of the species and its sensitivity to sedimentation.

- The Kilkenny County Development Plan 2014-2020 has the potential for in-combination or cumulative impacts on the River Barrow and Nore SAC and the River Nore SPA in relation to planned new infrastructure. No significant in-combination effects with the FRMP are predicted at plan level, however the potential for impacts should however be re-examined at the project level where additional detail on potential interactions between infrastructure and FRM schemes may be assessed once project-specific design information is available.
- FRM works may give rise to in-combination effects with the objective of new “open space” zoning in the Callan Local Area Plan Area Plan 2009-2020 through cumulative loss of habitat and ecological corridors. Additional detail on potential interactions between development and the FRM scheme will be captured and assessed at project level when project-specific design information is available.
- In-combination effects may occur with FRM works, parallel projects or drainage schemes (see sections 3.1.2.2 and 4.1.7), carried out at other AFAs or locations in the UoM. There may be cumulative impacts on habitats or species from schemes constructed or undergoing maintenance simultaneously. Generic mitigation and monitoring measures have been developed in the FRMP, including the avoidance of undertaking FRM work on adjoining reaches of rivers for different AFAs or other parallel projects simultaneously. Provided the timing of FRM works is planned and managed correctly, no significant in-combination impacts are anticipated.

There are no other plans/projects ongoing or proposed (at the time of this study) which may give rise to any form of cumulative impact on the European sites.

Table 5.2.2: Impact assessment for FRM measures at Callan AFA (hard defences)

Site name (site code)	Qualifying interests	Potential source of impact	Pathway	Potential Impact	Avoidance/mitigation measures	Residual impact
River Barrow and Nore SAC (002162)	<p>Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno-Padion, <i>Alnion incanae</i>, <i>Salicion albae</i>) [91E0]</p> <p>Water courses of plain to montane levels with the <i>Ranunculum fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation [3260]</p> <p><i>Vertigo moulinsiana</i> (Desmoulin's Whorl Snail) [1016]</p> <p><i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) [1029]</p> <p><i>Austropotamobius pallipes</i> (White-clawed Crayfish) [1092]</p> <p><i>Petromyzon marinus</i> (Sea Lamprey) [1095]</p> <p><i>Lampetra planeri</i> (Brook Lamprey) [1096]</p> <p>River Lamprey (<i>Lampetra fluviatilis</i>) [1099]</p> <p><i>Alosa fallax fallax</i> (Twaite Shad) [1103]</p> <p>Salmon (<i>Salmo salar</i>) [1106]</p> <p>Otter (<i>Lutra lutra</i>) [1355]</p> <p><i>Margaritifera durrovensis</i> (Nore Pearl Mussel) [1990]</p>	<p>Suspended sediments</p> <p>Changes to nutrient levels/pollutant release</p>	Surface water	<p>The habitats and species for which the Barrow and Nore SAC was designated require particular water quality conditions. The favourable conservation conditions of Salmon, freshwater pearl mussel, and Nore pearl mussel are directly measured by water quality attributes, and the conservation status of other species are measured by attributes indirectly linked to water quality and sediment loadings, such as the extent and distribution of spawning habitats and the extent of freshwater habitat.</p> <p>Construction activities in or adjacent to the water could result in a release of suspended sediments and associated nutrients and/or pollution incidents from machinery. This could lead to a reduction in water quality, and result in adverse effects on the designated habitats and species through loss of habitat or changes to food supply. Salmon spawning grounds and freshwater and Nore pearl mussel juvenile habitat will be particularly susceptible to adverse impacts from the release of suspended solids. Disconnecting areas of floodplain from the river can lead to a reduction in water quality owing to a reduction in habitat area to attenuate nutrients or other pollutants.</p> <p>In the absence of mitigation there are likely to be indirect, negative downstream impacts from sedimentation during construction. These impacts are expected to be short-term and local in scale but may have long-term impacts if salmon spawning beds or important Freshwater pearl mussel juvenile habitat is present directly downstream.</p> <p>This AFA is within the Nore Lower Freshwater Pearl Mussel sensitive area, and is in a catchment with</p>	<p>A designated environmental officer should be appointed to oversee environmental management of the project.</p> <p>Strictly adhere to best practice protocols and SOPs during design, construction and maintenance.</p> <p>Follow Lamprey and Otter SOPs.</p> <p>Set hard defences back from the river channel wherever possible to minimise sediment loss into the river channel.</p> <p>Assess the need for silt management procedures and implement in consultation with a suitably-qualified FPM expert.</p> <p>Avoid arterial drainage or existing flood scheme maintenance works while FRM works are being undertaken.</p>	No

Site name (site code)	Qualifying interests	Potential source of impact	Pathway	Potential Impact	Avoidance/mitigation measures	Residual impact
				<p>previous records of <i>Margaritifera</i>, but current status unknown. The UoM is covered by the second draft Nore sub-Basin Management Plan of 2010. There is potential for impacts on the conservation objectives for this species, including potential 'habitat extent' and 'substratum quality'.</p> <p>There is potential for impacts on 'Water courses of plain to montane levels with the <i>Ranunculus fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation', in particular on the conservation objective for this habitat to 'maintain a substratum that is dominated by large particles and free from fine sediments'.</p>	<p>Avoid working in-channel to ensure salmon and lamprey habitat is not disturbed.</p> <p>Surveys should be undertaken by appropriately qualified ecologists prior to commencement of the FRM work, to identify any important salmon, lamprey, twaite shad or crayfish habitat, or 'Water courses of plain to montane levels with the <i>Ranunculus fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation' in the vicinity of FRM works or directly downstream of the AFA, and any potentially significant impacts on these areas. Surveys should inform option design and design-specific mitigation.</p> <p>An otter survey should be undertaken by an appropriately qualified ecologist with otter surveying experience. The survey should inform option design and design-specific mitigation.</p> <p>An appropriate</p>	

Site name (site code)	Qualifying interests	Potential source of impact	Pathway	Potential Impact	Avoidance/mitigation measures	Residual impact
					freshwater pearl mussel expert should be appointed, to identify potential impacts on this species and provide appropriate mitigation advice. Should sedimentation impacts be possible on this species and/or its potential habitat, the detailed FRM option design and sediment mitigation must prevent additional sediment from entering the watercourse. See also measures in Chapter 6	
		Water level changes		The designated habitats and species depend on specific hydrological regimes. Construction of flood walls and embankments can result in changes in channel hydrology, by increasing capacity and flow rates. This could lead to a reduction of suitable habitat and adverse effects on the conservation objectives for the species (population size and range). However, significant changes to the hydrological regime are unlikely, as the works will be local in nature, and are therefore unlikely to impact significantly on attributes used to define conservation status.	Strictly adhere to best practice protocols and SOPs during design, construction and maintenance. See also measures in Chapter 6	No
		Physical habitat disturbance/loss of woody vegetation cover	Land and air	Construction activities that remove vegetation or otherwise disturb habitats could adversely affect the habitat area, vegetation structure and composition of designated habitats.	Strictly adhere to best practice protocols and SOPs including Lamprey and Otter SOPs during	No

Site name (site code)	Qualifying interests	Potential source of impact	Pathway	Potential Impact	Avoidance/mitigation measures	Residual impact
				<p>Destruction or alteration of aquatic or riparian habitats could adversely affect designated species through loss of cover for otter or damage to lamprey or salmon spawning areas.</p> <p>There is likely to be a direct loss of natural and semi-natural habitat in the direct footprint and vicinity of hard defences. These impacts are expected to be local in scale.</p>	<p>design, construction and maintenance in order to minimise physical disturbance.</p> <p>Avoid working in-channel unless essential.</p> <p>Survey by a qualified ecologist prior to commencement of the FRM work, to identify any important salmon or lamprey habitat, or otter resting sites/holts in the vicinity of FRM works.</p> <p>No in-channel working where a suitable sand/gravel Lamprey spawning habitat exists from April-May (King et al, 2008), subject to adjustment owing to local knowledge of IFI.</p> <p>No in-channel working during the salmonid spawning season. Instream works should only be carried out during the period July to September inclusive, following consultation and agreement with IFI.</p> <p>No in-channel or bankside works to be</p>	

Site name (site code)	Qualifying interests	Potential source of impact	Pathway	Potential Impact	Avoidance/mitigation measures	Residual impact
					conducted within 50m of a known or potential Otter holt/ resting site. See also measures in Chapter 6	
		Noise and visual disturbance		The species for which this SAC is designated are sensitive to disturbance by maintenance workers and noise from machinery and may avoid areas where works are being undertaken. This could adversely affect habitat use by otter, which require lying up areas throughout their territory.	Strictly adhere to best practice protocols and SOPs including Lamprey and Otter SOPs during design, construction and maintenance in order to minimise physical disturbance. Avoid working in-channel unless essential. No in-channel or bankside works to be conducted within 50m of a known or potential otter holt/ resting site. See also measures in Chapter 6	No
		Introduction or spreading of alien invasive species	Land and surface water	Invasive species can spread rapidly through habitats, form dense thickets which can out-compete native plants and cause problems with soil erosion	Carry out invasive species surveys and follow SOPs (see Table 6.1.1) See general mitigation in Chapter 6	No
River Nore SPA (004233)	Kingfisher (<i>Alcedo atthis</i>)[A229]	Suspended sediments Changes to nutrient levels/pollutant release	Surface water	Kingfisher populations are dependent on river channels and their associated marginal and riparian habitats. Construction activities in or adjacent to the water could result in a release of suspended	Strictly adhere to best practice protocols and SOPs during design, construction and	No

Site name (site code)	Qualifying interests	Potential source of impact	Pathway	Potential Impact	Avoidance/mitigation measures	Residual impact
				<p>sediments and associated nutrients and/or pollution incidents from machinery. This could lead to a reduction in water quality, affecting the habitats and food supply (macroinvertebrates and fish) of the Kingfisher and adversely affecting the distribution and long-term population trends of the species within the SPA 0.7km downstream of the AFA.</p> <p>There are likely to be indirect, negative downstream impacts from sedimentation during construction. These impacts are expected to be short-term and local in scale, and are unlikely to impact significantly on attributes used to define conservation status.</p>	<p>maintenance.</p> <p>See also measures in Chapter 6</p>	
		Water level changes		<p>The habitats on which Kingfisher populations depend require specific hydrological regimes. Construction of flood walls and embankments can result in changes in channel hydrology, by increasing capacity and flow rates. This can adversely impact on Kingfisher populations through habitat loss and changes to/reduction in food supply, possibly affecting distribution and long-term population trends of the species within the SPA 0.7km downstream.</p> <p>However, significant changes to the hydrological regime are unlikely, as the works will be very local in nature, and are therefore unlikely to impact significantly on attributes used to define conservation status.</p>	<p>Strictly adhere to best practice protocols and SOPs during design, construction and maintenance.</p> <p>See also measures in Chapter 6</p>	No

5.2.3 Conclusions

This NIS details the findings of the Stage 2 Appropriate Assessment conducted to further examine the potential direct and indirect impacts of proposed FRM works at Callan AFA on the following European sites:

- River Barrow and Nore SAC (002162)
- River Nore SPA (004233)

The Appropriate Assessment investigated the potential direct and indirect impacts of the proposed works on the integrity and interest features of the above European sites, alone and in-combination with other plans and projects, taking into account the sites' structure, function and conservation objectives. Where potentially significant adverse impacts were identified, a range of mitigation and avoidance measures have been suggested to help offset them. As a result of this Appropriate Assessment it has been concluded that following the avoidance and mitigation measures suggested, the FRM measures at Callan AFA will not have a significant adverse impact on the above European sites

All lower level plans arising through the implementation of the FRMP which require the progression of physical works will themselves be subject to Appropriate Assessment, when details of design and location are known and potential effects on the attributes and targets of site specific conservation objectives can be fully evaluated.

5.3 FRESHFORD AFA

All European sites in the zone of influence of Freshford AFA were screened for possible impacts from FRM methods (see Chapter 3.5). Screening assessed the potential for impact at seven European sites (see Figure 5.3.1):

- Cullahill Mountain SAC (000831)
- Galmoy Fen SAC (001858)
- Lisbigney Bog SAC (000869)
- River Barrow and Nore SAC (002162)
- River Nore SPA (004233)
- Spahill and Clomantagh Hill SAC (000849)
- The Loughans SAC (000407).

Five sites were found to have no identifiable impact pathway arising from the implementation of FRM methods within the Freshford catchment and were therefore screened out as not requiring any further assessment. Two sites were identified as potentially being impacted upon through FRM activities at Freshford AFA; River Barrow and Nore SAC (002162) and River Nore SPA (004233). The following section assesses the proposed FRM measures in relation to the European sites detailed in Chapter 4.3.2.3.

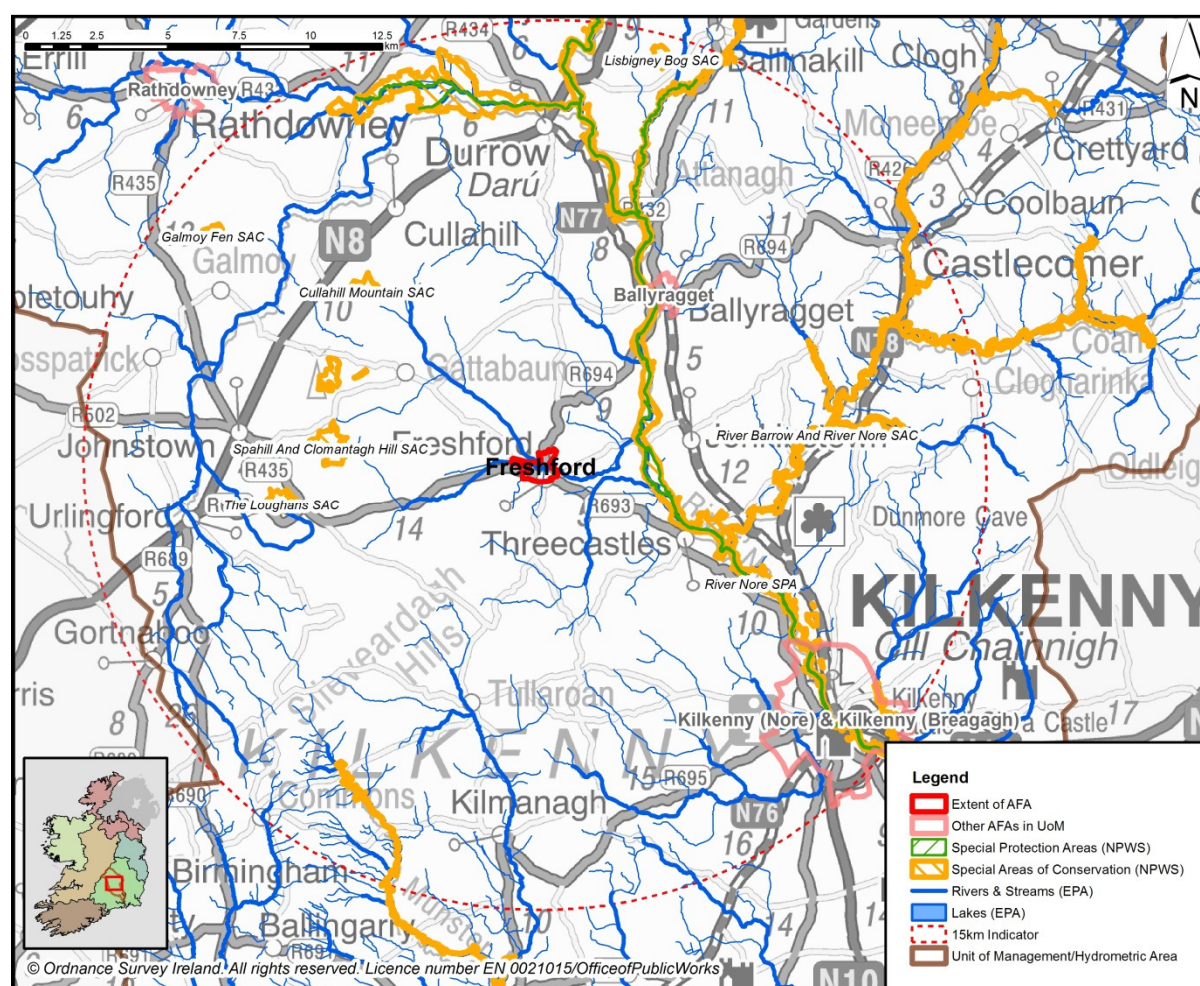


Figure 5.3.1: Freshford AFA in context of catchment and surrounding European sites

5.3.1 Identification of Potential Sources of Impact

This section further examines the source > pathway > receptor linkages that could potentially result in adverse impacts arising from FRM measures at Freshford AFA on the screened in European sites. The qualifying interest(s) of the site(s) at risk from surface water pathways are identified in Table 5.3.1 and from land and air pathways in Table 5.3.2. Additional detail on the attributes and targets of the qualifying interests has been included in Appendix C. These have been consulted in order to assess the potential impacts of the proposed flood relief measures on the designated habitats and species insofar as plan-level details allowed.

5.3.1.1 Potential Sources of Impact via Surface Water Pathways

Two European sites were identified as potentially being impacted upon via surface water pathways; River Barrow and Nore SAC (002162) and River Nore SPA (004233). Qualifying interests of these sites at risk from surface water pathways are identified in Table 5.3.1. Additional detail on the qualifying interests has been included in Appendix C.

Table 5.3.1: Qualifying Interests of the screened in European sites likely to be impacted upon via surface water pathways from FRM measures undertaken at Freshford AFA.

European Site (Site code)	Qualifying interests
River Barrow and Nore SAC (002162)	<p>Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i>, <i>Alnion incanae</i>, <i>Salicion albae</i>) [91E0]</p> <p>Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation [3260]</p> <p><i>Vertigo moulinsiana</i> (Desmoulin's Whorl Snail) [1016]</p> <p><i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) [1029]</p> <p><i>Austropotamobius pallipes</i> (White-clawed Crayfish) [1092]</p> <p><i>Petromyzon marinus</i> (Sea Lamprey) [1095]</p> <p><i>Lampetra planeri</i> (Brook Lamprey) [1096]</p> <p>River Lamprey (<i>Lampetra fluviatilis</i>) [1099]</p> <p><i>Alosa fallax fallax</i> (Twai Shad) [1103]</p> <p>Salmon (<i>Salmo salar</i>) [1106]</p> <p>Otter (<i>Lutra lutra</i>) [1355]</p> <p><i>Margaritifera durrovensis</i> (Nore Pearl Mussel) [1990]</p>
River Nore SPA (004233)	Kingfisher (<i>Alcedo atthis</i>) [A229]

The following sources of impact arising from FRM measures at Freshford AFA could potentially impact upon the European sites detailed above through surface water pathways:

- **Suspended sediments** – There may be indirect negative downstream impacts from sedimentation during construction. Construction activities within or adjacent to surface waters and in-channel works to create flow diversion channels can result in the release of suspended sediments into those waters. This can lead to increased turbidity of surface waters, and an associated reduction in photosynthesis, which can impact on surface water dependent habitats. Impacts on aquatic species can occur through loss of suitable habitat (e.g. salmon spawning habitat), changes to or reduction in food supply (e.g. aquatic

invertebrate density or diversity), or increased difficulty in feeding (e.g. otters will find greater difficulty hunting in turbid surface waters).

- **Changes in nutrient levels/pollutants** – Construction activities in or adjacent to surface waters and in-channel works to create flow diversion channels can result in the release of nutrients into those waters, and can lead to reduced water quality and eutrophication. Hard defences can interfere with natural process, by causing some or all of the floodplain to be disconnected from the river, which can lead to the loss of natural habitat to capture, filter and recycle nutrients or pollutants. This can lead to a reduction in water quality. Spillages of hydrocarbons or other contaminants during FRM works can also result in a reduction in water quality. Reduced water quality and eutrophication can adversely impact on surface water dependent habitats, and on aquatic species through loss of suitable habitat, changes to or reduction in food supply, or increased difficulty in feeding.
- **Changes in water levels/channel morphology** – Changes to channel morphology through the creation of new flow diversion channels can lead to changes in capacity and flow of surface waters. This can lead to hydrological impacts on surface water dependent habitats and to aquatic species through habitat loss and changes to or reduction in food supply.

5.3.2 Impact Assessment

Table 5.3.2 assesses the screened in European sites in more detail and examines the ways in which the identified sources and pathways could adversely impact on habitats or species. Avoidance and mitigation measures are proposed to mitigate any significant adverse impacts. The potential for cumulative impacts was considered throughout the process of option development. Engagement with stakeholders ensured that the potential for in-combination and cumulative impacts at plan level was minimised. In combination and cumulative effects will be re-assessed at the project stage when project-specific information has been captured.

5.3.2.1 In-combination Effects

Appropriate Assessment requires consideration of the impacts on European sites of FRM measures at Freshford AFA, in combination with other plans or projects that may impact on the sites resulting in cumulative negative impacts. Potential sources of in-combination effects identified as part of this assessment include:

- Drainage maintenance activities in the Nore catchment. The OPW carry out regular maintenance on those channels altered through schemes implemented following the 1945 Arterial Drainage Act. Ongoing maintenance activities that result in the release of suspended sediments are currently adversely impacting on salmon spawning grounds, therefore these activities could potentially result in adverse cumulative impacts on this species. All scheduled maintenance operations in the vicinity of a European Site will require Screening for Appropriate Assessment and Stage II Appropriate Assessment where required. It is recommended that no arterial drainage or existing flood scheme maintenance is carried out in the channels where FRM work is being undertaken during the construction phase.
- The Freshwater pearl mussel Nore sub-basin management plan (Second Draft, NS2, 2010) recognises that it is the combination of the negative effects of a number of pressures that are acting together to leave the freshwater pearl mussel habitat in unfavourable condition.

These include peat exploitation, agricultural activities (overgrazing, direct access to watercourses, nutrient addition through slurry or fertiliser additions), forestry activities and wastewater treatment. Existing pressures in the catchment that can result in an increased sediment load can be considered as cumulative impacts with the potential sediment load from FRM measures, owing to the unfavourable status of the species and its sensitivity to sedimentation.

- The Kilkenny County Development Plan 2014-2020 has the potential for in-combination or cumulative impacts on the River Barrow and Nore SAC and the River Nore SPA in relation to planned new infrastructure. No significant in-combination effects with the FRMP are predicted at plan level, however the potential for impacts should however be re-examined at the project level where additional detail on potential interactions between infrastructure and FRM schemes may be assessed once project-specific design information is available.
- In-combination effects may occur with FRM works, parallel projects or drainage schemes (see sections 3.1.2.2 and 4.1.7), carried out at other AFAs or locations in the UoM. There may be cumulative impacts on habitats or species from schemes constructed or undergoing maintenance simultaneously. Generic mitigation and monitoring measures have been developed in the FRMP, including the avoidance of undertaking FRM work on adjoining reaches of rivers for different AFAs or other parallel projects simultaneously. Provided the timing of FRM works is planned and managed correctly, no significant in-combination impacts are anticipated.

There are no other plans/projects ongoing or proposed (at the time of this study) which may give rise to any form of cumulative impact on the European sites.

Table 5.3.2: Impact assessment for FRM measures at Freshford AFA (Improvement of channel conveyance)

Site name (site code)	Qualifying interests	Potential source of impact	Pathway	Potential Impact	Avoidance/mitigation measures	Residual impact
River Barrow and Nore SAC (002162)	<p>Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i>, <i>Alnion incanae</i>, <i>Salicion albae</i>) [91E0]</p> <p>Water courses of plain to montane levels with the <i>Ranunculus fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation [3260]</p> <p><i>Vertigo moulinsiana</i> (Desmoulin's Whorl Snail) [1016]</p> <p><i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) [1029]</p> <p><i>Austropotamobius pallipes</i> (White-clawed Crayfish) [1092]</p> <p><i>Petromyzon marinus</i> (Sea Lamprey) [1095]</p> <p><i>Lampetra planeri</i> (Brook Lamprey) [1096]</p> <p>River Lamprey (<i>Lampetra fluviatilis</i>) [1099]</p> <p><i>Alosa fallax fallax</i> (Twaite Shad) [1103]</p> <p>Salmon (<i>Salmo salar</i>) [1106]</p> <p>Otter (<i>Lutra lutra</i>) [1355]</p> <p><i>Margaritifera durrovensis</i> (Nore Pearl Mussel) [1990]</p>	<p>Suspended sediments</p> <p>Changes to nutrient levels/pollutant release</p>	Surface water	<p>The habitats and species for which the Barrow and Nore SAC was designated require particular water quality conditions. The favourable conservation conditions of Salmon, freshwater pearl mussel, and Nore pearl mussel are directly measured by water quality attributes, and the conservation status of other species are measured by attributes indirectly linked to water quality and sediment loadings, such as the extent and distribution of spawning habitats and the extent of freshwater habitat.</p> <p>Construction activities in or adjacent to the water could result in a release of suspended sediments and associated nutrients and/or pollution incidents from machinery. This could lead to a reduction in water quality, and result in adverse effects on the designated habitats and species of the SAC 2.8km downstream through loss of habitat or changes to food supply. Salmon spawning grounds and freshwater and Nore pearl mussel juvenile habitat will be particularly susceptible to adverse impacts from the release of suspended solids. Disconnecting areas of floodplain from the river can lead to a reduction in water quality owing to a reduction in habitat area to attenuate nutrients or other pollutants.</p> <p>In the absence of mitigation there is potential for indirect, negative downstream impacts from sedimentation during construction. These impacts are expected to be short-term and local in scale but may have long-term impacts if salmon spawning beds or important Freshwater or Nore pearl mussel juvenile habitat are present directly downstream.</p> <p>This AFA is within the Nore Lower Freshwater Pearl</p>	<p>A designated environmental officer should be appointed to oversee environmental management of the project.</p> <p>Strictly adhere to best practice protocols and SOPs during design, construction and maintenance.</p> <p>Set hard defences back from the river channel wherever possible to minimise sediment loss into the river channel.</p> <p>Assess the need for silt management procedures and implement in consultation with a suitably-qualified FPM expert.</p> <p>Avoid arterial drainage or existing flood scheme maintenance works while FRM works are being undertaken.</p> <p>Avoid in-channel working during periods of high flow to minimise</p>	No

Site name (site code)	Qualifying interests	Potential source of impact	Pathway	Potential Impact	Avoidance/mitigation measures	Residual impact
				<p>Mussel sensitive area, and is in a catchment with previous records of Margaritifera, but current status unknown. The UoM is covered by the second draft Nore sub-Basin Management Plan of 2010. There is potential for impacts on the conservation objectives for this species, including potential 'habitat extent' and 'substratum quality'.</p> <p>There is potential for impacts on 'Water courses of plain to montane levels with the <i>Ranunculus fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation', in particular on the conservation objective for this habitat to 'maintain a substratum that is dominated by large particles and free from fine sediments'.</p>	<p>sediment mobilisation and transport.</p> <p>Surveys should be undertaken by appropriately qualified ecologists prior to commencement of the FRM work, to identify any important salmon, lamprey, twaite shad or crayfish habitat, or 'Water courses of plain to montane levels with the <i>Ranunculus fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation' in the vicinity of FRM works or directly downstream of the AFA, and any potentially significant impacts on these areas. Surveys should inform option design and design-specific mitigation.</p> <p>An otter survey should be undertaken by an appropriately qualified ecologist with otter surveying experience. The survey should inform option design and design-specific mitigation.</p> <p>An appropriate freshwater pearl mussel expert should be</p>	

Site name (site code)	Qualifying interests	Potential source of impact	Pathway	Potential Impact	Avoidance/mitigation measures	Residual impact
					<p>appointed, to identify potential impacts on this species and provide appropriate mitigation advice. Should sedimentation impacts be possible on this species and/or its potential habitat, the detailed FRM option design and sediment mitigation must prevent additional sediment from entering the watercourse.</p> <p>See also measures in Chapter 6</p>	
		Water level changes		<p>The designated habitats and species depend on specific hydrological regimes. In-channel working to provide diversion of flow can result in changes in channel hydrology. This could lead to a reduction of suitable habitat and adverse effects on the conservation objectives for the species (population size and range).</p> <p>However, significant changes to the hydrological regime are unlikely, as the works will be local in nature and only operational during extreme events, and are therefore unlikely to impact significantly on attributes used to define conservation status.</p> <p>Construction of new weir structure may impede passage of otters.</p> <p>Construction of new weir structure may impede the passage of fish.</p>	<p>Strictly adhere to best practice protocols and SOPs during design, construction and maintenance.</p> <p>An otter survey should be undertaken by an appropriately qualified ecologist with otter surveying experience. The survey should inform option design and design-specific mitigation. It may be necessary to include an otter pass and ramps / ledges in the design.</p> <p>Weir design should take</p>	No

Site name (site code)	Qualifying interests	Potential source of impact	Pathway	Potential Impact	Avoidance/mitigation measures	Residual impact
					account of best practice, design and Method Statement should be agreed with IFI prior to construction. See also measures in Chapter 6	
River Nore SPA (004233)	Kingfisher (<i>Alcedo atthis</i>)[A229]	Suspended sediments Changes to nutrient levels/pollutant release	Surface water	Kingfisher populations are dependent on river channels and their associated marginal and riparian habitats. Construction activities in or adjacent to the water could result in a release of suspended sediments and associated nutrients and/or pollution incidents from machinery. This could lead to a reduction in water quality, affecting the habitats and food supply (macroinvertebrates and fish) of the Kingfisher and adversely affecting the distribution of the species within the SPA and long-term population trends. There are likely to be indirect, negative downstream impacts from sedimentation during construction. These impacts are expected to be short-term and local in scale, and are unlikely to impact significantly on attributes used to define conservation status of Kingfisher populations in the SPA 2.9km downstream.	Strictly adhere to best practice protocols and SOPs during design, construction and maintenance. See also measures in Chapter 6	No
		Water level changes		The habitats on which Kingfisher populations depend require specific hydrological regimes. Construction activities in and adjacent to the water can result in changes in channel hydrology. This can adversely impact on Kingfisher populations through habitat loss and changes to/reduction in food supply, possibly affecting distribution of the species within the SPA and long-term population trends.	Strictly adhere to best practice protocols and SOPs during design, construction and maintenance. See also measures in Chapter 6	No

Site name (site code)	Qualifying interests	Potential source of impact	Pathway	Potential Impact	Avoidance/mitigation measures	Residual impact
				However, significant changes to the hydrological regime are unlikely, as the works will be very local in nature, and are therefore unlikely to impact significantly on attributes used to define conservation status of Kingfisher populations in the SPA 2.9km downstream.		

5.3.3 Conclusions

This NIS details the findings of the Stage 2 Appropriate Assessment conducted to further examine the potential direct and indirect impacts of proposed FRM works at Freshford AFA on the following European sites:

- River Barrow and Nore SAC (002162)
- River Nore SPA (004233)

The Appropriate Assessment investigated the potential direct and indirect impacts of the proposed works on the integrity and interest features of the above European sites, alone and in-combination with other plans and projects, taking into account the sites' structure, function and conservation objectives. Where potentially significant adverse impacts were identified, a range of mitigation and avoidance measures have been suggested to help offset them. As a result of this Appropriate Assessment it has been concluded that, following the avoidance and mitigation measures suggested, the FRM measures at Freshford AFA will not have a significant adverse impact on the above European sites.

All lower level plans arising through the implementation of the FRMP which require the progression of physical works will themselves be subject to Appropriate Assessment, when details of design and location are known and potential effects on the attributes and targets of site specific conservation objectives can be fully evaluated.

5.4 INISTIOGE AFA

All European sites in the zone of influence of Inistioge AFA were screened for possible impacts from FRM methods (see Chapter 3.5). Screening assessed the potential for impact at five European sites (See Figure 5.4.1):

- Blackstairs Mountains SAC (000770)
- Hugginstown Fen SAC (000404)
- River Barrow and Nore SAC (002162)
- River Nore SPA (004233)
- Thomastown Quarry SAC (002252)

Three sites were found to have no identifiable impact pathway arising from the implementation of FRM methods within the Inistioge catchment and were therefore screened out as not requiring any further assessment. Two sites were identified as potentially being impacted upon through FRM activities at Inistioge AFA; River Barrow and Nore SAC (002162) and River Nore SPA (004233). The following section assesses the proposed FRM measures described in Chapter 4.3.2.4 in relation to the screened-in European sites.

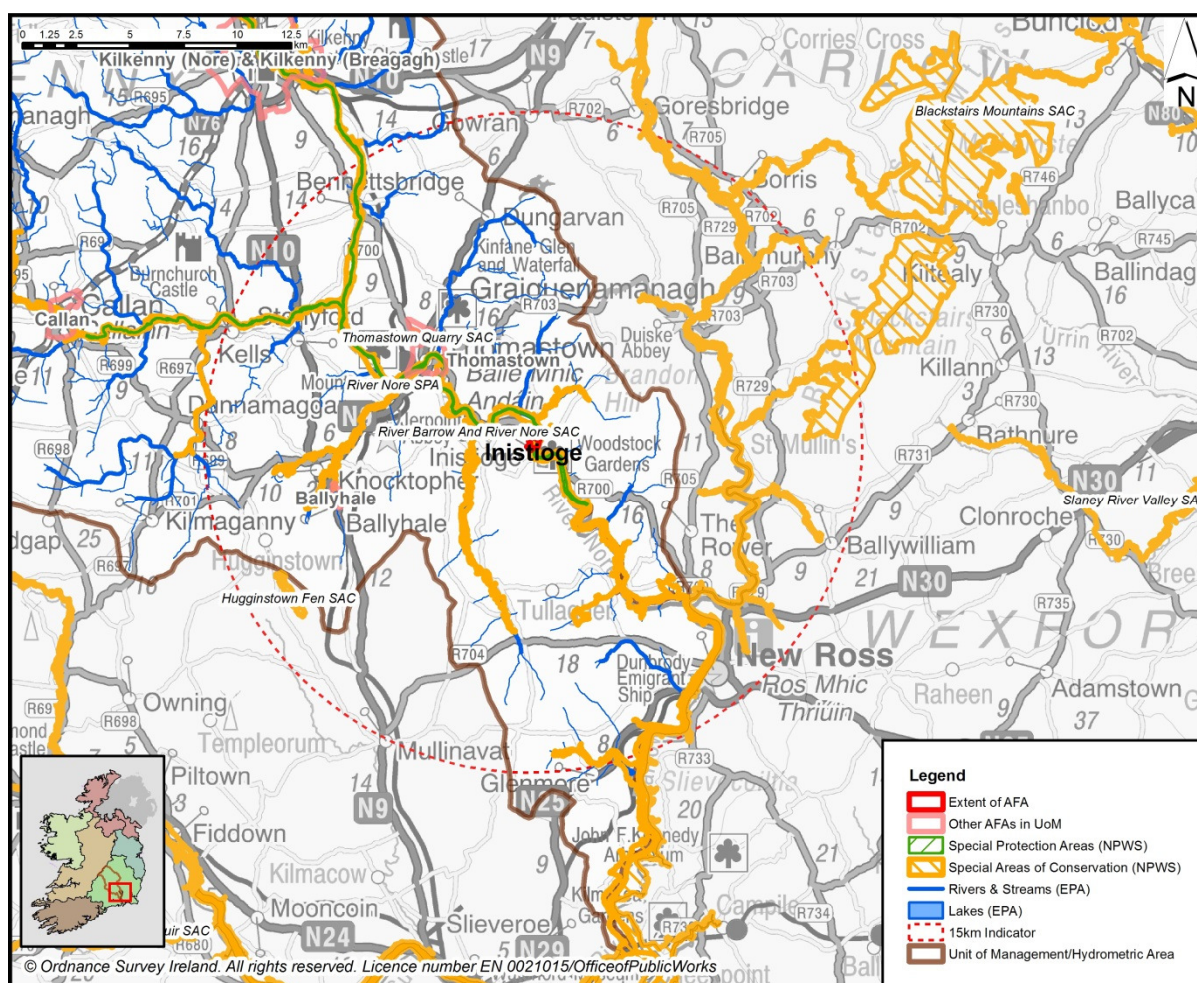


Figure 5.4.1: Inistioge AFA in context of catchment and surrounding European sites

5.4.1 Identification of Potential Sources of Impact

This section further examines the source > pathway > receptor linkages that could potentially result in adverse impacts arising from FRM measures at Inistioge AFA on the screened in European sites. The qualifying interest(s) of the site(s) at risk from surface water pathways are identified in Table 5.4.1 and from land and air pathways in Table 5.4.2. Additional detail on the attributes and targets of the qualifying interests has been included in Appendix C. These have been consulted in order to assess the potential impacts of the proposed flood relief measures on the designated habitats and species insofar as plan-level details allowed.

