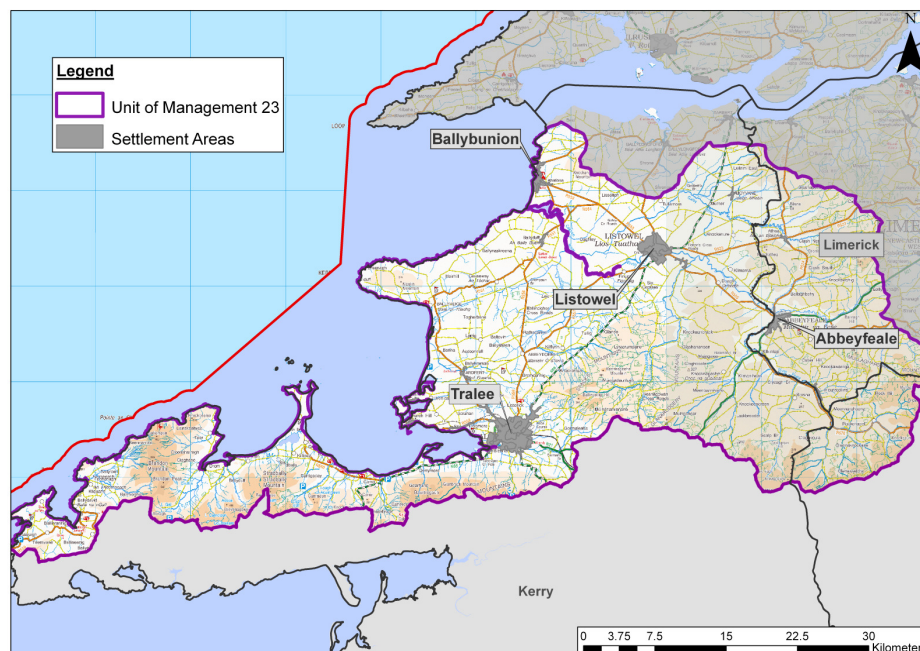




Strategic Environmental Assessment - Scoping Report [Consultation Draft] - Annex I

Unit of Management 23: Tralee Bay / Feale - Flood History and Key Environmental Issues










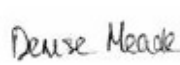

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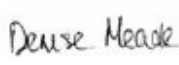
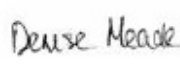

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	Originated by	Checked by	Reviewed by	Approved by
ORIGINAL	NAME Muriel Ennis Oonagh Duffy  	NAME Kelly Kasperczyk 	NAME Kelly Kasperczyk 	NAME Peter Smyth 
DATE	INITIALS	INITIALS	INITIALS	INITIALS
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REVISION	NAME Muriel Ennis 	NAME Oonagh Duffy 	NAME Denise Meade 	NAME Peter Smyth 
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1

Introduction

1.1 Background

As part of the Strategic Environmental Assessment (SEA) process, the Office of Public Works (OPW) invites you to give your views on the development and implementation of a series of Flood Risk Management Plans (FRMPs) in the Shannon River Basin District (RBD).

This Annex represents a key element of the SEA scoping process for the proposed FRMP for the **Tralee Bay - Feale Unit of Management (UoM 23)** by describing the existing and potential future characteristics of the Unit of Management, summarising the history of flooding associated with its coastline and river catchments, and identifying the key social and environmental issues relating to flooding and flood risk management specific to this Unit of Management. This Annex should be read in conjunction with the overarching Shannon River Basin District Environmental Scoping Report which documents all other elements relevant to this scoping process.

Your comments on the information outlined in this Annex, coupled with those on the overarching Shannon RBD Environmental Scoping Report, will assist the scoping of, and the consultation about, the environmental impacts of the Tralee Bay – Feale Unit of Management (UoM 23) FRMP by initiating the strategic environmental assessment scoping stage.

The preparation of the FRMP for Unit of Management 23 will consider the risk of flooding from the rivers, estuaries and coastal waters at various different spatial scales. The locations that are considered to be potentially at risk of flooding, and therefore been identified as Areas for Further Assessment (AFAs) or Individual Risk Receptors (IRRs), will be subject to more detailed consideration in the development of the FRMP for this Unit of Management given their history of flooding, or where such risk might arise through future development or other changes/pressures.

Flood maps indicating where flood risk from river, estuarine or coastal waters exists within AFAs or at IRRs, and along the watercourses connecting AFAs / IRRs will be produced for this Unit of Management.

Annex I – Tralee Bay – Feale Unit of Management (UoM 23)

1.2 Consultation

You have an important role to play in helping us identify all the key issues relating to flood risk management, and we are keen to hear what you think. Specific to **Unit of Management 23 (Tralee Bay - Feale)**, we welcome your comments on the key environmental issues.

It is important to note that the information in this Annex accounts for pre-scoping consultation already undertaken with key organisations, and the following sections present our current understanding of the Tralee Bay – Feale Unit of Management. The SEA baseline and framework will develop as the Study progresses, and will be further informed by views and knowledge of stakeholders and the wider public.

You can send us your views by email or by post to the details below.

Email	Shannon.cframes@jacobs.com
Write to	Shannon CFRAM Study Jacobs Engineering Ireland Ltd Merrion House Merrion Road Dublin 4
Telephone	01 2028113
Website	www.shannoncframstudy.ie

2 Characteristics and History of Flooding

2.1 Unit of Management Characteristics

The Tralee Bay – Feale Unit of Management is shown in Figure 2.1 and encompasses areas of three counties; Kerry, Limerick and Cork. It is bounded on the northwest by the mouth of the Shannon Estuary and on the east and southeast by the Mullaghareirk Mountains, forming the catchment divide between Unit of Management 23 and Unit of Management 24 (Shannon Estuary South). Along the southern boundary from east to west are the Glanaruddery Mountains and the Slieve Mish Mountains which extend into the Dingle Peninsula.

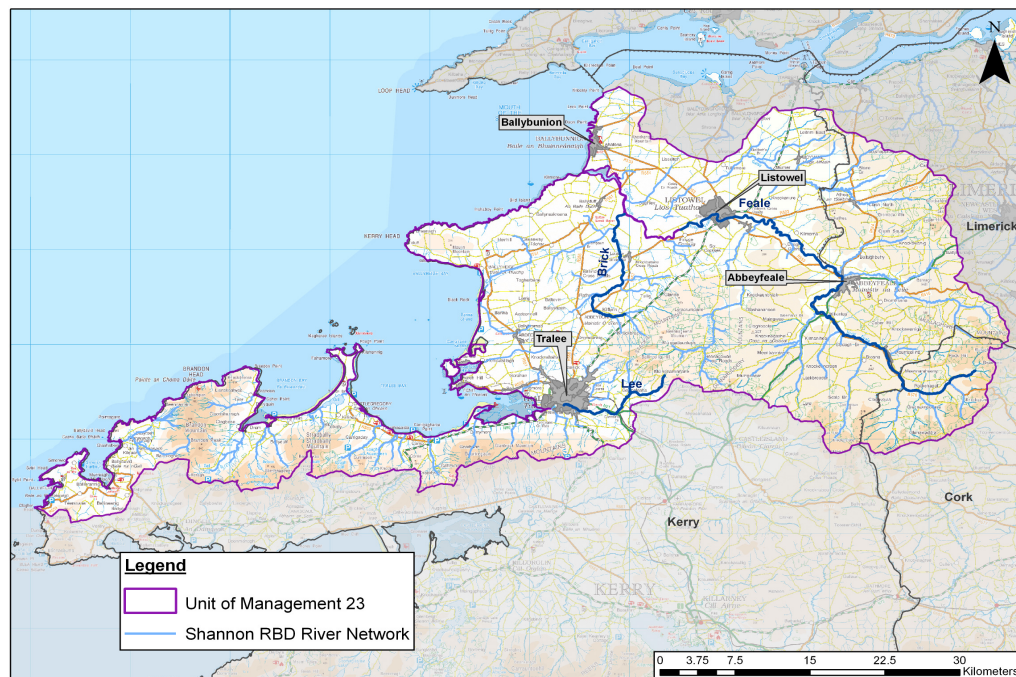


Figure 2.1 - UoM 23 Tralee Bay – Feale Overview

Unit of Management 23 is dominated by the Feale catchment in the central and eastern area. The River Feale drains into Cashen Bay in its lower reaches where it becomes tidally influenced. This catchment, with a total area to the mouth of the Cashen of 1,155km² makes up around 65% of the total area of this Unit of Management.

Major tributaries to the Feale catchment include the Shannow, Brick, Galey, Smearlagh, Allaghaun, and Oolagh rivers. These typically drain the upland areas to the east and south of the area, with the exception of the Brick which predominantly drains a lowland area towards the west.

The southern and southwestern area is dominated by mountainous and upland areas with many steep and flashy watercourses, notably around the Dingle Peninsula and Tralee. The Slieve Mish Mountains are to the south and southwest of Tralee, with Stack's Mountains to the east and northeast of Tralee. The main rivers in this area are the River Lee and Big River, both flowing into Tralee.

Annex I – Tralee Bay – Feale Unit of Management (UoM 23)

The western area along the Atlantic coast (Ballyheige Bay) is a mainly low lying area with small catchments draining to the west coast. This area is protected by an extensive coastal dune system. There are important drainage schemes in this area behind the dune system, notably the Akeragh Drainage System which discharges to the Atlantic approximately 3km south of Ballyheige. The northwest coast, with the exception of the Cashen which also discharges here, is characterised by small rivers and streams discharging to the Atlantic Ocean.

Spatial Scale Assessment

There are two Water Management Units (WMUs) within Unit of Management 23 (refer to Figure 2.2). These consist of the Feale and North Kerry/Tralee Bay WMUs. Approximately two thirds of the area of the Feale WMU (the central, eastern and southern areas) is included in Unit of Management 23, whereas the remainder of the Feale WMU lies within Unit of Management 24 (see Annex II).

Table 2.1 and Figure 2.2 illustrate the AFAs identified for Unit of Management 23, all of which may be subject to changes as the CFRAM Study develops. No IRRs have been identified within Unit of Management 23.

Table 2.1: UoM 23 spatial scales of assessment

County	WMU	AFA Name
Areas for Further Assessment		
Kerry	North Kerry/Tralee Bay	Banna
Kerry	North Kerry/Tralee Bay	Tralee
Kerry	Feale	Moneycashen
Kerry	Feale	Abbeydorney
Kerry	Feale	Listowel
Limerick	Feale	Athea
Limerick	Feale	Abbeyfeale

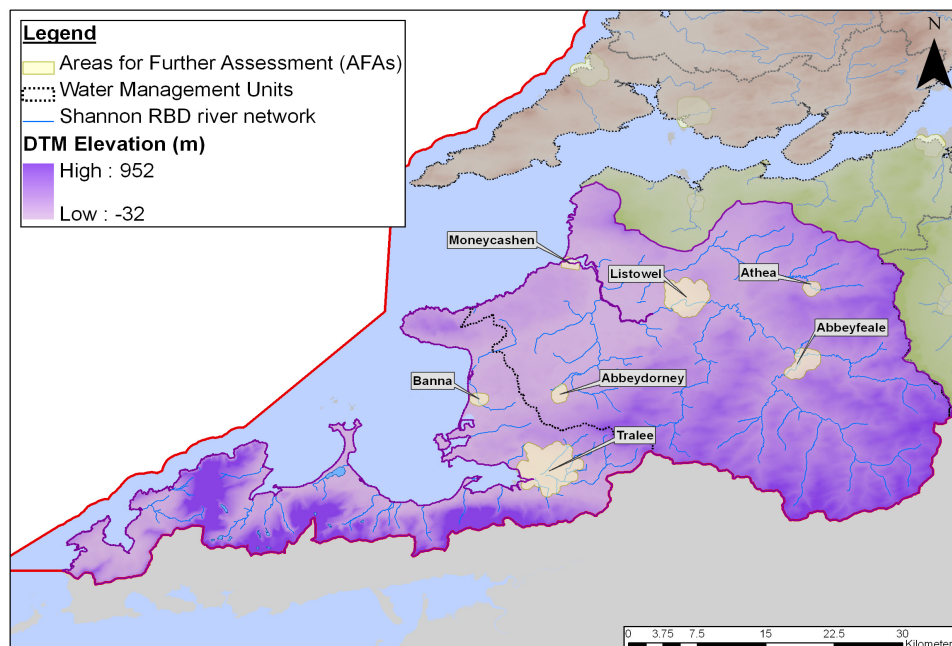


Figure 2.2 - UoM 23 spatial scales of assessment

Annex I – Tralee Bay – Feale Unit of Management (UoM 23)

2.2 History of Flooding

Within Unit of Management 23, there are records of significant flooding that has occurred throughout the Feale WMU from 1916 to 2009, affecting a number of towns and villages. The major cause of flooding, based on the available records, appears to be fluvial and tidal.