5.4.2 Potential Sources of Impact via Surface Water Pathways

Two European sites were identified as potentially being impacted upon via surface water pathways; River Barrow and Nore SAC (002162) and River Nore SPA (004233). Qualifying interests of these sites at risk from surface water pathways are identified in Table 5.4.1. Additional detail on the qualifying interests has been included in Appendix C.

Table 5.4.1: Qualifying Interests of the screened in European sites likely to be impacted upon via surface water pathways from FRM measures undertaken at Inistioge AFA.

European Site (Site code)	Qualifying interests
River Barrow and Nore SAC (002162)	Estuaries [1130] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i> , <i>Alnion incanae</i> , <i>Salicion albae</i>) [91E0] Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation [3260] <i>Vertigo moulinsiana</i> (Desmoulin's Whorl Snail) [1016] <i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) [1029] <i>Austropotamobius pallipes</i> (White-clawed Crayfish) [1092] <i>Petromyzon marinus</i> (Sea Lamprey) [1095] <i>Lampetra planeri</i> (Brook Lamprey) [1096] River Lamprey (<i>Lampetra fluviatilis</i>) [1099] <i>Alosa fallax fallax</i> (Twaite Shad) [1103] Salmon (<i>Salmo salar</i>) [1106] Otter (<i>Lutra lutra</i>) [1355] <i>Margaritifera durrovensis</i> (Nore Pearl Mussel) [1990]
River Nore SPA (004233)	Kingfisher (<i>Alcedo atthis</i>) [A229]

The following sources of impact arising from FRM measures at Inistioge AFA could potentially impact upon the European sites detailed above through surface water pathways:

- **Suspended sediments** – There may be indirect negative downstream impacts from sedimentation during construction. Construction activities within or adjacent to surface waters can result in the release of suspended sediments into those waters. This can lead to increased turbidity of surface waters, and an associated reduction in photosynthesis, which can impact on surface water dependent habitats. Impacts on aquatic species can occur through loss of suitable habitat (e.g. salmon spawning habitat), changes to or reduction in

food supply (e.g. aquatic invertebrate density or diversity), or increased difficulty in feeding (e.g. otters will find greater difficulty hunting in turbid surface waters).

- **Changes in nutrient levels/pollutants** – Construction activities in or adjacent to surface waters can result in the release of nutrients into those waters, and can lead to reduced water quality and eutrophication. Hard defences can interfere with natural process, by causing some or all of the floodplain to be disconnected from the river, which can lead to the loss of natural habitat to capture, filter and recycle nutrients or pollutants. This can lead to a reduction in water quality. Spillages of hydrocarbons or other contaminants during FRM works can also result in a reduction in water quality. Reduced water quality and eutrophication can adversely impact on surface water dependent habitats, and on aquatic species through loss of suitable habitat, changes to or reduction in food supply, or increased difficulty in feeding.
- **Changes in water levels/channel morphology** – Changes to channel morphology through the use of flood walls and embankments can lead to changes in capacity and flow of surface waters. This can lead to hydrological impacts on surface water dependent habitats and to aquatic species through habitat loss and changes to or reduction in food supply.

5.4.2.1 Potential Sources of Impact via Land and Air Pathways

Two European sites were identified as potentially being impacted upon via land and air pathways; River Barrow and Nore SAC (002162) and River Nore SPA (004233). Qualifying interests of these sites at risk from land and air pathways are identified in Table 5.4.2. Additional detail on the qualifying interests has been included in Appendix C.

Table 5.4.2: Qualifying Interests of the screened in European sites likely to be impacted upon via land and air pathways from FRM measures undertaken at Inistioge AFA.

European Site (Site code)	Qualifying interests
River Barrow and Nore SAC (002162)	<p>Estuaries [1130]</p> <p>Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i>, <i>Alnion incanae</i>, <i>Salicion albae</i>) [91E0]</p> <p>Water courses of plain to montane levels with the <i>Ranunculon fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation [3260]</p> <p><i>Vertigo moulinsiana</i> (Desmoulin's Whorl Snail) [1016]</p> <p><i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) [1029]</p> <p><i>Austropotamobius pallipes</i> (White-clawed Crayfish) [1092]</p> <p><i>Petromyzon marinus</i> (Sea Lamprey) [1095]</p> <p><i>Lampetra planeri</i> (Brook Lamprey) [1096]</p> <p>River Lamprey (<i>Lampetra fluviatilis</i>) [1099]</p> <p><i>Alosa fallax fallax</i> (Twaite Shad) [1103]</p> <p>Salmon (<i>Salmo salar</i>) [1106]</p> <p>Otter (<i>Lutra lutra</i>) [1355]</p> <p><i>Margaritifera durrovensis</i> (Nore Pearl Mussel) [1990]</p>
River Nore SPA (004233)	Kingfisher (<i>Alcedo atthis</i>) [A229]

The following sources of impact arising from FRM measures at Inistioge AFA could potentially impact upon the European sites detailed above through land and air pathways:

- **Physical habitat disturbance and loss of woody vegetation cover** – There is likely to be a direct loss of natural and semi-natural habitat in the direct footprint and vicinity of the defences. Construction of flood walls and embankments adjacent to surface waters can result in a direct loss of or disturbance to aquatic, marginal and riparian habitats. This can indirectly impact on species through loss of habitat or changes in food supply, thereby negatively affecting conservation objectives.
- **Noise and visual disturbance** – The use of construction machinery and the presence of construction and maintenance workers can result in avoidance of suitable habitat by sensitive species.

5.4.3 Impact Assessment

Table 5.4.3 assesses the screened in European sites in more detail and examines the ways in which the identified sources and pathways could adversely impact on habitats or species. Avoidance and mitigation measures are proposed to mitigate any significant adverse impacts. The potential for cumulative impacts was considered throughout the process of option development. Engagement with stakeholders ensured that the potential for in-combination and cumulative impacts at plan level was minimised. In combination and cumulative effects will be re-assessed at the project stage when project-specific information has been captured.

5.4.3.1 In-combination Effects

Appropriate Assessment requires consideration of the impacts on European sites of FRM measures at Inistioge AFA, in combination with other plans or projects that may impact on the sites resulting in cumulative negative impacts. Potential sources of in-combination effects identified as part of this assessment include:

- Drainage maintenance activities in the Nore catchment. The OPW carry out regular maintenance on those channels altered through schemes implemented following the 1945 Arterial Drainage Act. Ongoing maintenance activities that result in the release of suspended sediments are currently adversely impacting on salmon spawning grounds, therefore these activities could potentially result in adverse cumulative impacts on this species. All scheduled maintenance operations in the vicinity of a European Site will require Screening for Appropriate Assessment and Stage II Appropriate Assessment where required. It is recommended that no arterial drainage or existing flood scheme maintenance is carried out in the channels where FRM work is being undertaken during the construction phase.
- The Freshwater pearl mussel Nore sub-basin management plan (Second Draft, NS2, 2010) recognises that it is the combination of the negative effects of a number of pressures that are acting together to leave the freshwater pearl mussel habitat in unfavourable condition. These include peat exploitation, agricultural activities (overgrazing, direct access to watercourses, nutrient addition through slurry or fertiliser additions), forestry activities and wastewater treatment. Existing pressures in the catchment that can result in an increased sediment load can be considered as cumulative impacts with the potential sediment load

from FRM measures, owing to the unfavourable status of the species and its sensitivity to sedimentation.

- The Kilkenny County Development Plan 2014-2020 has the potential for in-combination or cumulative impacts on the River Barrow and Nore SAC and the River Nore SPA in relation to planned new infrastructure. No significant in-combination effects with the FRMP are predicted at plan level, however the potential for impacts should however be re-examined at the project level where additional detail on potential interactions between infrastructure and FRM schemes may be assessed once project-specific design information is available.
- In-combination effects may occur with FRM works, parallel projects or drainage schemes (see sections 3.1.2.2 and 4.1.7), carried out at other AFAs or locations in the UoM. There may be cumulative impacts on habitats or species from schemes constructed or undergoing maintenance simultaneously. Generic mitigation and monitoring measures have been developed in the FRMP, including the avoidance of undertaking FRM work on adjoining reaches of rivers for different AFAs or other parallel projects simultaneously. Provided the timing of FRM works is planned and managed correctly, no significant in-combination impacts are anticipated.

There are no other plans/projects ongoing or proposed (at the time of this study) which may give rise to any form of cumulative impact on the European sites.

Table 5.4.3: Impact assessment for FRM measures at Inistioge AFA (hard defences)

Site name (site code)	Qualifying interests	Potential source of impact	Pathway	Potential Impact	Avoidance/mitigation measures	Residual impact
River Barrow and Nore SAC (002162)	<p>Estuaries [1130]</p> <p>Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i>, <i>Alnion incanae</i>, <i>Salicion albae</i>) [91E0]</p> <p>Water courses of plain to montane levels with the <i>Ranunculus fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation [3260]</p> <p><i>Vertigo moulinsiana</i> (Desmoulin's Whorl Snail) [1016]</p> <p><i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) [1029]</p> <p><i>Austropotamobius pallipes</i> (White-clawed Crayfish) [1092]</p> <p><i>Petromyzon marinus</i> (Sea Lamprey) [1095]</p> <p><i>Lampetra planeri</i> (Brook Lamprey) [1096]</p> <p>River Lamprey (<i>Lampetra fluviatilis</i>) [1099]</p> <p><i>Alosa fallax fallax</i> (Twaite Shad) [1103]</p> <p>Salmon (<i>Salmo salar</i>) [1106]</p> <p>Otter (<i>Lutra lutra</i>) [1355]</p> <p><i>Margaritifera durrovensis</i> (Nore Pearl Mussel) [1990]</p>	<p>Suspended sediments</p> <p>Changes to nutrient levels/pollutant release</p>	Surface water	<p>The habitats and species for which the Barrow and Nore SAC was designated require particular water quality conditions. The favourable conservation conditions of Salmon, freshwater pearl mussel, and Nore pearl mussel are directly measured by water quality attributes, and the conservation status of other species are measured by attributes indirectly linked to water quality and sediment loadings, such as the extent and distribution of spawning habitats and the extent of freshwater habitat.</p> <p>Construction activities in or adjacent to the water could result in a release of suspended sediments and associated nutrients and/or pollution incidents from machinery. This could lead to a reduction in water quality, and result in adverse effects on the designated habitats and species through loss of habitat or changes to food supply. Salmon spawning grounds and freshwater and Nore pearl mussel juvenile habitat will be particularly susceptible to adverse impacts from the release of suspended solids. Disconnecting areas of floodplain from the river can lead to a reduction in water quality owing to a reduction in habitat area to attenuate nutrients or other pollutants.</p> <p>In the absence of mitigation there are likely to be indirect, negative downstream impacts from sedimentation during construction. These impacts are expected to be short-term and local in scale but may have long-term impacts if salmon spawning beds or important Freshwater pearl mussel juvenile habitat is present directly downstream.</p>	<p>Strictly adhere to best practice protocols and SOPs during design, construction and maintenance.</p> <p>An otter survey should be undertaken by an appropriately qualified ecologist with otter surveying experience. The survey should inform option design and design-specific mitigation.</p> <p>Set hard defences back from the river channel wherever possible to minimise sediment loss into the river channel.</p> <p>Avoid arterial drainage or existing flood scheme maintenance works while FRM works are being undertaken.</p> <p>Avoid working in-channel to ensure salmon and lamprey habitat is not disturbed.</p> <p>Survey by a qualified ecologist prior to commencement of the</p>	No

Site name (site code)	Qualifying interests	Potential source of impact	Pathway	Potential Impact	Avoidance/mitigation measures	Residual impact
					FRM work, to identify any important salmon, pearl mussel or twaite shad habitat in the vicinity of FRM works or directly downstream of the AFA, and any potentially significant impacts on these areas. See also measures in Chapter 6	
		Water level changes		The designated habitats and species depend on specific hydrological regimes. Construction of flood walls and embankments can result in changes in channel hydrology, by increasing capacity and flow rates. This could lead to a reduction of suitable habitat and adverse effects on the conservation objectives for the species (population size and range). However, significant changes to the hydrological regime are unlikely, as the works will be local in nature, and are therefore unlikely to impact significantly on attributes used to define conservation status.	Strictly adhere to best practice protocols and SOPs during design, construction and maintenance. See also measures in Chapter 6	No
		Physical habitat disturbance/loss of woody vegetation cover	Land and air	Construction activities that remove vegetation or otherwise disturb habitats could adversely affect the habitat area, vegetation structure and composition of designated habitats. Destruction or alteration of aquatic or riparian habitats could adversely affect designated species through loss of cover for otter or damage to lamprey or salmon spawning areas. There is likely to be a direct loss of natural and semi-	Strictly adhere to best practice protocols and SOPs including Lamprey and Otter SOPs during design, construction and maintenance in order to minimise physical disturbance. Avoid working in-channel unless essential.	No

Site name (site code)	Qualifying interests	Potential source of impact	Pathway	Potential Impact	Avoidance/mitigation measures	Residual impact
				natural habitat in the direct footprint and vicinity of hard defences. These impacts are expected to be local in scale.	<p>Survey by a qualified ecologist prior to commencement of the FRM work, to identify any important salmon or lamprey habitat, or otter resting sites/holts in the vicinity of FRM works.</p> <p>No in-channel working where a suitable sand/gravel Lamprey spawning habitat exists from April-May (King et al, 2008), subject to adjustment owing to local knowledge of IFI.</p> <p>No in-channel working during the salmonid spawning season. Instream works should only be carried out during the period July to September inclusive, following consultation and agreement with IFI.</p> <p>No in-channel or bankside works to be conducted within 50m of a known or potential Otterholt/ resting site.</p> <p>Rehabilitate any areas where riparian habitat</p>	

Site name (site code)	Qualifying interests	Potential source of impact	Pathway	Potential Impact	Avoidance/mitigation measures	Residual impact
					has been damaged.	
		Noise and visual disturbance		The species for which this SAC is designated are sensitive to disturbance by maintenance workers and noise from machinery and may avoid areas where works are being undertaken. This could adversely affect habitat use by otter, which require lying up areas throughout their territory.	<p>Strictly adhere to best practice protocols and SOPs including Lamprey and Otter SOPs during design, construction and maintenance in order to minimise physical disturbance.</p> <p>Avoid working in-channel unless essential.</p> <p>No in-channel or bankside works to be conducted within 50m of a known or potential otter holt/ resting site.</p> <p>See also measures in Chapter 6</p>	No
		Introduction or spreading of alien invasive species	Land and surface water	Invasive species can spread rapidly through habitats, form dense thickets which can out-compete native plants and cause problems with soil erosion	<p>Carry out invasive species surveys and follow SOPs (see Table 6.1.1)</p> <p>See general mitigation in Chapter 6</p>	No
River Nore SPA (004233)	Kingfisher (<i>Alcedo atthis</i>)[A229]	<p>Suspended sediments</p> <p>Changes to nutrient levels/pollutant release</p>	Surface water	Kingfisher populations are dependent on river channels and their associated marginal and riparian habitats. Construction activities in or adjacent to the water could result in a release of suspended sediments and associated nutrients and/or pollution incidents from machinery. This could lead to a reduction in water quality, affecting the habitats and food supply (macroinvertebrates and fish) of the Kingfisher and adversely affecting the distribution and long-term population trends of the species	<p>Strictly adhere to best practice protocols and SOPs during design, construction and maintenance.</p> <p>See also measures in Chapter 6</p>	No

Site name (site code)	Qualifying interests	Potential source of impact	Pathway	Potential Impact	Avoidance/mitigation measures	Residual impact
				<p>within the SPA 0.7km downstream of the AFA.</p> <p>There are likely to be indirect, negative downstream impacts from sedimentation during construction. These impacts are expected to be short-term and local in scale, and are unlikely to impact significantly on attributes used to define conservation status.</p>		
		Water level changes		<p>The habitats on which Kingfisher populations depend require specific hydrological regimes. Construction of flood walls and embankments can result in changes in channel hydrology, by increasing capacity and flow rates. This can adversely impact on Kingfisher populations through habitat loss and changes to/reduction in food supply, possibly affecting distribution and long-term population trends of the species within the SPA 0.7km downstream.</p> <p>However, significant changes to the hydrological regime are unlikely, as the works will be very local in nature, and are therefore unlikely to impact significantly on attributes used to define conservation status.</p>	<p>Strictly adhere to best practice protocols and SOPs during design, construction and maintenance.</p> <p>See also measures in Chapter 6</p>	No
		<p>Physical habitat disturbance</p> <p>Noise and visual disturbance</p>	Land and air	<p>Kingfisher populations are dependent on marginal and riparian habitats of river channels, and nest in burrows on vertical river banks. Construction of flood walls and embankments and associated removal of vegetation and disturbance of banks could adversely affect the range area, foraging/perching habitat and distribution of the species within the SPA as well as long-term population trends.</p> <p>Kingfishers are sensitive to disturbance by maintenance workers and noise from machinery and may avoid areas where works are being undertaken.</p>	<p>Survey by a qualified ecologist prior to commencement of the FRM work, to assess use of the channel by kingfisher in the vicinity of FRM works and presence of burrows.</p> <p>Avoid disturbance of Kingfisher burrows from March-September.</p>	No

Site name (site code)	Qualifying interests	Potential source of impact	Pathway	Potential Impact	Avoidance/mitigation measures	Residual impact
				This could adversely affect its distribution within the SPA.	<p>Avoid in-channel or bankside vegetation removal within 30m of Kingfisher burrows</p> <p>If burrows in vertical banks are discovered during the works, works must stop immediately and the burrows be inspected by a suitably qualified ecologist.</p> <p>Leave bankside vegetation intact wherever possible. Rehabilitate any areas where riparian habitat has been damaged.</p> <p>See also measures in Chapter 6</p>	
		Introduction or spreading of alien invasive species	Land and surface water	Invasive species can spread rapidly through habitats, form dense thickets which can out-compete native plants and cause problems with soil erosion	<p>Carry out invasive species surveys and follow SOPs (see Table 6.1.1)</p> <p>See general mitigation in Chapter 6</p>	No

5.4.4 Conclusions

This NIS details the findings of the Stage 2 Appropriate Assessment conducted to further examine the potential direct and indirect impacts of proposed FRM works at Inistioge AFA on the following European sites:

- River Barrow and Nore SAC (002162)
- River Nore SPA (004233)

The Appropriate Assessment investigated the potential direct and indirect impacts of the proposed works on the integrity and interest features of the above European sites, alone and in-combination with other plans and projects, taking into account the sites' structure, function and conservation objectives. Where potentially significant adverse impacts were identified, a range of mitigation and avoidance measures have been suggested to help offset them. As a result of this Appropriate Assessment it has been concluded that, following the avoidance and mitigation measures suggested, the FRM measures at Inistioge AFA will not have a significant adverse impact on the above European

All lower level plans arising through the implementation of the FRMP which require the progression of physical works will themselves be subject to Appropriate Assessment, when details of design and location are known and potential effects on the attributes and targets of site specific conservation objectives can be fully evaluated.

5.5 MOUNTRATH AFA

All European sites in the zone of influence of Mountrath AFA were screened for possible impacts from FRM methods (See Chapter 3.5). Screening assessed the potential for impact at eight European sites (See Figure 5.5.1):

- Coolrain Bog SAC (002332)
- Knockacoller Bog SAC (002333)
- Lisbigney Bog SAC (000869)
- Mountmellick SAC (002141)
- River Barrow and Nore SAC (002162)
- River Nore SPA (004233)
- Slieve Bloom Mountains SAC (000412)
- Slieve Bloom Mountains SPA (004160)

Six sites were found to have no identifiable impact pathway arising from the implementation of FRM methods within the Mountrath catchment and were therefore screened out as not requiring any further assessment. Two sites were identified as potentially being impacted upon through FRM activities at Mountrath AFA; River Barrow and Nore SAC (002162) and River Nore SPA (004233). The following section assesses the proposed FRM measures described in Chapter 4.3.2.5 in relation to the screened-in European sites.

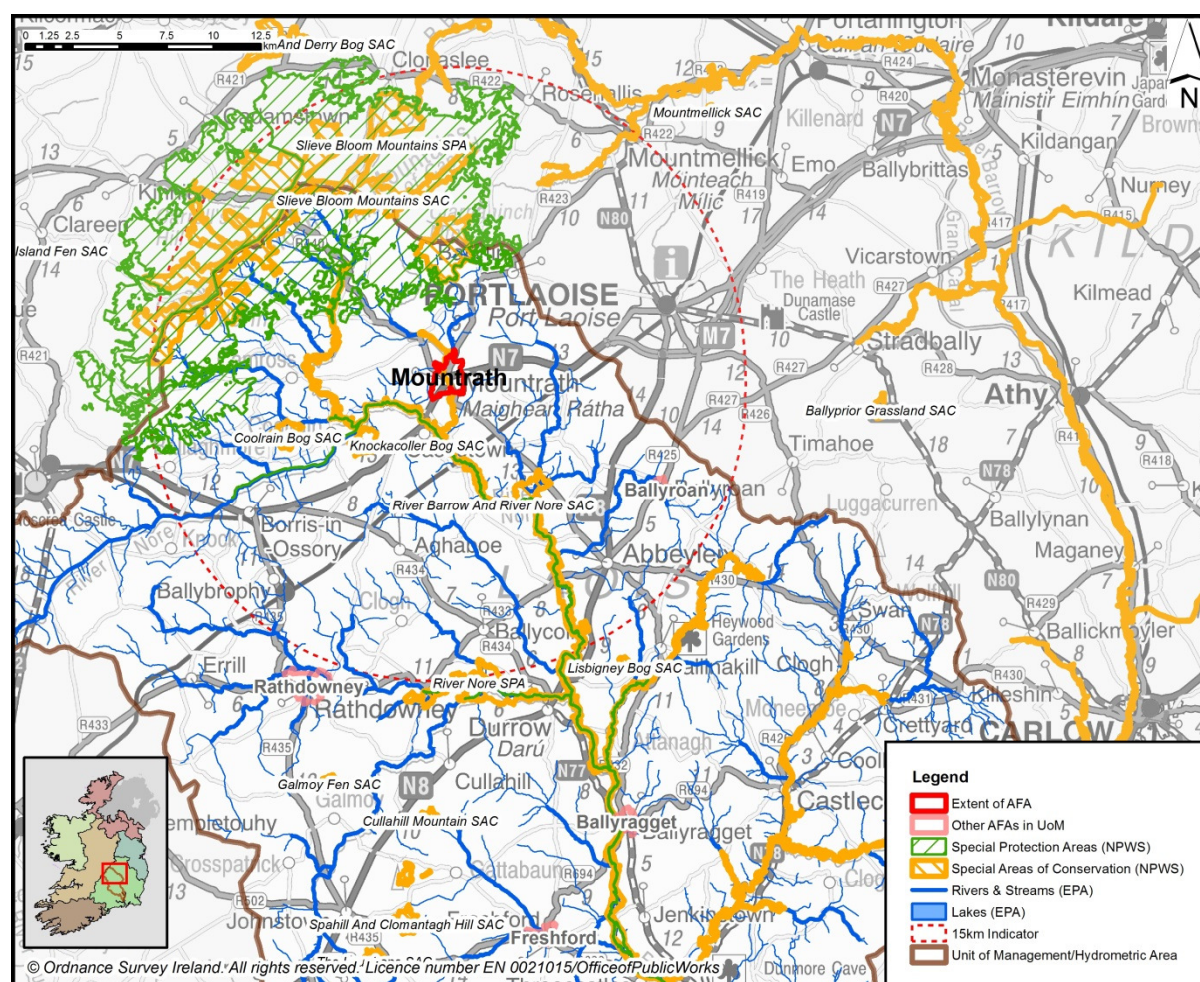


Figure 5.5.1: Mountrath AFA in context of catchment and surrounding European sites

5.5.1 Identification of Potential Sources of Impact

This section further examines the source > pathway > receptor linkages that could potentially result in adverse impacts arising from FRM measures at Mountrath AFA on the screened in European sites. The qualifying interest(s) of the site(s) at risk from surface water pathways are identified in Table 5.5.1 and from land and air pathways in Table 5.5.2. Additional detail on the attributes and targets of the qualifying interests has been included in Appendix C. These have been consulted in order to assess the potential impacts of the proposed flood relief measures on the designated habitats and species insofar as plan-level details allowed.

5.5.1.1 Potential Sources of Impact via Surface Water Pathways

Two European sites were identified as potentially being impacted upon via surface water pathways; River Barrow and Nore SAC (002162) and River Nore SPA (004233). Qualifying interests of these sites at risk from surface water pathways are identified in Table 5.5.1. Additional detail on the qualifying interests has been included in Appendix C.

Table 5.5.1: Qualifying Interests of the screened in European sites likely to be impacted upon via surface water pathways from FRM measures undertaken at Mountrath AFA.

European Site (Site code)	Qualifying interests
River Barrow and Nore SAC (002162)	<p>Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i>, <i>Alnion incanae</i>, <i>Salicion albae</i>) [91E0]</p> <p>Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation [3260]</p> <p><i>Vertigo moulinsiana</i> (Desmoulin's Whorl Snail) [1016]</p> <p><i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) [1029]</p> <p><i>Austropotamobius pallipes</i> (White-clawed Crayfish) [1092]</p> <p><i>Petromyzon marinus</i> (Sea Lamprey) [1095]</p> <p><i>Lampetra planeri</i> (Brook Lamprey) [1096]</p> <p>River Lamprey (<i>Lampetra fluviatilis</i>) [1099]</p> <p><i>Alosa fallax fallax</i> (Twai Shad) [1103]</p> <p>Salmon (<i>Salmo salar</i>) [1106]</p> <p>Otter (<i>Lutra lutra</i>) [1355]</p> <p><i>Margaritifera durrovensis</i> (Nore Pearl Mussel) [1990]</p>
River Nore SPA (004233)	Kingfisher (<i>Alcedo atthis</i>) [A229]

The following sources of impact arising from FRM measures at Mountrath AFA could potentially impact upon the European sites detailed above through surface water pathways:

- **Suspended sediments** – There may be indirect negative downstream impacts from sedimentation during construction. Construction activities within or adjacent to surface waters can result in the release of suspended sediments into those waters. This can lead to increased turbidity of surface waters, and an associated reduction in photosynthesis, which can impact on surface water dependent habitats. Impacts on aquatic species can occur through loss of suitable habitat (e.g. salmon spawning habitat), changes to or reduction in food supply (e.g. aquatic invertebrate density or diversity), or increased difficulty in feeding (e.g. otters will find greater difficulty hunting in turbid surface waters).

- **Changes in nutrient levels/pollutants** – Construction activities in or adjacent to surface waters can result in the release of nutrients into those waters, and can lead to reduced water quality and eutrophication. Hard defences can interfere with natural process, by causing some or all of the floodplain to be disconnected from the river, which can lead to the loss of natural habitat to capture, filter and recycle nutrients or pollutants. This can lead to a reduction in water quality. Spillages of hydrocarbons or other contaminants during FRM works can also result in a reduction in water quality. Reduced water quality and eutrophication can adversely impact on surface water dependent habitats, and on aquatic species through loss of suitable habitat, changes to or reduction in food supply, or increased difficulty in feeding.
- **Changes in water levels/channel morphology** – Changes to channel morphology through the use of flood walls and embankments can lead to changes in capacity and flow of surface waters. This can lead to hydrological impacts on surface water dependent habitats and to aquatic species through habitat loss and changes to or reduction in food supply.

5.5.1.2 Potential Sources of Impact via Land and Air Pathways

Two European sites were identified as potentially being impacted upon via land and air pathways; River Barrow and Nore SAC (002162) and River Nore SPA (004233). Qualifying interests of these sites at risk from land and air pathways are identified in Table 5.5.2. Additional detail on the qualifying interests has been included in Appendix C.

Table 5.5.2: Qualifying Interests of the screened in European sites likely to be impacted upon via land and air pathways from FRM measures undertaken at Mountrath AFA.

European Site (Site code)	Qualifying interests
River Barrow and Nore SAC (002162)	<p>Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i>, <i>Alnion incanae</i>, <i>Salicion albae</i>) [91E0]</p> <p>Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation [3260]</p> <p><i>Vertigo moulinsiana</i> (Desmoulin's Whorl Snail) [1016]</p> <p><i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) [1029]</p> <p><i>Austropotamobius pallipes</i> (White-clawed Crayfish) [1092]</p> <p><i>Petromyzon marinus</i> (Sea Lamprey) [1095]</p> <p><i>Lampetra planeri</i> (Brook Lamprey) [1096]</p> <p>River Lamprey (<i>Lampetra fluviatilis</i>) [1099]</p> <p><i>Alosa fallax fallax</i> (Twaite Shad) [1103]</p> <p>Salmon (<i>Salmo salar</i>) [1106]</p> <p>Otter (<i>Lutra lutra</i>) [1355]</p> <p><i>Margaritifera durrovensis</i> (Nore Pearl Mussel) [1990]</p>
River Nore SPA (004233)	Kingfisher (<i>Alcedo atthis</i>)[A229]

The following sources of impact arising from FRM measures at Mountrath AFA could potentially impact upon the European sites detailed above through land and air pathways:

- **Physical habitat disturbance and loss of woody vegetation cover** – There is likely to be a direct loss of natural and semi-natural habitat in the direct footprint and vicinity of the defences. Construction of flood walls and embankments adjacent to surface waters and

addition of culverts can result in a direct loss of or disturbance to aquatic, marginal and riparian habitats. This can indirectly impact on species through loss of habitat or changes in food supply, thereby negatively affecting conservation objectives.

- **Noise and visual disturbance** – The use of construction machinery and the presence of construction and maintenance workers can result in avoidance of suitable habitat by sensitive species.

5.5.2 Impact Assessment

Table 5.5.3 assesses the screened in European sites in more detail and examines the ways in which the identified sources and pathways could adversely impact on habitats or species. Avoidance and mitigation measures are proposed to mitigate any significant adverse impacts. The potential for cumulative impacts was considered throughout the process of option development. Engagement with stakeholders ensured that the potential for in-combination and cumulative impacts at plan level was minimised. In combination and cumulative effects will be re-assessed at the project stage when project-specific information has been captured.

5.5.2.1 In-combination Effects

Appropriate Assessment requires consideration of the impacts on European sites of FRM measures at Mountrath AFA, in combination with other plans or projects that may impact on the sites resulting in cumulative negative impacts. Potential sources of in-combination effects identified as part of this assessment include:

- Drainage maintenance activities in the Nore catchment. The OPW carry out regular maintenance on those channels altered through schemes implemented following the 1945 Arterial Drainage Act. Ongoing maintenance activities that result in the release of suspended sediments are currently adversely impacting on salmon spawning grounds, therefore these activities could potentially result in adverse cumulative impacts on this species. All scheduled maintenance operations in the vicinity of a European Site will require Screening for Appropriate Assessment and Stage II Appropriate Assessment where required. It is recommended that no arterial drainage or existing flood scheme maintenance is carried out in the channels where FRM work is being undertaken during the construction phase.
- The Freshwater pearl mussel Nore sub-basin management plan (Second Draft, NS2, 2010) recognises that it is the combination of the negative effects of a number of pressures that are acting together to leave the freshwater pearl mussel habitat in unfavourable condition. These include peat exploitation, agricultural activities (overgrazing, direct access to watercourses, nutrient addition through slurry or fertiliser additions), forestry activities and wastewater treatment. Existing pressures in the catchment that can result in an increased sediment load can be considered as cumulative impacts with the potential sediment load from FRM measures, owing to the unfavourable status of the species and its sensitivity to sedimentation.
- The Laois County Development Plan 2011-2017 has the potential for impacts in relation to planned new infrastructure. No significant in-combination effects with the FRMP are predicted at plan level; additional detail on potential interactions between infrastructure

and FRM schemes will be captured and assessed at project level when project-specific design information is available.

- In-combination effects may occur with FRM works, parallel projects or drainage schemes (see sections 3.1.2.2 and 4.1.7), carried out at other AFAs or locations in the UoM. There may be cumulative impacts on habitats or species from schemes constructed or undergoing maintenance simultaneously. Generic mitigation and monitoring measures have been developed in the FRMP, including the avoidance of undertaking FRM work on adjoining reaches of rivers for different AFAs or other parallel projects simultaneously. Provided the timing of FRM works is planned and managed correctly, no significant in-combination impacts are anticipated.

There are no other plans/projects ongoing or proposed (at the time of this study) which may give rise to any form of cumulative impact on the European sites.

Table 5.5.3: Impact assessment for FRM measures at Mountrath AFA (hard defences and culverting in the Shannon stream)

Site name (site code)	Qualifying interests	Potential source of impact	Pathway	Potential Impact	Avoidance/mitigation measures	Residual impact
River Barrow and Nore SAC (002162)	<p>Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i>, <i>Alnion incanae</i>, <i>Salicion albae</i>) [91E0]</p> <p>Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation [3260]</p> <p><i>Vertigo moulinsiana</i> (Desmoulin's Whorl Snail) [1016]</p> <p><i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) [1029]</p> <p><i>Austropotamobius pallipes</i> (White-clawed Crayfish) [1092]</p> <p><i>Petromyzon marinus</i> (Sea Lamprey) [1095]</p> <p><i>Lampetra planeri</i> (Brook Lamprey) [1096]</p> <p>River Lamprey (<i>Lampetra fluviatilis</i>) [1099]</p> <p><i>Alosa fallax fallax</i> (Twaite Shad) [1103]</p> <p>Salmon (<i>Salmo salar</i>) [1106]</p> <p>Otter (<i>Lutra lutra</i>) [1355]</p> <p><i>Margaritifera durrovensis</i></p>	<p>Suspended sediments</p> <p>Changes to nutrient levels/pollutant release</p>	Surface water	<p>The habitats and species for which the Barrow and Nore SAC was designated require particular water quality conditions. The favourable conservation conditions of Salmon, freshwater pearl mussel, and Nore pearl mussel are directly measured by water quality attributes, and the conservation status of other species are measured by attributes indirectly linked to water quality and sediment loadings, such as the extent and distribution of spawning habitats and the extent of freshwater habitat.</p> <p>Construction activities in or adjacent to the water could result in a release of suspended sediments and associated nutrients and/or pollution incidents from machinery. This could lead to a reduction in water quality, and result in adverse effects on the designated habitats and species through loss of habitat or changes to food supply. Salmon spawning grounds and freshwater and Nore pearl mussel juvenile habitat will be particularly susceptible to adverse impacts from the release of suspended solids. Disconnecting areas of floodplain from the river can lead to a reduction in water quality owing to a reduction in habitat area to attenuate nutrients or other pollutants.</p> <p>Otter may be impacted by sedimentation, should visibility be impaired or food supply be affected.</p> <p>In the absence of mitigation there are likely to be indirect, negative downstream impacts from sedimentation during construction of hard defences and culverting of a section of the Shannon stream.</p>	<p>A designated environmental officer should be appointed to oversee environmental management of the project.</p> <p>Strictly adhere to best practice protocols and SOPs during design, construction and maintenance.</p> <p>Assess the need for silt management procedures for works upstream of the Nore pearl mussel population and implement in consultation with a suitably-qualified FPM expert.</p> <p>Set hard defences back from the river channel wherever possible to minimise sediment loss into the river channel.</p> <p>Avoid arterial drainage or existing flood scheme maintenance works while FRM works are being</p>	No

Site name (site code)	Qualifying interests	Potential source of impact	Pathway	Potential Impact	Avoidance/mitigation measures	Residual impact
	(Nore Pearl Mussel) [1990]			<p>These impacts are expected to be short-term and local in scale but may have long-term impacts if salmon spawning beds or important Freshwater or Nore pearl mussel juvenile habitat is present directly downstream.</p> <p>Mountrath is within the Nore Upper Freshwater Pearl Mussel sensitive area, and is in the upstream catchment of SAC populations listed in S.I. 296 of 2009. This UoM is covered by the second draft Nore sub-Basin Management Plan of 2010. There is potential for impacts on the conservation objectives for this species, including potential 'habitat extent' and 'substratum quality'.</p> <p>There is potential for impacts on 'Water courses of plain to montane levels with the <i>Ranunculus fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation', in particular on the conservation objective for this habitat to 'maintain a substratum that is dominated by large particles and free from fine sediments'.</p>	<p>undertaken.</p> <p>Avoid working in-channel to ensure salmon and lamprey habitat is not disturbed.</p> <p>Surveys should be undertaken by appropriately qualified ecologists prior to commencement of the FRM work, to identify any important salmon, lamprey, twaite shad or crayfish habitat, or 'Water courses of plain to montane levels with the <i>Ranunculus fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation' in the vicinity of FRM works or directly downstream of the AFA, and any potentially significant impacts on these areas. Surveys should inform option design and design-specific mitigation.</p> <p>An otter survey should be undertaken by an appropriately qualified ecologist with otter surveying experience. The survey should inform</p>	

Site name (site code)	Qualifying interests	Potential source of impact	Pathway	Potential Impact	Avoidance/mitigation measures	Residual impact
					<p>option design and design-specific mitigation.</p> <p>An appropriate freshwater pearl mussel expert should be appointed, to identify potential impacts on this species and provide appropriate mitigation advice. Should sedimentation impacts be possible on this species and/or its potential habitat, the detailed FRM option design and sediment mitigation must prevent additional sediment from entering the watercourse.</p> <p>See also measures in Chapter 6</p>	
		Water level changes		<p>The designated habitats and species depend on specific hydrological regimes. Construction of flood walls and embankments can result in changes in channel hydrology, by increasing capacity and flow rates. This could lead to a reduction of suitable habitat and adverse effects on the conservation objectives for the species (population size and range). Culverting sections of the water channel may impede the passage of migratory fish.</p> <p>However, significant changes to the hydrological regime are unlikely, as the works will be local in</p>	<p>Strictly adhere to best practice protocols and SOPs during design, construction and maintenance.</p> <p>Ensure culvert design will not impede the upstream passage of migratory fish.</p> <p>An otter survey should be undertaken by an</p>	No

Site name (site code)	Qualifying interests	Potential source of impact	Pathway	Potential Impact	Avoidance/mitigation measures	Residual impact
				<p>nature, and are therefore unlikely to impact significantly on attributes used to define conservation status.</p> <p>Construction of culvert structure may impede passage of otters during high flows.</p>	<p>appropriately qualified ecologist with otter surveying experience. The survey should inform option design and design-specific mitigation. It may be necessary to include ramps / ledges in the design.</p> <p>See also measures in Chapter 6</p>	
		Physical habitat disturbance/loss of woody vegetation cover	Land and air	<p>Construction activities that remove vegetation or otherwise disturb habitats could adversely affect the habitat area, vegetation structure and composition of designated habitats.</p> <p>Destruction or alteration of aquatic or riparian habitats could adversely affect designated species through loss of cover for otter or damage to lamprey or salmon spawning areas.</p> <p>There is likely to be a direct loss of natural and semi-natural habitat in the direct footprint and vicinity of the hard defences and culverted section of the Shannon stream. These impacts are expected to be local in scale.</p>	<p>Strictly adhere to best practice protocols and SOPs including Lamprey and Otter SOPs during design, construction and maintenance in order to minimise physical disturbance.</p> <p>Avoid working in-channel unless essential.</p> <p>Set hard defences back from the river channel as far as possible to avoid disturbance of riparian habitat.</p> <p>Rehabilitate any areas where riparian habitat has been damaged.</p>	No

Site name (site code)	Qualifying interests	Potential source of impact	Pathway	Potential Impact	Avoidance/mitigation measures	Residual impact
					<p>Survey by a qualified ecologist prior to commencement of the FRM work, to identify any important salmon or lamprey habitat, or otter resting sites/holts in the vicinity of FRM works.</p> <p>No in-channel working where a suitable sand/gravel Lamprey spawning habitat exists from April-May, inclusive (River and Brook Lamprey), and late April-early July (Sea Lamprey) subject to adjustment owing to local knowledge of IFI.</p> <p>No in-channel working during the salmonid spawning season. Instream works should only be carried out during the period July to September inclusive, following consultation and agreement with IFI.</p> <p>No in-channel or bankside works to be conducted within 50m of a known or potential Otter holt/ resting site.</p>	

Site name (site code)	Qualifying interests	Potential source of impact	Pathway	Potential Impact	Avoidance/mitigation measures	Residual impact
					See also measures in Chapter 6	
		Noise and visual disturbance		The species for which this SAC is designated are sensitive to disturbance by maintenance workers and noise from machinery and may avoid areas where works are being undertaken. This could adversely affect habitat use by otter, which require lying up areas throughout their territory.	Strictly adhere to best practice protocols and SOPs including Lamprey and Otter SOPs during design, construction and maintenance in order to minimise physical disturbance. Avoid working in-channel unless essential. No in-channel or bankside works to be conducted within 50m of a known or potential otter holt/ resting site.	No
		Introduction or spreading of alien invasive species	Land and surface water	Invasive species can spread rapidly through habitats, form dense thickets which can out-compete native plants and cause problems with soil erosion	Carry out invasive species surveys and follow SOPs (see Table 6.1.1) See general mitigation in Chapter 6	No
River Nore SPA (004233)	Kingfisher (<i>Alcedo atthis</i>)[A229]	Suspended sediments Changes to nutrient levels/pollutant release	Surface water	Kingfisher populations are dependent on river channels and their associated marginal and riparian habitats. Construction activities in or adjacent to the water could result in a release of suspended sediments and associated nutrients and/or pollution incidents from machinery. This could lead to a reduction in water quality, affecting the habitats and food supply (macroinvertebrates and fish) of the Kingfisher and adversely affecting the distribution and long-term population trends of the species	Strictly adhere to best practice protocols and SOPs during design, construction and maintenance. See also measures in Chapter 6	No

Site name (site code)	Qualifying interests	Potential source of impact	Pathway	Potential Impact	Avoidance/mitigation measures	Residual impact
				<p>within the SPA 1km downstream of the AFA.</p> <p>There are likely to be indirect, negative downstream impacts from sedimentation during construction. These impacts are expected to be short-term and local in scale, and are unlikely to impact significantly on attributes used to define conservation status.</p>		
		Water level changes		<p>The habitats on which Kingfisher populations depend require specific hydrological regimes. Construction of flood walls and embankments can result in changes in channel hydrology, by increasing capacity and flow rates. This can adversely impact on Kingfisher populations through habitat loss and changes to/reduction in food supply, possibly affecting distribution and long-term population trends of the species within the SPA 1km downstream.</p> <p>However, significant changes to the hydrological regime are unlikely, as the works will be very local in nature, and are therefore unlikely to impact significantly on attributes used to define conservation status.</p>	<p>Strictly adhere to best practice protocols and SOPs during design, construction and maintenance.</p> <p>See also measures in Chapter 6</p>	No
		<p>Physical habitat disturbance</p> <p>Noise and visual disturbance</p>	Land and air	<p>Kingfishers are sensitive to disturbance by maintenance workers and noise from machinery and may avoid areas where works are being undertaken. This could adversely affect its distribution within the SPA.</p>	<p>Survey by a qualified ecologist prior to commencement of the FRM work, to assess use of the channel by kingfisher in the vicinity of FRM works and presence of burrows.</p> <p>Avoid disturbance of Kingfisher burrows from March-September.</p>	No

Site name (site code)	Qualifying interests	Potential source of impact	Pathway	Potential Impact	Avoidance/mitigation measures	Residual impact
					<p>Avoid in-channel or bankside vegetation removal within 30m of Kingfisher burrows</p> <p>If burrows in vertical banks are discovered during the works, works must stop immediately and the burrows be inspected by a suitably qualified ecologist.</p> <p>Leave bankside vegetation intact wherever possible.</p> <p>See also measures in Chapter 6</p>	

5.5.3 Conclusions

This NIS details the findings of the Stage 2 Appropriate Assessment conducted to further examine the potential direct and indirect impacts of proposed FRM works at Mountrath AFA on the following European sites:

- River Barrow and Nore SAC (002162)
- River Nore SPA (004233)

The Appropriate Assessment investigated the potential direct and indirect impacts of the proposed works on the integrity and interest features of the above European sites, alone and in-combination with other plans and projects, taking into account the sites' structure, function and conservation objectives. Where potentially significant adverse impacts were identified, a range of mitigation and avoidance measures have been suggested to help offset them. As a result of this Appropriate Assessment it has been concluded that, following the avoidance and mitigation measures suggested - in particular the requirement to ensure effective silt management upstream of the Nore pearl mussel population in consultation with a suitably-qualified FPM expert, the FRM measures at Mountrath AFA will not have a significant adverse impact on the above European site

All lower level plans arising through the implementation of the FRMP which require the progression of physical works will themselves be subject to Appropriate Assessment, when details of design and location are known and potential effects on the attributes and targets of site specific conservation objectives can be fully evaluated.

5.6 RATHDOWNEY AFA

All European sites in the zone of influence of Rathdowney AFA were screened for possible impacts from FRM methods (see Chapter 3.5). Screening assessed the potential for impact at ten European sites (see Figure 5.6.1):

- Coolrain Bog SAC (002332)
- Cullahill Mountain SAC (000831)
- Galmoy Fen SAC (001858)
- Knockacoller Bog SAC (002333)
- Lisbigney Bog SAC (000869)
- River Barrow and River Nore SAC (002162)
- River Nore SPA (004233)
- Slieve Bloom Mountains SPA (004160)
- Spahill and Clomantagh Hill SAC (000849)
- The Loughans SAC (000407)

Eight sites were found to have no identifiable impact pathway arising from the implementation of FRM methods within the Rathdowney catchment and were therefore screened out as not requiring any further assessment. Two sites were identified as potentially being impacted upon through FRM activities at Rathdowney AFA; River Barrow and Nore SAC (002162) and River Nore SPA (004233). The following section assesses the proposed FRM measures described in Chapter 4.3.2.6 in relation to the screened-in European sites.

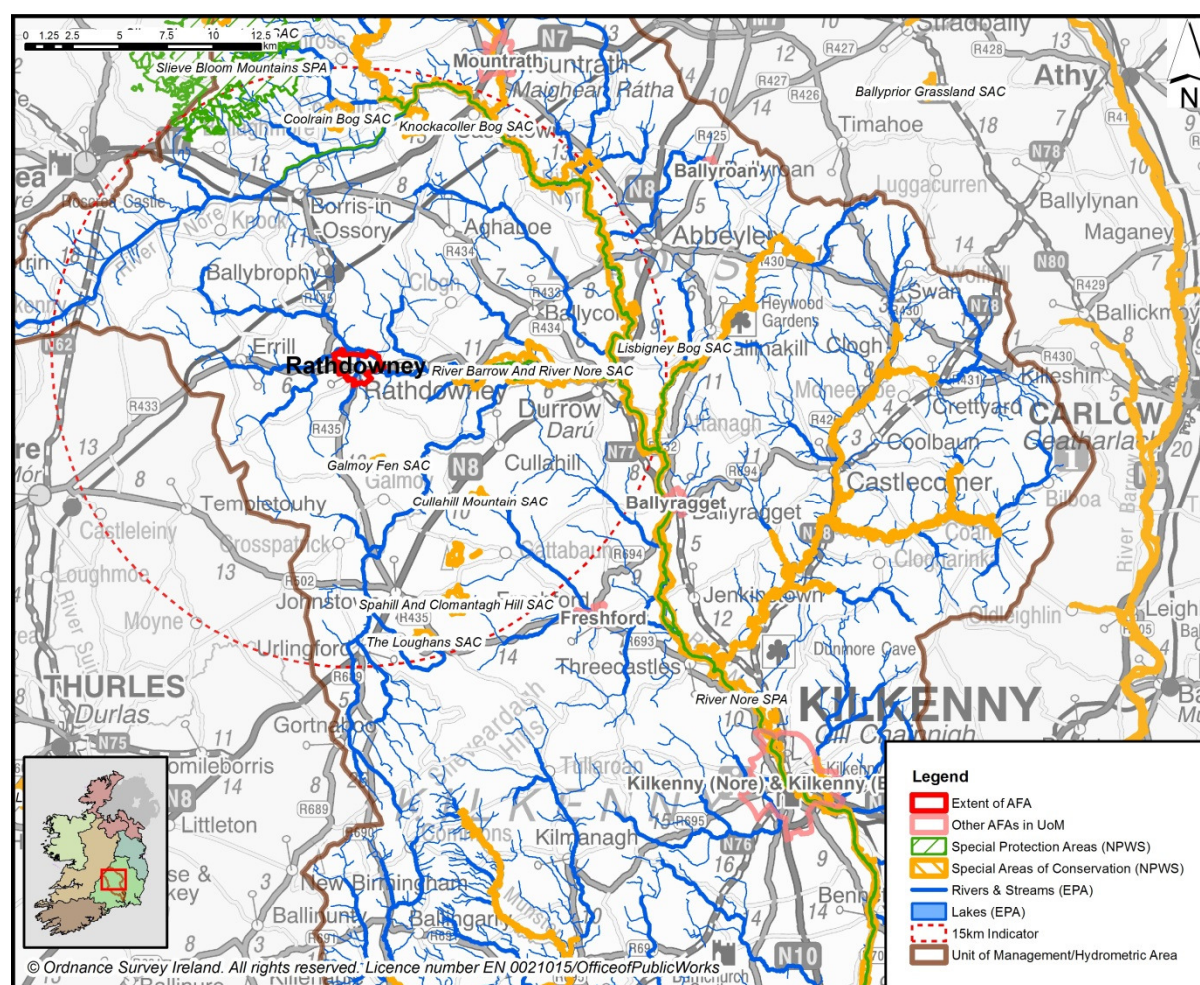


Figure 5.6.1 Rathdowney AFA in context of catchment and surrounding European sites

5.6.1 Identification of Potential Sources of Impact

This section further examines the source > pathway > receptor linkages that could potentially result in adverse impacts arising from FRM measures at Rathdowney AFA on the screened in European sites. The qualifying interest(s) of the site(s) at risk from surface water pathways are identified in Table 5.6.1 and from land and air pathways in Table 5.6.2. Additional detail on the attributes and targets of the qualifying interests has been included in Appendix C. These have been consulted in order to assess the potential impacts of the proposed flood relief measures on the designated habitats and species insofar as plan-level details allowed.

5.6.1.1 Potential Sources of Impact via Surface Water Pathways

One European site was identified as potentially being impacted upon via surface water pathways; River Barrow and Nore SAC (002162). Qualifying interests at this site at risk from surface water pathways are identified in Table 5.6.1. Additional detail on the qualifying interests has been included in Appendix C.

Table 5.6.1: Qualifying Interests of the screened in European site likely to be impacted upon via surface water pathways from FRM measures undertaken at Rathdowney AFA.

European Site (Site code)	Qualifying interests
River Barrow and Nore SAC (002162)	<p>Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i> <i>Alnion incanae</i>, <i>Salicion albae</i>) [91E0]</p> <p>Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation [3260]</p> <p><i>Vertigo moulinsiana</i> (Desmoulin's Whorl Snail) [1016]</p> <p><i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) [1029]</p> <p><i>Austropotamobius pallipes</i> (White-clawed Crayfish) [1092]</p> <p><i>Petromyzon marinus</i> (Sea Lamprey) [1095]</p> <p><i>Lampetra planeri</i> (Brook Lamprey) [1096]</p> <p>River Lamprey (<i>Lampetra fluviatilis</i>) [1099]</p> <p><i>Alosa fallax fallax</i> (Twaite Shad) [1103]</p> <p>Salmon (<i>Salmo salar</i>) [1106]</p> <p>Otter (<i>Lutra lutra</i>) [1355]</p> <p><i>Margaritifera durrovensis</i> (Nore Pearl Mussel) [1990]</p>
River Nore SPA (004233)	Kingfisher (<i>Alcedo atthis</i>) [A229]

The following sources of impact arising from FRM measures at Rathdowney AFA could potentially impact upon the European site detailed above through surface water pathways:

- **Suspended sediments** – There may be indirect negative downstream impacts from sedimentation during construction. Construction activities within or adjacent to surface waters can result in the release of suspended sediments into those waters. This can lead to increased turbidity of surface waters, and an associated reduction in photosynthesis, which can impact on surface water dependent habitats. Impacts on aquatic species can occur through loss of suitable habitat (e.g. salmon spawning habitat), changes to or reduction in food supply (e.g. aquatic invertebrate density or diversity), or increased difficulty in feeding (e.g. otters will find greater difficulty hunting in turbid surface waters).

- **Changes in nutrient levels/pollutants** – Construction activities in or adjacent to surface waters can result in the release of nutrients into those waters, and can lead to reduced water quality and eutrophication. Hard defences can interfere with natural processes, by causing some or all of the floodplain to be disconnected from the river, which can lead to the loss of natural habitat to capture, filter and recycle nutrients or pollutants. This can lead to a reduction in water quality. Spillages of hydrocarbons or other contaminants during FRM works can also result in a reduction in water quality. Reduced water quality and eutrophication can adversely impact on surface water dependent habitats, and on aquatic species through loss of suitable habitat, changes to or reduction in food supply, or increased difficulty in feeding.
- **Changes in water levels/channel morphology** – Changes to channel morphology through the use of flood walls and embankments can lead to changes in capacity and flow of surface waters. This can lead to hydrological impacts on surface water dependent habitats and to aquatic species through habitat loss and changes to or reduction in food supply. Erosion may also increase either side of the defences due to changes in river processes.

5.6.1.2 Potential Sources of Impact via Land and Air Pathways

Two European sites were identified as potentially being impacted upon via land and air pathways; River Barrow and River Nore SAC (002162) and River Nore SPA (004233). The qualifying interests of these sites at risk from land and air pathways are identified in Table 5.6.2. Additional detail on the qualifying interests has been included in Appendix C.

Table 5.6.2: Qualifying Interest of the screened in European site likely to be impacted upon via land and air pathways from FRM measures undertaken at Rathdowney AFA.

European Site (Site code)	Qualifying interests
River Nore SPA (004233)	Kingfisher (<i>Alcedo atthis</i>) [A229]
River Barrow and Nore SAC (002162)	<i>Austropotamobius pallipes</i> (White-clawed Crayfish) [1092] <i>Petromyzon marinus</i> (Sea Lamprey) [1095] <i>Lampetra planeri</i> (Brook Lamprey) [1096] River Lamprey (<i>Lampetra fluviatilis</i>) [1099] <i>Alosa fallax fallax</i> (Twaiite Shad) [1103] Salmon (<i>Salmo salar</i>) [1106] Otter (<i>Lutra lutra</i>) [1355]

The following sources of impact arising from FRM measures at Rathdowney AFA could potentially impact upon the European site detailed above through land and air pathways:

- **Noise and visual disturbance** – The use of construction machinery and the presence of construction and maintenance workers can result in avoidance of suitable habitat by sensitive species.
- **Physical habitat disturbance and loss of woody vegetation cover** – There is potential for direct loss of natural and semi-natural habitat in the footprint and vicinity of hard defences. Construction of flood walls and embankments adjacent to surface waters can result in a direct loss of or disturbance to aquatic, marginal and riparian habitats. This can indirectly impact on species through loss of habitat or changes in food supply, thereby negatively affecting conservation objectives.

5.6.2 Impact Assessment

Table 5.6.3 assesses the screened in European sites in more detail and examines the ways in which the identified sources and pathways could adversely impact on habitats or species. Avoidance and mitigation measures are proposed to mitigate any significant adverse impacts. The potential for cumulative impacts was considered throughout the process of option development. Engagement with stakeholders ensured that the potential for in-combination and cumulative impacts at plan level was minimised. In combination and cumulative effects will be re-assessed at the project stage when project-specific information has been captured.

5.6.2.1 In-combination Effects

Appropriate Assessment requires consideration of the impacts on European sites of FRM measures at Rathdowney AFA, in combination with other plans or projects that may impact on the sites resulting in cumulative negative impacts. Potential sources of in-combination effects identified as part of this assessment include:

- Drainage maintenance activities in the Nore catchment. The OPW carry out regular maintenance on those channels altered through schemes implemented following the 1945 Arterial Drainage Act. Ongoing maintenance activities that result in the release of suspended sediments are currently adversely impacting on salmon spawning grounds, therefore these activities could potentially result in adverse cumulative impacts on this species. All scheduled maintenance operations in the vicinity of a European Site will require Screening for Appropriate Assessment and Stage II Appropriate Assessment where required. It is recommended that no arterial drainage or existing flood scheme maintenance is carried out in the channels where FRM work is being undertaken during the construction phase.
- The Freshwater pearl mussel Nore sub-basin management plan (Second Draft, NS2, 2010) recognises that it is the combination of the negative effects of a number of pressures that are acting together to leave the freshwater pearl mussel habitat in unfavourable condition. These include peat exploitation, agricultural activities (overgrazing, direct access to watercourses, nutrient addition through slurry or fertiliser additions), forestry activities and wastewater treatment. Existing pressures in the catchment that can result in an increased sediment load can be considered as cumulative impacts with the potential sediment load from FRM measures, owing to the unfavourable status of the species and its sensitivity to sedimentation.
- The Laois County Development Plan 2011-2017 has the potential for impacts in relation to planned new infrastructure. No significant in-combination effects with the FRMP are predicted at plan level; additional detail on potential interactions between infrastructure and FRM schemes will be captured and assessed at project level when project-specific design information is available.
- In-combination effects may occur with FRM works, parallel projects or drainage schemes (see sections 3.1.2.2 and 4.1.7), carried out at other AFAs or locations in the UoM. There may be cumulative impacts on habitats or species from schemes constructed or undergoing maintenance simultaneously. Generic mitigation and monitoring measures have been developed in the FRMP, including the avoidance of undertaking FRM work on adjoining reaches of rivers for different AFAs or other parallel projects simultaneously. Provided the

timing of FRM works is planned and managed correctly, no significant in-combination impacts are anticipated.

There are no other plans/projects ongoing or proposed (at the time of this study) which may give rise to any form of cumulative impact on the European sites.

Table 5.6.3: Impact assessment for FRM measures at Rathdowney AFA (storage and hard defences)

Site name (site code)	Qualifying interests	Potential source of impact	Pathway	Potential Impact	Avoidance/mitigation measures	Residual impact
River Barrow and Nore SAC (002162)	<p>Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i>, <i>Alnion incanae</i>, <i>Salicion albae</i>) [91E0]</p> <p>Water courses of plain to montane levels with the <i>Ranunculon fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation [3260]</p> <p><i>Vertigo moulinsiana</i> (Desmoulin's Whorl Snail) [1016]</p> <p><i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) [1029]</p> <p><i>Austropotamobius pallipes</i> (White-clawed Crayfish) [1092]</p> <p><i>Petromyzon marinus</i> (Sea Lamprey) [1095]</p> <p><i>Lampetra planeri</i> (Brook Lamprey) [1096]</p> <p>River Lamprey (<i>Lampetra fluviatilis</i>) [1099]</p> <p><i>Alosa fallax fallax</i> (Twaite Shad) [1103]</p> <p>Salmon (<i>Salmo salar</i>) [1106]</p>	<p>Suspended sediments</p> <p>Changes to nutrient levels/pollutant release</p>	Surface water	<p>The habitats and species for which the Barrow and Nore SAC was designated require particular water quality conditions. The favourable conservation conditions of Salmon, freshwater pearl mussel, and Nore pearl mussel are directly measured by water quality attributes, and the conservation status of other species are measured by attributes indirectly linked to water quality and sediment loadings, such as the extent and distribution of spawning habitats and the extent of freshwater habitat.</p> <p>Construction activities in or adjacent to the water could result in a release of suspended sediments and associated nutrients and/or pollution incidents from machinery. This could lead to a reduction in water quality, and result in adverse effects on the designated habitats and species of the SAC 3.8km downstream through loss of habitat or changes to food supply. Salmon spawning grounds and freshwater and Nore pearl mussel juvenile habitat will be particularly susceptible to adverse impacts from the release of suspended solids. Disconnecting areas of floodplain from the river can lead to a reduction in water quality owing to a reduction in habitat area to attenuate nutrients or other pollutants.</p> <p>Otter may be impacted by sedimentation, should visibility be impaired or food supply be affected.</p> <p>In the absence of mitigation there are likely to be</p>	<p>A designated environmental officer should be appointed to oversee environmental management of the project.</p> <p>Strictly adhere to best practice protocols and SOPs during design, construction and maintenance.</p> <p>Assess the need for silt management procedures for works upstream of the Nore pearl mussel population and implement in consultation with a suitably-qualified FPM expert.</p> <p>Set hard defences back from the river channel wherever possible to minimise sediment loss into the river channel.</p> <p>Avoid working in-channel to minimise sediment mobilisation.</p> <p>Surveys should be undertaken by appropriately qualified</p>	No

Site name (site code)	Qualifying interests	Potential source of impact	Pathway	Potential Impact	Avoidance/mitigation measures	Residual impact
	<p>Otter (<i>Lutra lutra</i>) [1355]</p> <p><i>Margaritifera durrovensis</i> (Nore Pearl Mussel) [1990]</p>			<p>indirect, negative downstream impacts from sedimentation during construction. These impacts are expected to be short-term and local in scale but may have long-term impacts if salmon spawning beds or important Freshwater or Nore pearl mussel juvenile habitat are present directly downstream.</p> <p>Rathdowney is within the Nore Upper Freshwater Pearl Mussel sensitive area, and is in the upstream catchment of SAC populations listed in S.I. 296 of 2009. This UoM is covered by the second draft Nore sub-Basin Management Plan of 2010. There is potential for impacts on the conservation objectives for this species, including potential 'habitat extent' and 'substratum quality'.</p> <p>There is potential for impacts on 'Water courses of plain to montane levels with the <i>Ranunculus fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation', in particular on the conservation objective for this habitat to 'maintain a substratum that is dominated by large particles and free from fine sediments'.</p>	<p>ecologists prior to commencement of the FRM work, to identify any important salmon, lamprey, twaite shad or crayfish habitat, or 'Water courses of plain to montane levels with the <i>Ranunculus fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation' in the vicinity of FRM works or directly downstream of the AFA, and any potentially significant impacts on these areas. Surveys should inform option design and design-specific mitigation.</p> <p>An otter survey should be undertaken by an appropriately qualified ecologist with otter surveying experience. The survey should inform option design and design-specific mitigation.</p> <p>An appropriate freshwater pearl mussel expert should be appointed, to identify potential impacts on this species and provide appropriate mitigation advice. Should sedimentation impacts be possible on this species</p>	

Site name (site code)	Qualifying interests	Potential source of impact	Pathway	Potential Impact	Avoidance/mitigation measures	Residual impact
					and/or its potential habitat, the detailed FRM option design and sediment mitigation must prevent additional sediment from entering the watercourse. See also measures in Chapter 6	
		Water level changes		The designated habitats and species depend on specific hydrological regimes. Construction of flood walls and embankments can result in changes in channel hydrology, by increasing capacity and flow rates. This could lead to a reduction of suitable habitat and adverse effects on the conservation objectives for the species (population trends, range or habitat use). Significant changes to the hydrological regime are unlikely, as the works will be local in nature, and are therefore unlikely to impact significantly on attributes used to define conservation status. A weir structure will be required alongside the storage option, and this may impede passage of salmon, lamprey or twaite shad.	Strictly adhere to best practice protocols and SOPs during design, construction and maintenance. Ensure that weir structure will not impede the passage of migratory fish. See also measures in Chapter 6	No
		Physical habitat disturbance	Land and air	Mobile aquatic species may range upstream beyond the SAC boundary. Destruction or alteration of aquatic or riparian habitats could adversely affect designated species through loss of cover for otter, damage to lamprey or salmon spawning areas or to the heterogeneity of white-clawed crayfish habitat.	Strictly adhere to best practice protocols and SOPs during design, construction and maintenance in order to minimise physical disturbance. Set hard defences back	

Site name (site code)	Qualifying interests	Potential source of impact	Pathway	Potential Impact	Avoidance/mitigation measures	Residual impact
				Hard defences will be set back from the river channel wherever possible. Where this is not possible, there is potential for direct disturbance of designated species in the vicinity of hard defences.	<p>from the river channel wherever possible and avoid working in-channel unless essential.</p> <p>Surveys should be undertaken by appropriately qualified ecologists prior to commencement of the FRM work, to identify any important salmon, lamprey, twaite shad or crayfish habitat in the vicinity of FRM works or directly downstream of the AFA, and any potentially significant impacts on these areas. Surveys should inform any necessary mitigation.</p> <p>No in-channel working where a suitable sand/gravel Lamprey spawning habitat exists from April-May (King et al, 2008), subject to adjustment owing to local knowledge of IFI.</p> <p>No in-channel working during the salmonid spawning season. Instream works should only be carried out during the period July to</p>	

Site name (site code)	Qualifying interests	Potential source of impact	Pathway	Potential Impact	Avoidance/mitigation measures	Residual impact
					<p>September inclusive, following consultation and agreement with IFI.</p> <p>An otter survey of proposed works areas and any access routes should be undertaken by an appropriately qualified ecologist with otter surveying experience. The survey should inform any necessary mitigation. No in-channel or bankside works to be conducted within 50m of a known or potential Otter holt/ resting site.</p> <p>See also measures in Chapter 6</p>	
		Noise and Visual Disturbance	Land and Air	<p>Otter may be sensitive to disturbance by maintenance workers and noise from machinery and may avoid areas where works are being undertaken. This could adversely affect habitat use as otter require lying up areas throughout their territory.</p>	<p>Strictly adhere to best practice protocols and SOPs including Lamprey and Otter SOPs during construction and maintenance in order to minimise physical disturbance.</p> <p>Avoid working in-channel unless essential.</p> <p>An otter survey of proposed works areas and any access routes should be undertaken by an appropriately qualified</p>	

Site name (site code)	Qualifying interests	Potential source of impact	Pathway	Potential Impact	Avoidance/mitigation measures	Residual impact
					ecologist with otter surveying experience. The survey should inform any necessary mitigation. No in-channel or bankside works to be conducted within 50m of a known or potential otter holt/ resting site. See also measures in Chapter 6	
River Nore SPA (004233)	Kingfisher (<i>Alcedo atthis</i>)[A229]	Suspended sediments Changes to nutrient levels/pollutant release	Surface water	Kingfisher populations are dependent on river channels and their associated marginal and riparian habitats. Construction activities in or adjacent to the water could result in a release of suspended sediments and associated nutrients and/or pollution incidents from machinery. This could lead to a reduction in water quality, affecting the habitats and food supply (macroinvertebrates and fish) of the Kingfisher and adversely affecting the distribution of the species within the SPA and long-term population trends. There are likely to be indirect, negative downstream impacts from sedimentation during construction. These impacts are expected to be short-term and local in scale, and are unlikely to impact significantly on attributes used to define conservation status.	Strictly adhere to best practice protocols and SOPs during design, construction and maintenance. Set hard defences back from the river channel wherever possible to minimise sediment loss into the river channel. Avoid working in-channel to minimise sediment mobilisation. See also measures in Chapter 6	No
		Water level changes		The habitats on which Kingfisher populations depend require specific hydrological regimes. Construction of flood walls and embankments can result in changes in channel hydrology, by increasing capacity and flow rates. This can adversely impact on Kingfisher populations through habitat loss and changes to/reduction in food supply, possibly	Strictly adhere to best practice protocols and SOPs during design, construction and maintenance. See also measures in	No

Site name (site code)	Qualifying interests	Potential source of impact	Pathway	Potential Impact	Avoidance/mitigation measures	Residual impact
				<p>affecting distribution of the species within the SPA and long-term population trends.</p> <p>However, significant changes to the hydrological regime are unlikely, as the works will be very local in nature, and are therefore unlikely to impact significantly on attributes used to define conservation status of the SPA 4.8km downstream of the AFA.</p>	Chapter 6	
		Physical Habitat Loss Noise and visual disturbance	Land and air	<p>Kingfisher populations are dependent on marginal and riparian habitats of river channels, and nest in burrows on vertical river banks. Construction of flood walls and embankments and associated removal of vegetation and disturbance of banks could adversely affect the range area, foraging/perching habitat and distribution of the species within the SPA as well as long-term population trends.</p> <p>Kingfishers are sensitive to disturbance by maintenance workers and noise from machinery and may avoid areas where works are being undertaken. This could adversely affect its distribution within the SPA.</p> <p>However, the FRM work will be very local in nature, and is therefore unlikely to impact significantly on attributes used to define conservation status of the Kingfisher population of the SPA 4.8km downstream of the AFA.</p>	<p>Leave bankside vegetation intact wherever possible.</p> <p>Survey by a qualified ornithologist prior to commencement of the FRM work, to assess use of the channel by kingfisher in the vicinity of FRM works and look presence of burrows. Surveys will inform mitigation in design / construction.</p> <p>See also measures in Chapter 6</p>	No

5.6.3 Conclusions

This NIS details the findings of the Stage 2 Appropriate Assessment conducted to further examine the potential direct and indirect impacts of proposed FRM works at Rathdowney AFA on the following European sites:

- River Barrow and Nore SAC (002162)
- River Nore SPA (004233)

The Appropriate Assessment investigated the potential direct and indirect impacts of the proposed works on the integrity and interest features of the above European sites, alone and in-combination with other plans and projects, taking into account the sites' structure, function and conservation objectives. Where potentially significant adverse impacts were identified, a range of mitigation and avoidance measures have been suggested to help offset them. As a result of this Appropriate Assessment it has been concluded that, following the avoidance and mitigation measures suggested - in particular the requirement to ensure effective silt management upstream of the Nore pearl mussel population in consultation with a suitably-qualified FPM expert, the FRM measures at Rathdowney AFA will not have a significant adverse impact on the above European site

All lower level plans arising through the implementation of the FRMP which require the progression of physical works will themselves be subject to Appropriate Assessment, when details of design and location are known and potential effects on the attributes and targets of site specific conservation objectives can be fully evaluated.