Tables 2.2 and 2.3 show the reported fluvial and tidal flood events for the AFAs within the Unit of Management 23 WMUs. This historical flooding information has been gathered using the OPW National Flood Hazard Mapping website (www.floodmaps.ie), and the National Preliminary Flood Risk Assessment (PFRA) Report (August 2011) produced by the OPW. The 'known' main flood mechanism is not recorded for all flood events and is assumed for some records in the tables below (these are shown in *italics*).

Table 2.2: Summary of historical flood events within the Feale WMU (for those catchments that fall within UoM 23)

FEALE WMU		
Flood Event	Main Flood Mechanism	Description of Flood Event
(a) Abbeydorney		
Oct 1994	-	No flooding details available.
Nov 1994	-	No flooding details available.
(b) Abbeyfeale		
Jan 2005	Fluvial	Local road at Allaghaun Bridge, Ballaugh impassable. One house under threat of flooding.
Recurring	Fluvial	Flooding occurs roughly twice a year at Allaghaun Bridge, Ballaugh.
(c) Athea		
Sept 2009	Fluvial	Approximately 4 properties, The Avenue & Con Colbert (main street) flooded.
Aug 2008	Fluvial	At least 12 properties, R523, Wastewater treatment plant flooded.
Aug 2008	Fluvial	At least 14 properties flooded (2 additional properties compared to 01 st August 2008 event).
Apr 2005	Fluvial	Area adjacent to the bridge in the village was affected by flooding. One resident's house was flooded.
(d) Listowel		
Aug 2003	<i>Fluvial & pluvial</i>	Land at Coibee, Listowel flooded.
Nov 2002	<i>Fluvial & pluvial</i>	House at Curraghatoosane, Listowel flooded.
Nov 2002	<i>Fluvial & pluvial</i>	Septic tank at Gortnaminch, Listowel flooded.
Jul 2002	<i>Fluvial & pluvial</i>	Field at Greenville, Listowel flooded.
Feb 2001	<i>Fluvial & pluvial</i>	Field (Feale Galey tributary) at Shrone West, Listowel flooded.
(e) Moneycashen		
Feb 2002	Tidal	3 or 4 houses and roads flooded at Cashen Village and Moneycashen.
Recurring	<i>Tidal</i>	4 properties flooded (PFRA).

Annex I – Tralee Bay – Feale Unit of Management (UoM 23)

Table 2.3: Summary of historical flood events within the North Kerry/Tralee Bay WMU

NORTH KERRY/TRALEE BAY WMU		
Flood Event	Main Flood Mechanism	Description of Flood Event
(a) Banna		
Nov 1980	Fluvial	Main Ballyheigue – Ardfert Road flooded to approximately 0.15m.
(b) Tralee		
Feb 2011	Tidal	Karney's Rd Blennerville flooded.
Nov 2009	Fluvial & pluvial	Flooding occurred in Curragraigue TD and Ballymullen (Munster Bar Road U171) N70 from Army Barracks to Ballymullen roundabout. The flood affected 6 residential, 1 commercial – public House in Ballymullen and Local GAA Clubhouse flooded to depth of 300mm in Curragraigue. The flood in Curragraigue disrupted road access to Blennerville.
Aug 2008	Fluvial & pluvial	Caherweesheen TD, Ballyard, 0.6m deep flood. One house and a farm building were flooded. Access to L6516 affected for a number of hours.
Dec 2005	Fluvial	Flooding occurred in three areas Ballinorig, Caherleheen, Ardfert
Aug 1997	Fluvial	Tralee Killarney Road, Ardnabraher Ballinorig – 3 properties flooded (PFRA). One property at Ballycarty Cross flooded (PFRA).
Nov 1996	Fluvial	Flooding in Ballyseedy area
Aug 1986	Fluvial	Entire business centre of Tralee flooded causing severe damage to shops, offices & private dwellings. Severe flooding in Ballymullen & Castlecountess areas. Roads impassable.
Nov 1980	Fluvial & pluvial	Ballyseedy, Ballyard, Oakview and the railway yard near Ashe Street flooded. New Ring Road flooded due to surface water. Ballymullen areas – Killerisk, terrace of houses opposite Army Barracks and land near Castlemaine Road flooded.
Dec 1973	Fluvial, groundwater & exacerbated by tidal	Entire business area of Tralee flooded.
May 1971	-	No flooding details available.
Mar 1955	-	No flooding details available.
Jan 1925	-	No flooding details available.
Nov 1924 to Dec 1924	-	No flooding details available.
Nov 1916	-	No flooding details available.
Recurring	Fluvial, groundwater & pluvial	Ballinorig: Castleisland to Tralee Road and 5 properties affected (PFRA), Caherleheen: N70 - Tralee to Castlemaine Ardfert: R551 and 10 houses affected

3 Key Environmental Issues in Unit of Management 23

3.1 Introduction

The following sections provide a preliminary discussion of the environmental baseline for Unit of Management 23.

Both the existing and potential future environmental characteristics of the Unit of Management are summarised. These characteristics can influence the risk and repercussions of flooding and can constrain or provide opportunities for the implementation of strategic flood risk management options.

On developing the scope of the SEA for the Shannon CFRAM Study, and following consultation with stakeholders, the key social and environmental issues relating to flooding and flood risk management within Unit of Management 23 have been identified, and these are documented in the following sections.

Potential interactions between the different aspects of the environment are outlined within Section 5 of the overarching Shannon RBD Environmental Scoping Report. These interactions will be further considered and documented during the later stages of the SEA process.

Annex I – Tralee Bay – Feale Unit of Management (UoM 23)

3.2 Population and Human Health

3.2.1 Current Conditions

Population

The population of Ireland was over 4.2 million in 2006 and provisional numbers from the 2011 census indicate that population figures have increased by approximately 8.1% to 4.5 million. Ireland has experienced increasing population growth since 1961, however the past two years has seen a decrease in the demand for development, and increased unemployment within this Unit of Management as is the trend seen across the entire country.

The provisional 2011 census population figures currently available from the Central Statistics Office (CSO) do not segregate city populations from rural population, but these are due to be published in April 2012 and will be considered as appropriate in the following stages of the SEA. Settlement patterns within this Unit of Management are illustrated in Figure 3.2.1.

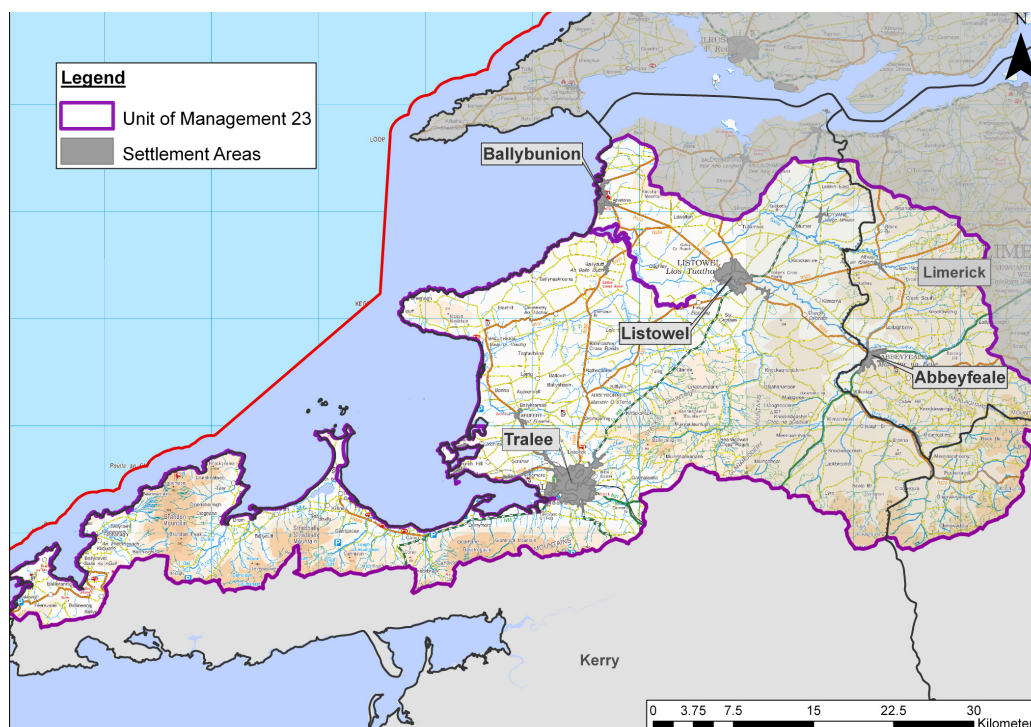


Figure 3.2.1 - Settlement patterns within UoM 23

Population figures reported in the 2006 census for the town boundaries of each AFA within this Unit of Management are outlined in Table 3.2.1.

Annex I – Tralee Bay – Feale Unit of Management (UoM 23)

Table 3.2.1: Population figures within the Areas for Further Assessment
(source: CSO)

Town (AFAs)	Population 2002	Population 2006
Abbeydorney	218	244
Abbeyfeale	1683	1940
Athea	410	377
Banna	724	732
Listowel (urban & environs)	3999	4338
Moneycashen	-	-
Tralee (town & urban)	26686	25744

Towns and villages within commuting distance from Limerick City have experienced population growth in recent years, e.g. Listowel (300+) and Abbeyfeale (250+). However, those areas further away from Limerick City such as Tralee have seen a decrease since the 2002 figures (900+). Tralee by some magnitude still has the highest population recorded within this Unit of Management.

Transport 21, the Government's development programme for the network of national roads over the period 2006 to 2015 included the following developments of relevance to the population distribution within this Unit of Management:

- Atlantic Road Corridor from Letterkenny to Sligo, Galway, Limerick and Waterford. This will connect the NSS 2002-2020 Gateway Cities;
- Improve the key national primary routes, N21 from Limerick to Tralee and N24 from Limerick to Waterford; and
- Targeted improvement of national secondary roads: the N69 along the Shannon Estuary from Limerick to Tralee.

Transport 21 will be superseded by the new National Development Plan from 2012. However, the NDP reflects many of the road infrastructural proposals under Transport 21.

Human Health

Hospitals, health service centres, nursing homes and schools, as well as their ancillary services and roads, are recognised as vulnerable receptors to flooding. The distribution of these receptor groups throughout this Unit of Management is illustrated by Figure 3.2.2.

The major hospitals servicing this Unit of Management are regional hospitals located in Tralee and Listowel.

Annex I – Tralee Bay – Feale Unit of Management (UoM 23)

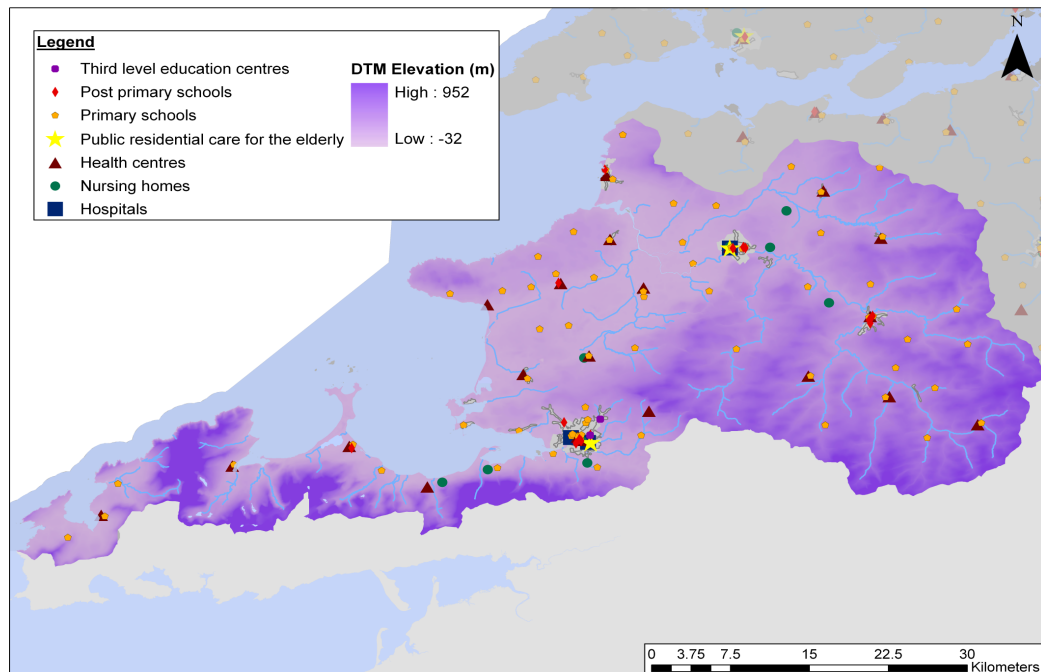


Figure 3.2.2 - Critical human health receptors within UoM 23 (source: OPW, HSE)

Details regarding the existing and future characteristics of this Unit of Management associated with pollution risks to human health are outlined in Section 3.4 of this Annex.

3.2.2 Future Trends

Housing and Economic Development Planning

The Planning and Development (Amendment) Act 2010 (and subsequently the Regional Planning Guidelines) includes new provisions for Development Plans, requiring the introduction of a 'core strategy that shall show that the development objectives in the Development Plan are consistent, as far as practicable, with national and regional development objectives set out in the National Spatial Strategy and Regional Planning Guidelines'. The Core Strategy of each plan must provide a transparent evidence-based rationale for the amount of land proposed to be zoned for residential and allied mixed-use zonings in the relevant Development Plan and associated compliance with relevant EU Directives. The implementation of core strategies (which is being monitored by the Mid-west and South West Regional Authorities for this Unit of Management) within the Development Plans is likely to result in de-zoning, re-zoning and phasing of development of lands.

Local Authorities with AFAs within this Unit of Management, which include Limerick, Cork¹ and Kerry County Councils, have incorporated Core Strategies into their Development Plans. Each Council are now required to integrate these Strategies

¹ The area of County Cork which lies within this Unit of Management is at the upstream end of the Feale catchment and does not include identified AFAs.

Annex I – Tralee Bay – Feale Unit of Management (UoM 23)

into the relevant Local Area Plans. The implementation of these strategies may result in re-zoning or de-zoning of land within this Unit of Management, influencing population distribution and development. Core Strategies outlined in the Limerick (draft 2010 – 2016), Cork (2009 – 2015) and Kerry (2009 – 2015) County Development Plans emphasise the need for sustainable development and appropriately zoned land, in addition to a strong link to enforcement of planning regulations for sustainable development into the future. The strategies relevant to the AFAs will be examined further in the next stage of the SEA process. In addition, consultation with relevant Regional Planning Authorities for this Unit of Management will continue.

There is a requirement for planning authorities to have regard to the Planning System and Flood Risk Management Guidelines (Department of Environmental Heritage and Local Government² and the OPW, 2009) in carrying out their functions under the Planning Acts. This is to ensure that ‘where relevant, flood risk is a key consideration in preparing Development Plans and Local Area Plans and in the assessment of planning applications’. These guidelines aim to help revise and strengthen planning policy on development and flood risk across Ireland, and will therefore have a significant influence on future population and development growth and distribution across the Unit of Management.

The preparation of a Strategic Integrated Framework Plan (SIFP) and its associated SEA and AA for the Shannon Estuary has recently commenced. This Plan aims to identify the nature and location of future development, economic growth and employment that can be sustainably accommodated within the estuary whilst ensuring that the habitat status of the Natura 2000 and other environmentally sensitive sites would not be reduced as a result of the impacts of such developments (for further information, refer to Section 3.9.2).

Regional Planning Guidelines – Population Targets

Population targets are outlined in the respective Regional Planning Guidelines to assist planning authorities to decide on the extent of land to be zoned for development (particularly residential development). Population targets indicate the minimum population numbers for these locations to be used in determining future development land requirements for the region, setting the context for city and county Development Plans and Local Area Plans. While zoning should have regard to these population targets, the Guidelines note that additional development may be permitted where there is a clear need. The targets outlined in Table 3.2.2 below provide an indication of future population distribution in this Unit of Management.

Table 3.2.2: Population targets set out in the South West and Mid-West Regional Planning Guidelines for regions within UoM 23.

Area / Region	2006 (Census)	2016	2022	Predicted Increase 2016-2022
Limerick County	124,265	147,081	157,065	9,984
Kerry County	139,835	165,470	174,378	8,908
Cork County	361,877	436,920	470,622	33,702

² Now the Department of the Environment, Community and Local Government.

Annex I – Tralee Bay – Feale Unit of Management (UoM 23)**Box 3.2: Population and Human Health – Key strategic issues relating to flood risk management**

- Population and development growth will potentially increase the number of people at risk from flooding;
- Recent and emerging changes to planning and development regulations/guidance and their associated influences on the distribution of both existing and future population and development, can provide opportunities for the avoidance or mitigation of flood risk if appropriately enforced;
- Flooding can have significant social and socio-economic effects, such as increased stress and anxiety for individuals and communities as well as monetary impacts associated with ‘clean-up’ activities;
- Increased levels of resilience and resistance of infrastructure protecting or managing human health to flooding is important to support emergency planning and response e.g. hospitals, nursing homes, health care facilities, etc;
- Access to healthcare and emergency services should be maintained during flood events;
- Failure to protect or manage potential ‘at risk’ areas, can influence property insurance policies and may also restrict development potential;
- Publication of nationally / regionally consistent information relating to flood risk will help towards standardising planning, development and insurance policies;
- Good public access to information relating to flood risk can support ongoing community and business resilience, which in turn can provide opportunities for facilitating or enhancing the sustainability of flood risk management; and
- It is acknowledged that Local Authorities are legally required to undertake emergency planning and therefore this will not be proposed as a flood risk management option by the CFRAM Study. However, other aspects of strategic flood risk management can enhance business and community emergency planning and continuity frameworks, e.g. linking emergency planning frameworks with flood forecasting, to provide flood warning.

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3.3 Geology, Soils and Land Use

3.3.1 Existing Conditions

The topography of the Feale catchment is varied, with a generally flat gradient near the Kerry coastline. The Slieve Mish Mountains are located along the Dingle Peninsula and the Stacks and Mullaghareirks Mountains located in the eastern section of this Unit of Management. Underlying this is a sedimentary **geology** of shale, sandstone, siltstone and limestone with the Dingle peninsula also containing ribbons of mudstone, siltstone & breccia, see Figure 3.3.1.

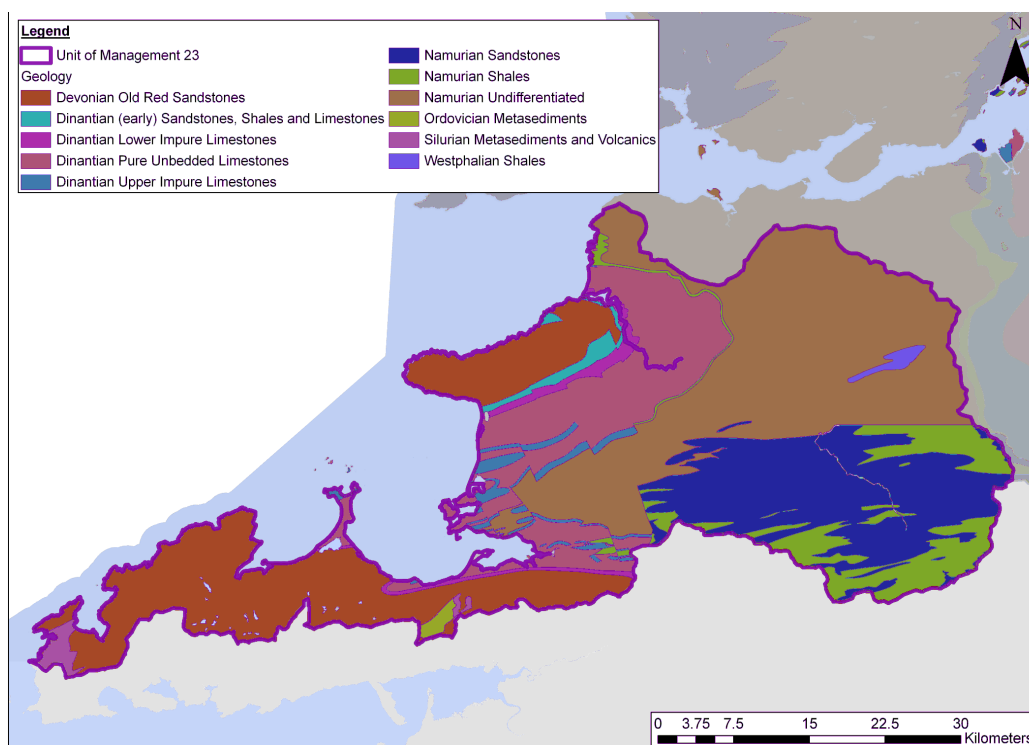


Figure 3.3.1 - Geology within UoM 23 (source: GSI)

As part of the Irish Geological Heritage (IGH) Programme, a partnership between Geological Survey of Ireland (GSI) and the National Parks and Wildlife Service (NPWS), the GSI have identified important geological and geomorphological sites which could be conserved as Natural Heritage Areas (NHAs). Until designation is confirmed, these sites are classified as Irish Geological Heritage Sites (IGHs). There are 29 IGHs classified within this Unit of Management (refer to Figure 3.3.2 and Table 3.3.1).