5.7 THOMASTOWN AFA

All European sites in the zone of influence of Thomastown AFA were screened for possible impacts from FRM methods (See Chapter 3.5). Screening assessed the potential for impact at five European sites (Figure 5.7.1):

- Blackstairs Mountains SAC (000770)
- Hugginstown Fen SAC (000404)
- River Barrow and Nore SAC (002162)
- River Nore SPA (004233)
- Thomastown Quarry SAC (002252)

Two sites were found to have no identifiable impact pathway arising from the implementation of FRM methods within the Thomastown catchment and were therefore screened out as not requiring any further assessment. Three sites were identified as potentially being impacted upon through FRM activities at Thomastown AFA; River Barrow and Nore SAC (002162), River Nore SPA (004233) and Thomastown Quarry SAC (002252). The following section assesses the proposed FRM measures described in Chapter 4.3.2.7 in relation to the screened-in European sites.

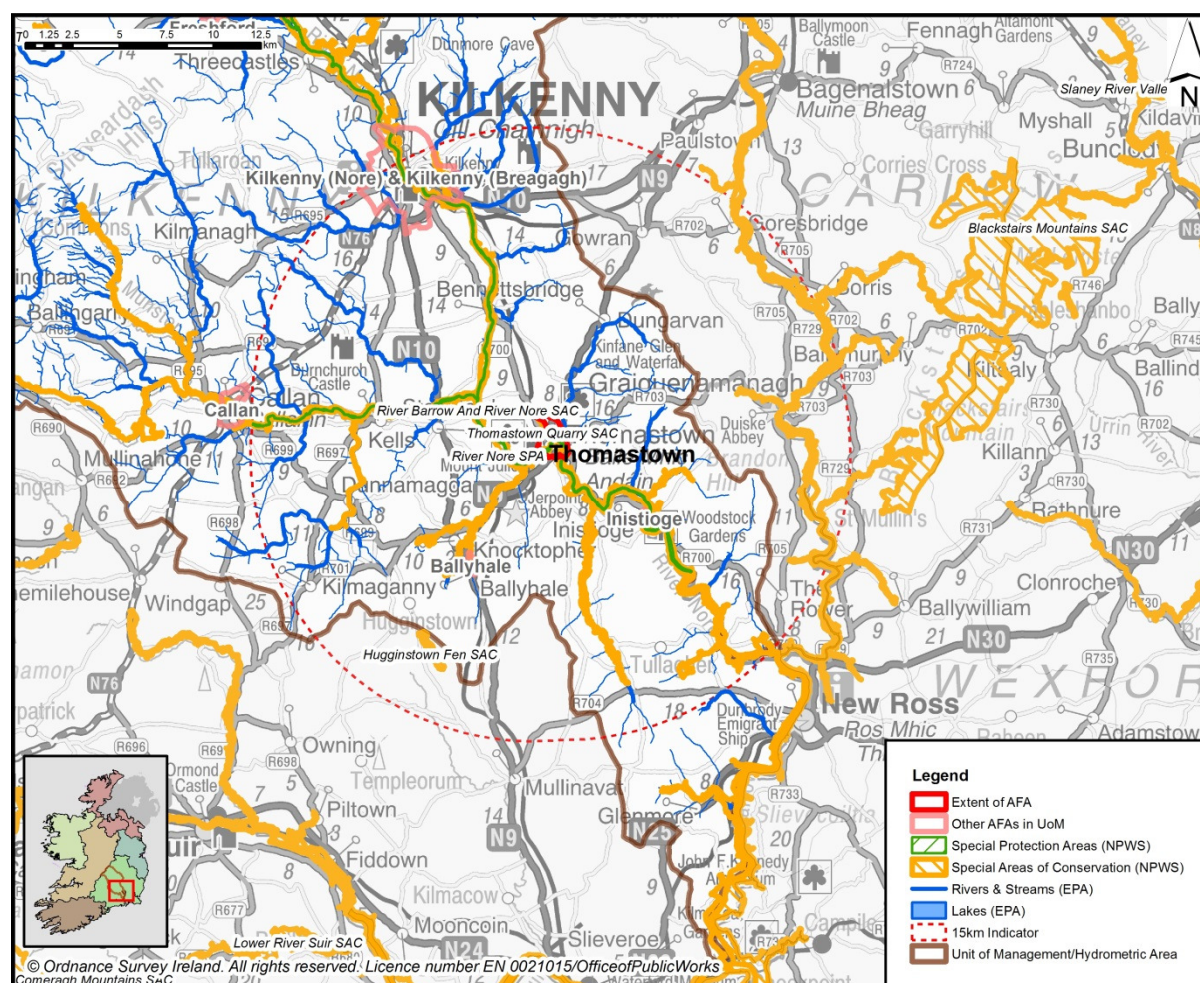


Figure 5.7.1: Thomastown AFA in context of catchment and surrounding European sites

5.7.1 Identification of Potential Sources of Impact

This section further examines the source > pathway > receptor linkages that could potentially result in adverse impacts arising from FRM measures at Thomastown AFA on the screened in European sites. The qualifying interest(s) of the site(s) at risk from surface water pathways are identified in Table 5.7.1 and from land and air pathways in Table 5.7.2. Additional detail on the attributes and targets of the qualifying interests has been included in Appendix C. These have been consulted in order to assess the potential impacts of the proposed flood relief measures on the designated habitats and species insofar as plan-level details allowed.

5.7.1.1 Potential Sources of Impact via Surface Water Pathways

The qualifying interest of Thomastown Quarry SAC (002252) is not expected to be impacted on via surface water pathways as this site is approximately 1km north overland from Thomastown AFA. Two European sites were identified as potentially being impacted upon via surface water pathways; River Barrow and Nore SAC (002162) and River Nore SPA (004233). Qualifying interests of these sites at risk from surface water pathways are identified in Table 5.7.1. Additional detail on the qualifying interests has been included in Appendix C.

Table 5.7.1: Qualifying Interests of the screened in European sites likely to be impacted upon via surface water pathways from FRM measures undertaken at Thomastown AFA.

European Site (Site code)	Qualifying interests
River Barrow and Nore SAC (002162)	<p>Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i>, <i>Alnion incanae</i>, <i>Salicion albae</i>) [91E0]</p> <p>Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation [3260]</p> <p><i>Vertigo moulinsiana</i> (Desmoulin's Whorl Snail) [1016]</p> <p><i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) [1029]</p> <p><i>Austropotamobius pallipes</i> (White-clawed Crayfish) [1092]</p> <p><i>Petromyzon marinus</i> (Sea Lamprey) [1095]</p> <p><i>Lampetra planeri</i> (Brook Lamprey) [1096]</p> <p>River Lamprey (<i>Lampetra fluviatilis</i>) [1099]</p> <p><i>Alosa fallax fallax</i> (Twaite Shad) [1103]</p> <p>Salmon (<i>Salmo salar</i>) [1106]</p> <p>Otter (<i>Lutra lutra</i>) [1355]</p> <p><i>Margaritifera durrovensis</i> (Nore Pearl Mussel) [1990]</p>
River Nore SPA (004233)	Kingfisher (<i>Alcedo atthis</i>) [A229]

The following sources of impact arising from FRM measures at Thomastown AFA could potentially impact upon the European sites detailed above through surface water pathways:

- **Suspended sediments** – There may be indirect negative downstream impacts from sedimentation during construction. Construction activities within or adjacent to surface waters can result in the release of suspended sediments into those waters. This can lead to increased turbidity of surface waters, and an associated reduction in photosynthesis, which can impact on surface water dependent habitats. Impacts on aquatic species can occur through loss of suitable habitat (e.g. salmon spawning habitat), changes to or reduction in food supply (e.g. aquatic invertebrate density or diversity), or increased difficulty in feeding (e.g. otters will find greater difficulty hunting in turbid surface waters).

- **Changes in nutrient levels/pollutants** – Construction activities in or adjacent to surface waters can result in the release of nutrients into those waters, and can lead to reduced water quality and eutrophication. Hard defences can interfere with natural process, by causing some or all of the floodplain to be disconnected from the river, which can lead to the loss of natural habitat to capture, filter and recycle nutrients or pollutants. This can lead to a reduction in water quality. Spillages of hydrocarbons or other contaminants during FRM works can also result in a reduction in water quality. Reduced water quality and eutrophication can adversely impact on surface water dependent habitats, and on aquatic species through loss of suitable habitat, changes to or reduction in food supply, or increased difficulty in feeding.
- **Changes in water levels/channel morphology** – Changes to channel morphology through the use of flood walls and embankments can lead to changes in capacity and flow of surface waters. This can lead to hydrological impacts on surface water dependent habitats and to aquatic species through habitat loss and changes to or reduction in food supply.

5.7.1.2 Potential Sources of Impact via Land and Air Pathways

The qualifying interest of Thomastown Quarry SAC (002252) is not expected to be impacted upon via land and air pathways as this site is approximately 1km north from Thomastown AFA. Two European sites were identified as potentially being impacted upon via land and air pathways; River Barrow and Nore SAC (002162) and River Nore SPA (004233). Qualifying interests of these sites at risk from land and air pathways are identified in Table 5.7.2. Additional detail on the qualifying interests has been included in Appendix C.

Table 5.7.2: Qualifying Interests of the screened in European sites likely to be impacted upon via land and air pathways from FRM measures undertaken at Thomastown AFA.

European Site (Site code)	Qualifying interests
River Barrow and Nore SAC (002162)	<p>Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i>, <i>Alnion incanae</i>, <i>Salicion albae</i>) [91E0]</p> <p>Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation [3260]</p> <p><i>Vertigo moulinsiana</i> (Desmoulin's Whorl Snail) [1016]</p> <p><i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) [1029]</p> <p><i>Austropotamobius pallipes</i> (White-clawed Crayfish) [1092]</p> <p><i>Petromyzon marinus</i> (Sea Lamprey) [1095]</p> <p><i>Lampetra planeri</i> (Brook Lamprey) [1096]</p> <p>River Lamprey (<i>Lampetra fluviatilis</i>) [1099]</p> <p><i>Alosa fallax fallax</i> (Twaite Shad) [1103]</p> <p>Salmon (<i>Salmo salar</i>) [1106]</p> <p>Otter (<i>Lutra lutra</i>) [1355]</p> <p><i>Margaritifera durrovensis</i> (Nore Pearl Mussel) [1990]</p>
River Nore SPA (004233)	Kingfisher (<i>Alcedo atthis</i>) [A229]

The following sources of impact arising from FRM measures at Thomastown AFA could potentially impact upon the European sites detailed above through land and air pathways:

- **Physical habitat disturbance and loss of woody vegetation cover** – There is likely to be a direct loss of natural and semi-natural habitat in the direct footprint and vicinity of the defences. Construction of flood walls and embankments adjacent to surface waters can result in a direct loss of or disturbance to aquatic, marginal and riparian habitats. This can indirectly impact on species through loss of habitat or changes in food supply, thereby negatively affecting conservation objectives.
- **Noise and visual disturbance** – The use of construction machinery and the presence of construction and maintenance workers can result in avoidance of suitable habitat by sensitive species.

5.7.1.3 Potential Sources of Impact via Groundwater Pathways

The qualifying interest of Thomastown Quarry SAC (002252) is 'Petrifying springs with tufa formation (Cratoneurion) [7220]', a groundwater-dependent terrestrial ecosystem. However, conservation objectives of this habitat are not expected to be impacted upon via groundwater pathways as this site is approximately 1km north upland from Thomastown AFA.

5.7.2 Impact Assessment

Table 5.7.3 assesses the screened in European sites in more detail and examines the ways in which the identified sources and pathways could adversely impact on habitats or species. Avoidance and mitigation measures are proposed to mitigate any significant adverse impacts. The potential for cumulative impacts was considered throughout the process of option development. Engagement with stakeholders ensured that the potential for in-combination and cumulative impacts at plan level was minimised. In combination and cumulative effects will be re-assessed at the project stage when project-specific information has been captured.

5.7.2.1 In-combination Effects

Appropriate Assessment requires consideration of the impacts on European sites of FRM measures at Thomastown AFA, in combination with other plans or projects that may impact on the sites resulting in cumulative negative impacts. Potential sources of in-combination effects identified as part of this assessment include:

- Drainage maintenance activities in the Nore catchment. The OPW carry out regular maintenance on those channels altered through schemes implemented following the 1945 Arterial Drainage Act. Ongoing maintenance activities that result in the release of suspended sediments are currently adversely impacting on salmon spawning grounds, therefore these activities could potentially result in adverse cumulative impacts on this species. All scheduled maintenance operations in the vicinity of a European Site will require Screening for Appropriate Assessment and Stage II Appropriate Assessment where required. It is recommended that no arterial drainage or existing flood scheme maintenance is carried out in the channels where FRM work is being undertaken during the construction phase.
- The Freshwater pearl mussel Nore sub-basin management plan (Second Draft, NS2, 2010) recognises that it is the combination of the negative effects of a number of pressures that are acting together to leave the freshwater pearl mussel habitat in unfavourable condition.

These include peat exploitation, agricultural activities (overgrazing, direct access to watercourses, nutrient addition through slurry or fertiliser additions), forestry activities and wastewater treatment. Existing pressures in the catchment that can result in an increased sediment load can be considered as cumulative impacts with the potential sediment load from FRM measures, owing to the unfavourable status of the species and its sensitivity to sedimentation.

- The Kilkenny County Development Plan 2014-2020 has the potential for in-combination or cumulative impacts on the River Barrow and Nore SAC and the River Nore SPA in relation to planned new infrastructure. No significant in-combination effects with the FRMP are predicted at plan level, however the potential for impacts should however be re-examined at the project level where additional detail on potential interactions between infrastructure and FRM schemes may be assessed once project-specific design information is available.
- The Graiguenamanagh & Thomastown Community Resilience Pilot Project comprises mainly non-structural measures such as flood warning systems which cannot be assessed in the NIS. Should individual property protection measures be adopted as a method of flood risk management in this project, these would generally be undertaken within the curtilage of existing properties and, as such, are unlikely to result in in-combination effects with FRM measures proposed in the FRMP on the River Barrow and Nore SAC. The potential for interactions should however be re-examined at the project level.
- FRM works may give rise to in-combination effects with the Thomastown Local Area Plan Area Plan 2009-2020's objective of creating open space and amenity areas, through cumulative loss of biodiversity, habitat and ecological corridors. Additional detail on potential interactions between development and the FRM scheme will be captured and assessed at project level when project-specific design information is available.
- In-combination effects may occur with FRM works, parallel projects or drainage schemes (see sections 3.1.2.2 and 4.1.7), carried out locally, or at other AFAs or locations in the UoM. There may be cumulative impacts on habitats or species from schemes constructed or undergoing maintenance simultaneously. Generic mitigation and monitoring measures have been developed in the FRMP, including the avoidance of undertaking FRM work on adjoining reaches of rivers for different AFAs or other parallel projects simultaneously. Provided the timing of FRM works is planned and managed correctly, no significant in-combination impacts are anticipated.

There are no other plans/projects ongoing or proposed (at the time of this study) which may give rise to any form of cumulative impact on the European sites.

Table 5.7.3: Impact assessment for FRM measures at Thomastown AFA (hard defences)

Site name (site code)	Qualifying interests	Potential source of impact	Pathway	Potential Impact	Avoidance/mitigation measures	Residual impact
River Barrow and Nore SAC (002162)	<p>Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno-Padion, <i>Alnion incanae</i>, <i>Salicion albae</i>) [91E0]</p> <p>Water courses of plain to montane levels with the <i>Ranunculon fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation [3260]</p> <p><i>Vertigo moulinsiana</i> (Desmoulin's Whorl Snail) [1016]</p> <p><i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) [1029]</p> <p><i>Austropotamobius pallipes</i> (White-clawed Crayfish) [1092]</p> <p><i>Petromyzon marinus</i> (Sea Lamprey) [1095]</p> <p><i>Lampetra planeri</i> (Brook Lamprey) [1096]</p> <p>River Lamprey (<i>Lampetra fluviatilis</i>) [1099]</p> <p><i>Alosa fallax fallax</i> (Twaite Shad) [1103]</p> <p>Salmon (<i>Salmo salar</i>) [1106]</p> <p>Otter (<i>Lutra lutra</i>) [1355]</p> <p><i>Margaritifera durrovensis</i> (Nore Pearl Mussel) [1990]</p>	<p>Suspended sediments</p> <p>Changes to nutrient levels/pollutant release</p>	Surface water	<p>The habitats and species for which the Barrow and Nore SAC was designated require particular water quality conditions. The favourable conservation conditions of Salmon, freshwater pearl mussel, and Nore pearl mussel are directly measured by water quality attributes, and the conservation status of other species are measured by attributes indirectly linked to water quality and sediment loadings, such as the extent and distribution of spawning habitats and the extent of freshwater habitat.</p> <p>Construction activities in or adjacent to the water could result in a release of suspended sediments and associated nutrients and/or pollution incidents from machinery. This could lead to a reduction in water quality, and result in adverse effects on the designated habitats and species through loss of habitat or changes to food supply. Salmon spawning grounds and freshwater and Nore pearl mussel juvenile habitat will be particularly susceptible to adverse impacts from the release of suspended solids. Disconnecting areas of floodplain from the river can lead to a reduction in water quality owing to a reduction in habitat area to attenuate nutrients or other pollutants.</p> <p>Otter may be impacted by sedimentation, should visibility be impaired or food supply be affected.</p> <p>In the absence of mitigation there are likely to be indirect, negative downstream impacts from sedimentation during construction. These impacts are expected to be short-term and local in scale but may have long-term impacts if salmon spawning beds or important Freshwater pearl mussel juvenile</p>	<p>A designated environmental officer should be appointed to oversee environmental management of the project.</p> <p>Strictly adhere to best practice protocols and SOPs during design, construction and maintenance.</p> <p>Follow Lamprey and Otter SOPs.</p> <p>Assess the need for silt management procedures and implement in consultation with a suitably-qualified FPM expert.</p> <p>Set hard defences back from the river channel wherever possible to minimise sediment loss into the river channel.</p> <p>Avoid arterial drainage or existing flood scheme maintenance works while FRM works are being undertaken.</p>	No

Site name (site code)	Qualifying interests	Potential source of impact	Pathway	Potential Impact	Avoidance/mitigation measures	Residual impact
				<p>habitat is present directly downstream.</p> <p>This AFA is within the Nore Lower Freshwater Pearl Mussel sensitive area, and is in a catchment with previous records of <i>Margaritifera</i>, but current status unknown. The UoM is covered by the second draft Nore sub-Basin Management Plan of 2010. There is potential for impacts on the conservation objectives for this species, including potential 'habitat extent' and 'substratum quality'.</p> <p>There is potential for impacts on 'Water courses of plain to montane levels with the <i>Ranunculus fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation', in particular on the conservation objective for this habitat to 'maintain a substratum that is dominated by large particles and free from fine sediments'.</p>	<p>Avoid working in-channel to ensure salmon and lamprey habitat is not disturbed.</p> <p>Surveys should be undertaken by appropriately qualified ecologists prior to commencement of the FRM work, to identify any important salmon, lamprey, twaite shad or crayfish habitat, or 'Water courses of plain to montane levels with the <i>Ranunculus fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation' in the vicinity of FRM works or directly downstream of the AFA, and any potentially significant impacts on these areas. Surveys should inform option design and design-specific mitigation.</p> <p>An appropriate freshwater pearl mussel expert should be appointed, to identify potential impacts on this species and provide appropriate mitigation advice. Should sedimentation impacts be possible on this species</p>	

Site name (site code)	Qualifying interests	Potential source of impact	Pathway	Potential Impact	Avoidance/mitigation measures	Residual impact
					and/or its potential habitat, the detailed FRM option design and sediment mitigation must prevent additional sediment from entering the watercourse. See also measures in Chapter 6	
		Water level changes		The designated habitats and species depend on specific hydrological regimes. Construction of flood walls and embankments can result in changes in channel hydrology, by increasing capacity and flow rates. This could lead to a reduction of suitable habitat and adverse effects on the conservation objectives for the species (population size and range). However, significant changes to the hydrological regime are unlikely, as the works will be local in nature, and are therefore unlikely to impact significantly on attributes used to define conservation status.	Strictly adhere to best practice protocols and SOPs during design, construction and maintenance. See also measures in Chapter 6	No
		Physical habitat disturbance/loss of woody vegetation cover	Land and air	Construction activities that remove vegetation or otherwise disturb habitats could adversely affect the habitat area, vegetation structure and composition of designated habitats. Destruction or alteration of aquatic or riparian habitats could adversely affect designated species through loss of cover for otter or damage to lamprey or salmon spawning areas. There is likely to be a direct loss of natural and semi-natural habitat in the direct footprint and vicinity of	Strictly adhere to best practice protocols and SOPs including Lamprey and Otter SOPs during design, construction and maintenance in order to minimise physical disturbance. Avoid working in-channel unless essential.	No

Site name (site code)	Qualifying interests	Potential source of impact	Pathway	Potential Impact	Avoidance/mitigation measures	Residual impact
				hard defences. These impacts are expected to be local in scale.	<p>An otter survey should be undertaken by an appropriately qualified ecologist with otter surveying experience. The survey should inform option design and design-specific mitigation.</p> <p>No in-channel working where a suitable sand/gravel Lamprey spawning habitat exists from April-May (King et al, 2008), subject to adjustment owing to local knowledge of IFI.</p> <p>No in-channel working during the salmonid spawning season. Instream works should only be carried out during the period July to September inclusive, following consultation and agreement with IFI.</p> <p>No in-channel or bankside works to be conducted within 50m of a known or potential Otter holt/ resting site.</p> <p>Rehabilitate any areas where riparian habitat has been damaged.</p>	

Site name (site code)	Qualifying interests	Potential source of impact	Pathway	Potential Impact	Avoidance/mitigation measures	Residual impact
					See also measures in Chapter 6.	
		Noise and visual disturbance		The species for which this SAC is designated are sensitive to disturbance by maintenance workers and noise from machinery and may avoid areas where works are being undertaken. This could adversely affect habitat use by otter, which require lying up areas throughout their territory.	<p>Strictly adhere to best practice protocols and SOPs including Lamprey and Otter SOPs during design, construction and maintenance in order to minimise physical disturbance.</p> <p>Avoid working in-channel unless essential.</p> <p>No in-channel or bankside works to be conducted within 50m of a known or potential otter holt/ resting site.</p> <p>See also measures in Chapter 6.</p>	No
		Introduction or spreading of alien invasive species	Land and surface water	Invasive species can spread rapidly through habitats, form dense thickets which can out-compete native plants and cause problems with soil erosion	<p>Carry out invasive species surveys and follow SOPs (see Table 6.1.1)</p> <p>See general mitigation in Chapter 6</p>	No
River Nore SPA (004233)	Kingfisher (<i>Alcedo atthis</i>)[A229]	<p>Suspended sediments</p> <p>Changes to nutrient levels/pollutant release</p>	Surface water	Kingfisher populations are dependent on river channels and their associated marginal and riparian habitats. Construction activities in or adjacent to the water could result in a release of suspended sediments and associated nutrients and/or pollution incidents from machinery. This could lead to a reduction in water quality, affecting the habitats and food supply (macroinvertebrates and fish) of the	<p>Strictly adhere to best practice protocols and SOPs during design, construction and maintenance.</p> <p>See also measures in Chapter 6.</p>	No

Site name (site code)	Qualifying interests	Potential source of impact	Pathway	Potential Impact	Avoidance/mitigation measures	Residual impact
				Kingfisher and adversely affecting the distribution and long-term population trends of the species. There are likely to be indirect, negative downstream impacts from sedimentation during construction. These impacts are expected to be short-term and local in scale, and are unlikely to impact significantly on attributes used to define conservation status.		
		Water level changes		The habitats on which Kingfisher populations depend require specific hydrological regimes. Construction of flood walls and embankments can result in changes in channel hydrology, by increasing capacity and flow rates. This can adversely impact on Kingfisher populations through habitat loss and changes to/reduction in food supply, possibly affecting distribution and long-term population trends of the species within the SPA. However, significant changes to the hydrological regime are unlikely, as the works will be local in nature, and are therefore unlikely to impact significantly on attributes used to define conservation status.	Strictly adhere to best practice protocols and SOPs during design, construction and maintenance. See also measures in Chapter 6.	No
		Physical habitat disturbance Noise and visual disturbance	Land and air	Kingfisher populations are dependent on marginal and riparian habitats of river channels, and nest in burrows on vertical river banks. Construction of flood walls and embankments and associated removal of vegetation and disturbance of banks could adversely affect the range area, foraging/perching habitat and distribution of the species within the SPA as well as long-term population trends. Kingfishers are sensitive to disturbance by maintenance workers and noise from machinery and may avoid areas where works are being undertaken.	Survey by a qualified ecologist prior to commencement of the FRM work, to assess use of the channel by kingfisher in the vicinity of FRM works and presence of burrows. Avoid disturbance of Kingfisher burrows from March-September.	No

Site name (site code)	Qualifying interests	Potential source of impact	Pathway	Potential Impact	Avoidance/mitigation measures	Residual impact
				This could adversely affect its distribution within the SPA.	<p>Avoid in-channel or bankside vegetation removal within 30m of Kingfisher burrows</p> <p>If burrows in vertical banks are discovered during the works, works must stop immediately and the burrows be inspected by a suitably qualified ecologist.</p> <p>Leave bankside vegetation intact wherever possible. Rehabilitate any areas where riparian habitat has been damaged.</p> <p>See also measures in Chapter 6.</p>	
		Introduction or spreading of alien invasive species	Land and surface water	Invasive species can spread rapidly through habitats, form dense thickets which can out-compete native plants and cause problems with soil erosion	<p>Carry out invasive species surveys and follow SOPs (see Table 6.1.1)</p> <p>See general mitigation in Chapter 6</p>	No

5.7.3 Conclusions

This NIS details the findings of the Stage 2 Appropriate Assessment conducted to further examine the potential direct and indirect impacts of proposed FRM works at Thomastown AFA on the following European sites:

- River Barrow and Nore SAC (002162)
- River Nore SPA (004233)
- Thomastown Quarry SAC (002252)

The Appropriate Assessment investigated the potential direct and indirect impacts of the proposed works on the integrity and interest features of the above European sites, alone and in-combination with other plans and projects, taking into account the sites' structure, function and conservation objectives. Where potentially significant adverse impacts were identified, a range of mitigation and avoidance measures have been suggested to help offset them. As a result of this Appropriate Assessment it has been concluded that, following the avoidance and mitigation measures suggested, the FRM measures at Thomastown AFA will not have a significant adverse impact on the above European sites.

All lower level plans arising through the implementation of the FRMP which require the progression of physical works will themselves be subject to Appropriate Assessment, when details of design and location are known and potential effects on the attributes and targets of site specific conservation objectives can be fully evaluated.

5.8 KILKENNY (BREAGAGH) AFA

All European sites in the zone of influence of Kilkenny (Nore) and Kilkenny (Breaghagh) AFA were screened for possible impacts from FRM methods (See Chapter 3.5). The Kilkenny (Nore) AFA has been evaluated as having a low level of flood risk and has no new physical measures proposed in the FRMP. Screening of the Kilkenny (Breaghagh) measures assessed the potential for impact at three European sites (Figure 5.8.1):

- River Barrow and Nore SAC (002162)
- River Nore SPA (004233)
- Thomastown Quarry SAC (002252)

Thomastown Quarry SAC was found to have no identifiable impact pathway arising from the implementation of FRM methods within the Kilkenny (Breaghagh) AFA catchment and was therefore screened out as not requiring any further assessment. Two sites were identified as potentially being impacted upon through FRM activities at Kilkenny (Breaghagh) AFA: River Barrow and Nore SAC (002162), River Nore SPA (004233). The following section assesses the proposed FRM measures described in Chapter 4.3.2.8 in relation to the screened-in European sites.

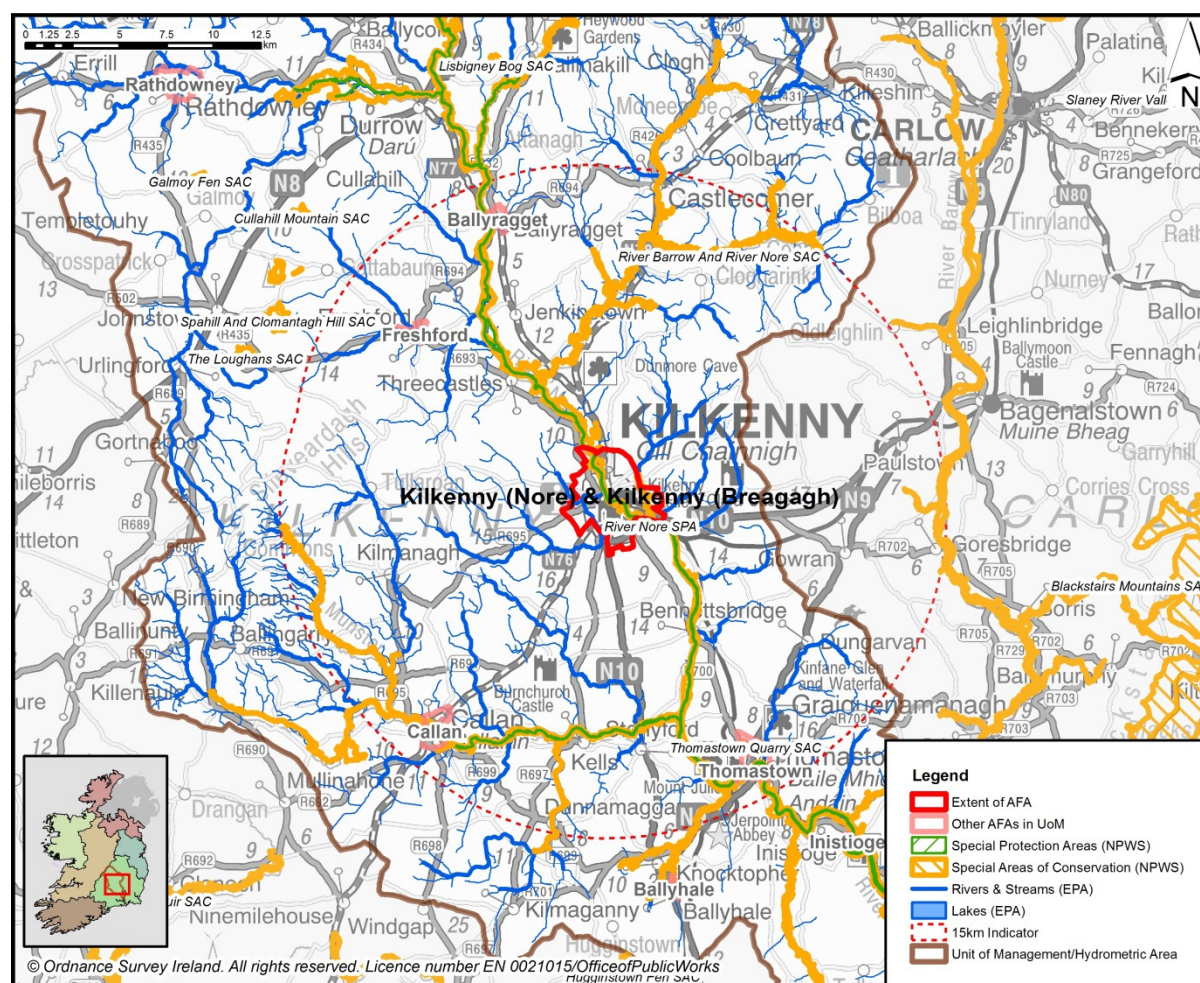


Figure 5.8.1: Kilkenny (Nore) and Kilkenny (Breaghagh) AFA in context of catchment and surrounding European sites

5.8.1 Identification of Potential Sources of Impact

This section further examines the source > pathway > receptor linkages that could potentially result in adverse impacts arising from FRM measures at Kilkenny (Breagagh) AFA on the screened in European sites. The qualifying interest(s) of the site(s) at risk from surface water pathways are identified in Table 5.8.1 and from land and air pathways in Table 5.8.2. Additional detail on the attributes and targets of the qualifying interests has been included in Appendix C. These have been consulted in order to assess the potential impacts of the proposed flood relief measures on the designated habitats and species insofar as plan-level details allowed.

5.8.1.1 Potential Sources of Impact via Surface Water Pathways

Two European sites were identified as potentially being impacted upon via surface water pathways; River Barrow and Nore SAC (002162) and River Nore SPA (004233). Qualifying interests of these sites at risk from surface water pathways are identified in Table 5.7.1. Additional detail on the qualifying interests has been included in Appendix C.

Table 5.8.1: Qualifying Interests of the screened in European sites likely to be impacted upon via surface water pathways from FRM measures undertaken at Kilkenny (Breagagh) AFA.

European Site (Site code)	Qualifying interests
River Barrow and Nore SAC (002162)	<p>Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i>, <i>Alnion incanae</i>, <i>Salicion albae</i>) [91E0]</p> <p>Water courses of plain to montane levels with the <i>Ranunculon fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation [3260]</p> <p><i>Vertigo moulinsiana</i> (Desmoulin's Whorl Snail) [1016]</p> <p><i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) [1029]</p> <p><i>Austropotamobius pallipes</i> (White-clawed Crayfish) [1092]</p> <p><i>Petromyzon marinus</i> (Sea Lamprey) [1095]</p> <p><i>Lampetra planeri</i> (Brook Lamprey) [1096]</p> <p>River Lamprey (<i>Lampetra fluviatilis</i>) [1099]</p> <p><i>Alosa fallax fallax</i> (Twaite Shad) [1103]</p> <p>Salmon (<i>Salmo salar</i>) [1106]</p> <p>Otter (<i>Lutra lutra</i>) [1355]</p> <p><i>Margaritifera durrovensis</i> (Nore Pearl Mussel) [1990]</p>
River Nore SPA (004233)	Kingfisher (<i>Alcedo atthis</i>) [A229]

The following sources of impact arising from FRM measures at Kilkenny (Breagagh) AFA could potentially impact upon the European sites detailed above through surface water pathways:

Suspended sediments – There may be indirect negative downstream impacts from sedimentation during construction of hard defences. Construction activities within or adjacent to surface waters can result in the release of suspended sediments into those waters. This can lead to increased turbidity of surface waters, and an associated reduction in photosynthesis, which can impact on surface water dependent habitats. Impacts on aquatic species can occur through loss of suitable habitat (e.g. salmon spawning habitat), changes to or reduction in food supply (e.g. aquatic invertebrate density or diversity), or increased difficulty in feeding (e.g. otters will find greater difficulty hunting in turbid surface waters).