Annex I – Tralee Bay – Feale Unit of Management (UoM 23)

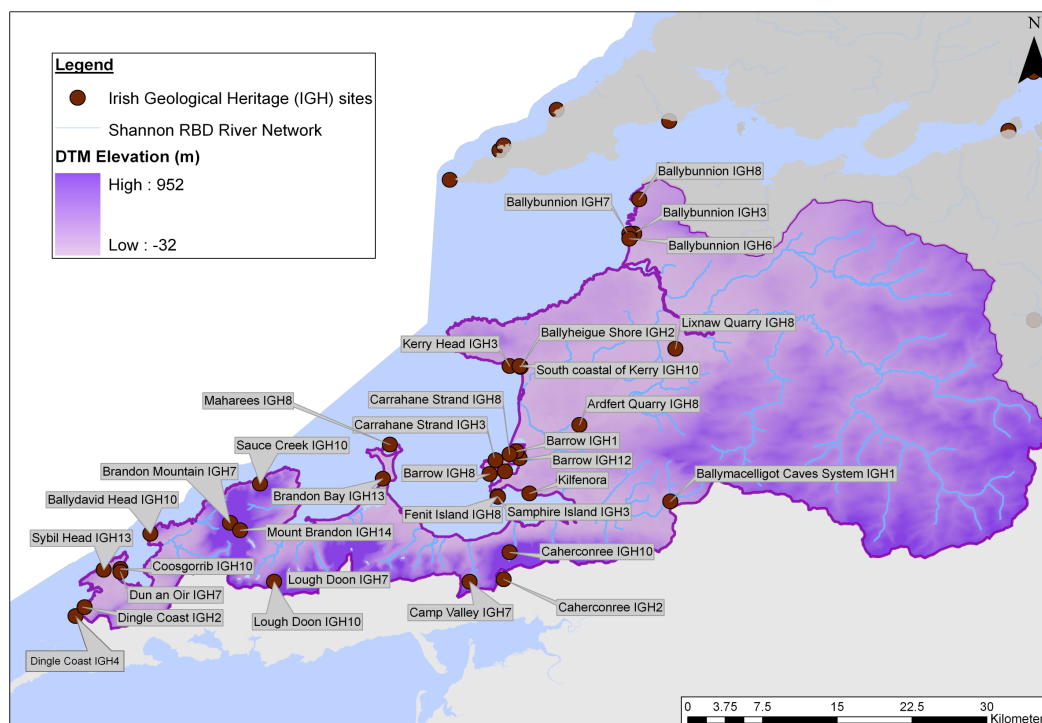


Figure 3.3.2 – Irish Geological Heritage Sites within UoM 23 (source: GSI)

Table 3.3.1: Description of the IGH within UoM 23

Site Name	Theme No(s).	Theme Type	Principal Characteristics
Ardfer Quarry	IGH8	Lower Carboniferous	Quarry
Ballybunnion	IGH3 IGH8 IGH6	Carboniferous - Pliocene Palaeontology Lower Carboniferous Mineralogy	Goniatites and Bivalves Exposed Waulsortian Sulphides
Ballydauid Head	IGH10	Devonian	Not Provided
Ballyheigue Shore	IGH2	Precambrian - Devonian Palaeontology	Devonian
Ballymacelligot Caves System	IGH1	Karst	Cave System
Barrow	IGH12 IGH8 IGH1	Mesozoic/ Cenozoic Lower Carboniferous Karst	Residual Tower Karst
Barrow Harbour - Fenit	IGH13	Coastal Geomorphology	Carboniferous Limestone Beach of Calcareous Sand
Beal Point	IGH9	Upper Carboniferous	Carboniferous Rocks Exposed
Brandon Bay	IGH13	Coastal Geomorphology	A Large Tombolo of Carboniferous Limestone
Brandon Mountain	IGH7	Quaternary	Pyramidal Peaks

Annex I – Tralee Bay – Feale Unit of Management (UoM 23)

Site Name	Theme No(s).	Theme Type	Principal Characteristics
Caherconree and Derrymore Glen	IGH2 IGH10	Precambrian - Devonian Palaeontology Devonian	Ludlow Graptolite and Shelly Faunas
Camp Valley	IGH7	Quaternary	Erratic
Carrahane Strand	IGH3 IGH8	Carboniferous - Pliocene Palaeontology Lower Carboniferous	Waulsortian Buildups with Lithistid Demosponges
Coosgorrib (Smerwick Harbour)	IGH10	Devonian	Devonian Dingle
Dingle Silurian Coast	IGH4 IGH2	Cambrian-Silurian Precambrian - Devonian Palaeontology	Dunquin Group Stratigraphy and Important Fossil Localities
Dun an Oir	IGH7	Quaternary	Stripes
Fenit - Kilfenora - Spa	IGH14 IGH7	Fluvial/Lacustrine Geomorphology Quaternary	Mass Wasting
Fenit Island	IGH8	Lower Carboniferous	Waulsortian with Large Sponges
Kerry Head	IGH3	Carboniferous - Pliocene Palaeontology	Palynological and Palaeobotanical Assemblages
Kilfenora	IGH12	Mesozoic/ Cenozoic	Saprolite
Lixnaw Quarry	IGH8	Lower Carboniferous	Working Quarry, Visean Limestone and Distinctive Rock Type
Lough Doon	IGH7 IGH10	Quaternary Devonian	Corrie
Maharees, Tralee Bay	IGH8	Lower Carboniferous	Waulsortian Mudbank
Mount Brandon	IGH14	Fluvial/Lacustrine Geomorphology	Pysical Weathering, Scree and Paternoster Lakes
Plover Hill	IGH8	Lower Carboniferous	Asbian Mound
Samphire Island	IGH3	Carboniferous - Pliocene Palaeontology	Waulsortian Mudmound
Sauce Creek	IGH10	Devonian	Not Provided
South coastal section of Kerry Head	IGH10	Devonian	Not Provided
Sybil Head - Smerwick Harbour	IGH13	Coastal Geomorphology	Devonian Coastal Geomorphology

Annex I – Tralee Bay – Feale Unit of Management (UoM 23)

The **soils** to the east of this Unit of Management are made up of primarily blanket peat and peaty acidic gleys, moving west in the northern section of this Unit of Management the majority of the soils is classed as acidic surface/ groundwater gleys and in the southern section the primary soil class is blanket peat. Extending further west along the Dingle peninsula the soil class is made up primarily with podzols and blanket peat. The sub-soil consists primarily of shale's / sandstone with sections of blanket bog and ribbons on alluvium. A large section in the north west of and the Dingle peninsula are made up of devonian sandstone with alluvium and blanket bog throughout. Figure 3.3.3 shows the type of sub-soils within this Unit of Management.

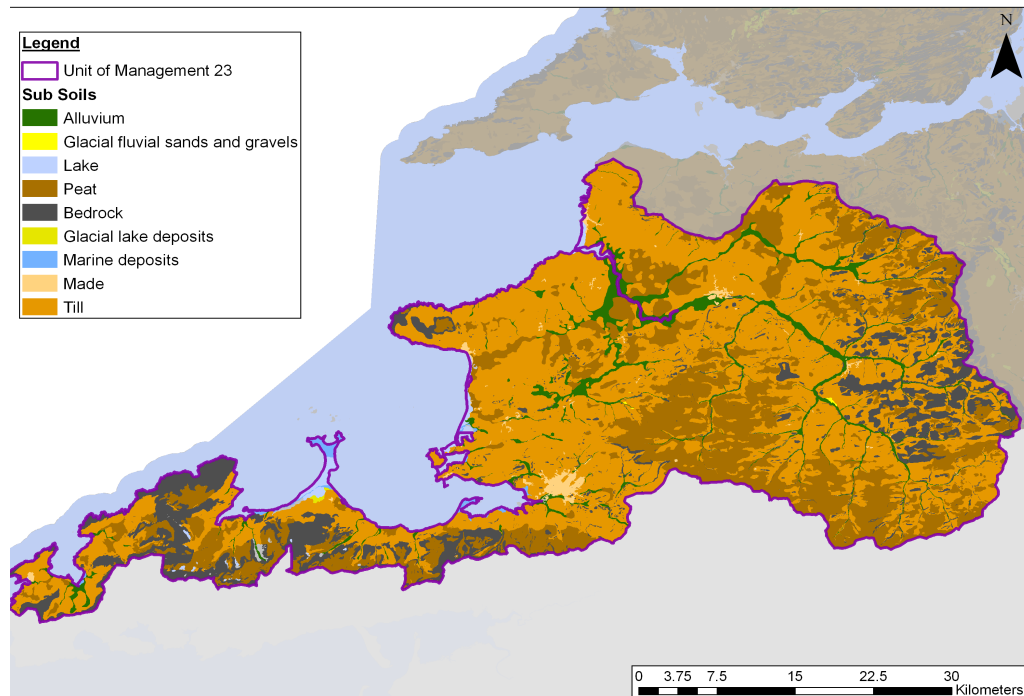


Figure 3.3.3 - Sub-soils within UoM 23 (source: Teagasc)

Land use within this Unit of Management is shown on Figure 3.3.4. Based on data from 2006, agriculture is the dominate land use within this Unit of Management, accounting for 62% of land area. Other areas include wetlands and peat bog areas (18%), forestry and semi-natural areas (18%) and built land (1%). Due to the coastal nature of Co. Kerry agriculture tends to be dominated by grassland based activities with limited arable production (Kerry Country Development Plan 2009-2015).

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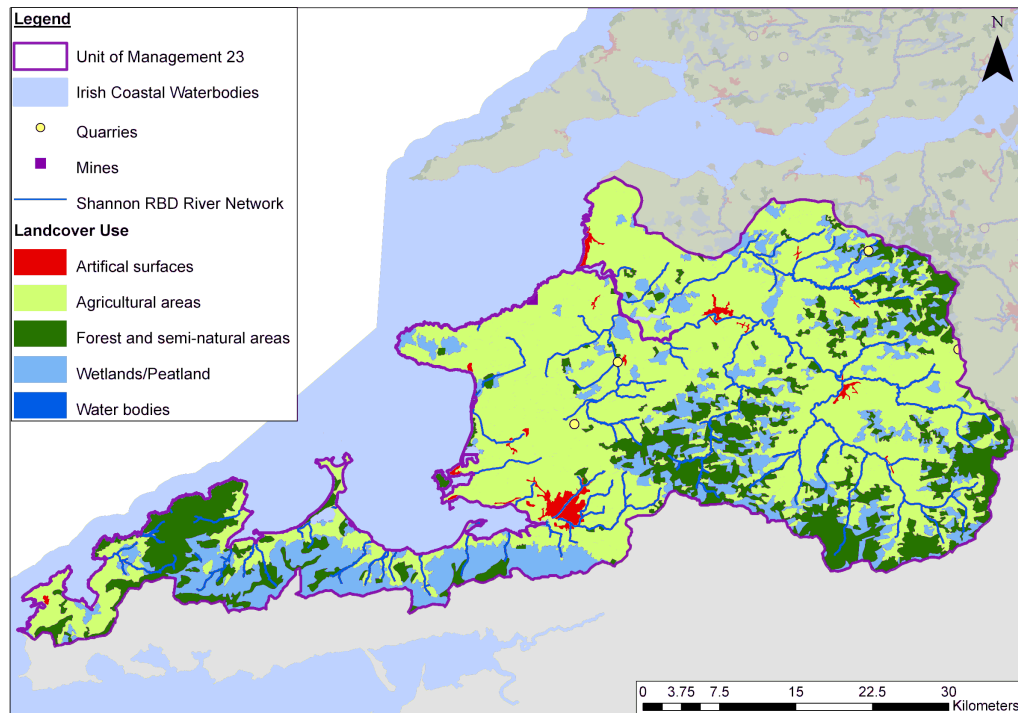


Figure 3.3.4 - Land use within UoM 23 (source: EPA Corine land cover database 2006)

Pasture is the dominant agricultural land-use within this Unit of Management; however, there are large areas of forestry and peat bog particularly along the border of the Unit of Management and along the Dingle Peninsula. Of the three major urban settlements within Co. Kerry two are located within this Unit of Management; Tralee and Listowel.

The reform of the EU Common Agricultural Policy (CAP) provided the incentive for the formulation of the Rural Environment Protection Scheme (REPS). The overarching principle of the REPS was to reward farmers for undertaking farming practices in an environmentally friendly manner. The uptake of the REPS throughout Ireland is reported on a percentage uptake per county with the highest percentage uptake being 30-35%. Within County Limerick and County Cork, the uptake is 15-20%, and in County Kerry uptake is reported to be 30-35% (EPA Envision Mapper). The Forest Environmental Scheme (FEPS) which is an 'add on' to REPS, provided incentives to farmers within REPS to plant woodland with emphasis on environmental gain, rather than solely for economic gain. The percentage FEPS (forest as a % of county area) for this Unit of Management is 15-20% based on Co. Kerry data (EPA).