The creation of habitat and / or land management practices which help to control runoff can help to reduce the loss of sediments, leading to improvements in water quality.

- **Changes in nutrient levels/pollutants** – Construction activities in or adjacent to surface waters can result in the release of nutrients into those waters, and can lead to reduced water quality and eutrophication. Hard defences can interfere with natural process, by causing some or all of the floodplain to be disconnected from the river, which can lead to the loss of natural habitat to capture, filter and recycle nutrients or pollutants. This can lead to a reduction in water quality. Spillages of hydrocarbons or other contaminants during FRM works can also result in a reduction in water quality. Reduced water quality and eutrophication can adversely impact on surface water dependent habitats, and on aquatic species through loss of suitable habitat, changes to or reduction in food supply, or increased difficulty in feeding.
- **Changes in water levels/channel morphology** – Changes to channel morphology through the use of flood walls and embankments can lead to changes in capacity and flow of surface waters. This can lead to hydrological impacts on surface water dependent habitats and to aquatic species through habitat loss and changes to or reduction in food supply.

5.8.1.2 Potential Sources of Impact via Land and Air Pathways

Two European sites were identified as potentially being impacted upon via land and air pathways; River Barrow and Nore SAC (002162) and River Nore SPA (004233). Qualifying interests of these sites at risk from land and air pathways are identified in Table 5.8.2. Additional detail on the qualifying interests has been included in Appendix C.

Table 5.8.2: Qualifying Interests of the screened in European sites likely to be impacted upon via land and air pathways from FRM measures undertaken at Kilkenny (Breagagh) AFA.

European Site (Site code)	Qualifying interests
River Barrow and Nore SAC (002162)	<p>Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i>, <i>Alnion incanae</i>, <i>Salicion albae</i>) [91E0]</p> <p>Water courses of plain to montane levels with the <i>Ranunculus fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation [3260]</p> <p><i>Vertigo moulinsiana</i> (Desmoulin's Whorl Snail) [1016]</p> <p><i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) [1029]</p> <p><i>Austropotamobius pallipes</i> (White-clawed Crayfish) [1092]</p> <p><i>Petromyzon marinus</i> (Sea Lamprey) [1095]</p> <p><i>Lampetra planeri</i> (Brook Lamprey) [1096]</p> <p>River Lamprey (<i>Lampetra fluviatilis</i>) [1099]</p> <p><i>Alosa fallax fallax</i> (Twaiite Shad) [1103]</p> <p>Salmon (<i>Salmo salar</i>) [1106]</p> <p>Otter (<i>Lutra lutra</i>) [1355]</p> <p><i>Margaritifera durrovensis</i> (Nore Pearl Mussel) [1990]</p>
River Nore SPA (004233)	Kingfisher (<i>Alcedo atthis</i>)[A229]

The following sources of impact arising from FRM measures at Kilkenny (Breagagh) AFA could potentially impact upon the European sites detailed above through land and air pathways:

- **Physical habitat disturbance and loss of woody vegetation cover** – There is likely to be a direct loss of natural and semi-natural habitat in the direct footprint and vicinity of new hard defences. Construction of flood walls and embankments adjacent to surface waters can result in a direct loss of or disturbance to aquatic, marginal and riparian habitats. This can indirectly impact on species through loss of habitat or changes in food supply, thereby negatively affecting conservation objectives.
- **Noise and visual disturbance** – The use of construction machinery and the presence of construction and maintenance workers can result in avoidance of suitable habitat by sensitive species.

5.8.2 Impact Assessment

Table 5.8.3 assesses the screened-in European sites in more detail and examines the ways in which the identified sources and pathways could adversely impact on habitats or species. Avoidance and mitigation measures are proposed to mitigate any significant adverse impacts. The potential for cumulative impacts was considered throughout the process of option development. Engagement with stakeholders ensured that the potential for in-combination and cumulative impacts at plan level was minimised. In combination and cumulative effects will be re-assessed at the project stage when project-specific information has been captured.

5.8.2.1 In-combination Effects

Appropriate Assessment requires consideration of the impacts on European sites of FRM measures at Kilkenny (Breagagh) AFA, in combination with other plans or projects that may impact on the sites resulting in cumulative negative impacts. Potential sources of in-combination effects identified as part of this assessment include:

- Drainage maintenance activities in the Nore catchment. The OPW carries out regular maintenance on those channels altered through schemes implemented following the 1945 Arterial Drainage Act. Ongoing maintenance activities that result in the release of suspended sediments are currently adversely impacting on salmon spawning grounds, therefore these activities could potentially result in adverse cumulative impacts on this species. All scheduled maintenance operations in the vicinity of a European Site will require Screening for Appropriate Assessment and Stage II Appropriate Assessment where required. It is recommended that no arterial drainage or existing flood scheme maintenance is carried out in the channels where FRM work is being undertaken during the construction phase.
- The Freshwater pearl mussel Nore sub-basin management plan (Second Draft, NS2, 2010) recognises that it is the combination of the negative effects of a number of pressures that are acting together to leave the freshwater pearl mussel habitat in unfavourable condition. These include peat exploitation, agricultural activities (overgrazing, direct access to watercourses, nutrient addition through slurry or fertiliser additions), forestry activities and wastewater treatment. Existing pressures in the catchment that can result in an increased sediment load can be considered as cumulative impacts with the potential sediment load from FRM measures, owing to the unfavourable status of the species and its sensitivity to sedimentation.

- The Kilkenny County Development Plan 2014-2020 has the potential for in-combination or cumulative impacts on the River Barrow and Nore SAC and the River Nore SPA in relation to planned new infrastructure. No significant in-combination effects with the FRMP are predicted at plan level, however the potential for impacts should however be re-examined at the project level where additional detail on potential interactions between infrastructure and FRM schemes may be assessed once project-specific design information is available.
- The Kilkenny City and Environs Development Plan 2014-2020 has the potential for in-combination or cumulative impacts on the River Barrow and Nore SAC and the River Nore SPA in relation to development (including infrastructure) and creation of amenity and recreation areas which may give rise to cumulative loss of biodiversity, habitat or ecological corridors. Additional detail on potential interactions between development and the FRM scheme will be captured and assessed at project level when project-specific design information is available.
- In-combination effects may occur with FRM works, parallel or preceding projects or drainage schemes (see sections 3.1.2.2 and 4.1.7), carried out locally or at other AFAs or locations in the UoM. There may be cumulative impacts on habitats or species from schemes constructed or undergoing maintenance simultaneously. Generic mitigation and monitoring measures have been developed in the FRMP, including the avoidance of undertaking FRM work on adjoining reaches of rivers for different AFAs or other parallel projects simultaneously. Provided the timing of FRM works is planned and managed correctly, no significant in-combination impacts are anticipated.

There are no other plans/projects ongoing or proposed (at the time of this study) which may give rise to any form of cumulative impact on the European sites.

Table 5.8.3: Impact assessment for FRM measures at Kilkenny (Breagagh) AFA (Hard Defences)

Site name (site code)	Qualifying interests	Potential source of impact	Pathway	Potential Impact	Avoidance/mitigation measures	Residual impact
River Barrow and Nore SAC (002162)	<p>Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i>, <i>Alnion incanae</i>, <i>Salicion albae</i>) [91E0]</p> <p>Water courses of plain to montane levels with the <i>Ranunculum fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation [3260]</p> <p><i>Vertigo moulinsiana</i> (Desmoulin's Whorl Snail) [1016]</p> <p><i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) [1029]</p> <p><i>Austropotamobius pallipes</i> (White-clawed Crayfish) [1092]</p> <p><i>Petromyzon marinus</i> (Sea Lamprey) [1095]</p> <p><i>Lampetra planeri</i> (Brook Lamprey) [1096]</p> <p>River Lamprey (<i>Lampetra fluviatilis</i>) [1099]</p> <p><i>Alosa fallax fallax</i> (Twaite Shad) [1103]</p> <p>Salmon (<i>Salmo salar</i>) [1106]</p> <p>Otter (<i>Lutra lutra</i>) [1355]</p> <p><i>Margaritifera durrovensis</i> (Nore Pearl Mussel) [1990]</p>	<p>Suspended sediments</p> <p>Changes to nutrient levels/pollutant release</p>	Surface water	<p>The habitats and species for which the Barrow and Nore SAC was designated require particular water quality conditions. The favourable conservation conditions of Salmon, freshwater pearl mussel, and Nore pearl mussel are directly measured by water quality attributes, and the conservation status of other species are measured by attributes indirectly linked to water quality and sediment loadings, such as the extent and distribution of spawning habitats and the extent of freshwater habitat.</p> <p>Construction activities in or adjacent to the water could result in a release of suspended sediments and associated nutrients and/or pollution incidents from machinery. This could lead to a reduction in water quality, and result in adverse effects on the designated habitats and species through loss of habitat or changes to food supply. Salmon spawning grounds and freshwater and Nore pearl mussel juvenile habitat will be particularly susceptible to adverse impacts from the release of suspended solids. Disconnecting areas of floodplain from the river can lead to a reduction in water quality owing to a reduction in habitat area to attenuate nutrients or other pollutants.</p> <p>Otter may be impacted by sedimentation, should visibility be impaired or food supply be affected.</p> <p>In the absence of mitigation there are likely to be indirect, negative downstream impacts from sedimentation during construction. These impacts are expected to be short-term and local in scale but may have long-term impacts if salmon spawning beds or important Freshwater pearl mussel juvenile habitat is present directly downstream.</p>	<p>A designated environmental officer should be appointed to oversee environmental management of the project.</p> <p>Strictly adhere to best practice protocols and SOPs during design, construction and maintenance.</p> <p>Follow Lamprey and Otter SOPs.</p> <p>Assess the need for silt management procedures and implement in consultation with a suitably-qualified FPM expert.</p> <p>Set hard defences back from the river channel wherever possible to minimise sediment loss into the river channel.</p> <p>Avoid arterial drainage or existing flood scheme maintenance works while FRM works are being undertaken.</p>	No

Site name (site code)	Qualifying interests	Potential source of impact	Pathway	Potential Impact	Avoidance/mitigation measures	Residual impact
				<p>This AFA is within the Nore Lower Freshwater Pearl Mussel sensitive area, and is in a catchment with previous records of <i>Margaritifera</i>, but current status unknown. The UoM is covered by the second draft Nore sub-Basin Management Plan of 2010. There is potential for impacts on the conservation objectives for this species, including potential 'habitat extent' and 'substratum quality'.</p> <p>There is potential for negative impacts on 'Water courses of plain to montane levels with the <i>Ranunculus fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation', in particular on the conservation objective for this habitat to 'maintain a substratum that is dominated by large particles and free from fine sediments'.</p>	<p>Avoid working in-channel to ensure salmon and lamprey habitat is not disturbed.</p> <p>Surveys should be undertaken by appropriately qualified ecologists prior to commencement of the FRM work, to identify any important salmon, lamprey, twaite shad or crayfish habitat, or 'Water courses of plain to montane levels with the <i>Ranunculus fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation' in the vicinity of FRM works or directly downstream of the AFA, and any potentially significant impacts on these areas. Surveys should inform option design and design-specific mitigation.</p> <p>An appropriate freshwater pearl mussel expert should be appointed, to identify potential impacts on this species and provide appropriate mitigation advice. Should sedimentation impacts be possible on this species</p>	

Site name (site code)	Qualifying interests	Potential source of impact	Pathway	Potential Impact	Avoidance/mitigation measures	Residual impact
					and/or its potential habitat, the detailed FRM option design and sediment mitigation must prevent additional sediment from entering the watercourse. See also measures in Chapter 6	
		Water level changes		The designated habitats and species depend on specific hydrological regimes. Construction of flood walls and embankments can result in changes in channel hydrology, by increasing capacity and flow rates. This could lead to a reduction of suitable habitat and adverse effects on the conservation objectives for the species (population size and range). However, significant changes to the hydrological regime are unlikely, as the works will be local in nature, and are therefore unlikely to impact significantly on attributes used to define conservation status.	Strictly adhere to best practice protocols and SOPs during design, construction and maintenance. See also measures in Chapter 6	No
		Physical habitat disturbance/loss of woody vegetation cover	Land and air	Construction activities that remove vegetation or otherwise disturb habitats could adversely affect the habitat area, vegetation structure and composition of designated habitats. Destruction or alteration of aquatic or riparian habitats could adversely affect designated species through loss of cover for otter or damage to lamprey or salmon spawning areas. There is likely to be a direct loss of natural and semi-natural habitat in the direct footprint and vicinity of hard defences. These impacts are expected to be	Strictly adhere to best practice protocols and SOPs including Lamprey and Otter SOPs during design, construction and maintenance in order to minimise physical disturbance. Avoid working in-channel unless essential. An otter survey should be	No

Site name (site code)	Qualifying interests	Potential source of impact	Pathway	Potential Impact	Avoidance/mitigation measures	Residual impact
				local in scale.	<p>undertaken by an appropriately qualified ecologist with otter surveying experience. The survey should inform option design and design-specific mitigation.</p> <p>No in-channel working where a suitable sand/gravel Lamprey spawning habitat exists from April-May (King et al, 2008), subject to adjustment owing to local knowledge of IFI.</p> <p>No in-channel working during the salmonid spawning season. Instream works should only be carried out during the period July to September inclusive, following consultation and agreement with IFI.</p> <p>No in-channel or bankside works to be conducted within 50m of a known or potential Otter holt/ resting site.</p> <p>Rehabilitate any areas where riparian habitat has been damaged.</p>	

Site name (site code)	Qualifying interests	Potential source of impact	Pathway	Potential Impact	Avoidance/mitigation measures	Residual impact
					See also measures in Chapter 6.	
		Noise and visual disturbance		The species for which this SAC is designated are sensitive to disturbance by maintenance workers and noise from machinery and may avoid areas where works are being undertaken. This could adversely affect habitat use by otter, which require lying up areas throughout their territory.	<p>Strictly adhere to best practice protocols and SOPs including Lamprey and Otter SOPs during design, construction and maintenance in order to minimise physical disturbance.</p> <p>Avoid working in-channel unless essential.</p> <p>No in-channel or bankside works to be conducted within 50m of a known or potential otter holt/ resting site.</p> <p>See also measures in Chapter 6.</p>	No
		Introduction or spreading of alien invasive species	Land and surface water	Invasive species can spread rapidly through habitats, form dense thickets which can out-compete native plants and cause problems with soil erosion	<p>Carry out invasive species surveys and follow SOPs (see Table 6.1.1)</p> <p>See general mitigation in Chapter 6</p>	No
River Nore SPA (004233)	Kingfisher (<i>Alcedo atthis</i>)[A229]	<p>Suspended sediments</p> <p>Changes to nutrient levels/pollutant release</p>	Surface water	Kingfisher populations are dependent on river channels and their associated marginal and riparian habitats. Construction activities in or adjacent to the water could result in a release of suspended sediments and associated nutrients and/or pollution incidents from machinery. This could lead to a reduction in water quality, affecting the habitats and food supply (macroinvertebrates and fish) of the Kingfisher and adversely affecting the distribution	<p>Strictly adhere to best practice protocols and SOPs during design, construction and maintenance.</p> <p>See also measures in Chapter 6.</p>	No

Site name (site code)	Qualifying interests	Potential source of impact	Pathway	Potential Impact	Avoidance/mitigation measures	Residual impact
				and long-term population trends of the species. There are likely to be indirect, negative downstream impacts from sedimentation during construction. These impacts are expected to be short-term and local in scale, and are unlikely to impact significantly on attributes used to define conservation status.		
		Water level changes		The habitats on which Kingfisher populations depend require specific hydrological regimes. Construction of flood walls and embankments can result in changes in channel hydrology, by increasing capacity and flow rates. This can adversely impact on Kingfisher populations through habitat loss and changes to/reduction in food supply, possibly affecting distribution and long-term population trends of the species within the SPA. However, significant changes to the hydrological regime are unlikely, as the works will be local in nature, and are therefore unlikely to impact significantly on attributes used to define conservation status.	Strictly adhere to best practice protocols and SOPs during design, construction and maintenance. See also measures in Chapter 6.	No
		Physical habitat disturbance Noise and visual disturbance	Land and air	Kingfisher populations are dependent on marginal and riparian habitats of river channels, and nest in burrows on vertical river banks. Construction of flood walls and embankments and associated removal of vegetation and disturbance of banks could adversely affect the range area, foraging/perching habitat and distribution of the species within the SPA as well as long-term population trends. Kingfishers are sensitive to disturbance by maintenance workers and noise from machinery and may avoid areas where works are being undertaken. This could adversely affect its distribution within the SPA.	Survey by a qualified ecologist prior to commencement of the FRM work, to assess use of the channel by kingfisher in the vicinity of FRM works and presence of burrows. Avoid disturbance of Kingfisher burrows from March-September. Avoid in-channel or bankside vegetation	No

Site name (site code)	Qualifying interests	Potential source of impact	Pathway	Potential Impact	Avoidance/mitigation measures	Residual impact
					<p>removal within 30m of Kingfisher burrows</p> <p>If burrows in vertical banks are discovered during the works, works must stop immediately and the burrows be inspected by a suitably qualified ecologist.</p> <p>Leave bankside vegetation intact wherever possible. Rehabilitate any areas where riparian habitat has been damaged.</p> <p>See also measures in Chapter 6.</p>	
		Introduction or spreading of alien invasive species	Land and surface water	Invasive species can spread rapidly through habitats, form dense thickets which can out-compete native plants and cause problems with soil erosion	<p>Carry out invasive species surveys and follow SOPs (see Table 6.1.1)</p> <p>See general mitigation in Chapter 6</p>	No

5.8.3 Conclusions

This NIS details the findings of the Stage 2 Appropriate Assessment conducted to further examine the potential direct and indirect impacts of proposed FRM works at Kilkenny (Breaghagh) AFA on the following European sites:

- River Barrow and Nore SAC (002162)
- River Nore SPA (004233)

The Appropriate Assessment investigated the potential direct and indirect impacts of the proposed works on the integrity and interest features of the above European sites, alone and in-combination with other plans and projects, taking into account the sites' structure, function and conservation objectives. Where potentially significant adverse impacts were identified, a range of mitigation and avoidance measures have been suggested to help offset them. As a result of this Appropriate Assessment it has been concluded that, following the avoidance and mitigation measures suggested, the FRM measures at Kilkenny (Breaghagh) AFA will not have a significant adverse impact on the above European sites.

All lower level plans arising through the implementation of the FRMP which require the progression of physical works will themselves be subject to Appropriate Assessment, when details of design and location are known and potential effects on the attributes and targets of site specific conservation objectives can be fully evaluated.s and targets of site specific conservation objectives can be fully evaluated.

6 AVOIDANCE AND MITIGATION MEASURES

6.1 GENERAL MITIGATION

General mitigation measures have been included in Chapter 6 of the FRMP. Mitigation measures are recommended where the preferred options are predicted to have negative effects (whether minor, moderate or major). In some cases where positive effects are identified, actions may be recommended to maximise the potential benefit.

The principal mitigation recommendation is that the predicted negative effects should be considered further during the next stage of option development, when details of the option (e.g. alignment and footprint of flood defences) can be optimised through detailed feasibility studies and design in order to limit identified impacts on sensitive receptors.

Further environmental studies to inform the detailed design and construction methodology should be undertaken as appropriate. These studies may involve, but are not limited to, aquatic and terrestrial habitat surveys, ornithological, ground mammal and bat surveys and fish surveys. At project level, the preferred option design and construction methodology will be subject to a further screening for Appropriate Assessment and, where necessary, Appropriate Assessment carried out.

Before any works are carried out, detailed method statements and management plans (construction and environmental) should be prepared, including timing of works and information on the specific mitigation measures to be employed for each works area. These should be completed in the option design stage and should be subject to further Appropriate Assessment where potential impacts have been identified in this NIS for the FRMP. Works should only be carried out once the method statements have been agreed with relevant authorities such as the NPWS and Inland Fisheries Ireland (IFI). At the project level it will not be sufficient to defer the production of construction method statements.

Consideration will be given to the planning and timing of construction and maintenance works. FRM works on adjoining reaches of rivers in different AFAs should not be scheduled to occur simultaneously with each other, or with other parallel projects.

Direct instream works such as culvert upgrades or proposed measures along the riverbank have the greatest potential for negative impacts during spawning / breeding and early nursery periods for aquatic protected species. No instream or potentially significantly damaging out of river works should occur during restricted periods for relevant species and consultation should be undertaken with Inland Fisheries Ireland (IFI) in this regard.

A designated environmental officer should be appointed for environmental management of each scheme. Monitoring of project level mitigation measures should be undertaken during and after works, to ensure effectiveness.

All works and planning of works will be undertaken with regard to the OPW Environmental Management Protocols (EMP) and Standard Operating Procedures (SOP), all relevant legislation, licensing and consent requirements, and recommended best practice guidelines at the time of construction or maintenance.

Table 6.1.1: General Mitigation recommended in the FRMP

Potential Impact	Proposed Mitigation
Temporary disturbance and destruction of existing habitats and flora, and the displacement of fauna, along the river corridors.	Good planning and timing of works to minimise footprint impacts. Where applicable, prior to any vegetation clearance an appropriately qualified ecologist should be contracted to undertake a 'pre-vegetation clearance' survey for signs of nesting birds and protected and important species e.g. otters, kingfisher etc. Should important species be found during surveys the sequential approach of avoid, reduce or mitigate should be adopted to prevent significant impacts with advice from appropriately qualified professional. Vegetation and tree clearance should be minimised and only occur outside the main bird nesting season. If this seasonal restriction cannot be accommodated, a suitably qualified ecologist with experience in nest-finding will be required to check all vegetation for nests (under licence from NPWS to permit potential disturbance to nesting birds) prior to removal/trimming. At sites where there are populations of over-wintering birds, to avoid disturbance, works should not be undertaken between September and March. Following construction, replanting and landscaping, or natural revegetating, should be undertaken in line with appropriate guidelines that aim to improve local biodiversity and wildlife, therefore will give medium and long term benefits to the biodiversity, flora and fauna of the working areas. Where possible, original sediment/soil should be reinstated to original levels to facilitate natural restoration and recolonisation of habitat. Adhere to OPW EMP and SOP or other relevant best practice at the time of development and consider integration of design as part of blue/green infrastructure plans and habitat enhancement where possible
Temporary displacement of otters, birds, fish and other fauna during the construction period.	Good planning, good timing of works and sensitive construction methods are essential. Adherence to best practice at the time of construction or maintenance, e.g. NRA construction guidelines on Crossing of Watercourses, on Treatment of Otters etc., Eastern Regional Fisheries Board Requirements for 'Protection of Fisheries Habitat during Construction and Development Works at River Sites' and IFI 'Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters'. Proposed measures should be designed to minimise impact on otter habitat and shall include otter passes and fishways / ladders where possible. Pre-construction otter survey on all watercourses and any derogation licences applied for, where necessary. Adhere to OPW EMP and SOP or other relevant best practice at the time of development and maintenance.
Impact on European sites, habitats and species from construction or operation of FRM scheme.	Good planning and timing of works, and good construction and management practices to keep impacts to a minimum. Site and species specific mitigation provided in NIS for the FRMP including site specific surveys, timing of works etc. Provide local, connected, compensatory habitat if loss of area of Natura site is unavoidable. Adhere to OPW EMP and SOP or other relevant best practice at the time of development and maintenance.
Spread of invasive species during construction.	Pre-construction survey for alien invasive species along all watercourses and adjoining lands where necessary, e.g. for Himalayan balsam and Japanese knotweed. Cleaning of equipment and machinery along with strict management protocols to combat the spread of invasive species. Preparation of invasive species management plan for construction and maintenance-related activities, if invasive species are recorded during the pre-construction surveys. Any imported materials will need to be free from alien invasive species. Post-construction survey for invasive species. Adhere to OPW EMP and SOP or other relevant best practice at the time of development and maintenance.

Potential Impact	Proposed Mitigation
Culverting impacts on faunal passage, where applicable.	Ledges and adequate access may be required for some culverts to allow continued passage of fauna. Consideration will be given to setting back walls from the river bank as an alternative to culverts where feasible. Adhere to OPW EMP and SOP or other relevant best practice at the time of development and maintenance.
Impacts on Freshwater Pearl Mussel	Where freshwater pearl mussels may be impacted, an appropriate FPM expert should be consulted for surveys and in planning, scheme design and project level mitigation. Any relevant FPM Management Plans and SOPs should be adhered to and relevant best practice adhered to.
Dredging impacts on biodiversity, flora and fauna.	Minimise requirement for in-stream works through good planning. Good dredging practices should be implemented, along with consultation with environmental bodies e.g. IFI, on methodology and appropriate timing to cause the least amount of damage, habitat loss, and sedimentation. Dredging works should be carried out during low flow conditions and should cease during heavy rainfall and flood conditions, to reduce suspended solids in the river. Spoil and removed vegetation material from the river should be stored back from the river and a vegetation buffer zone is to be retained, in order to reduce the run-off of suspended solids back into the watercourse. In stream works should be phased to leave undamaged refugia to maintain aquatic macroinvertebrates populations within the river channel. No machinery should be allowed to operate within the river flow without full consultation and approval of the methodology of the proposed works by the relevant statutory bodies. Scoping or relevant specialist ecological surveys during the planning stage and prior to any construction works. Adhere to OPW EMP and SOP or other relevant best practice at the time of development and maintenance.
Removal of soil and rock material via dredging and excavation works during construction.	Re-use material where possible on site for either embankments or landscaping. Consideration for use of material such as geojute or coir mesh on embankments above rivers or streams to hold the soil allowing time for vegetation to establish, while avoiding erosion. Where applicable it is recommended that coarse aggregates (cobble and gravel) removed from the river channel should be stockpiled for replacement and rehabilitation in the reformed river bed. Such material will be stored away from the river bank to ensure that runoff from the material does not affect water quality in the river in the form of increased suspended solids.
Temporary disturbances of water quality during the construction phase	Good management and planning to keep water quality disturbance to a minimum. Any potential water quality issues from construction should be contained and treated to ensure no damage to natural waterbodies. Dredging and construction will have to be planned appropriately, using Best Available Techniques / Technology (BAT) at all times, to ensure water quality issues are kept to a minimum, with no significant adverse effects. Guidelines such as CIRIA Document C532 - Control of Water Pollution from Construction Sites and CIRIA documents C521 - SUDS -Design manual for Scotland and NI, and C523 - SUDS -Best Practice Manual to be adhered to. Development and consenting of environmental management plan prior to commencement of works. Adhere to OPW EMP and SOP or other relevant best practice at the time of development and maintenance.
Potential for pollution incidents during the construction phase.	Minimise requirement for in-stream works through good planning. Strict management and regulation of construction activities. Provision of good facilities in construction areas to help prevent pollution incidents. Preparation of emergency response plans. Good work practices including; channelling of discharges to settlement ponds, construction of silt traps, construction of cut-off ditches to prevent run-off from entering watercourse, hydrocarbon

Potential Impact	Proposed Mitigation
	interceptors installed at sensitive outfalls, appropriate storage of fuel, oils and chemicals, refuelling of plant and vehicles on impermeable surfaces away from drains / watercourses, provision of spill kits, installation of wheelwash and plant washing facilities, implementation of measures to minimise waste and ensure correct handling, storage and disposal of waste and regular monitoring of surface water quality. Adhere to OPW EMP and SOP or other relevant best practice at the time of development and maintenance.
Potential requirement for maintenance dredging as siltation of the channel and excess vegetative growth will naturally occur.	Design should aim to ensure WFD objectives are not compromised and all options will be subject to a WFD Assessment. Any negative impact on the status of a water body will only be permitted under the WFD if the strict conditions set out in WFD Article 4 are met. Where appropriate, watercourses affected by a scheme should be subjected to a River Hydromorphology Assessment Technique survey (RHAT) for pre and post scheme scenarios. Adhering to good work practices including; diversion of discharges to settlement ponds, construction of silt traps, construction of cut-off ditches to prevent run-off from entering excavations, granular materials placed over bare soils. If a channel is maintained on an as required basis, using good planning, timing and BAT, there should be only minimal temporary disturbance to the local water quality. Adhere to OPW EMP and SOP or other relevant best practice at the time of development and maintenance.
Alterations to coastal processes	Detailed surveys and hydrodynamic modelling to inform detailed design of coastal works to ensure no negative impacts on coastal processes.
Culverting, dredging and impoundment impacts on fisheries and potential to impede fish passage.	Instream works including any culverting, provision of sluice gates, penstocks and dredging operations to be undertaken during the period July to September inclusive, following consultation and agreement with IFI. All works affecting any watercourse both temporary and permanent will be agreed with the relevant drainage and fishery authorities. Project level aquatic ecology and fisheries surveys and assessment, based on option design, to be undertaken prior to consenting. Where possible bottomless culverts should be used so the natural stream bed can be retained. Proposed measures should be designed to minimise impact on fish spawning grounds, migration and habitats. Adhere to OPW EMP and SOP or other relevant best practice at the time of development and maintenance.

6.1.1 Avoidance of Impacts by Selecting Alternative Options and/or Design Solutions

This has been undertaken for all locations and options through the option development and integrated multi-criteria assessment process. Environmental constraints and opportunities highlighted through the SEA and AA processes were used to screen out environmentally unacceptable flood risk management measures in each location and then inform the identification and development of options, prior to the detailed option assessment process. This process, described in detail in Chapter 3.1.3, ensures that the options selected from the multi-criteria option assessment process were generally those that had a lower risk of significant negative impacts on European sites and that the likely impacts of the preferred flood risk management options could potentially be minimised.

6.1.2 Avoid, or Reduce the Scale of, Identified Impacts through Option Development

The outline measures identified for the preferred options following the option assessment process have been reviewed in order to identify and recommend mitigation to avoid, or reduce, significant effects. Further avoidance of impacts will be achieved through careful design at the next stage of detailed option development as required.

Specific mitigation measures, other than those within the individual impact assessment sections in Chapter 5 include:

- Where possible, defences should be set back from the waterbodies and sensitive environmental habitats and species.
- Utilise environmentally sensitive techniques;
- Consideration of potential negative impacts associated with future developments at the planning stage, before development is allowed to proceed;
- Generally, areas to be coffer dammed and de-watered should be kept to the minimum required;
- Except where absolutely necessary, machinery should operate from the bankside/shore, i.e. “in the dry”;
- The contents and objectives of the South Eastern River Basin Management Plan should be considered during the option design phase;
- A full work methodology should be developed prior to the commencement of any on site works;
- Works should only be carried out after a method statement, detailed plans and timing of works have been agreed with the National Parks & Wildlife Service and Inland Fisheries Ireland; and
- Timing of works in environmentally sensitive areas should be a key consideration, e.g. carrying out construction outside of the main breeding/wintering seasons as appropriate.

6.1.2.1 Mitigation of loss of Habitats and Species

- Avoid unnecessary vegetation clearance, particularly trees. Where possible, retain vegetated buffer strips. Ensure that reinstatement of appropriate, local riparian vegetation is carried out once works are completed.
- Undertake surveys and ecological assessments in relation to biodiversity, flora and fauna;
- If scope is present for applying basic instream enhancement techniques to develop suitable spawning and nursery habitats for fish, this should be pursued. The IFI Guidelines referenced below in 6.4 should be consulted in this regard during option design.
- To prevent the spread of invasive aquatic / riparian species, all plant and equipment employed on the construction site (e.g. excavator, footwear, etc.) must be thoroughly cleaned down using a power washer unit and washed into a dedicated and contained area, prior to arrival on site. A sign off sheet must be maintained by the contractor to confirm cleaning. Imported materials must be free from alien invasive species.

6.1.2.2 Mitigation in relation to Lamprey & Salmonids

- Surveys should be carried out for lamprey, salmonids and other aquatic species of conservation concern, e.g. white-clawed crayfish.
- Before any area is de-watered, suitable juvenile lamprey habitat, and suitable salmonid nursery habitat in adjacent areas of river should be identified if present.

- Following installation of coffer dams, the enclosed waters should be electrofished. Fish removal must be completed by IFI or persons authorised under Section 14 of the Fisheries Consolidation Acts 1959 (as amended).
- Pumps used for de-watering should be provided with mesh screens to avoid taking in fish.

6.2 MITIGATION OF SUSPENDED SOLIDS POLLUTION

The construction method statement should indicate what measures will be taken to avoid sediment or soil loss associated with all aspects of the construction and how these will be monitored for effectiveness. These mitigation measures in combination with an appropriate considerable buffer area between the works and the river will serve to reduce the likelihood of silt mobilisation. Measures to mitigate against suspended solids pollution should include (but not be limited to):

- The amount of bare ground created by excavation and vegetation removal should be minimised to prevent run-off;
- Works should be carried out ideally during a period of settled weather with no flood risk which will allow sufficient time for construction materials to settle;
- The construction method statement should include planning / contingency measures to be undertaken in the event of the risk of a flood event;
- [Where relevant] embankment material should be selected that has low silt content;
- Where construction of flood defences poses a significant risk of suspended solids and other pollution, the area of the proposed works should be isolated using coffer dams. If de-watering is necessary to allow works to proceed, water pumped from the contained area should be passed through a settlement pond or pre-fabricated settlement tanks with oil interceptor before being discharged to the river;
- For construction activities close to the river bank, eroded sediments should be retained on site with erosion and sediment control structures such as sediment traps, silt fences and sediment control ponds. Sediment ponds and grit/oil interceptors should be placed at the end of drainage channels. Sediment control measures should be regularly monitored for effectiveness.

6.3 MITIGATION OF OTHER POLLUTION

The construction Method Statement should indicate what measures will be taken to avoid pollution associated with all aspects of the construction and how these will be monitored for effectiveness. Measures to mitigate against pollutants being discharged may include (but not be limited to):

- Raw or uncured waste concrete should be disposed of by removal from the site;
- Washing out of truck mixers, concrete pumps, skips and other items of plant and equipment needing to be cleaned of concrete after use must only take place at a designated area, away from watercourses.
- Direct discharges of waste water onsite to watercourses, ditches or roadside drains will not be permitted. Waste water will be directed to a suitable treatment area within the site and treated to an appropriate standard prior to discharge by an approved method.
- Biodegradable fuels and lubricants should be used where possible;
- All fuels, lubricants and hydraulic fluids will be kept in secure bunded areas at a minimum of 10m from the river. The bunded area will accommodate 110% of the total capacity of the containers within it. Containers will be properly secured to prevent unauthorised access and misuse.