In 2009 the REP Scheme ended, and 2014 will see the last of the REPS payments. In 2010, the Agri-Environmental Options Scheme (AEOS) was rolled out, which targets three environmental challenges; loss of biodiversity, improvement of water quality and combating climate change. This scheme also runs for 5 years, and early REPS³ farmers can avail of this scheme however this scheme does not involve the whole farm so may not be as financially rewarding to farmers. In 2011/12 an AEOS2

³ REPS1, REPS2 and REPS3

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is being offered for a period of five years, or until CAP reform in 2013. The CAP 2013 reform is still in process, but 'aims to maintain income stability for farmers, while farming with respect to environmental, food safety and animal welfare standards'.

Farms within this Unit of Management are required to comply with Ireland's (second) Nitrates Action Programme which was given effect through a series of Regulations⁴. This includes the implementation of Fertilisation Plans. These Regulations support the protection of waters against pollution from agricultural sources, e.g. by phosphorus and nitrogen.

Figure 3.3.5 illustrates the recorded forestry cover in this Unit of Management which consists of mainly commercial plantation of conifers, owned by Collite. These tend to be located on poor soils of the uplands, harvested on a rotational period of 40 years (WRBD, 2008⁵). Forestry on the lowlands is dominated by small privately owned forest plots. All forestry operations are required to be carried out in compliance with the principles of Sustainable Forest Management (SFM), as outlined in the Code of Forest Practice⁶ to promote sustainable forestry and to meet high environmental, economic and social standard.

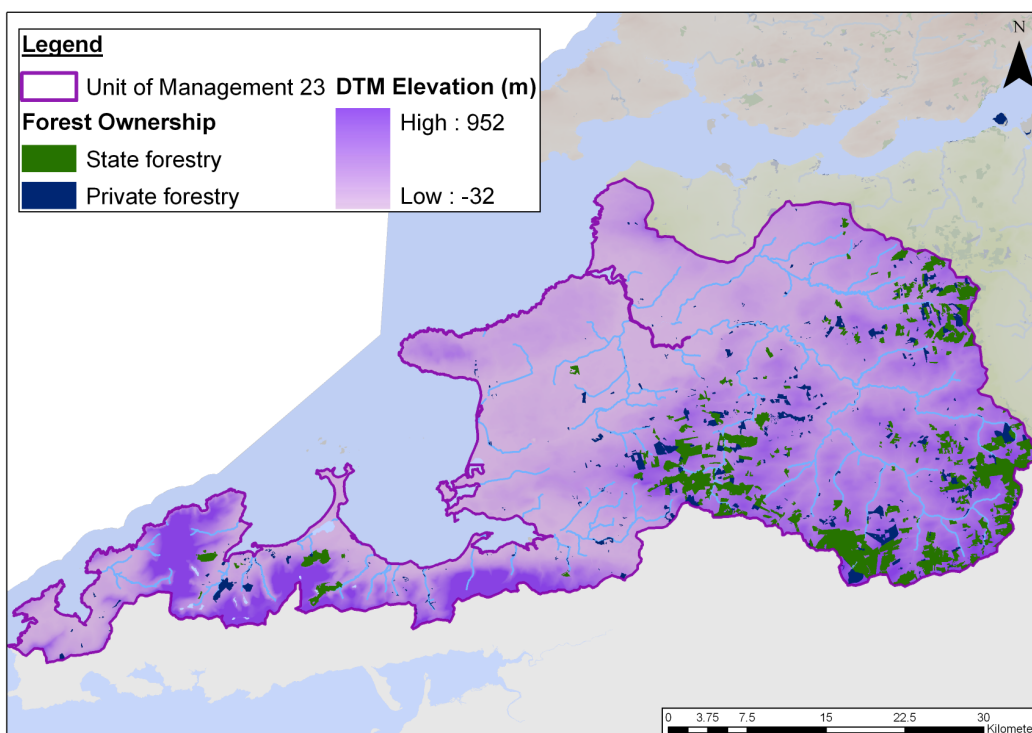


Figure 3.3.5 - Forest ownership within UoM 23 (source: Forestry Service)

Previous flood relief programmes run by the OPW under the Arterial Drainage Acts 1945 and 1995, have shaped some the landscape within this Unit of Management. Originally implemented to protect agricultural land from flooding, this programme

⁴ The most recent being the European Communities (Good Agricultural Practice for the Protection of Waters) (Amendment) Regulations 2011.

⁵ Western River Basin District (2008), Programme of Measures and Standards for Forest and Water

⁶ Forestry Service (2000) Code of Best Forest Practice – Ireland.

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was updated in 1995 to include urban areas. The OPW maintain all embankment, weirs and bridges that were constructed under this programme.

There are some extensive areas of bog, concentrated largely along the southern boundary of this Unit of Management, these are predominately blanket bog. There are no Bord na Móna bogs present within this Unit of Management. However, a potential issue raised at the stakeholder workshops, is that conventionally, peat harvesting of areas <50 hectares were not licensed, and therefore records of harvesting activities may not represent the full extent of activity at a particular bog

Landslide records obtained from the GSI do not include any records for this Unit of Management.

Historical contamination of soils resulting from past and present land use may present significant pollutions risks. Data on the location of known contaminated sites is held by Local Authorities and continued consultation with the relevant Local Authorities during the next stages of this SEA will identify those most relevant to this Unit of Management.

There approximately eleven landfills and two licensed waste transfer stations within this Unit of Management (refer to Figure 3.4.6 in Section 3.4).

Sites with concrete plants, desilting ponds, leachate lagoons, disused quarries, holding tanks under cattle houses (slurry tanks) may also be considered as potentially contaminated sites, and will be investigated further during the risk assessment of potential flood risk management options.

Onsite Waste Water Treatment Systems (OSWTS)⁷ such as septic tanks can present pollution risks between surface and groundwater. OSWTS have been identified nationally as part of Ireland's Water Framework Directive Programme of Measures Unsewered Wastewater Treatment Systems National Study (Western RBD) 2008. The EPA is in the process of mapping OSWTS, and this data will be made available to the CFRAM Study in the coming months.

Flooding has the potential to impacts on the supply from water treatment plants (WTP). There are four water supply treatment plants within this Unit of Management, all of which are within the Feale WMU and these are detailed further in Section 3.4 of this report.

3.3.2 Future trends

The IGH sites referred to above are in the process of being reviewed by the NPWS to determine which sites shall be designated as NHAs and therefore afforded statutory protection.

In 2006, the European Commission adopted a proposal for a Soil Framework Directive, to provide soil statutory protection and to recognise soil as an invaluable natural resource. This is likely to influence land cover and land use practices. As of early 2012, this Directive is still in the decision-making process within the European Council.

⁷ OSWTS are defined as areas not connected to sewerage systems and that discharge treated wastewater into the ground by percolation

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Agricultural land-use within this Unit of Management is likely to remain dominant; although the pattern and trends of this use will change to reflect the reform of the CAP in 2013 ('the CAP towards 2020'), compliance with the Nitrates Regulations (Ireland's Nitrates Action Programme is due to be reviewed for a third time in 2013) and abolishment of the EU Milk Quotas⁸ in April 2015.

One objective of this CAP 2013 reform is to make agriculture competitive on the world market; similarly the abolishment of the EU Milk Quotas is likely to make the dairy industry more competitive in Ireland. This is in line with the Food Harvest Report 2020 recommendations, which aim to increase Irish agri-food export by 2020.

Coillite forests within this Unit of Management have individual management plans that are derived from the Coillite's Forestry Services District Strategic Plan 2011-2015. This Unit of Management lies within the Lower Shannon District (S2) management plan area, for which both environmental and economic objectives are set for the management of the forests at local level for the next five years. Within this management plan, Coillite recognise forests as being an important resource in the role of moderating flooding at times of high rainfall. Water quality is also addressed as 'drainage and cultivation practices in Coillite forests are designed to minimise their impact on local water'. Water protection areas (buffer zones) are also being established in plantations at present. The Government has made a commitment to increase the forest area to 17% of the total land area in Ireland by 2030⁹ which is likely to include areas of this Unit of Management. As referred to in Section 3.3.1, all new forestry is managed in line with the SFM principals, including a guideline of development of a buffer of natural riparian vegetation along rivers and streams (Forestry Service 2000).

The Forestry Service have produced a Geographical Information System (GIS) based Forest Inventory Planning System (FIPS) to act as an aid in the long term spatial planning of national forest, and to provide guidance to forestry grants. This data provides further detail to that provided by the CORINE database, such as tree species.

With regards private turf-cutting for domestic use, this is now prohibited on raised bogs designated as Special Areas of Conservation (SACs) in the absence of Ministerial consent.

The EPA has published a series of Codes of Practice and Advice Notes, the implementation of which can influence geology, soils and land use in this Unit of Management. Those of relevance in this context are:

- Code of Practice for Wastewater Treatment and Disposal Systems Serving Single Houses (population equivalent < 10);
- The EPA Code of Practice: Environmental Risk Assessment for Unregulated Waste Disposal Sites; and
- Advice Note No.6, Version 1; Restoring Public Water Supplies Affected by Flooding.

⁸ S.I. No. 94/2000 — European Communities (Milk Quota) Regulations, 2000

⁹ Rural Development Programme 2007-2013, CAP Rural Development Division, Dublin.

Annex I – Tralee Bay – Feale Unit of Management (UoM 23)**Box 3.3: Geology, Soils and Land Use – Key issues relating to flood risk management**

- Flooding and flood risk management measure/options can potentially adversely affect the productivity of agricultural land, and can lead to changes/abandonment of land use;
- Agricultural practices can have both negative and positive effects on flooding and flood risk management, for example:
 - Negative: reduction in soil infiltration rates and available soil water storage capacities, and increasing rapid runoff in the form of overland flow;
 - Positive: agricultural lands may help manage runoff and provide natural storage areas whilst also providing opportunities for biodiversity and potentially supporting agri-environmental schemes.
- Forestry-related land use practices (afforestation and deforestation) and associated land drainage schemes can influence the conveyance of water within the catchments;
- Changes of land use from agriculture to urban/semi-urban behind OPW arterial drainage scheme embankments (originally constructed to protect agricultural land) has increased flood risk in these areas; and
- Upland forestry practices can include significant drainage systems resulting in sudden water losses for the area.

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3.4 Water

3.4.1 Existing conditions

The EU Water Framework Directive (2000/60/EC) establishes a framework for the protection of both surface and ground waters. Transposing legislation outlines the water protection and water management measures required in Ireland to maintain high status of waters where it exists, prevent any deterioration in existing water status and achieve at least 'good' status for all waters by 2015. This is currently being achieved through the implementation of River Basin Management Plans (RBMPs). The Shannon RBMP 2009-2015 was adopted in June 2009 and includes Water Management Unit (WMU) Action Plans¹⁰ and a programme of measures required to facilitate the achievement of the WFD objectives.

Surface Water

The surface water bodies within this Unit of Management are primarily associated with the River Feale catchment, but also include transitional (estuarine) and a coastal water bodies such as the North Kerry Coast and Tralee Bay.

Rivers and Lakes

The Feale WMU Action Plan states that 55% of the rivers within its catchment area are classified as good status, with the remaining water bodies failing to achieve the WFD objectives. The North Kerry / Tralee Bay WMU reports that 12% and 54% of it's rivers are achieving high and good status respectively, and of it's nine lakes, 75% and 8% are achieving high and good status respectively.

The Action Plans associate the following anthropogenic pressures/activities with the current failure of the surface water bodies to achieve the WFD objectives:

- Nutrient Sources: Total Phosphorous predominantly from diffuse sources, agricultural discharges, unsewered properties, forestry and waste water treatment plants (WWTPs);
- Point Pressures: such as WWTPs, IPPC discharges, Section 4 discharges (trade or sewage effluent), waste facilities and water treatment plants;
- Landfills;
- On site waste water systems (OSWTS);
- Forestry;
- Physical alterations (morphological pressures); and
- Abstractions.