- The Contractor shall indicate designated areas for fuel transfer away from any watercourses or drainage channels. The refuelling of mobile plant in the working area will be undertaken well away from any drains or water bodies. Vehicles will not be left unattended during refuelling
- Any waste oils or hydraulic fluids will be collected, stored in appropriate containers and disposed of offsite in an appropriate manner;
- Spill kits will be made available and an effective spillage procedure will be put in place with all staff properly briefed.
- All plant shall be well maintained with any fuel or oil drips attended to on an ongoing basis.
- Foul drainage from site offices etc. should be connected to a local sewer or removed to a suitable treatment facility or discharged to a septic tank system constructed in accordance with EPA guidelines;
- Tools and equipment are not to be cleaned in rivers;
- Chemicals shall be stored in sealed containers in the site lockup;
- Any chemicals shall be applied in such a way as to avoid any spillage or leakage;
- If temporary toilet facilities are used, the location of these facilities must be suitable and they must be maintained by a licensed contractor.

6.4 GUIDELINES

The following guidelines should be consulted during the detailed planning of the works phase.

- Guidelines on Protection of Fisheries during Construction Works in or adjacent to Waters, Inland Fisheries Ireland (2016).
- Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites', Eastern Regional Fisheries Board (2003).
- Best practice toolkit of freshwater morphology measures developed by the Freshwater Morphology Programmes of Measures and Standards (POMS) study under the Shannon International River Basin District (ShIRBD) project.
- Good Practice Guidelines on the Control of Water Pollution from Construction Sites developed by the Construction Industry Research and Information Association (CIRIA).
- Pollution prevention guidelines (PPGs) in relation to a variety of activities developed by the Environmental Agency (EA), the Scottish Environmental Protection Agency (SEPA) and the Northern Ireland Environment Agency (NIEA).

The OPW's Environmental Management Protocols and Standard Operating Procedures (OPW, 2011) set out how regional management staff manage a range of environmental aspects, including programming of works to accommodate certain environmental windows or restrictions on timing of works, and recording of data. A total of 7 No. Standard Operating Procedures (SOPs) are applied during operational works. These SOPs set out actions designed to eliminate, or substantially reduce likely impacts to identified species and their associated habitats. These include:

- Environmental Drainage Maintenance Guidance Notes (10 Steps to Environmentally Friendly Maintenance)
- Lamprey SOP
- Crayfish SOP
- Otter SOP
- Mussel SOP
- Invasive Species SOP
- Zebra Mussel SOP
- Bank Protection.
- Bush Cutting / Branch Trimming.

7 CONCLUSIONS

This NIS details the findings of the Stage 2 Appropriate assessment conducted to further examine the potential direct and indirect impacts of the FRM Options advanced in the Final FRMP for UoM15 incorporating the AFAs of Ballyhale, Callan, Freshford, Inistioge, Kilkenny, Mountrath, Rathdowney and Thomastown on the following European sites:

- River Barrow and River Nore SAC (002162)
- River Nore SPA (004233)
- Thomastown Quarry SAC (002252)

These sites were identified by a screening exercise (see Chapter 3.5) that determined the risk of significant effects in relation to the above sites. The screening exercise was conducted using the source – pathway –receptor method, examining surface water, groundwater, land and air pathways.

The Appropriate Assessment (Chapter 5) has investigated the potential direct and indirect impacts of the proposed works on the integrity and interest features of the above European sites for each of the AFAs where FRM Options have been proposed in the Final FRMP.

As a result of this Appropriate Assessment it has been concluded, that provided the avoidance and mitigation measures suggested are adopted at the project stage, the proposed draft FRM measures in the UoM15 FRMP will not have a significant adverse impact on the above European sites.

Where potentially significant adverse impacts were identified, a range of mitigation and avoidance measures have been suggested to help eliminate them by design or reduce them to acceptable levels (see Chapter 6).

The potential physical flood relief works or 'Schemes' set out in the FRMP that have been developed through the CFRAM Programme are to an outline design, and are not at this point ready for construction. The potential routes for the implementation of physical works are set out in Section 8.1 of the FRMP. Project-level assessment will take account of the potentially viable measures identified in the Plan, but will involve the consideration of alternatives at the project-level and, as appropriate, EIA and AA, including the definition of necessary mitigation measures at the project-level. Only schemes/measures that are confirmed to be viable following project level assessment will be brought forward for Exhibition/Planning and detailed design.

To confirm this conclusion, the following checklist, taken from DEHLG (2009) has been completed.

Table 7.1.1: Integrity of Site Checklist (from DEHLG, 2009)

Conservation objectives: does the project or plan have the potential to:	Y/N
Cause delays in progress towards achieving the conservation objectives of the sites?	N - Following mitigation, no significant adverse residual impacts have been identified that will prevent achievement of the conservation objectives of the assessed sites.
Interrupt progress towards achieving the conservation objectives of the sites?	N - Following mitigation, no significant adverse residual impacts have been identified that will prevent achievement of the conservation objectives of the assessed site.
Disrupt those factors that help to maintain the favourable conditions of the site?	N - Potential adverse impacts via surface water; land and air; and groundwater pathways identified during the screening process can be mitigated against.
Interfere with the balance, distribution and density of key species that are the indicators of the favourable condition of the site?	N - Potential adverse impacts on the habitats and species of the two SACs and one SPA are not expected as impacts can be avoided by implementing the mitigation and avoidance measures detailed.

Other objectives: does the project or plan have the potential to:	Y/N
Cause changes to the vital defining aspects (e.g. nutrient balance) that determine how the site functions as a habitat or ecosystem?	N - Potential adverse impacts from suspended solid and nutrient release are not expected as measures can be included within working protocols to ensure potential impacts are effectively mitigated.
Change the dynamics of the relationships (between, for example, soil and water or plants and animals) that define the structure and/or function of the site?	N - Potential adverse impacts relating to hydrological status and water quality have been identified which could impact on the functioning and dynamics of the site, however, these are not expected to be significant given the mitigation measures detailed to ensure potential impacts are effectively mitigated.
Interfere with predicted or expected natural changes to the site (such as water dynamics or chemical composition)?	N - Potential adverse impacts from changes to the hydrological regime and suspended solid/nutrient/pollutant release are not expected, as measures can be included within working protocols to ensure potential impacts are effectively mitigated.
Reduce the area of key habitats?	N - Potential adverse impacts on the habitats of the two SACs and one SPA are not expected given the mitigation measures that have been detailed.
Reduce the population of key species?	N - Potential impacts to the habitats supporting the aquatic and riparian species for which the SACs and SPAs are designated, are not expected as impacts can be avoided by implementing the mitigation measures detailed.
Change the balance between key species?	N - Potential impacts on the aquatic and riparian species for which the SACs and SPAs are designated, are not expected as impacts can be avoided by implementing the mitigation measures detailed.

Other objectives: does the project or plan have the potential to:	Y/N
Reduce diversity of the site?	N - The identified mitigation measures to protect designated habitats and species will ensure that the current diversity of the sites is maintained.
Result in disturbance that could affect population size or density or the balance between key species?	N - Potential impacts to the aquatic and riparian species for which the SACs and SPAs are designated, are not expected as impacts can be avoided by implementing the mitigation measures detailed.
Result in fragmentation	N - The proposed works will not result in fragmentation of habitats.
Result in loss or reduction of key features (e.g. tree cover, tidal exposure, annual flooding etc.)?	N - Potential adverse impacts on SAC and SPA habitats are not expected as impacts can be avoided by implementing the mitigation measures detailed so there will be no loss of, or reduction of, key features.

8 REFERENCES

Council Directive 2001/42/EC *on the Assessment of the Effects of Certain Plans and Programmes on the Environment*

Council Directive 92/43/EEC *on the Conservation of Natural Habitats and of Wild Fauna and Flora*

Council Directive 2009/147/EC *on the Conservation of Wild Birds*

DEHLG (2009 –rev. 2010) *Appropriate Assessment of Plans and Projects in Ireland – Guidance for Planning Authorities*

EC (2000) *Managing Natura 2000 sites: the provisions of Article 6 of the ‘Habitats’ Directive 92/43/EEC*

EC (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.*

EC (2007) *Guidance Document on Article 6(4) of the Habitats Directive 92/43/EEC*

EC (2011) *Guidelines on the Implementation of the Birds and Habitats Directives in Estuaries and Coastal Zones with particular attention to port development and dredging*

EC (2013) *Guidelines on Climate Change and Natura 2000 Dealing with the impact of climate change on the management of the Natura 2000 Network of areas of high biodiversity value*

EPA (2012) *Integrated Biodiversity Impact Assessment best practice guidance; Streamlining AA, SEA and EIA Processes, Best Practice Guidance*

NPWS (2014) *The Status of EU Protected Habitats and Species in Ireland 2013 – Overview Report*

OPW (2004) *Report of the Flood Policy Review Group*

Scottish Natural Heritage (2015) *Habitats Regulation Appraisal of Plans, Guidance for Plan-Making Bodies in Scotland (version 3)*

APPENDIX A

**SUMMARY OF FLOOD RISK MANAGEMENT METHODS AND THEIR HIGH LEVEL
IMPACTS**

APPENDIX A: TABLE OF FLOOD RISK MANAGEMENT METHODS AND THEIR HIGH LEVEL IMPACTS

FRM Method	Likely Positive Impacts (+)	Likely Negative Impacts (-)
Do Nothing No new flood risk management measures and abandon existing defences and maintenance		
<i>Do Nothing</i>	Unlikely to be significant positive impacts at a strategic level, however there is the potential for local improvements to habitats and biodiversity in the vicinity of previously maintained defences.	Potential for significantly increased flood risk to human health, properties and infrastructure.
Existing Regime Continue existing flood risk management practices		
<i>Existing Regime</i>	Unlikely to be significant positive impacts at a strategic level.	Potential for increased flood risk to human health, properties and infrastructure due to climate change. Existing defence works may be interfering or causing deterioration to the ecological requirements of species and habitats and the relevant conservation objectives.
Do Minimum Additional minimum measures to reduce flood risk in specific areas. Includes channel or flood defence maintenance works / programme.		
<i>Do Minimum</i>	Unlikely to be significant positive impacts at a strategic level.	Unlikely to be significant negative impacts at a strategic level. However method is non-specific.
<i>Maintenance Programme</i>	Unlikely to be significant positive impacts at a strategic level.	Unregulated maintenance of existing flood defence measures has the potential to result in impacts such as pollution, changes in sedimentation, disturbance, deterioration, damage and other impacts on species distribution arising from maintenance activities. It is therefore assumed that maintenance programmes already in place recognise the requirements of the 2011 Regulations and that ongoing or future planned maintenance of existing flood defence measures incorporates any necessary mitigation measures such as conducting works out of season in sensitive areas and implementing pollution prevention measures. Having regard to this is therefore considered that maintenance is unlikely to have significant negative environmental impacts upon designated sites. Unlikely to be significant negative impacts at a strategic level.
Planning and Development Zoning of land for flood risk appropriate development, prevention of inappropriate development, and / or review of Local Areas Plan (LAP).		
<i>Planning and Development</i>	Unlikely to be significant positive impacts at a strategic level, however will prevent future additional flood risk from being created.	Unlikely to be significant negative impacts at a strategic level, however will prevent some developments which may curtail economic growth in certain areas.
Building Regulations Regulations on finished floor levels, flood proofing, flood resilience and SuDS.		
<i>Building Regulations</i>	Unlikely to be significant positive impacts at a strategic level, however will prevent	Unlikely to be significant negative impacts at a strategic level.

	future additional flood risk from being created.	
Catchment Wide Sustainable Drainage Systems (SuDS) Recommendations for future development drainage systems.		
<i>SuDS</i>	Slight direct positive impacts through reduction of flood risk and impacts to property and infrastructure.	Likely to be temporary negative impacts through disturbance and inconvenience to the local population during construction.
Land Use Management (NFM) Runoff Control – Overland flow management through changes in land use and / or agricultural practices. River / Floodplain Restoration - Creation of wetlands, restoration of meanders, in-channel flow retardation, floodplain flow retardation and riparian buffer zones. Coastal Restoration - Attenuation waves and coastal surge through the creation and restoration of natural habitats.		
<i>Runoff Control</i>	<p>Implementation of runoff control would slow down and store some potential flood waters, which will benefit the downstream population through reduction of flood risk and impacts to property and infrastructure during high frequency flood events. Done correctly in the appropriate locations, non-structural land use management has the potential to have positive environmental benefits through habitat creation, increased biodiversity and natural flood management.</p> <p>The creation of habitat and / or land management practices can help to improve attenuation of nutrients and reduce the loss of sediments, leading to improvements in water quality.</p> <p>By increasing habitats such as woodland and wetland, there is potential to increase carbon storage.</p> <p>Enhancing and restoring wetlands may lead to benefits to habitats and species.</p> <p>Runoff control may enhance the productivity of cultivated land and semi natural grassland by protecting soils from erosion and loss of nutrients, and through providing a more diverse habitat for pollinators and biological control of pests and disease.</p> <p>Run off control in drinking water catchments may help to reduce treatment requirements for drinking water.</p> <p>There may be benefits to freshwater fisheries from improved water quality and reduced sedimentation.</p> <p>The effects on recreation, wildlife watching and landscape are generally likely to be positive, as runoff control should improve habitat diversity and biodiversity.</p> <p>The introduction of riparian buffer zones is unlikely to have negative impacts on habitats and species.</p>	<p>If misplaced, non-structural land use management has the potential to be either ineffective or actually detrimental to the local environment, through loss or displacement of native species.</p> <p>Some areas of productive agricultural land may be lost.</p> <p>An increase in the wetness of cultivated land and semi-natural grassland ecosystems may increase the prevalence of some livestock pests.</p>
<i>River / Floodplain Restoration</i>	<p>Reconnection of the river with the floodplain will enhance the natural storage capacity and provide slight direct positive social impacts through reduction of flood risk and impacts to property and infrastructure during high frequency flood events.</p> <p>Restoration of habitat within the river and floodplain, and reduced erosion of the river bed and banks can help to filter nutrients and reduce sediments; which can lead to improved water quality.</p>	<p>There is the potential for the direct loss of agricultural land with this method.</p> <p>The existing ecosystems in the area for restoration will be directly impacted in the short term through a potential change of land use, habitat and hydromorphology. These impacts could be positive or negative in the long term.</p> <p>If parkland areas are used the land could become unsuitable for some types of recreation, temporarily during a flood event or in the medium to long term through changing the wetness of the land.</p>

	<p>There is the potential for improved fish habitats.</p> <p>Greater areas of river and floodplain wetland habitat will provide increased biodiversity.</p> <p>River and floodplain restoration in drinking water catchments may help to reduce treatment requirements for drinking water.</p> <p>The effects on recreation, wildlife watching and landscape are generally likely to be positive, with improved habitat diversity and biodiversity.</p> <p>With improvements to biodiversity and water quality, this method may help to improve WFD status.</p> <p>With wetland enhancement there may be benefits to the connectivity and health of wetland ecosystems, and there may be benefits to carbon storage.</p> <p>There may be local improvements in recreational fishing in the area with a more natural river course and improved water quality.</p>	<p>There could be reduced seasonal access to riparian areas for recreational activities from floodplain re-connection.</p> <p>In-stream works can release fine sediments which adversely affect fish spawning gravels.</p> <p>There is the potential for impacts on the local landscape from this; however these could be positive or negative, depending on the finished look of established vegetation.</p>
<i>Coastal Restoration</i>	<p>Coastal restoration can attenuate waves and coastal surge through the creation and restoration of natural habitats, reducing the potential flood risk.</p> <p>Enhancement of coastal natural habitats can help to protect from coastal erosion, provide carbon storage, and help to adapt to future climate change.</p> <p>Restoration and creation of intertidal areas may help to provide nurseries for fish.</p> <p>By improving the coastal environment there is likely to be benefits to recreation, amenity and wildlife experience.</p>	<p>Works could cause disturbance to feeding and breeding birds.</p> <p>Restoration and creation of intertidal areas could lead to some loss of productive land.</p> <p>Works could restrict or alter access to coastal areas which could cause short or long term, local negative effects.</p> <p>In areas of longshore drift, works in one location can have implications for sediment distribution in others.</p> <p>Beach re-charge could affect sediment sources for offshore sand banks.</p>
Strategic Development Management For necessary floodplain development, with integration of structural measures into development design and zoning.		
<i>Strategic Development</i>	Unlikely to be significant positive impacts at a strategic level, however will reduce flood risk to human health.	Unlikely to be significant negative impacts at a strategic level.
Upstream Storage Online or offline, single or multiple storage areas, with potential for embankments / engineered walls. Online storage refers to creating a dam and reservoir across the floodplain of a river, often with an outlet control structure such as an undershot culvert or sluices, to control outlet flow, and with an overflow weir and spillway. Offline storage is an area of floodplain that is embanked to prevent or control flooding within the storage area or wash-land during minor events.		
<i>Storage</i>	<p>There will be slight direct positive social impacts through the regulation of flow and reduction of flood risk and impacts to property and infrastructure.</p> <p>Recreational access to the waterway for some activities could be improved with sensitive scheme design.</p> <p>Offline storage areas should ideally be located away from the existing riparian zone and can then provide environmental benefits through the creation of high biodiversity wetlands.</p> <p>Prolonged flooding in offline storage could increase the sediment store in the floodplain and reduce sediments stored in rivers, reducing downstream sedimentation and potential flood risk.</p>	<p>Online storage dams should not be placed in areas of high biodiversity or on migratory routes, therefore not within SACs or SPAs. However if the normal discharge volume is to be maintained they should be able to be placed upstream of an SAC or SPA.</p> <p>Offline storage areas should not be developed within an SAC or SPA where the designated habitat and / or species are vulnerable to flooding. This method could be further investigated within designated areas that require or are not sensitive to periodic inundation.</p> <p>Storage is likely to cause or exacerbate the disconnection between the river and the floodplain.</p> <p>There is the potential for disruption to natural processes, loss of habitat and</p>

		<p>potentially negative effects on water quality (due to loss of habitat to filter nutrients) and carbon storage.</p> <p>Erosion can be exacerbated upstream and / or downstream of storage areas with potentially significant negative effects.</p> <p>There is the potential for a reduction in pollinating services and pest and disease control due to the loss of natural habitat from direct footprint impacts.</p> <p>Embankment of rivers to create storage areas can result in the loss of natural riparian habitat that filters and removes nutrients from agriculture.</p> <p>There is the potential for long term changes to land use from direct footprint impacts.</p> <p>Loss of natural habitat and reduced biodiversity can impact recreational activities like angling and wildlife watching.</p> <p>Some storage areas may use parkland and recreational grounds which could render the land unsuitable for some types of activities, either temporarily during a flood event, or in the medium to long term through changing accessibility to the area.</p> <p>Changes to river flow and water levels could affect navigation channels.</p> <p>Prolonged flooding in offline storage could increase the sediment store in the floodplain and reduce sediments stored in rivers, disrupting the natural sediment regime.</p> <p>Drinking water quantity may be negatively impacted if using reservoirs for flood storage, as retaining lower water levels could affect water supply.</p> <p>There is likely to be temporary negative impacts through disturbance and inconvenience to the local population during construction of storage areas.</p>
Improvement of Channel Conveyance Deepening channel, widening channel, realigning long section, removing constraints and / or lining smoothing channel.		
<i>Increase Conveyance</i>	<p>There will be slight direct positive social impacts from increasing conveyance through the regulation of flow and reduction of flood risk and impacts to property and infrastructure.</p> <p>Removal of channel constraints provides the opportunity to remove barriers to fish migration. This could improve production of salmon when combined with other river restoration actions. The design of the new structures should build in requirements for migratory fish and to diversify in-stream habitat where possible. Daylighting culverts may reduce barriers to fish barriers and improve habitats.</p>	<p>It may be possible to use this method within some designated areas depending on the species and habitats present. Short sections of increased channel conveyance are unlikely to have significant impacts upon species and habitats, however over long sections of river where there may be significant in-channel losses of protected vegetation and habitat this may be unacceptable. Culverting may interfere with the hydrology of a river and its structure and function and thus may have implications for habitats where natural hydrological processes need to be maintained and/or restored. The SAC and SPA designation criteria will need to be investigated in this instance for important in-channel habitats and species.</p> <p>Culverting of an entire AFA has the potential for significant negative environmental impacts within a designated site, as it replaces the natural hydrological and ecological regime with an artificial bypass. Culverting is unlikely to be an acceptable standalone method within a designated site. Culverting however should have no hydraulic impacts upstream of a designated site.</p> <p>Increasing conveyance modifies the storage and flow of water, causing or</p>

		<p>exacerbating disconnection between the river and the floodplain. There can be disruption to natural processes, the loss of habitat and potentially negative effects on water quality, due to loss of habitat to filter nutrients, and reduced carbon storage.</p> <p>There is the potential for increased downstream flood risk.</p> <p>Erosion can be exacerbated upstream and / or downstream of modified conveyance areas with potentially significant negative effects.</p> <p>There is likely to be the direct loss of habitat and displacement of species in the vicinity of works, however these may re-establish in the medium to long term.</p> <p>There is the potential for a reduction in pollinating services and pest and disease control due to the loss of natural habitat from direct footprint impacts.</p> <p>There is the potential for long term changes to land use from direct footprint impacts.</p> <p>Loss of natural habitat and reduced biodiversity can impact recreational activities like angling and wildlife watching.</p> <p>There is the potential for reduced water quality during construction from increased sediments.</p> <p>There may be temporary negative visual impacts during in-channel works.</p>
Hard Defences Fluvial flood walls or flood embankments. Rehabilitate and / or improve existing defences Tidal Barrages Coastal Flood walls		
<i>Fluvial flood walls or flood embankments</i>	<p>Hard river defences can deliver benefits by regulating water flow and reducing flood risk; therefore protecting human health, properties and infrastructure. Depending on their design, some defences can improve access for some types of recreation.</p>	<p>Hard defences can interfere with natural process, by causing some or all of the floodplain to be disconnected from the river, which can lead to the loss of natural habitat to capture, filter and recycle nutrients or pollutants. This can lead to a reduction in water quality.</p> <p>There is likely to be a direct loss of natural and semi-natural habitat in the direct footprint and vicinity of the defences. There may be indirect negative downstream impacts from sedimentation during construction.</p> <p>Erosion may also increase either side of the defences due to changes in river processes.</p> <p>Defences could impact negatively on river morphology and sediment dynamics, and affect WFD status and classification.</p> <p>Loss of natural habitat and biodiversity can reduce the quality of the environment for recreation and wildlife watching.</p> <p>Within the urban landscape, direct defences have potentially negative effects through disrupting the setting and view of the river and floodplain.</p> <p>Defences may alter the setting of heritage sites.</p> <p>There is the potential for downstream increased flood risk.</p> <p>Direct defences have the potential for negative effects on freshwater fisheries due</p>

		<p>to the loss of in river and riparian habitat and sedimentation.</p> <p>There may be temporary negative impacts through disturbance and inconvenience to the local population during engineering works.</p> <p>Flood walls and embankments are unlikely to have negative impacts upon designated sites, unless the footprint of the structure is directly on the designated feature, or if they cause a greater flood hazard downstream of the feature in a vulnerable designated area.</p>
<i>Tidal Barriers</i>	Tidal barrages can deliver benefits by regulating water flow and reducing flood risk, therefore protecting human health, properties and infrastructure.	<p>Tidal barrages should ideally not be placed within a designated site, however probably all estuaries where a tidal barrage could be incorporated within Ireland are designated Natura 2000 sites. This measure has the potential to have significant ecological impacts, particularly on migratory fish and other water dependent species.</p> <p>New tidal barriers could have potentially significant negative effects on water quality (including morphology) and erosion.</p> <p>Tidal barriers could impede fish passage and impact on upstream protected sites.</p>
<i>Coastal Flood walls</i>	Hard coastal defences can deliver benefits by regulating water flow and reducing flood risk, therefore protecting human health, properties and infrastructure.	<p>New hard coastal defences on undeveloped shoreline or tidal barriers could have potentially significant negative effects on water quality, coastal morphology and erosion.</p> <p>In areas of longshore drift, defences in one location can have implications for sediment distribution in other areas.</p> <p>Coastal defences may reduce access for recreational activities.</p> <p>There are potential negative visual effects on urban and coastal landscapes.</p> <p>There are potential negative visual effects on the seascape from artificial structures offshore or on the beach.</p> <p>Flood walls and embankments on coastal areas should not be on protected habitats and cannot alter coastal processes where a protected habitat requires inundation.</p>
<i>Rehabilitation of Existing Defences</i>	<p>Changes to existing defences could potentially deliver significant positive environmental effects, for example, by setting back defences from the shoreline or river.</p> <p>Sensitively rehabilitated defences may help to improve amenity, particularly if the shoreline is already modified.</p>	<p>Although existing defences have an established footprint and have an established hydraulic impact, rehabilitation of existing flood defence measures has the potential to result in impacts such as pollution, changes in sedimentation, disturbance, deterioration, damage and other impacts on species distribution arising from construction or repair activities. Regard must therefore be undertaken for the planning and implementation of such activities.</p>
Relocation		
Abandoning existing properties and relocating to existing or new properties outside the floodplain.		
<i>Relocation</i>	Reduced flood risk to human health and properties.	<p>Potential for direct, significant, long term social impacts to those required to relocate. These impacts could however be positive or negative depending on the occupant's attitude to relocating. There is the potential for indirect, significant social impacts to residents through fragmentation of neighbourhoods. There is the potential for indirect, significant social impacts to relocated commercial properties</p>

		<p>if old customers do not frequent the new premises.</p> <p>There are unlikely to be any significant impacts on the environment from the relocation of properties/infrastructure away from flood risk areas, provided the new properties / infrastructure are not relocated to environmentally sensitive areas.</p>
Flow Diversion Diversion of Flow - Realignment of entire river, diversion channel out of river basin and/or bypass channel to return flow downstream. Overland Floodways - Using roads or linear floodways to convey flow to a determined discharge point.		
<i>Diversion of Flow</i>	There will be direct positive social impacts from diversion of flow through the reduction of flood risk and impacts to property and infrastructure.	<p>Flow diversion includes realigning the entire river or creating by-pass channels. They are usually implemented in the immediate vicinity of the AFA and any impacts are likely to be localised. There will however be direct negative impacts on local existing habitats in the footprint of the diversion channel.</p> <p>Flow diversions have the potential to interfere with the hydrology of a river and its structure and function and thus may have implications for habitats where natural hydrological processes need to be maintained and/or restored and also in habitats where flooding is an important constituent element.</p> <p>Full diversion of a watercourse should not be proposed within a designated site, as is likely to impact upon the designation criteria.</p> <p>There should be limited impact from bypass channels if the normal flow in the original channel is maintained and the bypass channel is not created in a habitat that is sensitive to flooding.</p> <p>Diversion of flow may just transfer the flood risk to another location.</p>
<i>Overland Floodways</i>	There will be direct positive social impacts from using overland floodways through the reduction of flood risk and impacts to property and infrastructure.	<p>Overland floodways should not be proposed within designated sites where the designated habitat and / or species are vulnerable to flooding, as there is the potential for significant negative environmental impacts during a flood event. This measure may be further investigated within designated areas that require or are not sensitive to periodic inundation.</p> <p>Overland floodways may just transfer the flood risk to another location.</p>
Other Works Minor raising of existing defences / levels, infilling gaps in defences, site specific localised protection works, etc.		
<i>Other Works</i>	Unknown	Unknown
<i>Site Specific Protection Works</i>	Unlikely to be significant positive impacts at a strategic level.	Unlikely to be significant negative impacts at a strategic level. However method is non-specific.
Flood Forecasting Monitoring rain and flows and alerting relevant recipients of flood risk likely to occur.		
<i>Flood Forecasting</i>	Unlikely to be significant positive impacts at a strategic level, however will reduce flood risk to human health.	Unlikely to be significant negative impacts at a strategic level.
Public Awareness		

Make public aware of risk and advice on measures to protect themselves and properties.		
<i>Public Awareness</i>	Unlikely to be significant positive impacts at a strategic level, however will reduce flood risk to human health.	Unlikely to be significant negative impacts at a strategic level.
Individual Property Protection Flood proofing, flood gates, capping vents and / or resilience measures.		
<i>Individual Property Protection</i>	Property level protection may provide positive impacts to those provided with protective equipment by giving them more peace of mind. There will be positives for the public that can protect themselves from small flood events, reducing or even eliminating damages that would otherwise cause disturbance and inconvenience.	Unlikely to be significant negative impacts at a strategic level, provided property protection does not impact on protected structures or monuments and their setting.

APPENDIX B

SCREENING OF EUROPEAN SITES WITH POTENTIAL TO BE IMPACTED BY THE SOUTH EEASTERN CFRAM STUDY

APPENDIX B: SCREENING OF EUROPEAN SITES WITH POTENTIAL TO BE IMPACTED BY THE SOUTH EASTERN CFRAM STUDY

UOM15 SCREENING TABLES

Name: Ballyprior Grassland SAC		Site Code: (IE00002256)
Qualifying Interest(s)	Annex I Habitats: *Semi-natural dry grasslands and scrubland facies on calcareous substrates (<i>Festuco Brometalia</i>)(*important orchid sites) [6210].	
Proximity to AFA(s) and Linkage	<p>Ballyprior Grassland, 4 km south of the village of Stradbally in Co. Laois, is located at the north end of the Castlecomer Plateau on largely limestone bedrock. Ballyprior Grassland is an important example of orchid-rich calcareous grassland, a habitat listed on Annex I of the E.U.Habitats Directive.</p> <p>Ballyprior Grassland SAC is located on top of a localised area of high ground in the central western area of UoM14. However, as it is located within the zone of influence of UoM15 it has the potential to be influenced by FRM methods used for AFAs in UoM15 and is therefore being screened for the UoM15 FRMP.</p> <p>There is one AFA in UoM15 within the potential area of influence of Ballyprior Grassland SAC, Ballyroan (10.9km). On examination of the available hydraulic and biodiversity data, there are no watercourses leading from this SAC and no potential hydraulic connectivity, nor any connectivity by virtue of a biodiversity corridor or stepping stone between this SAC and any of the potential FRM methods for AFAs in UoM15.</p>	
Potential Impacts	There is no potential impact pathway between the FRM methods proposed at any of the AFAs in UoM15 and the qualifying interests of Ballyprior Grassland SAC. Consequently this site has been removed from requiring any further screening for the UoM15 FRMP.	

Name: Bannow Bay SAC		Site Code: (IE00000697)
Qualifying Interest(s)	Annex I Habitats: Estuaries [1130], Mudflats and sandflats not covered by seawater at low tide [1140], Annual vegetation of drift lines [1210], Perennial vegetation of stony banks [1220], <i>Salicornia</i> and other annuals colonising mud and sand [1310], Atlantic salt meadows (<i>Glaucopuccinellietalia maritima</i>) [1330], Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410], Mediterranean and thermo-Atlantic halophilous scrubs (<i>Sarcocornetea fruticosi</i>) [1420], Embryonic shifting dunes [2110], Shifting dunes along the shoreline with <i>Ammophila arenaria</i> (white dunes) [2120] and Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130].	
Proximity to AFA(s) and Linkage	<p>Bannow Bay SAC is located in UoM13. It encompasses Bannow Bay and extends up the Corock and Owenduff Rivers. As it is located within the zone of influence of UoM15 it has the potential to be influenced by FRM methods used for AFAs in UoM15 and therefore is being screened for the UoM15 FRMP.</p> <p>Bannow Bay SAC is in a separate hydrometric area from the AFAs in UoM15 and therefore has no hydraulic connectivity with the river catchments of the AFAs in UoM15, the nearest of which is Inistioge, c. 30km away. The rivers Nore and Barrow join together at New Ross before meeting at the River Suir at Waterford Harbour, where all three rivers discharge into the sea. Due to the effects of distance and dilution, there is no potential impact pathway between FRM methods used in the catchments of AFAs in UoM15 and the qualifying interests of Bannow Bay SAC.</p>	
Potential Impacts	There is no potential impact pathway between the FRM methods proposed in the catchments of any of the AFAs in UoM15 and the qualifying interests of Bannow Bay SAC. Consequently this site has been removed from requiring any further screening for the	

	UoM15 FRMP.
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Name: Bannow Bay SPA		Site Code: (IE00004033)
Qualifying Interest(s)	Species of Special Conservation Interest: Light-bellied Brent Goose (<i>Branta bernicla hrota</i>) [A046], Shelduck (<i>Tadorna tadorna</i>) [A048], Pintail (<i>Anas acuta</i>) [A054], Oystercatcher (<i>Haematopus ostralegus</i>) [A130], Golden Plover (<i>Pluvialis apricaria</i>) [A140], Grey Plover (<i>Pluvialis squatarola</i>) [A141], Lapwing (<i>Vanellus vanellus</i>) [A142], Knot (<i>Calidris canutus</i>) [A143], Dunlin (<i>Calidris alpina</i>) [A149], Black-tailed Godwit (<i>Limosa limosa</i>) [A156], Bar-tailed Godwit (<i>Limosa lapponica</i>) [A157], Curlew (<i>Numenius arquata</i>) [A160], Redshank (<i>Tringa totanus</i>) [A162], Wetland and Waterbirds [A999].	
Proximity to AFA(s) and Linkage	<p>Bannow Bay SPA is a large, sheltered estuarine system located in UoM13 with extensive areas of intertidal mud and sand flats exposed at low tide. As it is located within the zone of influence of UoM15 it has the potential to be influenced by FRM methods used for AFAs in UoM15 and therefore is being screened for the UoM15 FRMP.</p> <p>Bannow Bay SPA is in a separate hydrometric area from the AFAs in UoM15 and therefore has no hydraulic connectivity with the river catchments of the AFAs in UoM15, the nearest of which is Inistioge, c. 32km away. The rivers Nore and Barrow join together at New Ross before meeting at the River Suir at Waterford Harbour, where all three rivers discharge into the sea. Due to the effects of distance and dilution, there is no potential impact pathway between FRM methods used in the catchments of AFAs in UoM15 and the qualifying interests of Bannow Bay SPA.</p>	
Potential Impacts	There is no potential impact pathway the FRM methods proposed in the catchments of any of the AFAs in UoM15 and the qualifying interests of Bannow Bay SPA. Consequently this site has been removed from requiring any further screening for the UoM15 FRMP.	

Name: Blackstairs Mountains SAC		Site Code: (IE00000770)
Qualifying Interest(s)	Annex I Habitats: Northern Atlantic wet heaths with <i>Erica tetralix</i> [4010] and European dry heaths [4030].	
Proximity to AFA(s) and Linkage	<p>The Blackstairs Mountains are located along the border of the Counties Wexford and Carlow, forming a mountain chain that runs in a north-east/south-west direction for approximately 22 km, and includes six peaks over 520 m. The range has a core of granite, and on the Carlow side, erosion has cut deeply into the dome exposing successive layers of granite, giving a steeply stepped slope. The Blackstairs Mountains SAC is the only example of moorland above 300 m in Counties Wexford and Carlow. It includes good examples of dry heath, a habitat listed on Annex I of the E.U. Habitats Directive.</p> <p>Blackstairs Mountains SAC straddles two Units of Management, UoM12 and UoM14. As it is located within the zone of influence of UoM15 it has the potential to be influenced by FRM methods used for AFAs in UoM15 and therefore is being screened for the UoM15 FRMP.</p> <p>Blackstairs Mountain SAC is in a separate hydrometric area from the AFAs in UoM15 and therefore has no direct hydraulic connectivity with the river catchments of the AFAs in UoM15, the nearest of which are Inistioge (12.4km) and Thomastown (16.9km) on the River Nore. There is no potential connectivity between the qualifying interests of the SAC and the AFAs in UoM15 by virtue of a biodiversity corridor or stepping stone. There is not considered to be any potential impact pathway between FRM methods used in the catchments of the AFAs in UoM15 and the qualifying interests of the SAC.</p>	
Potential Impacts	There is not considered to be any potential impact pathway between the qualifying interests of Blackstairs Mountains SAC and the implementation of FRM methods for any of the AFAs in UoM15. Consequently this site has been removed from requiring any further screening for the UoM15 FRMP.	

Name: Clonaslee Eskers and Derry Bog SAC		Site Code: (IE0000859)
Qualifying Interest(s)	Annex I Habitats: Alkaline fens [7230]. Annex II Species: <i>Vertigo geyeri</i> (Geyer's Whorl Snail) [1013].	
Proximity to AFA(s) and Linkage	<p>Clonaslee Eskers and Derry Bog SAC a series of morainic hills and esker ridges which are the legacy of the last period of glaciation. This site is of conservation importance for the presence of alkaline fen vegetation and is considered one of the best sites in the south-east region for this habitat. Also of interest is the extremely unusual assemblage of plants associated with the esker ridges, which includes three rare plants, two of which are legally protected in Ireland.</p> <p>The SAC is located outside the South Eastern CFRAM Study area, however as it is located within the zone of influence of UoM15 it has the potential to be influenced by FRM methods used for AFAs in UoM15 and is therefore being screened for the UoM15 FRMP.</p> <p>Clonaslee Eskers and Derry Bog SAC is in a separate hydrometric area from the AFAs in UoM15 and therefore has no hydraulic connectivity with the river catchments of the AFAs in UoM15, the nearest of which is Mountrath (17.6km). There is also no potential connectivity with any of the AFAs in UoM15 by means of a biodiversity corridor or stepping stone. There is not considered to be any potential impact pathway between the implementation of FRM methods for any of the AFAs in UoM15 and the qualifying interests of Clonaslee Eskers and Derry Bog SAC.</p>	
Potential Impacts	There is no potential impact pathway between the implementation of FRM methods for any of the AFAs in UoM15 and the qualifying interests of Clonaslee Eskers and Derry Bog SAC. Consequently this site has been removed from requiring any further screening for the UoM15 FRMP.	

Name: Coolrain Bog SAC		Site Code: (IE00002332)
Qualifying Interest(s)	Annex I Habitats: Degraded raised bogs still capable of natural regeneration [7120], *Active raised bogs [7110] (*priority habitat) and Depressions on peat substrates of the Rhynchosporion [7150].	
Proximity to AFA(s) and Linkage	<p>Coolrain Bog is situated in Co. Laois, approximately 4 km north-east of Borris-in-Ossory. The site comprises a raised bog that includes both areas of high bog and cutover bog. Coolrain Bog is a site of considerable conservation significance as raised bog is a rare habitat in the E.U. and one that is becoming increasingly scarce and under threat in Ireland. This site supports a good diversity of raised bog microhabitats, including hummock/hollow complexes and flushes.</p> <p>There are two AFAs in UoM15 with the potential to influence Coolrain Bog SAC. They are: Mountrath (7.0km) and Rathdowney (11.6km).</p> <p>The SAC is located in the catchment of the Tonet River, an upcatchment tributary of the River Nore. Mountrath AFA is in the catchment of the Mountrath River, which is in a separate catchment to the Tonet River and joins the Nore several km downstream of it. Rathdowney is also located on a tributary of the River Nore, the Erkina, which is again in separate catchment area to the Coolrain Bog SAC and has no hydraulic connectivity with it. The nearest AFA with hydraulic connectivity to the SAC is Ballyragget, in excess of 38km downstream. At this distance there is not considered to be any pathway for impacts from the implementation of FRM methods. There is also no potential connectivity between the SAC and any of the AFAs in UoM15 by means of a biodiversity corridor or stepping stone. There is not considered to be any potential impact pathway between the implementation of FRM methods for any of the AFAs in UoM15 and the qualifying interests of Coolrain Bog SAC.</p>	
Potential Impacts	There is no potential impact pathway between the implementation of FRM methods for any of the AFAs in UoM15 and the qualifying interests of Coolrain Bog SAC. Consequently this site has been removed from requiring any further screening for the UoM15 FRMP.	

Name: Cullahill Mountain SAC	Site Code: (IE0000831)
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Qualifying Interest(s)	Annex I Habitats: *Semi-natural dry grasslands and scrubland facies on calcareous substrates (<i>Festuco Brometalia</i>)(*important orchid sites) [6210].
Proximity to AFA(s) and Linkage	Cullahill Mountain SAC is an escarpment, with a steep side facing the central plain and more gradual slopes to the south-east. Most of the site features herb-rich grassland over limestone. There are three AFAs in UoM15 with the potential to influence the Cullahill Mountain SAC, Ballyragget (9.1km), Freshford (7.1km) and Rathdowney (8.2km). On examination of the hydraulic data, no mapped watercourses intersect the SAC, however it lies across the upper catchment sub-basin areas of the Gorteenahilla River catchment and the Goul River catchment. Neither of these catchments have any connectivity with Rathdowney AFA, which is on the upper part the Erkina River catchment. The SAC is in the highest part of the Gorteenahilla catchment, 8.3km upstream of Freshford AFA. The SAC is in the highest part of the Goul catchment, 20km upstream of Ballyragget via the lower section of the Erkina river and the River Nore. The Preliminary Options report for HA15 Optioneering of SSAs has rejected the use of upstream storage FRM methods at the sub-sub catchment and AFA SSA scale for UoM15 and there is therefore not considered to be any potential hydraulic impact pathway between the implementation of FRM methods at the AFAs in UoM15 and the qualifying interest of Cullahill Mountain SAC. No potential connectivity by virtue of a biodiversity corridor or stepping stone is evident between the AFAs in UoM15 and the qualifying interest of Cullahill Mountain SAC.
Potential Impacts	There is no potential impact pathway between the implementation of FRM methods for any of the AFAs in UoM15 and the qualifying interests of Cullahill Mountain SAC. Consequently this site has been removed from requiring any further screening for the UoM15 FRMP.

Name: Galmoy Fen SAC		Site Code: (IE00001858)
Qualifying Interest(s)	Annex I Habitats: Alkaline fens [7230].	
Proximity to AFA(s) and Linkage	<p>Galmoy Fen SAC cutover raised bog that has become flooded with base-rich groundwater and that now supports alkaline fen vegetation. There are three AFAs in UoM15 with the potential to influence the Galmoy Fen SAC, Ballyragget (15.0km), Freshford (12.8km) and Rathdowney (4.0km).</p> <p>On examination of the hydraulic data, no mapped watercourses intersect the SAC, however it lies across the upper catchment sub-basin area of the Goul River catchment (Goul 060). This sub-basin catchment does not have any connectivity with Rathdowney AFA, which is on the upper part of the Erkina River catchment or Freshford AFA, which is in the Nuenna River catchment. The closest AFA to the SAC with hydraulic connectivity is Ballyragget, 25km downstream via the lower section of the Erkina river and the River Nore. The Preliminary Options report for HA15 Optioneering of SSAs has rejected the use of upstream storage FRM methods at the sub-sub catchment and AFA SSA scale for UoM15 and there is therefore not considered to be any potential hydraulic impact pathway between the implementation of FRM methods at the AFAs in UoM15 and the qualifying interest of Galmoy Fen SAC. No potential connectivity by virtue of a biodiversity corridor or stepping stone is evident between the AFAs in UoM15 and the qualifying interest of Galmoy Fen SAC.</p>	
Potential Impacts	<p>There is no potential impact pathway between the implementation of FRM methods in the catchments of any of the AFAs in UoM15 and the qualifying interest of Galmoy Fen SAC. Consequently this site has been removed from requiring any further screening for the UoM15 FRMP.</p>	

Name: Hugginstown Fen SAC		Site Code: (IE00000404)
Qualifying Interest(s)	Annex I Habitats: Alkaline fens [7230].	
Proximity to AFA(s) and Linkage	Hugginstown Fen SAC a relatively large, isolated area of swamp and floating fen developed in a small valley in hilly country and is located in UoM16. However, as it is located within the	

	<p>zone of influence of UoM15 it has the potential to be influenced by FRM methods used for AFAs in UoM15 and is therefore being screened for the UoM15 FRMP.</p> <p>There are four AFAs in UoM15 with the potential to influence Hugginstown Fen SAC. They are: Ballyhale (4km), Callan (14.7km), Inistioge (12.7km) and Thomastown (10.9km).</p> <p>Hugginstown Fen SAC is in a separate hydrometric area from the catchments of the AFAs in UoM15, the nearest of which is Ballyhale. Although in general, hydrometric areas are defined by watersheds and thus do not result in connectivity between catchments, part of the SAC falls within the Little Arrigle_010 sub-basin catchment which, although falling within UoM16 is a sub-basin largely within UoM15. However, this sub-basin does not connect with the catchment of Ballyhale AFA which is within the Knockwilliam 010 sub-basin catchment.</p> <p>Hugginstown Fen SAC has no hydraulic connectivity with the river catchments of any of the AFAs in UoM15, and on examination of the available biodiversity data no connectivity with the qualifying interests by virtue of a biodiversity corridor or stepping stone is evident.</p>
Potential Impacts	<p>There is no potential impact pathway between the implementation of FRM methods in the catchments of any of the AFAs in UoM15 and the qualifying interest of Hugginstown Fen SAC. Consequently this site has been removed from requiring any further screening for the UoM15 FRMP.</p>

Name: Island Fen SAC Site Code: (IE002236)	
Qualifying Interest(s)	<p>Annex I Habitats: <i>Juniperus communis</i> formations on heaths or calcareous grasslands [5130], Alkaline fens [7230].</p>
Proximity to AFA(s) and Linkage	<p>Island Fen SAC is a relatively small, but quite species –diverse wetland located in a small valley in the foothills of the Slieve Bloom Mountains. It is located outside the South Eastern CFRAM Study area, however as it is located within the zone of influence of UoM15 it has the potential to be influenced by FRM methods used for AFAs in UoM15 and is therefore being screened for the UoM15 FRMP.</p> <p>Island Fen SAC is in a separate hydrometric area from the AFAs in UoM15 and therefore has no hydraulic connectivity with the river catchments of the AFAs in UoM15, the nearest of which is Mountrath (23.1km). There is also no potential connectivity with any of the AFAs in UoM15 by means of a biodiversity corridor or stepping stone. There is not considered to be any potential impact pathway between the implementation of FRM methods in the catchments of any of the AFAs in UoM15 and the qualifying interest of Island Fen SAC.</p>
Potential Impacts	<p>There is no potential impact pathway between the implementation of FRM methods in the catchments of any of the AFAs in UoM15 and the qualifying interests of Island Fen SAC. Consequently this site has been removed from requiring any further screening for the UoM15 FRMP.</p>

Name: Kilduff, Devilsbit Mountain SAC Site Code: (IE00000934)	
Qualifying Interest(s)	<p>Annex I Habitats: *Species-rich <i>Nardus</i> grasslands, on siliceous substrates in mountain areas (and submountain areas, in Continental Europe) [6230] (*priority habitat) and European dry heaths [4030].</p>
Proximity to AFA(s) and Linkage	<p>Kilduff, Devilsbit Mountain SAC is an upland grassland, heath and woodland comprising the summit of Devilsbit Mountain and much of the eastern side of the ridge which extends northwards to Kilduff Mountain. It is situated in UoM16, however as it is located within the zone of influence of UoM15 it has the potential to be influenced by FRM methods used for AFAs in UoM15 and is therefore being screened for the UoM15 FRMP.</p> <p>Kilduff, Devilsbit Mountain SAC is in a separate hydrometric area from the AFAs in UoM15 and therefore has no hydraulic connectivity with the river catchments of the AFAs in UoM15, the nearest of which is Rathdowney (20.2km). There is also no potential connectivity with any of the AFAs in UoM15 by means of a biodiversity corridor or stepping stone. There is not</p>

	considered to be any potential impact pathway between the implementation of FRM methods in the catchments of any of the AFAs in UoM15 and the qualifying interests of Kilduff, Devilsbit Mountain SAC.
Potential Impacts	There is no potential impact pathway between the implementation of FRM methods for any of the AFAs in UoM15 and the qualifying interests of Kilduff, Devilsbit Mountain SAC. Consequently this site has been removed from requiring any further screening for the UoM15 FRMP.

Name: Knockacoller Bog SAC Site Code: (IE00002333)	
Qualifying Interest(s)	Annex I Habitats: Degraded raised bogs still capable of natural regeneration [7120], *Active raised bogs [7110] (*priority habitat), Depressions on peat substrates of the Rhynchosporion [7150].
Proximity to AFA(s) and Linkage	<p>Knockacoller Bog SAC is a raised bog that includes both areas of high bog and cutover bog, located in the northernmost part of UoM15. It is a site of considerable conservation significance as raised bog is a rare habitat in the E.U. and one that is becoming increasingly scarce and under threat in Ireland. This site supports a good diversity of raised bog microhabitats, including hummock/hollow complexes, pools and regenerating cutover bog.</p> <p>There are three AFAs in UoM15 with the potential to influence Knockacoller Bog SAC: Ballyroan (14.8km), Mountrath (3.4km) and Rathdowney (11.5km). On examination of the hydraulic information, the bog appears to be connected to the upper reaches of the River Nore via a small tributary. Mountrath, Ballyroan and Mountrath are located on separate tributaries in the River Nore system, all of which join the Nore downstream of Knockacoller Bog SAC. There is thus no potential hydraulic connectivity between the AFA catchments and the SAC, nor is any connectivity evident by means of a biodiversity corridor or stepping stone. There is not considered to be any potential impact pathway between the implementation of FRM methods for any of the AFAs in UoM14 and the qualifying interests of influence Knockacoller Bog SAC.</p>
Potential Impacts	There is no potential impact pathway between FRM methods used in the catchment of any of the AFAs in UoM15 and the qualifying interest of Knockacoller Bog SAC. Consequently this site has been removed from requiring any further screening for the UoM15 FRMP

Name: Lisbigney Bog SAC Site Code: (IE000869)	
Qualifying Interest(s)	<p>Annex I Habitats: *Calcareous fens with <i>Cladium mariscus</i> and species of the <i>Caricion davallianae</i> [7210] (*priority habitat).</p> <p>Annex II Species: <i>Vertigo moulinsiana</i> (Desmoulin's Whorl Snail) [1016].</p>
Proximity to AFA(s) and Linkage	<p>Lisbigney Bog SAC is a wetland dominated by fen vegetation, located in UoM15. The SAC is of considerable conservation significance for the good example of <i>Cladium</i> fen, a priority-listed habitat on Annex I of the E.U. Habitats Directive, and for the population of <i>Vertigo moulinsiana</i> that it supports.</p> <p>There are four AFAs in UoM15 with the potential to influence Lisbigney Bog SAC. They are: Ballyragget (7.1km), Ballyroan (8.8km), Freshford (13.8km) and Rathdowney (15.1km).</p> <p>On examination of the hydraulic information, the SAC does not appear to be connected to any watercourses. Its sub-catchment basin is located on a tributary of the River Nore that enters the system downstream of the catchments of Ballyroan and Rathdowney. Freshford is also located on a separate tributary that enters the Nore significantly downstream and thus there is no potential hydraulic connectivity between these AFAs' catchments and the SAC, nor is any connectivity evident by means of a biodiversity corridor or stepping stone. Ballyragget is located c.11km downstream of the SAC's catchment area, however the Preliminary Options report for HA15 Optioneering of SSAs has rejected the use of upstream storage FRM methods at the sub-sub catchment and AFA SSA scale for UoM15 and therefore no potential impact pathway exists between FRM methods used for Ballyragget and the qualifying interests of the</p>

	SAC.
Potential Impacts	There is no potential impact pathway between FRM methods used for any of the AFAs in UoM15 and the qualifying interests of Lisbigney Bog SAC. Consequently this site has been removed from requiring any further screening for the UoM15 FRMP

Name: Lisduff Fen SAC		Site Code: (IE00002147)
Qualifying Interest(s)	Annex I Habitats: Alkaline fens [7230], *Petrifying springs with tufa formation (<i>Cratoneurion</i>) [7220] (*priority habitat). Annex II Species: <i>Vertigo geyeri</i> (Geyer's Whorl Snail) [1013].	
Proximity to AFA(s) and Linkage	<p>Lisduff Fen SAC is a wet calcareous fen, with typical fen and marsh species. It is located outside the South Eastern CFRAM Study area, however as it is located within the zone of influence of UoM15 it has the potential to be influenced by FRM methods used for AFAs in UoM15 and is therefore being screened for the UoM15 FRMP.</p> <p>Lisduff Fen SAC is in a separate hydrometric area from the AFAs in UoM15 and therefore has no hydraulic connectivity with the river catchments of the AFAs in UoM15, the nearest of which is Mountrath (c.26km). There is also no potential connectivity with any of the AFAs in UoM15 by means of a biodiversity corridor or stepping stone. There is not considered to be any potential impact pathway between the implementation of FRM methods in the catchments of any of the AFAs in UoM15 and the qualifying interest of Lisduff Fen SAC.</p>	
Potential Impacts	There is no potential impact pathway between the implementation of FRM methods in the catchments of any of the AFAs in UoM15 and the qualifying interest of Lisduff Fen SAC. Consequently this site has been removed from requiring any further screening for the UoM15 FRMP.	

Name: Lower River Suir SAC		Site Code: (IE00002137)
Qualifying Interest(s)	Annex I Habitats: Atlantic salt meadows (<i>Glaucopuccinellietalia maritima</i>) [1330], Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410], Water courses of plain to montane levels with the <i>Ranunculus fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation [3260], Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430], Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles [91A0], Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i> , <i>Alnion incanae</i> , <i>Salicion albae</i>) [91E0] and <i>Taxus baccata</i> woods of the British Isles [91J0]. Annex II Species: <i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) [1029], <i>Austropotamobius pallipes</i> (White-clawed Crayfish) [1092], <i>Petromyzon marinus</i> (Sea Lamprey) [1095], <i>Lampetra planeri</i> (Brook Lamprey) [1096], <i>Lampetra fluviatilis</i> (River Lamprey) [1099], <i>Alosa fallax fallax</i> (Twaite Shad) [1103], <i>Salmo salar</i> (Salmon) [1106] and <i>Lutra lutra</i> (Otter) [1355].	
Proximity to AFA(s) and Linkage	<p>Lower River Suir SAC consists of the freshwater stretches of the River Suir immediately south of Thurles, the tidal stretches as far as the confluence with the Barrow/Nore immediately east of Cheekpoint in Co. Waterford, and many tributaries. The site contains ns excellent examples of a number of Annex I habitats, including the priority habitats alluvial forest and Yew woodland. The site also supports populations of several important animals species, some listed on Annex II of the Habitats Directive or listed in the Irish Red Data Book. The presence of two legally protected plants and the ornithological importance of the site adds further to the ecological interest and importance.</p> <p>Lower River Suir SAC is in UoM16, however as it is located within the zone of influence of UoM15 it has the potential to be affected by FRM methods used in UoM15 and therefore is being screened for the UoM15 FRMP.</p> <p>There are two AFAs in UoM15 with the potential to influence the Lower River Suir SAC. They are: Ballyhale (12.9km) and Callan (9.5km).</p>	

	<p>Although it is 12.9 linear km from the Lower River Suir SAC, Ballyhale is located in the uppermost reaches of the Little Arrigal River, a tributary of the River Nore and is more than 50km upstream of the Nore's confluence with the River Suir. There is not considered to be any potential impact pathway between the implementation of FRM methods at Ballyhale AFA and the qualifying interests of the Lower River Suir SAC.</p> <p>Callan is in the upper part of the King's River, another tributary of the River Nore and is c. 65km upstream of the Nore's confluence with the River Suir. There is not considered to be any potential impact pathway between the implementation of FRM methods at Callan AFA and the qualifying interests of the Lower River Suir SAC.</p>
Potential Impacts	<p>There is no potential impact pathway between the implementation of FRM methods in Ballyhale or Callan AFAs in UoM15 (or in the catchment of any of the other AFAs in UoM15) and the qualifying interests of the Lower River Suir SAC. Consequently this site has been removed from requiring any further screening for the UoM15 FRMP.</p>

Name: Mountmellick SAC		Site Code: (IE00002141)
Qualifying Interest(s)	<p>Annex II Species: <i>Vertigo moulinsiana</i> (Desmoulin's Whorl Snail) [1016].</p>	
Proximity to AFA(s) and Linkage	<p>Mountmellick SAC comprises a disused stretch of the Grand Canal between Dangan's Bridge and Skeagh Bridge in UoM14. The habitat at this site is composed largely of fen-type vegetation and is important as it provides useful habitat for a population of the whorl snail <i>Vertigo moulinsiana</i>.</p> <p>As it is located within the zone of influence of UoM15 it has the potential to be influenced by FRM methods used for AFAs in UoM15 and is therefore being screened for the UoM15 FRMP.</p> <p>Mountmellick SAC is in a separate hydrometric area from the AFAs in UoM15 and therefore has no hydraulic connectivity with the river catchments of the AFAs in UoM15, the nearest of which are Ballyroan (19.3km) and Mountrath (18.2km). There is also no potential connectivity with any of the AFAs in UoM15 by means of a biodiversity corridor or stepping stone. There is not considered to be any potential impact pathway between the implementation of FRM methods in the catchments of any of the AFAs in UoM15 and the qualifying interests of Mountmellick SAC.</p>	
Potential Impacts	<p>There is no potential impact pathway between FRM methods used in the catchments of any of the AFAs in UoM15 and the qualifying interests of Mountmellick SAC. Consequently this site has been removed from requiring any further screening for the UoM15 FRMP.</p>	

Name: River Barrow And River Nore SAC		Site Code: (IE00002162)
Qualifying Interest(s)	<p>Annex I Habitats: Estuaries [1130], Mudflats and sandflats not covered by seawater at low tide [1140], Salicornia and other annuals colonising mud and sand [1310], Atlantic salt meadows (<i>Glauco-Puccinellietalia maritimae</i>) [1330], Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410], Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation [3260], European dry heaths [4030], Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430], Petrifying springs with tufa formation (<i>Cratoneurion</i>) [7220], Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles [91A0] and Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i>, <i>Alnion incanae</i>, <i>Salicion albae</i>) [91E0].</p> <p>Annex II Species: <i>Vertigo moulinsiana</i> (Desmoulin's Whorl Snail) [1016], <i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) [1029], <i>Austropotamobius pallipes</i> (White-clawed Crayfish) [1092], <i>Petromyzon marinus</i> (Sea Lamprey) [1095], <i>Lampetra planeri</i> (Brook Lamprey) [1096], <i>Lampetra fluviatilis</i> (River Lamprey) [1099], <i>Alosa fallax fallax</i> (Twait Shad) [1103], <i>Salmo salar</i> (Salmon) [1106], <i>Lutra lutra</i> (Otter) [1355], <i>Trichomanes speciosum</i> (Killarney Fern) [1421] and <i>Margaritifera durrovensis</i> (Nore Pearl Mussel) [1990].</p>	
Proximity to AFA(s) and Linkage	<p>The River Barrow And River Nore SAC covers an extensive area as it consists of the freshwater stretches of the Barrow and Nore River catchments as far upstream as the Slieve Bloom</p>	

	<p>Mountains, and it also includes the tidal elements and estuary as far downstream as Creadun Head in Waterford. The River Barrow And River Nore SAC covers an extensive area as it consists of the freshwater stretches of the Barrow and Nore River catchments as far upstream as the Slieve Bloom Mountains, and it also includes the tidal elements and estuary as far downstream as Creadun Head in Waterford. Overall, the site is of considerable conservation significance for the occurrence of good examples of habitats and of populations of plant and animal species that are listed on Annexes I and II of the E.U. Habitats Directive. Furthermore it is of high conservation value for the populations of bird species that use it. The occurrence of several Red Data Book plant species including three rare plants in the salt meadows and the population of the hard water form of the Freshwater Pearl Mussel, which is limited to a 10 km stretch of the Nore, add further interest to this site.</p> <p>In UoM15 there are 10 AFAs with the potential to influence the River Barrow And River Nore SAC. They are: Ballyhale (0.0km), Ballyragget (0.0km), Ballyroan (4.4km), Callan (0.0km), Freshford (2.8km), Inistioge (0.0km), Kilkenny (Nore) & Kilkenny (Breagagh) (0.0km), Mountrath (0.0km), Rathdowney (3.8km) and Thomastown (0.0km).</p> <p>The AFAs of Ballyhale, Ballyragget, Callan, Inistioge, Kilkenny (Nore) & Kilkenny (Breagagh), Mountrath and Thomastown are all located on the River Nore and all have boundaries adjoining or are within the SAC. They are therefore all are directly hydraulically linked to the SAC and there exists a high potential for direct impacts on the qualifying interests of the SAC from the implementation of FRM methods at these AFAs.</p> <p>Ballyroan is located on the Gloreen Stream, c.10km upstream of the boundary of the River Barrow And River Nore SAC.</p> <p>Freshford is located on the Nuenna River, c.4km upstream of the boundary of the River Barrow And River Nore SAC.</p> <p>Rathdowney AFA is located on the Erkina River, c.6km upstream of the boundary of the River Barrow And River Nore SAC.</p> <p>There exists the potential for indirect impacts on the qualifying interests of the River Barrow And River Nore SAC from the implementation of FRM methods at these AFAs. Further assessment is recommended to examine the significance of the potential impacts.</p>
Potential Impacts	<p>There exists the potential for direct impacts on the qualifying interest of the River Barrow And River Nore SAC from the implementation of FRM methods at Ballyhale, Ballyragget, Callan, Inistioge, Kilkenny (Nore) & Kilkenny (Breagagh), Mountrath and Thomastown.</p> <p>There exists the potential for indirect impacts on the qualifying interest of the River Barrow And River Nore SAC from the implementation of FRM methods at Ballyroan, Freshford and Rathdowney AFAs. Appropriate Assessment is required to examine the significance of these potential impacts.</p>

Name: River Nore SPA Site Code: (IE00004233)	
Qualifying Interest(s)	Species of Special Conservation Interest: Kingfisher (<i>Alcedo atthis</i>) [A229]
Proximity to AFA(s) and Linkage	<p>The River Nore SPA is a long, linear site that includes sections of a number of rivers including the River Nore, the Delour River, the Erkina River, the River Goul and the Kings River. The site includes the river channel and marginal vegetation. The River Nore SPA is of high ornithological importance as it supports a nationally important population of Kingfisher, a species that is listed on Annex I of the E.U. Birds Directive.</p> <p>In UoM15 there are 10 AFAs with the potential to influence the River Nore SPA. They are: Ballyhale (5.3km), Ballyragget (0.0km), Ballyroan (6.0km), Callan (0.7km), Freshford (2.9km), Inistioge (0.0km), Kilkenny (Nore) & Kilkenny (Breagagh) (0.0km), Mountrath (1.0km), Rathdowney (4.8km) and Thomastown (0.0km).</p> <p>The AFAs of Ballyragget, Inistioge, Kilkenny (Nore) & Kilkenny (Breagagh), Mountrath and Thomastown are all located on the River Nore and all have boundaries adjoining or are within the SPA. They are therefore all are directly hydraulically linked to the SPA and there exists a high potential for direct impacts on the qualifying interest of the SPA from the implementation of FRM methods at these AFAs.</p> <p>Ballyhale is located on a tributary of the Little Arrigle River, c.10km upstream of the boundary</p>

	<p>of the River Nore SPA.</p> <p>Ballyroan is located on the Gloreen Stream, c.10km upstream of the boundary of the River Nore SPA.</p> <p>Callan is located on the King's River, c.1km upstream of the boundary of the River Nore SPA.</p> <p>Freshford is located on the Nuenna River, c.4km upstream of the boundary of the River Nore SPA.</p> <p>Mountrath is located on the Mountrath River, c.3km upstream of the boundary of the River Nore SPA.</p> <p>Rathdowney AFA is located on the Erkina River, c.6km upstream of the boundary of the River Nore SPA.</p> <p>There exists the potential for indirect impacts on the qualifying interest of the River Nore SPA from the implementation of FRM methods at these AFAs. Further assessment is recommended to examine the significance of the potential impacts.</p>
Potential Impacts	<p>There exists the potential for direct impacts on the qualifying interest of the River Nore SPA from the implementation of FRM methods at Ballyragget, Inistioge, Kilkenny (Nore) & Kilkenny (Breagagh), Mountrath and Thomastown.</p> <p>There exists the potential for indirect impacts on the qualifying interest of the River Nore SPA from the implementation of FRM methods at Ballyhale, Ballyroan, Callan, Freshford, Mountrath and Rathdowney AFAs. Appropriate Assessment is required to examine the significance of these potential impacts.</p>

Name: Sharavogue Bog SAC		Site Code: (IE00000585)
Qualifying Interest(s)	<p>Annex I Habitats: *Active raised bogs [7110] (*priority habitat), Degraded raised bogs still capable of natural regeneration [7120] and Depressions on peat substrates of the <i>Rhynchosporion</i> [7150].</p>	
Proximity to AFA(s) and Linkage	<p>Sharavogue Bog SAC is a bog with a well-developed dome of uncut peat. Much of the site, however, is classified as degraded raised bog, with only a relatively small area of active bog confined to the more central area of the dome. It is located outside the South Eastern CFRAM Study area, however as it is located within the zone of influence of UoM15 it has the potential to be influenced by FRM methods used for AFAs in UoM15 and is therefore being screened for the UoM15 FRMP.</p> <p>Sharavogue Bog SAC is in a separate hydrometric area from the AFAs in UoM15 and therefore has no hydraulic connectivity with the river catchments of the AFAs in UoM15, the nearest of which are Mountrath (c.29km) and Rathdowney c.28km. There is also no potential connectivity with any of the AFAs in UoM15 by means of a biodiversity corridor or stepping stone. There is not considered to be any potential impact pathway between the implementation of FRM methods in the catchments of any of the AFAs in UoM15 and the qualifying interest of Sharavogue Bog SAC.</p>	
Potential Impacts	<p>There is no potential impact pathway between the implementation of FRM methods in the catchments of any of the AFAs in UoM15 and the qualifying interest of Sharavogue Bog SAC. Consequently this site has been removed from requiring any further screening for the UoM15 FRMP.</p>	

Name: Slaney River Valley SAC		Site Code: (IE000781)
Qualifying Interest(s)	<p>Annex I Habitats: Estuaries [1130], Mudflats and sandflats not covered by seawater at low tide [1140], Water courses of plain to montane levels with the <i>Ranunculus fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation [3260], Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i>, <i>Alnion incanae</i>, <i>Salicion albae</i>) [91E0], Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in British Isles [91A0].</p> <p>Annex II Species: <i>Lampetra fluviatilis</i> (River Lamprey) [1099], <i>Lampetra planeri</i> (Brook</p>	

	Lamprey) [1096], <i>Petromyzon marinus</i> (Sea Lamprey) [1095], <i>Salmo salar</i> (Salmon) [1106], <i>Margaritifera margaritifera</i> (Freshwater Pearl Muscle) [1029], <i>Lutra lutra</i> (Otter) [1355], <i>Phoca vitulina</i> (Common Seal) [1365], <i>Alosa fallax</i> (Twaite Shad) [1103].
Proximity to AFA(s) and Linkage	<p>This SAC comprises the freshwater stretches of the River Slaney as far as the Wicklow Mountains and a number of tributaries, in addition to the estuary at Ferrycarrig and Wexford Harbour. The site supports populations of several species listed on Annex II of the E.U. Habitats Directive, and habitats listed on Annex I of this Directive, as well as important numbers of wintering wildfowl including some species listed on Annex I of the E.U. Birds Directive. The presence of wet and broadleaved woodlands increases the overall habitat diversity and the occurrence of a number of Red Data Book plant and animal species adds further importance to the site. Overall it is of considerable conservation significance.</p> <p>Although the SAC is in UoM12, as it is located within the zone of influence of UoM15 it has the potential to be influenced by FRM methods used for AFAs in UoM15 and is therefore being screened for the UoM15 FRMP.</p> <p>The Slaney River Valley SAC is in a separate hydrometric area from the AFAs in UoM15 and therefore has no direct hydraulic connectivity with the river catchments of the AFAs in UoM15, the nearest of which is Thomastown 23.6km on the River Nore. There is no potential connectivity between the qualifying interests of the SAC and the AFAs in UoM15 by virtue of a biodiversity corridor or stepping stone. There is not considered to be any potential impact pathway between FRM methods used in the catchments of the AFAs in UoM15 and the qualifying interests of the SAC.</p>
Potential Impacts	There is no potential impact pathway between the implementation of FRM methods in the catchments of any of the AFAs in UoM15 and the qualifying interest of the Slaney River Valley SAC. Consequently this site has been removed from requiring any further screening for the UoM15 FRMP.

Name: Slieve Bloom Mountains SAC		Site Code: (IE00000412)
Qualifying Interest(s)	Annex I Habitats: *Blanket bog (* active only priority habitat) [7130], Northern Atlantic wet heaths with <i>Erica tetralix</i> [4010] and *Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i> , <i>Alnion incanae</i> , <i>Salicion albae</i>) [91E0] (*priority habitat).	
Proximity to AFA(s) and Linkage	<p>The Slieve Bloom Mountains are a mountain range, extending across approximately 24km, with peaks ranging between around 180m to 529m. The Slieve Bloom SAC is remarkable for its mountain blanket bog habitat.</p> <p>There are two AFAs in UoM15 with the potential to influence the Slieve Bloom Mountains SAC. They are: Ballyroan (14.9km) and Mountrath (3.6km).</p> <p>Slieve Bloom Mountains SAC is the source area for many of the tributaries to the River Barrow and parts of the SAC are directly upstream from Mountrath AFA (5.5km from the SAC via tributaries in the Mountrath_030 sub-basin catchment) and the other AFAs further downstream on the River Nore. The SAC has no hydraulic connectivity with Ballyroan, which is on the Glorreen Stream, a separate tributary of the River Nore. No connectivity by virtue of a biodiversity stepping stone or corridor is evident between the SAC and any of the AFAs in the UoM.</p> <p>The Preliminary Options report for HA15 Optioneering of SSAs has rejected the use of upstream storage FRM methods at the sub-sub catchment and AFA SSA scale for UoM15 and therefore no potential impact pathway exists between FRM methods used for Mountrath (or any of the other AFAs downstream on the River Nore) and the Slieve Bloom Mountains SAC.</p>	
Potential Impacts	It is concluded that there is no potential impact pathway between the qualifying interests of the Slieve Bloom Mountains SAC and any of the AFAs in UoM15. Consequently the SAC has been removed from any further screening.	