Each Action Plan outlines a programme of measures to be implemented in the catchment areas, and in some instances at a regional or national level. Those of relevance to flood risk assessment and management include:

- Point sources: WWTP upgrades, review of the current terms of discharge authorisations;
- Diffuse sources: inspection / enforcement of the Good Agricultural Practice Regulations and inspection programme of 'at risk' septic tanks; and

¹⁰ WFD Ireland Document Store -

http://www.wfdireland.ie/docs/1_River%20Basin%20Management%20Plans%202009%20-%202015/ShIRBD%20RBMP%202010/

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- Morphological pressures: Investigation of channelisation to establish if supplementary measures are required to address water quality issues associated with morphology. Channel enhancement measures to assist recovery from this pressure are to be considered.

Implementation of these measures is now progressing so as to achieve the WFD objectives and inform the next RBMPs (2015 – 2021). Some measures responding to the WFD requirements were implemented prior to the completion of the RBMPs, for example, the EPA are progressing with a revised WWTP licensing regime implemented under the Waste Water Discharge (Authorisation) Regulations 2007.

Transitional (estuarine) and Coastal Waters

The Shannon RBD Transitional and Coastal Waters Action Programme reports that both the Inner Tralee Bay and Smerwick Harbour water bodies are achieving good status. Part of the Mouth of the Shannon transitional water body is adjacent to the northern section of this Unit of Management and achieving high status. The Cashen, Upper Feale Estuary and Lough Gill are failing to achieve good status, and the status of outer Tralee Bay, Brandon Bay and the South-western Atlantic Seaboard water bodies is not reported within this Action Programme.

The Shannon RBD Transitional and Coastal Waters Action Programme associates the following anthropogenic pressures/activities with the current failure of the surface water bodies to achieve the WFD objectives:

- Land based pressures - point source such as WWTPs, IPPC licensed facilities, combined sewer and treatment plant overflows, Section 4 licensed discharges, and also diffuse sources such as nutrient inputs.
- Marine Pressures – Morphological alterations and aquaculture.
 - Inner Tralee Bay - Embankment and shoreline reinforcement and the port activities at Fenit Port;
 - Lee K Estuary & Cashen – Shoreline reinforcement;
 - Upper Feale Estuary – Extensive subtidal embankments; and
 - Aquaculture licences in the Outer Tralee Bay and Mouth of the Shannon.

The Shannon RBD Transitional and Coastal Waters Action Programme has outlined a programme of measures to be implemented in the catchment areas, and in some instances at a regional or national level. Those of relevance to flood risk assessment and management include:

- Morphology (Controls on Physical Modifications): The Action Programme notes that the DECLG are considering the introduction of new regulations to control physical modifications in surface waters which may involve an authorisation system where low risk activities may simply be registered and higher risk works would be subject to more detailed assessment and more prescriptive licences. Consultation with the DECLG has confirmed that they are currently in the process of reviewing water legislation on a number of fronts, including controls on physical modifications however it may be some time before the regulation concerning controls on physical modifications are implemented;
- Implementation of the Shellfish Waters Pollution Reduction Programmes (there is one such programme relevant to this Unit of Management - Tralee

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Bay Pollution Reduction Programme and Maharees Pollution Reduction Programme (DECLG, 2010¹¹); and

- Full implementation of existing legislation including the Bathing Water Quality Regulations (including the development of Bathing Water Management Plans), Water Pollution Acts, Water Services Act, IPPC regulations, Urban Wastewater Treatment regulations, the Foreshore Acts and the Birds and Habitats Directives (particularly the Appropriate Assessment process).

The pressures/activities and measures outlined in the river catchment WMU Action Plans referred to under the 'River and Lake' section above are also relevant to the transitional and coastal water bodies within this Unit of Management.

Overall Status

Figure 3.4.1 presents the current reported status of all surface water bodies as provided by the EPA in November 2011. Water body classification results are currently being reviewed and updated with more recent monitoring data, and these will be reviewed in consultation with the EPA as the SEA process developments.

The majority of the river stretches in the Feale catchment is achieving good status or above (55%). However, a large portion the Galey River in the northern section of this Unit of Management is classified as poor status, and a stretch of the Lee at Tralee Bay is at bad status. The status of the transitional coastal waters is recorded as good to high or unassigned.

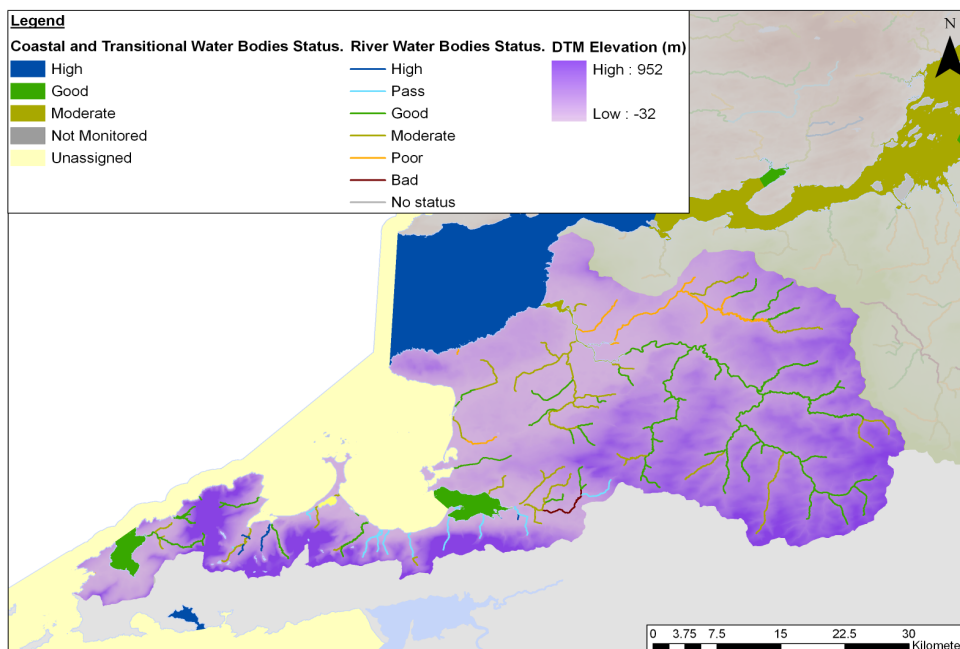


Figure 3.4.1 - Classification of surface water bodies under the WFD within UoM 23 (source: EPA)¹²

¹¹ Pollution Reduction Programmes, Characterisation Reports and Maps:
<http://www.environ.ie/en/Environment/Water/WaterQuality/ShellfishWaterDirective/ShellfishWatersFinalCharacterisationReportsandPRPs/Clare-Kerry/>

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As defined by the EPA, the Biotic Indices or Quality (Q) Values is 'a biological water quality index based on the composition and abundance of macroinvertebrate communities e.g. mayflies, stone flies, shrimps, snails, bivalves etc. present in rivers, and their varying sensitivities to increasing levels of pollution'. There are 79 Q Value monitoring stations within this Unit of Management. The Q Values recorded at these stations are summarised in Table 3.4.1 below.

Table 3.4.1: Q value and equivalent WFD Status recorded at the EPA Monitoring stations within UoM 23

Q Value*	WFD Status	Pollution Status	Condition**	No. of Stations in this UoM
Q5, Q4-5	High	Unpolluted	Satisfactory	8
Q4	Good	Unpolluted	Satisfactory	51
Q3-4	Moderate	Slightly polluted	Unsatisfactory	7
Q3, Q2-3	Poor	Moderately polluted	Unsatisfactory	5
Q2, Q1-2, Q1	Bad	Seriously polluted	Unsatisfactory	1
Unclassified	-	-	-	7

* These values are based primarily on the relative proportions of pollution sensitive to tolerant macroinvertebrates (the young stages of insects primarily but also snails, worms, shrimps etc.) resident at a river site (EPA¹³).

** 'Condition' refers to the likelihood of interference with beneficial or potential beneficial uses (EPA).

Figure 3.4.2 presents the location of the EPA Q Values monitoring stations and the pollution status recorded at each.

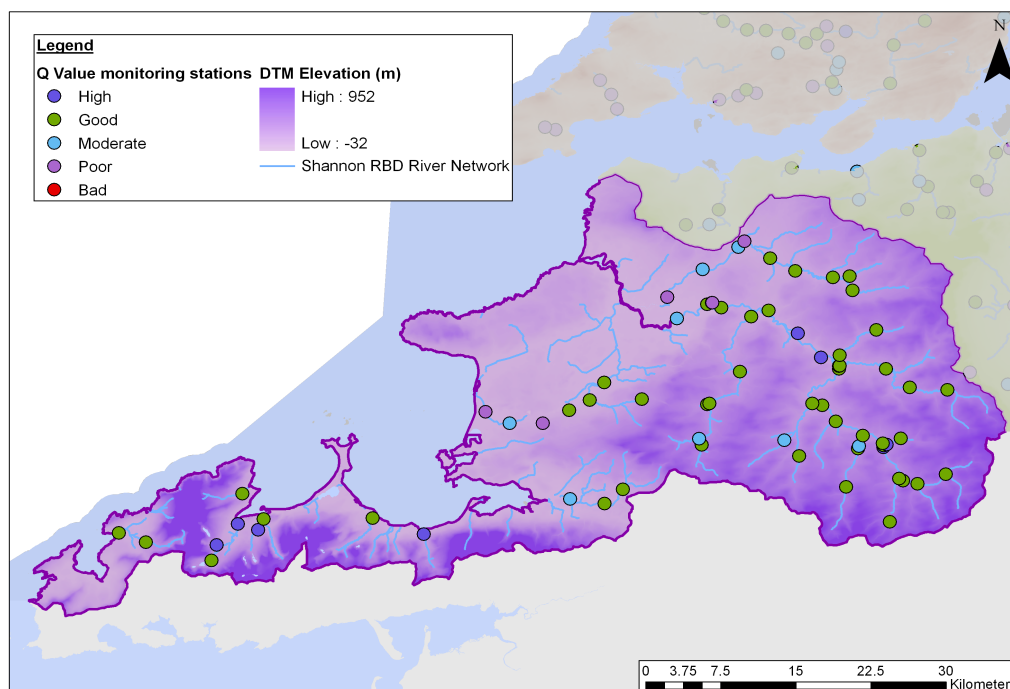


Figure 3.4.2 - EPA Q Value Monitoring Stations within UoM 23 (source: EPA)

¹² Water bodies classified as 'pass' are recorded as achieving good status, however prior to further monitoring, the confidence in the data is not at the adequate level to classify these as 'good' status.

¹³ EPA (2007) River Quality Surveys: Biological (<http://www.epa.ie/qvalue/webusers/>)

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Groundwater

The Shannon CFRAM Study is not assessing groundwater flood risk; however, the potential for groundwater flood risk to contribute to flood flows is recognised.

Groundwater status within this Unit of Management is classified predominately as good, however there are large areas achieving poor status in the northwest and west of this Unit of Management. Figure 3.4.3 below presents the current status of groundwater bodies classified for the purpose of the WFD.