Name: Slieve Bloom Mountains SPA		Site Code: (IE0004160)
Qualifying Interest(s)	Species of Special Conservation Interest: Hen Harrier (<i>Circus cyaneus</i>) [A082].	
Proximity to AFA(s) and Linkage	<p>The Slieve Bloom Mountains are a mountain range, extending across approximately 24km, with peaks ranging between around 180m to 529m. The Slieve Bloom SPA has an important population of Hen Harrier.</p> <p>There are three AFAs in UoM15 with the potential to influence the Slieve Bloom Mountains SPA. They are: Ballyroan (14.9km) Mountrath (3.6km) and Rathdowney (13.0km).</p> <p>Slieve Bloom Mountains SPA is the source area for many of the tributaries to the River Barrow and parts of the SPA are directly upstream from Mountrath AFA (5.5km from the SPA via tributaries in the Mountrath_030 sub-basin catchment) and the other AFAs further downstream on the River Nore. The SPA has no hydraulic connectivity with Ballyroan, which is on the Gloreen Stream, or Rathdowney, on the Erkina River, both of which are separate tributaries of the River Nore. No connectivity by virtue of a biodiversity stepping stone or corridor is evident between the SPA and any of the AFAs in the UoM.</p> <p>The Preliminary Options report for HA15 Optioneering of SSAs has rejected the use of upstream storage FRM methods at the sub-sub catchment and AFA SSA scale for UoM15 and therefore no potential impact pathway exists between FRM methods used for Mountrath (or any of the other AFAs downstream on the River Nore) and the Slieve Bloom Mountains SPA.</p>	
Potential Impacts	It is concluded that there is no potential impact pathway between the qualifying interests of the Slieve Bloom Mountains SPA and FRM methods used in the catchments of any of the AFAs in UoM15. Consequently the SPA has been removed from any further screening.	

Name: Spahill and Clomantagh Hill SAC		Site Code: (IE000849)
Qualifying Interest(s)	Annex I Habitats: *Semi-natural dry grasslands and scrubland facies on calcareous substrates (<i>Festuco Brometalia</i>)(*important orchid sites) [6210]	
Proximity to AFA(s) and Linkage	<p>Spahill and the adjacent hills form part of an escarpment, areas of which have been weathered into a pavement pattern, similar to that found in the Burren, Co. Clare. There are three AFAs which have the potential to influence the Spahill and Clomantagh Hill SAC. They are: Ballyragget (10.2km), Freshford (5.8km) and Rathdowney (9.8km).</p> <p>On review of the hydraulic information, Spahill and Clomantagh Hill SAC does not appear to be connected to any mapped watercourses. However it is in the uppermost part of the catchment areas of the Nuenna river, which passes through Freshford before joining the River Nore (which then passes through Kilkenny 15.6km downstream). It is also within the uppermost part of the catchment areas of the River Goul, which joins the Nore 9.5km upstream of Ballyragget.</p> <p>The Preliminary Options report for HA15 Optioneering of SSAs has rejected the use of upstream storage FRM methods at the sub-sub catchment and AFA SSA scale for UoM15 and there is therefore not considered to be any potential hydraulic impact pathway between the implementation of FRM methods at the AFAs in UoM15 and the qualifying interest of Spahill and Clomantagh Hill SAC. No potential connectivity by virtue of a biodiversity corridor or stepping stone is evident between the AFAs in UoM15 and the qualifying interest of Spahill and Clomantagh Hill SAC.</p>	
Potential Impacts	It is concluded that there is no potential impact pathway between the qualifying interests of the Spahill and Clomantagh Hill SAC and FRM methods used in the catchments of any of the AFAs in UoM15. Consequently the site has been removed from any further screening.	

Name: The Loughans SAC		Site Code: (IE000407)
Qualifying Interest(s)	Annex I Habitats: *Turloughs [3180] (*priority habitat).	

Proximity to AFA(s) and Linkage	<p>The Loughans SAC is a turlough with a slightly undulating basin, with banks and hummocks of glacial drift around which the water rises. There are three AFAs in UoM15 with the potential to influence the SAC. They are: Ballyragget (14.3km), Freshford (7.6km), and Rathdowney (13.4km).</p> <p>The Loughans SAC is located in the upper catchment area of a tributary of the Goul River, which is 7.7km downstream of the SAC. The nearest AFA with hydraulic connectivity is Ballyragget, 42km downstream. The AFAs of Freshford and Rathdowney are in separate river catchment sub-basins that have no hydraulic connectivity with the SAC. There is not considered to be any potential impact pathway between the implementation of FRM methods in the catchment of Ballyragget AFA and the qualifying interest of the Loughans SAC.</p>
Potential Impacts	<p>It is concluded that there is no potential impact pathway between the qualifying interests of THE Loughans SAC and FRM methods used in the catchments of any of the AFAs in UoM15. Consequently the site has been removed from any further screening.</p>

Name: Thomastown Quarry SAC Site Code: (IE002252)	
Qualifying Interest(s)	<p>Annex I Habitats: *Petrifying springs with tufa formation (Cratoneurion) [7220] (*priority habitat).</p>
Proximity to AFA(s) and Linkage	<p>Thomastown Quarry SAC is a disused limestone quarry in which an excellent diversity of calcareous habitat types has developed. The site has an excellent diversity of calcareous habitats, including petrifying springs, a habitat with priority status on Annex I of the E.U. Habitats Directive. The presence of rare and uncommon species of plant and animal add further to its interest and importance.</p> <p>There are four AFAs in UoM15 with the potential to influence Thomastown Quarry SAC. They are: Ballyhale (7.8km), Inistioge (6.8km), Kilkenny (Nore) & Kilkenny (Breaghagh)(11.9km) and Thomastown (0.0km). On review of the hydraulic information, Thomastown Quarry SAC does not appear to be connected to any watercourses. It is within the Nore_230 sub-basin and is within the boundary of Thomastown AFA. There exists the potential for direct impacts on the qualifying interest of the SAC from FRM methods at Thomastown AFA. There is no potential hydraulic connectivity with any of the other AFAs in UoM15 nor any connectivity by virtue of a biodiversity corridor or stepping stone. It is concluded that there is no potential impact pathway between the qualifying interest of Thomastown Quarry SAC and the use of FRM method in catchments of any of the other AFAs in UoM15.</p> <p>Consideration of the potential impacts from FRM methods used for AFAs in UoM14 has been given in that UoM's section.</p>
Potential Impacts	<p>There exists the potential for direct impacts on the qualifying interest of Thomastown Quarry SAC from the implementation of FRM methods at Thomastown AFA. Appropriate Assessment is required to examine the significance of these potential impacts.</p>

Name: Tramore Back Strand SPA Site Code: (IE004027)	
Qualifying Interest(s)	<p>Species of Special Conservation Interest: Light-bellied Brent Goose (<i>Branta bernicla hrota</i>) [A046], Golden Plover (<i>Pluvialis apricaria</i>) [A140], Grey Plover (<i>Pluvialis squatarola</i>) [A141], Lapwing (<i>Vanellus vanellus</i>) [A142], Dunlin (<i>Calidris alpina</i>) [A149], Black-tailed Godwit (<i>Limosa limosa</i>) [A156], Bar-tailed Godwit (<i>Limosa lapponica</i>) [A157], Curlew (<i>Numenius arquata</i>) [A160] and Wetland and Waterbirds [A999].</p>
Proximity to AFA(s) and Linkage	<p>Tramore Back Strand SPA comprises a medium sized estuary sheltered from the open sea by a long, shingle spit, with high dunes. The site is of high ornithological importance for wintering waterfowl, with one species having a population of International Importance and a further seven species having populations of National Importance. In addition, three of the species are listed on Annex I of the E.U. Birds Directive i.e. Golden Plover, Bar-tailed Godwit and Little Egret.</p>

	<p>The site is located in UoM17, however, as it is located within the zone of influence of UoM15 it has the potential to be influenced by FRM methods used in UoM15 and therefore is being screened for the UoM15 FRMP.</p> <p>Tramore Back Strand SPA is in a separate hydrometric area from the AFAs in UoM15 and therefore has no hydraulic connectivity with the river catchments of the AFAs in UoM15, the nearest of which is Inistioge (c.35.0km). There is also no potential connectivity with any of the AFAs in UoM15 by means of a biodiversity corridor or stepping stone. There is not considered to be any potential impact pathway between FRM methods used in the catchments of any of the AFAs in UoM15 and the qualifying interests of Tramore Back Strand SPA.</p>
Potential Impacts	<p>It is concluded that there is no potential impact pathway between the qualifying interests of Tramore Back Strand SPA and the implementation of FRM methods in the catchments of any of the AFAs in UoM15. Consequently this site has been removed from requiring any further screening for the UoM15 FRMP.</p>

Name: Tramore Dunes and Backstrand SAC		Site Code: (IE000671)
Qualifying Interest(s)	<p>Annex I Habitats: Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>) [1330], Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410], Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130], Annual vegetation of drift lines [1210], Embryonic shifting dunes [2110], Shifting dunes along the shoreline with <i>Ammophila arenaria</i> (white dunes) [2120], Mudflats and sandflats not covered by seawater at low tide [1140], Perennial vegetation of stony banks [1220] and <i>Salicornia</i> and other annuals colonizing mud and sand [1310].</p>	
Proximity to AFA(s) and Linkage	<p>Tramore Dunes and Backstrand SAC comprises a spit of shingle and sand across a shallow bay accompanied by sand dunes. It is a site of major ecological importance for the range of good quality coastal habitats which occur, including fixed dunes, which are listed as a priority habitat on Annex I of the E.U. Habitats Directive. The site has a remarkably rich flora, featuring a number of rare and protected species, and the intertidal area is important for wintering waterfowl.</p> <p>The SAC is located in UoM17, however, as it is located within the zone of influence of UoM15 it has the potential to be influenced by FRM methods used in UoM15 and therefore is being screened for the UoM15 FRMP.</p> <p>Tramore Dunes and Backstrand SAC is in a separate hydrometric area from the AFAs in UoM15 and therefore has no hydraulic connectivity with the river catchments of the AFAs in UoM15, the nearest of which is Inistioge (c.35.0km). There is also no potential connectivity with any of the AFAs in UoM15 by means of a biodiversity corridor or stepping stone. There is not considered to be any potential impact pathway between FRM methods used in the catchments of any of the AFAs in UoM15 and the qualifying interests of Tramore Dunes and Backstrand SAC.</p>	
Potential Impacts	<p>It is concluded that there is no potential impact pathway between the qualifying interests of Tramore Dunes and Backstrand SAC and the implementation of FRM methods in UoM15. Consequently this site has been removed from requiring any further screening for the UoM15 FRMP.</p>	

APPENDIX C

Qualifying interests, key environmental conditions supporting site integrity and conservation objectives

APPENDIX C: QUALIFYING INTERESTS AND CONSERVATION OBJECTIVES OF ASSESSED SITES

Table C1 – Qualifying interests, key environmental conditions supporting site integrity and conservation objectives for European sites in UoM15.

Site Name and Code	Qualifying interests	Key environmental conditions supporting site integrity	Conservation Objectives	Water-dependent
River Barrow and River Nore SAC (002162)	Freshwater Pearl Mussel <i>Margaritifera margaritifera</i> [1029]	Riverine habitat. Water quality (Q5). Riverbed breeding gravels. Unhindered migratory routes for salmon.	The status of the freshwater pearl mussel (<i>Margaritifera margaritifera</i>) as a qualifying Annex II species for the River Barrow and River Nore SAC is currently under review. The outcome of this review will determine whether a site-specific conservation objective is set for this species.	Yes
	Nore freshwater pearl mussel <i>Margaritifera durrovensis</i> [1990]	Riverine habitat. Water quality (Q5). Riverbed breeding gravels. Unhindered migratory routes for salmon.	<p>Restore favourable conservation condition, defined by the following attributes and targets:</p> <p>Distribution – Maintain at 15.5km.</p> <p>Population size: adult mussels – Restore to 5000 adult mussels.</p> <p>Population structure: recruitment - Restore to at least 20% of population no more than 65mm in length; and at least 5% of population no more than 30mm in length.</p> <p>Population structure: adult mortality – No more than 5% decline from previous number of live adults counted; dead shells less than 1% of the adult population and scattered in distribution.</p> <p>Habitat extent – Restore suitable habitat in length of river corresponding to distribution target (15.5km) and any additional stretches necessary for salmonid spawning.</p> <p>Water quality: macroinvertebrates and phytobenthos (diatoms) –Restore water quality - macroinvertebrates: EQR greater than 0.90; phytobenthos: EQR greater than 0.93.</p> <p>Substratum quality: Filamentous algae (macroalgae), macrophytes (rooted higher plants) –Restore substratum quality – filamentous algae: absent or trace (<5%); macrophytes: absent or trace (<5%).</p> <p>Substratum quality: sediment – Restore substratum quality – stable cobble and gravel substrate with very little fine material; no artificially elevated levels of fine sediment.</p> <p>Substratum quality: oxygen availability – Restore to no more than 20% decline from water column to 5cm depth in substrate.</p> <p>Hydrological regime: flow variability – Restore appropriate hydrological regimes.</p> <p>Host fish - Maintain sufficient juvenile salmonids to host glochidial larvae.</p>	
	Sea Lamprey <i>Petromyzon marinus</i> [1095]	Riverine habitat. Water quality. Riverbed breeding gravels and silt nursery substrate. Unhindered migratory channels.	<p>Restore favourable conservation condition, defined by the following attributes and targets:</p> <p>Distribution: extent of anadromy – Greater than 75% of main stem length of rivers accessible from estuary.</p> <p>Population structure of juveniles – At least three age/size groups present.</p> <p>Juvenile density in fine sediment – Juvenile density at least 1/m².</p> <p>Extent and distribution of spawning habitat - No decline in extent and distribution of spawning beds.</p> <p>Availability of juvenile habitat - More than 50% of sample sites positive.</p>	

Site Name and Code	Qualifying interests	Key environmental conditions supporting site integrity	Conservation Objectives	Water-dependent
	Brook Lamprey <i>Lampetra planeri</i> [1096]	Riverine habitat. Water quality. Riverbed breeding gravels and silt nursery substrate. Unhindered migratory channels.	Restore favourable conservation condition, defined by the following attributes and targets: Distribution - Access to all water courses down to first order streams. Population structure of juveniles - At least three age/size groups of brook/river lamprey present. Juvenile density in fine sediment - Mean catchment juvenile density of brook/river lamprey at least 2/m ² . Extent and distribution of spawning habitat - No decline in extent and distribution of spawning beds. Availability of juvenile habitat - More than 50% of sample sites positive.	
	River Lamprey <i>Lampetra fluviatilis</i> [1099]	Riverine habitat. Water quality. Riverbed breeding gravels and silt nursery substrate. Unhindered migratory channels.	Restore favourable conservation condition, defined by the following attributes and targets: Distribution: extent of anadromy - Greater than 75% of main stem and major tributaries down to second order accessible from estuary. Population structure of juveniles - At least three age/size groups of river/brook lamprey present. Juvenile density in fine sediment - Mean catchment juvenile density of brook/river lamprey at least 2/m ² . Extent and distribution of spawning habitat - No decline in extent and distribution of spawning beds. Availability of juvenile habitat - More than 50% of sample sites positive.	
	Twaite Shad <i>Alosa fallax</i> [1103]	Riverine habitat. Water quality. Riverbed breeding gravels. Unhindered migratory routes	Restore favourable conservation condition, defined by the following attributes and targets: Distribution: extent of anadromy - Greater than 75% of main stem length of rivers accessible from estuary. Population structure- age classes - More than one age class present. Extent and distribution of spawning habitat - No decline in extent and distribution of spawning habitats. Water quality - oxygen levels - No lower than 5mg/l. Spawning habitat quality: Filamentous algae; macrophytes; sediment - Maintain stable gravel substrate with very little fine material, free of filamentous algal (macroalgae) growth and macrophyte (rooted higher plants) growth.	
	Atlantic Salmon <i>Salmo salar</i> [1106]	Riverine habitat. Water quality (Q4-5). Riverbed breeding gravels. Quality riparian vegetation. Unhindered migratory routes	Restore favourable conservation condition, defined by the following attributes and targets: Distribution: extent of anadromy - 100% of river channels down to second order accessible from estuary. Adult spawning fish - Conservation Limit (CL) for each system consistently exceeded. Salmon fry abundance - Maintain or exceed 0+ fry mean catchment-wide abundance threshold value. Currently set at 17 salmon fry/5 min sampling. Out-migrating smolt abundance - No significant decline. Number and distribution of redds - No decline in number and distribution of spawning redds due to anthropogenic causes. Water quality - At least Q4 at all sites sampled by EPA.	

Site Name and Code	Qualifying interests	Key environmental conditions supporting site integrity	Conservation Objectives	Water-dependent
	Estuaries [1130]	Supply of riverine freshwater; Unimpeded tidal flow; Shelter from open coasts; Diverse invertebrate Communities.	Maintain favourable conservation condition, defined by the following attributes and targets: Habitat area – The permanent habitat area is stable or increasing, subject to natural processes. Community distribution – The following sediment communities should be maintained in a natural condition: Muddy estuarine community complex; Sand to muddy fine sand community complex; Fine sand with <i>Fabulina fabula</i> community. Community extent – Maintain the natural extent of the <i>Sabellaria alveolata</i> reef, subject to natural process.	
	Desmoulin's whorl snail <i>Vertigo moulinsiana</i> [1016]	Soil moisture. Habitat availability.	Maintain favourable conservation condition, defined by the following attributes and targets: Distribution: occupied sites – No decline. Two known sites: Borris Bridge, Co. Carlow S711503; Boston Bridge, Kilnaseer S338774, Co. Laois. Population size: adults – At least 5 adult snails in at least 50% of samples. Population density – Adult snails present in at least 60% of samples per site. Area of occupancy – Minimum of 1ha of suitable habitat per site. Habitat quality: vegetation – 90% of samples in habitat classes I and II as defined in Moorkens & Killeen (2011). Habitat quality: soil moisture levels – 90% of samples in moisture class 3-4 as defined in Moorkens & Killeen (2011).	
	White-clawed crayfish <i>Austropotamobius pallipes</i> [1092]	Water quality (at least Q3-4). Habitat heterogeneity.	Maintain favourable conservation condition, defined by the following attributes and targets: Distribution – No reduction from baseline. Population structure: recruitment - Juveniles and/or females with eggs in at least 50% of positive samples. Negative indicator species – No alien crayfish species. Disease – No instances of disease. Water quality - At least Q3-4 at all sites sampled by EPA. Habitat quality: heterogeneity - No decline in heterogeneity or habitat quality.	
	Otter <i>Lutra lutra</i> [1355]	Prey availability. Water Quality. Riparian vegetation for breeding sites. Unhindered passage along waterways.	Restore favourable conservation condition, defined by the following attributes and targets: Distribution – No significant decline. Extent of terrestrial habitat - No significant decline. Area mapped and calculated as 122.8ha above high water mark (HWM); 1136.0ha along river banks / around ponds. Extent of marine habitat - No significant decline. Area mapped and calculated as 857.7ha. Extent of freshwater (river) habitat - No significant decline. Length mapped and calculated as 616.6km. Extent of freshwater (lake/lagoon) habitat - No significant decline. Area mapped and calculated as 2.6ha. Couching sites and holts – No significant decline. Fish biomass available - No significant decline.	

Site Name and Code	Qualifying interests	Key environmental conditions supporting site integrity	Conservation Objectives	Water-dependent
	Water courses of plain to montane levels with the <i>Ranunculus fluitantis</i> and <i>Callitriche-Batrachion</i> Vegetation [3260]	Natural (relatively unmodified) flow regime. Water quality.	<p>Maintain favourable conservation condition, defined by the following attributes and targets:</p> <p>Habitat distribution - No decline, subject to natural processes.</p> <p>Habitat area - Area stable or increasing, subject to natural processes.</p> <p>Hydrological regime: river flow - Maintain appropriate hydrological regimes.</p> <p>Hydrological regime: groundwater discharge - The groundwater flow to the habitat should be permanent and sufficient to maintain tufa formation.</p> <p>Substratum composition: particle size range - The substratum should be dominated by large particles and free from fine sediments.</p> <p>Water chemistry: minerals - The groundwater and surface water should have sufficient concentrations of minerals to allow deposition and persistence of tufa deposits.</p> <p>Water quality: suspended sediment - The concentration of suspended solids in the water column should be sufficiently low to prevent excessive deposition of fine sediments.</p> <p>Water quality: nutrients - The concentration of nutrients in the water column must be sufficiently low to prevent changes in species composition or habitat condition.</p> <p>Vegetation composition: typical species - Typical species of the relevant habitat sub-type reach favourable status.</p> <p>Floodplain connectivity: area - The area of active floodplain at and upstream of the habitat must be maintained.</p>	
	Petrifying springs with tufa formation (<i>Cratoneurion</i>) [7220]	Groundwater rich in calcium bicarbonate.	<p>Maintain favourable conservation condition, defined by the following attributes and targets:</p> <p>Habitat area - Area stable or increasing, subject to natural processes.</p> <p>Habitat distribution - No decline.</p> <p>Hydrological regime: height of water table; water flow - Maintain appropriate hydrological regimes.</p> <p>Water quality - Maintain oligotrophic and calcareous conditions.</p> <p>Vegetation composition: typical species - Maintain typical species.</p>	
	* Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i> , <i>Alnion incanae</i> , <i>Salicion albae</i>) [91E0]	Periodical fluvial inundation.	<p>Restore favourable conservation condition, defined by the following attributes and targets:</p> <p>Habitat area - Area stable or increasing, subject to natural processes, at least 181.54ha for sites surveyed.</p> <p>Habitat distribution - No decline.</p> <p>Woodland size - Area stable or increasing. Where topographically possible, "large" woods at least 25ha in size and "small" woods at least 3ha in size.</p> <p>Woodland structure: cover and height - Diverse structure with a relatively closed canopy containing mature trees; sub-canopy layer with semi-mature trees and shrubs; and well-developed herb layer.</p> <p>Woodland structure: community diversity and extent - Maintain diversity and extent of community types.</p> <p>Woodland structure: natural regeneration - Seedlings, saplings and pole age-classes occur in adequate proportions to ensure survival of woodland canopy.</p> <p>Hydrological regime: Flooding depth/height of water table - Appropriate hydrological regime necessary</p>	

Site Name and Code	Qualifying interests	Key environmental conditions supporting site integrity	Conservation Objectives	Water-dependent
			<p>for maintenance of alluvial vegetation.</p> <p>Woodland structure: dead wood - At least 30m³/ha of fallen timber greater than 10cm diameter; 30 snags/ha; both categories should include stems greater than 40cm diameter (greater than 20cm diameter in the case of alder).</p> <p>Woodland structure: veteran trees - No decline.</p> <p>Woodland structure: indicators of local distinctiveness - No decline.</p> <p>Vegetation composition: native tree cover - No decline. Native tree cover not less than 95%.</p> <p>Vegetation composition: typical species - A variety of typical native species present, depending on woodland type, including ash (<i>Fraxinus excelsior</i>) alder (<i>Alnus glutinosa</i>), willows (<i>Salix</i> spp) and locally, oak (<i>Quercus robur</i>).</p> <p>Vegetation composition: negative indicator species - Negative indicator species, particularly non-native invasive species, absent or under control.</p>	
River Nore SPA (004233)	Kingfisher <i>Alcedo atthis</i> [A229]	Marine/freshwater food availability; Undisturbed soft substrate riparian nest sites; Regularity of extreme weather; Water quality.	<p>Maintain/restore favourable conservation condition, defined by the following attributes and targets:</p> <p>Population trend – Population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.</p> <p>Range – The natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future.</p> <p>Habitat – There is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.</p>	Yes
Thomastown Quarry SAC (002252)	Petrifying springs with tufa formation (Cratoneurion) [7220]	Groundwater rich in calcium bicarbonate.	<p>Maintain favourable conservation condition, defined by the following attributes and targets:</p> <p>Habitat area – The permanent habitat area is stable or increasing, subject to natural processes.</p> <p>Habitat distribution – the distribution of sandbanks is stable or increasing, subject to natural processes.</p> <p>Community distribution – conserve the following community type in a natural condition: Sand with <i>Nephtys cirrosa</i> and <i>Bathyporeia elegans</i> community complex.</p>	Yes

GLOSSARY OF TERMS

Annual Exceedance Probability Or AEP	The probability, typically expressed as a percentage, of a flood event of a given magnitude being equalled or exceeded in any given year. For example, a 1% AEP flood event has a 1%, or 1 in a 100, chance of occurring or being exceeded in any given year.
Appropriate Assessment	An assessment of the effects of a plan or project on Natura 2000 sites (European Sites). European Sites comprise Special Protection Areas under the Birds Directive and Special Areas of Conservation under the Habitats Directive.
Area for Further Assessment or AFA	Areas where, based on the Preliminary Flood Risk Assessment, the risks associated with flooding are considered to be potentially significant. For these areas further, more detailed assessment is required to determine the degree of flood risk, and develop measures to manage and reduce the flood risk. The AFAs are the focus of the CFRAM Studies.
Arterial Drainage Scheme	Works undertaken under the Arterial Drainage Act (1945) to improve the drainage of land. Such works were undertaken, and are maintained on an ongoing basis, by the OPW.
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	European Union Council Directive 2009/147/EC - codified version of Directive 79/409/EEC on the Conservation of Wild Birds, as amended
Catchment	The area of land draining to a particular point on a river or drainage system, such as an Area for Further Assessment (AFA) or the outfall of a river to the sea.
Catchment Flood Risk Assessment and Management Study Or CFRAM Study	A study to assess and map the flood hazard and risk, both existing and potential future, from fluvial and coastal waters, and to define objectives for the management of the identified risks and prepare a Plan setting out a prioritised set of measures aimed at meeting the defined objectives.
Consequences	The impacts of flooding, which may be direct (e.g., physical injury or damage to a property or monument), a disruption (e.g., loss of electricity supply or blockage of a road) or indirect (e.g., stress for affected people or loss of business for affected commerce)
Drainage	Works to remove or facilitate the removal of surface or sub-surface water, e.g., from roads and urban areas through urban storm-water drainage systems, or from land through drainage channels or watercourses that have been deepened or increased in capacity.
Drainage District	Works across a specified area undertaken under the Drainage Acts to facilitate land drainage.
Estuary	A semi-enclosed coastal body of water with one or more rivers or streams flowing into it, and with an open connection to the sea.
Flood	The temporary covering by water of land that is not normally covered by water.

‘Floods’ Directive	The European Union ‘Floods’ Directive [2007/60/EC] is the Directive that came into force in November 2007 requiring Member States to undertake a PFRA to identify Areas for Further Assessment (AFAs), and then to prepare flood maps and Plans for these areas.
Flood Extent	The extent of land that has been, or might be, flooded. Flood extent is often represented on a flood map.
Flood Risk	Refers to the potential adverse consequences resulting from a flood hazard. The level of flood risk is the product of the frequency or likelihood of flood events and their consequences (such as loss, damage, harm, distress and disruption).
Flood Risk Management Method	Structural and non-structural interventions that modify flooding and flood risk either through changing the frequency of flooding, or by changing the extent and consequences of flooding, or by reducing the vulnerability of those exposed to flood risks.
Flood Risk Management Option	Can be either a single flood risk management method in isolation or a combination of more than one method to manage flood risk.
Flood Risk Management Plan (Plan)	A Plan setting out a prioritised set of measures within a long-term sustainable strategy aimed at achieving defined flood risk management objectives. The Plan is developed at a River Basin (Unit of Management) scale, but is focused on managing risk within the AFAs.
Floodplain	The area of land adjacent to a river or coastal reach that is prone to periodic flooding from that river or the sea.
Fluvial	Riverine, often used in the context of fluvial flooding, i.e., flooding from rivers, streams, etc.
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.
Habitats Directive	The Habitats Directive [92/43/EEC] on the Conservation of Natural Habitats and of Wild Flora and Fauna aims at securing biodiversity through the provision of protection for animal and plant species and habitat types deemed to be of European conservation importance.
Hazard	Something that can cause harm or detrimental consequences. In this context, the hazard referred to is flooding.
Hydraulics	The science of the behaviour of fluids, often used in this context in relation to estimating the conveyance of flood water in river channels or structures (such as culverts) or overland to determine flood levels or extents.
Hydrology	The science of the natural water cycle, often used in this context in relation to estimating the rate and volume of rainfall flowing off the land and of flood flows in rivers.
Hydrometric Area	Hydrological divisions of land, generally large catchments or a conglomeration of small catchments, and associated coastal areas. There are 40 Hydrometric Areas in the island of Ireland.

Hydromorphology	The physical characteristics of the shape, boundaries and content of a water body. For rivers, this includes river depth and width variation, structure and substrate of the river bed and structure of the riparian zone. For lakes it includes lake depth variation, quantity, structure & substrate of the lake bed and structure of the lake shore.
Individual Risk Receptor Or IRR	A single receptor (see below) that has been determined to represent a potentially significant flood risk (as opposed to a community or other area at potentially significant flood risk AFA).
Inundation Measure	Another word for flooding or a flood (see 'Flood') A measure (when used in the context of a flood risk management measure) is a set of works, structural and / or non-structural, aimed at reducing or managing flood risk.
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 plan or project.
Morphology / Morphological National CFRAM Programme	See 'hydromorphology' above. The programme developed by the OPW to implement key aspects of the EU 'Floods' Directive in Ireland, which includes the CFRAM Studies, and builds on the findings of the PFRA.
Natura 2000	European network of protected sites ('European sites') which represent areas of the highest value for natural habitats and species of plants and animals which are rare, endangered or vulnerable in the European Community. The Natura 2000 network includes two types of area: Special Areas of Conservation (SAC) where they support rare, endangered or vulnerable natural habitats and species of plants or animals (other than birds) and Special Protection Areas (SPA) where areas support significant numbers of wild birds and their habitats. SACs are designated under the Habitats Directive and SPAs are classified under the Birds Directive. Certain sites may be designated as both SAC and SPA.
Natural Heritage Area	An area of national nature conservation importance, designated under the Wildlife Act 1976 (as amended), for the protection of features of high biological or earth heritage value or for its diversity of natural attributes.
Non Structural Options	Include flood forecasting and development control to reduce the vulnerability of those currently exposed to flood risks and limit the potential for future flood risks.
Pluvial	Refers to rainfall, often used in the context of pluvial flooding, i.e., flooding caused directly from heavy rainfall events (rather than over-flowing rivers).
Preliminary Flood Risk Assessment Or PFRA	An initial, high-level screening of flood risk at the national level to determine where the risks associated with flooding are potentially significant, to identify the AFAs. The PFRA is the first step required under the EU 'Floods' Directive.
Ramsar Site	Wetland site of international importance designated under the Ramsar Convention on Wetlands of International Importance 1971, primarily because of its importance for waterfowl. All Ramsar sites hold the European designation of SAC or SPA (or both).

Receptor	Something that might suffer harm or damage as a result of a flood, such as a house, office, monument, hospital, agricultural land or environmentally designated sites.
Return Period	A term that was used to describe the probability of a flood event, expressed as the interval in the number of years that, on average over a long period of time, a certain magnitude of flood would be expected to occur. This term has been replaced by 'Annual Exceedance Probability, as Return Period can be misleading.
Riparian	River bank. Often used to describe the area on or near a river bank that supports certain vegetation suited to that environment (Riparian Zone).
Risk	The combination of the probability of flooding, and the consequences of a flood.
River Basin	An area of land (catchment) draining to a particular estuary or reach of coastline.
River Basin District Or RBD	A hydrological division of land defined for the purposes of the Water Framework Directive. There are eight RBDs in the island of Ireland; each comprising a group of River Basins.
Riverine	Related to a river.
Runoff	The flow of water over or through the land to a waterbody (e.g., stream, river or lake) resulting from rainfall events. This may be overland, or through the soil where water infiltrates into the ground.
Screening [or Test of Likely Significance]	The process which identifies the likely impacts upon a European site [Natura 2000 site] of a project or plan, either alone or in combination with other projects or plans, and considers whether these impacts are likely to be significant.
SEA Directive	European Directive 2001/42/EC on the Assessment of the Effects of certain Plans and Programmes on the Environment – 'Strategic Environmental Assessment'.
Sedimentation	The accumulation of particles (of soil, sand, clay, peat, etc.) in the river channel.
Significant Risk	Flood risk that is of particular concern nationally. The PFRA Main Report (see www.cfram.ie) sets out how significant risk is determined for the PFRA, and hence how Areas for Further Assessment have been identified.
Spatial Scale(s) of Assessment	Defines the spatial scale at which flood risk management options are assessed. Assessment Units are defined on four spatial scales ranging in size from largest to smallest as follows: catchment scale, Assessment Unit (AU) scale, Areas for Further Assessment (APSR) and Individual Risk Receptors (IRR).
Special Area of Conservation	A Special Area of Conservation (SAC) is an internationally important site, protected for its habitats and non-bird species. It is designated, as required, under the EC Habitats Directive. A candidate SAC (cSAC) is a candidate site, but is afforded the same status as if it were confirmed.
Special Protection Area	A Special Protection Area (SPA) is a site of international importance for breeding, feeding and roosting habitat for bird species. It is designated, as required, under the EC Birds Directive.
Standard of Protection Or SoP	The magnitude of flood, often defined by the annual probability of that flood occurring being exceeded (the Annual Exceedance Probability, or 'AEP'), that a measure / works is designed to protect the area at risk against.

Strategic Environmental Assessment Or SEA	A SEA is an environmental assessment of plans (such as the Plans) and programmes to ensure a high level consideration of environmental issues in the plan preparation and adoption, and is a requirement provided for under the SEA directive [2001/42/EC]
Structural Options	Involve the application of physical flood defence measures, such as flood walls and embankments, which modify flooding and flood risk either through changing the frequency of flooding, or by changing the extent and consequences of flooding.
Surface Water	Water on the surface of the land. Often used to refer to ponding of rainfall unable to drain away or infiltrate into the soil.
Surge	The phenomenon of high sea levels due to meteorological conditions, such as low pressure or high winds, as opposed to the normal tidal cycles
Sustainability	The capacity to endure. Often used in an environmental context or in relation to climate change, but with reference to actions people and society may take.
Tidal	Related to the tides of the sea / oceans, often used in the context of tidal flooding, i.e., flooding caused from high sea or estuarine levels.
Topography	The shape of the land, e.g., where land rises or is flat.
Transitional Water	The estuarine or inter-tidal reach of a river, where the water is influenced by both freshwater river flow and saltwater from the sea.
Unit of Management Or UoM	A hydrological division of land defined for the purposes of the Floods Directive. One Plan will be prepared for each Unit of Management, which is referred to within the Plan as a River Basin.
Vulnerability	The potential degree of damage to a receptor (see above), and the degree of consequences that would arise from such damage.
Water Framework Directive Or WFD	The Water Framework Directive [2000/60/EC] aims to protect surface, transitional, coastal and ground waters to protect and enhance the aquatic environment and ecosystems and promote sustainable use of water resources
Waterbody	A term used in the Water Framework Directive (see below) to describe discrete section of rivers, lakes, estuaries, the sea, groundwater and other bodies of water.
Watercourse	Any flowing body of water including rivers, streams, drains, ditches etc.
Zone of Influence	The area over which ecological features may be subject to significant effects as a result of the proposed Plan and associated activities. This may extend beyond the Plan area, for example where there are ecological or hydrological links beyond the Plan boundary. The zone of influence may vary for different ecological features depending on their sensitivity to an environmental change.



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