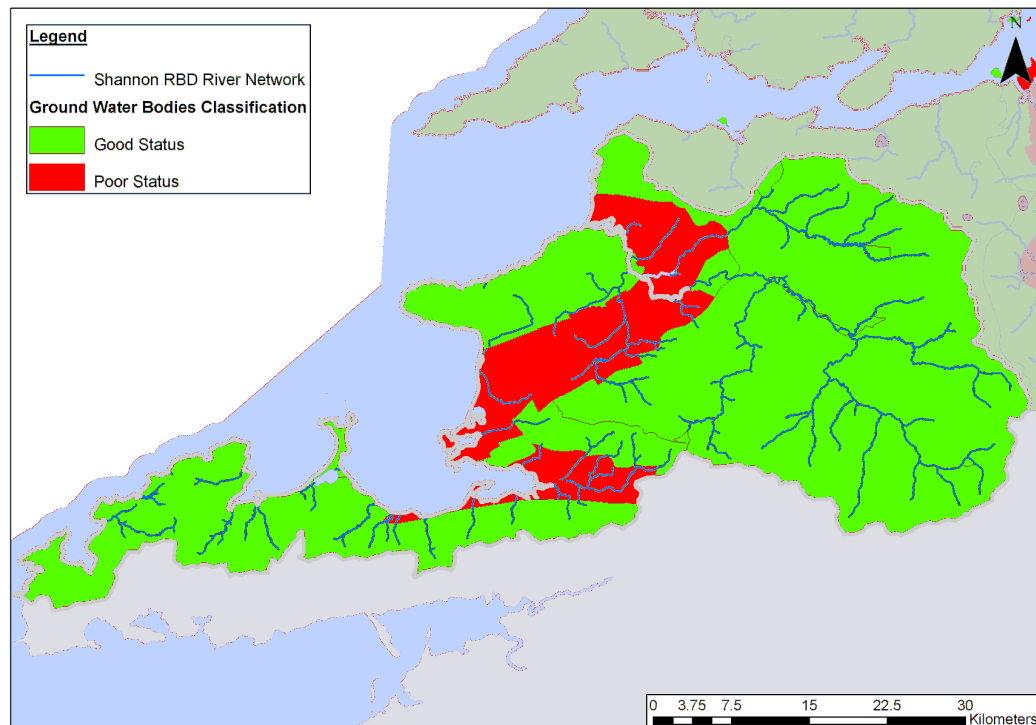


Figure 3.4.3 - Classification of groundwater bodies under the WFD within UoM 23 (source: EPA)

The Shannon RBD Groundwater Action Plan associates the following anthropogenic pressures/activities with the current failure of groundwater bodies to achieve the WFD objectives:

- Point source pressures: Existing landfills and old dump sites (illegal landfill sites), mines, contaminated land, and abstractions; and
- Diffuse source pressures: agriculture (nutrient loading), and OSWTS (septic tanks in areas of high or extreme vulnerability or systems located at unsuitable sites).

The Shannon RBD Groundwater Action Plan outlines a programme of measures to be implemented in the catchment areas as follows:

- Nitrate Action Plan – Implementation of the Nitrates Action Plan and Code of Good Agricultural Practices to reduce the level of pressure from diffuse nutrient sources;
- IPPC Licensing – Remediation of contaminated land at IPPC licensed sites; and

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- OSWTS – Implement the EPA Code of Practice for Wastewater Treatment and Disposal Systems Serving Single Houses (population equivalent ≤ 10)¹⁴.

Though not highlighted within the Shannon RBD Groundwater Action Plan it is also recognised that the EPA licensing regime for WWTPs is a programme that could aid in the achievement of the WFD objectives for groundwater bodies.

No Groundwater Protection Schemes were identified for this Unit of Management. However, all the groundwater bodies in this Unit of Management (and within the Shannon RBD) are designated as drinking water protected areas.

In terms of vulnerability (the likelihood of contamination if a contamination event occurs), there are also areas of extreme vulnerability within this Unit of Management, amounting to approximately 35% of the land area. In addition 11% of the land area is rock near surface or karst. These areas can be very vulnerable to infiltration and transportation of pollutants. Figure 3.4.4 illustrates the groundwater vulnerability within this Unit of Management.

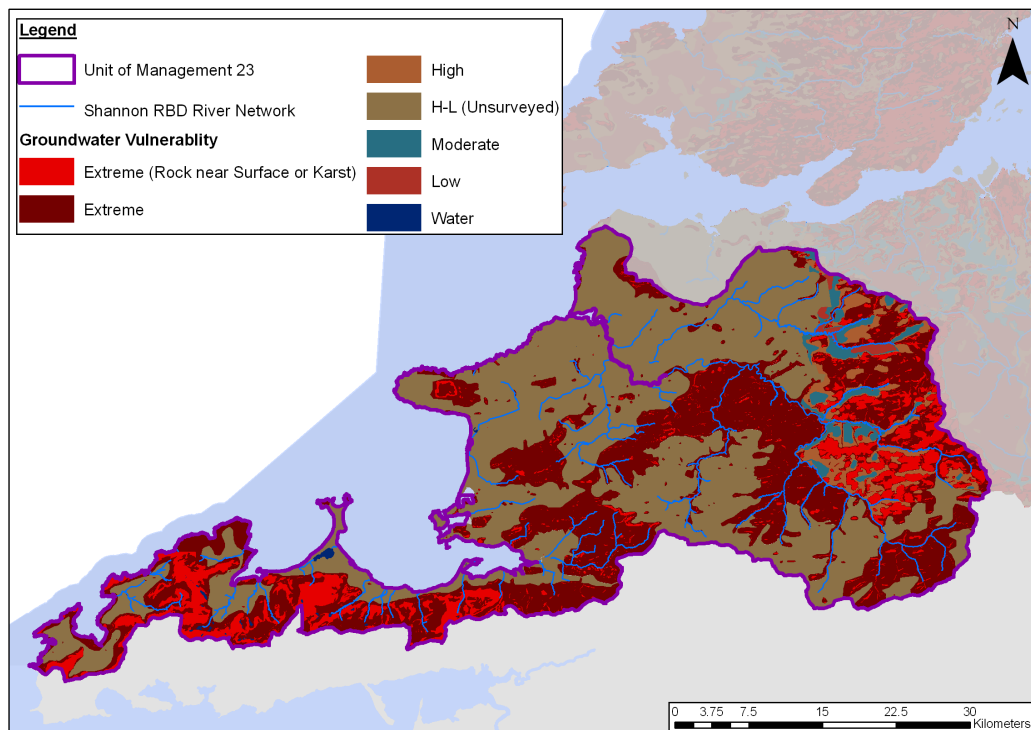


Figure 3.4.4 - Groundwater Vulnerability (source: GSI)

The Shannon RBD Groundwater Action Plan also identifies a groundwater dependant terrestrial Ecosystem located within this Unit of Management - Tralee Bay and Megharees Peninsula, West (Cloghane SAC 002070).

¹⁴ EPA 2000 Guidance is now replaced by EPA (2010) Code of Practice for Wastewater Treatment and Disposal Systems Serving Single Houses.

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Registered Protected Areas

In accordance with the WFD, a Register of Protected Areas has been compiled for the Shannon RBD. These areas are identified as those requiring special protection under existing national or European legislation:

- Waters used for the abstraction of drinking water;
- Areas designated to protect economically significant aquatic species - These are protected areas established under earlier EC directives aimed at protecting shellfish (79/923/EEC) and freshwater fish (78/659/EEC);
- Recreational waters (recreational beaches within this Unit of Management are Castlegregory, Maharabeg, Fenit, Banna Strand and Ballyheigue);
- Nutrient Sensitive Areas (the Feale and Lee Estuary Upper have been designated within this Unit of Management); and
- Areas designated for the protection of habitats or species (refer to Section 3.6 for details).

The locations of the Registered Protected Sites currently recorded for this Unit of Management are illustrated in Figure 3.4.5.

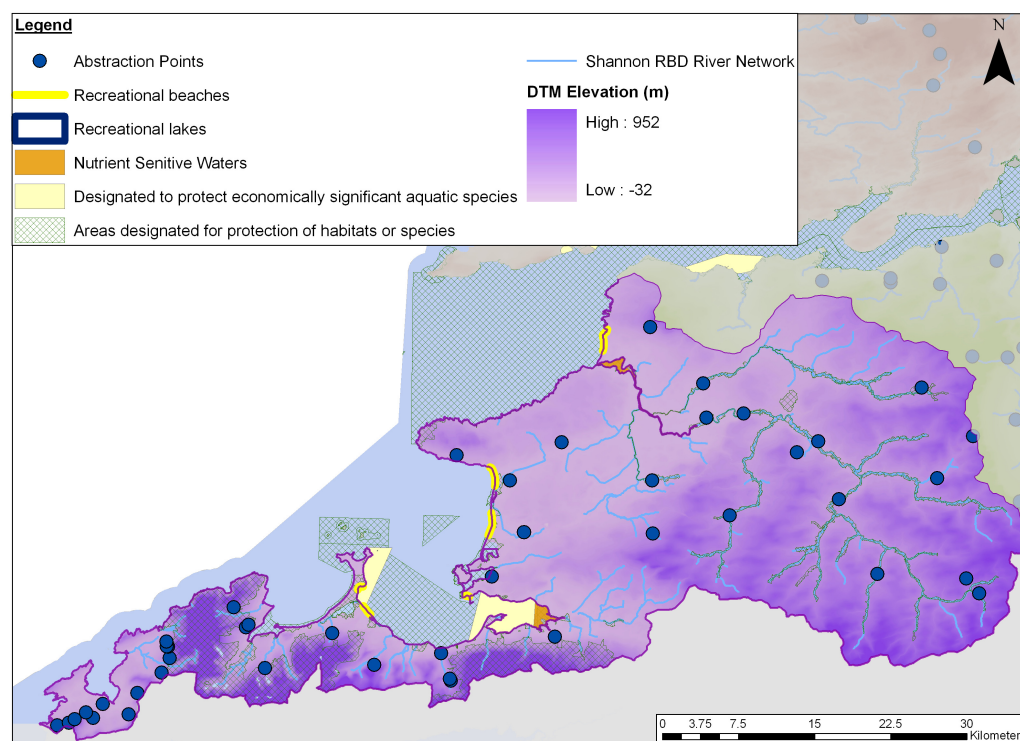


Figure 3.4.5 - Registered Protection Areas within UoM 23 (source: EPA)

Activities / Pressures

Figure 3.4.6 illustrates the distribution of various activities within this Unit of Management which can both influence and be influenced by the quality of water. The majority of this data was collated for the purpose of the WFD (and reported within the RBMP 2009-2015) and is currently being updated by the EPA and Local Authorities. Further information relating to these activities will be considered where relevant in the next stages of the SEA.

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A total of eight facilities within this Unit of Management currently hold IPPC licences. IPPC licences aim to prevent or reduce emissions to air, water and land, reduce waste and use energy/resources efficiently. There are two waste transfer stations at Listowel and Muingnaminnane near Tralee, which are licensed by the EPA, and a total of eleven landfills located within this Unit of Management.

Data supplied by the EPA indicated that there are 14 WWTPs within this Unit of Management.

The EPA report 'Focus on Urban Waste Water Discharges in Ireland (February 2012)', includes a review of the operation of urban waste water treatment plants (UWWTPs) that are the subject of an EPA waste water discharge licence application. Within this Unit of Management, the status of these UWWTPs varies from pass, fail and undetermined.

The majority of this Unit of Management is unsewered, with private sewerage systems/septic tanks installed. However, there are a number of sewered areas within this Unit of Management including Ballybunion, Listowel and Tralee¹⁵.

Water Pollution Discharge Licences issued under Section 4 of the Local Government (Water Pollution) Act 1977, as amended in 1990, refer to the discharge of trade or sewage effluent to waters. There are 69 such discharges within these Units of Management.

¹⁵ This does not include any sewerage network connected to a sewage treatment plant with less than 500 p.e. as this was the threshold for inclusion in WFD risk assessments.

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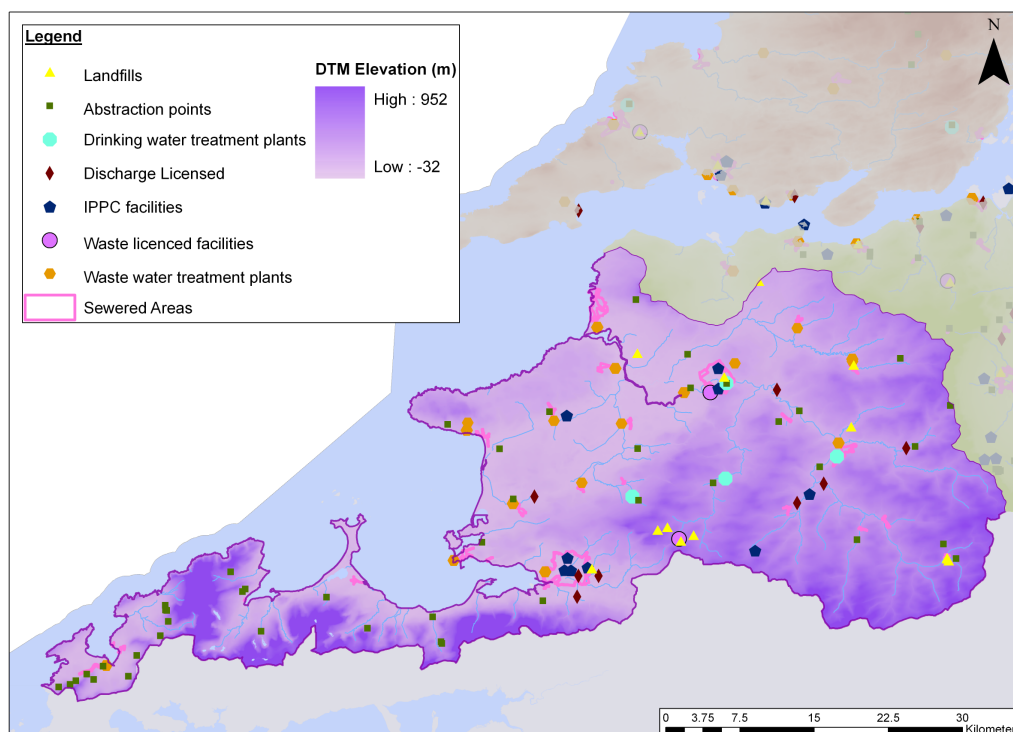


Figure 3.4.6 - Estimated locations of licensed abstractions (as of 2008), IPPC, waste licensed facilities, landfills, licensed discharges, waste water treatment plants and sewerage areas (source: EPA, GSI, HSE and Limerick / Kerry /Cork County Council)

There are four water supply treatment plants within this Unit of Management, at Abbeyfeale, Listowel, Abbeydorney and at Lyracrumpane. Water supply treatment plants are most likely to be located on the banks of rivers, and the EPA has published guidance¹⁶ on post-flooding checks for Local Authorities to implement at such plants.

There are currently no recorded SEVESO¹⁷ industries within this Unit of Management.

Hydromorphology

The WFD requires that hydromorphological elements are considered when defining, maintaining and improving water status. There have been some physical (morphological) alterations to various water bodies within this Unit of Management to facilitate certain uses such as navigation, flood defence/protection schemes, agricultural drainage schemes, etc.

In accordance with the WFD, the Tralee Ship Canal has been designated an Artificial Water Body (AWB) as this is 'a body of surface water created by human

¹⁶ Advice Note No.6, Version 1; Restoring Public Water Supplies Affected by Flooding, EPA (November, 2009)

¹⁷ The Control of Major Accident Hazards Involving Dangerous Substances Regulations, 2006 (SEVESO Regulations)

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activity'. The WFD requires that water bodies designated AWBs must meet the objectives of maximum or good ecological potential.

There are no Heavily Modified Water Bodies (HMWBs) present within this Unit of Management. A HMWB is defined as 'a body of surface water which as a result of physical alterations by human activity is substantially changed in character'

3.4.2 Future trends

The implementation of the programme of measures identified to meet the requirements of the WFD for this Unit of Management and the wider Shannon RBD aims to drive improvements and maintenance of the water quality in the short term and provide a basis for the continued maintenance of good status in the future. The EPA are continuing to monitor the status of surface and ground water bodies, and work will soon commence on the Shannon RBMP for the 2015 – 2021 cycle.

Proposed future development must meet the requirements of the WFD and transposing regulations. Derogations relating to new physical modifications and new sustainable developments are provided for in this legislation¹⁸; however, strict conditions for the application of such exemption provisions apply and must be demonstrated if these are to be considered for future development.

Future physical alterations to water bodies within this Unit of Management are likely to include flood relief measures (modifications) and harbour expansion by the Fenit Harbour and Marina.

¹⁸ Articles 32 – 34 of S.I. No. 272 of 2009 European Communities Environmental Objectives (Surface Waters) Regulations 2009

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Box 3.4: Water – Key strategic issues relating to flood risk management

- Proposed future development must meet the requirements of the WFD and transposing regulations;
- There may be opportunities for flood risk management measures/options which can present both flood risk benefits and ensure the environmental objectives of the WFD are met;
- The WFD programmes of measures include the modification or maintenance / removal of obsolete structures, including flood defence structures and also requirements for enhancing river morphological development and flood storage. This can offer opportunities and constraints for flood risk management;
- Physical modifications of water bodies can affect natural sediment processes and biodiversity; and
- FRMPs have the potential to help inform appropriate and sustainable planning / operation of water services, e.g. Water Safety Plans in accordance with EPA Guidance (Advice Note No. 8 Developing Drinking Water Safety Plans; EPA, 2011).

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3.5 Air and Climate

Air quality in Ireland is of good quality, and remains among the best in Europe¹⁹. The EPA has established an air quality monitoring network throughout the country, but there are no active air quality monitoring stations within this Unit of Management. This ongoing monitoring programme is a prerequisite of the transposed CAFE Directive²⁰.

Air quality will not be influenced or affected by the recommendations of the strategic flood risk assessment and management study for this Unit of Management or by the wider Shannon CFRAMS Study. Any specific issues relating to air quality will be considered as part of the environmental impact assessment of any detailed projects arising from the Tralee Bay – Feale Unit of Management 23 FRMP. Therefore, air quality will not be considered further in the SEA process as air quality will not be affected by the CFRAM process.

Future changes in **climate** and associated impacts on sea level, rainfall patterns/intensity and river flow will influence flooding frequency and extent in the future. The FRMPs will help Ireland adapt to some impacts of climate change. In addition to using best available data, policy and research documents will be referred to on considering these changes and determining the likely future influence of climate change on flood risk in this Unit of Management. The consideration of climatic factors in the development of the FRMPs will assist the Local Authorities in compliance with the Regional Planning Guidelines requirements to adopt sustainable flood risk strategies in areas likely to be at risk of flooding in the future in the context of climate change and changing weather patterns.

Stakeholder consultation undertaken to date has identified flood forecasting as a key aspect of flood risk assessment and management in Ireland. Rainfall prediction is a difficult factor to quantify (and is outside the scope of this Study); however, further development of elements of the OPW's national pluvial flood risk screening study²¹ is considered essential to develop the quality of flood warnings.

¹⁹ Environmental Protection Agency (2010) Air Quality in Ireland Report.

²⁰ Ambient Air Quality and Cleaner Air for Europe (CAFE) Directive, transposed into Irish legislation by the Air Quality Standards Regulations 2011 (S.I. No. 180 of 2011).

²¹ Office of Public Works (2010) Flood Risk Assessment and Management Programme National Pluvial Screening Project for Ireland. HR Wallingford Ltd.

Annex I – Tralee Bay – Feale Unit of Management (UoM 23)

Box 3.5: Climate – Key strategic issues relating to flood risk management

- Some flexibility and adaptability within the FRMPs is likely to be required to allow the FRMPs to adapt to unforeseen climate change and associated impacts;
- Flood risk management measures may provide opportunities of renewable energy through small-scale (or micro) hydropower, e.g. on tidal barrages or locks. However, these are considered as ‘bolt-on’ measures to be assessed/progressed at detailed project level; and
- Green infrastructure (such as networks of peatland, parks or drainage ditches) in the context of flood risk management can reduce, if not avoid, emissions from more engineering-based solutions.

Annex I – Tralee Bay – Feale Unit of Management (UoM 23)

3.6 Biodiversity, Flora and Fauna

3.6.1 Existing conditions

This Unit of Management contains a variety of terrestrial, wetland, freshwater, estuarine and coastal habitats which support a range of species, some of which are of particular conservation concern. Associated with these habitats and species are a number of National and European designated nature conservation sites (Natura 2000 sites). Consideration of potential impacts on these sites needs to meet the requirements of the European Habitats Directive (92/43/EEC) and Birds Directive (79/409/EEC). Specific assessment of the potential impacts of the FRMPs on these sites will be documented separately as part of the Appropriate Assessment (AA) process (required by Article 6 of the Habitats Directive).

The designated European and National nature conservation sites present within this Unit of Management are illustrated in Figures 3.6.1 and 3.6.2 and described in Tables 3.6.1 and 3.6.2.

This Unit of Management contains eleven sites designated under the EU Habitats and Birds Directive, seven of which are candidate Special Areas of Conservation (cSACs) and four are designated as Special Protection Areas (SPAs).

There are five nationally designated National Heritage Areas (NHAs) which are protected under the Wildlife Act 1976 (as amended 2000), as well as eight proposed Natural Heritage Sites (pNHAs) which were published on a non-statutory basis in 1995, but have yet to be statutorily proposed or designated. To date, the only sites to have received full NHA status are water dependant bog habitats, as reflected with the five designated NHA within this Unit of Management. Some pNHAs have been designated within Natura 2000 sites, and this affords them some statutory protection under the EU Habitat and Birds Directive. However, it is acknowledged that this may not be specific to the listed pNHA interests.

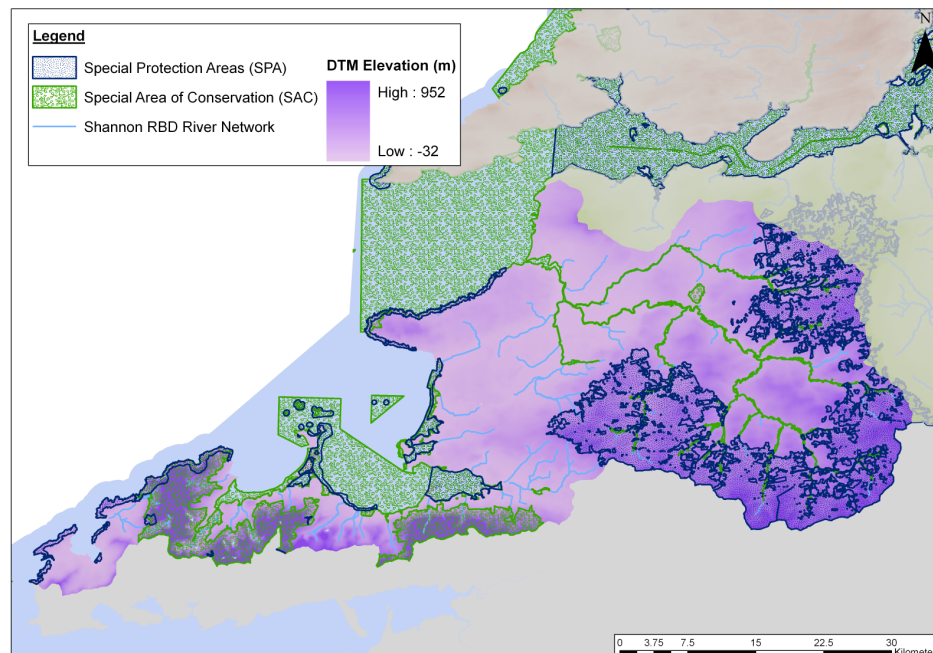


Figure 3.6.1 - European designated nature conservation sites within UoM 23 (source: NPWS)

Annex I – Tralee Bay – Feale Unit of Management (UoM 23)

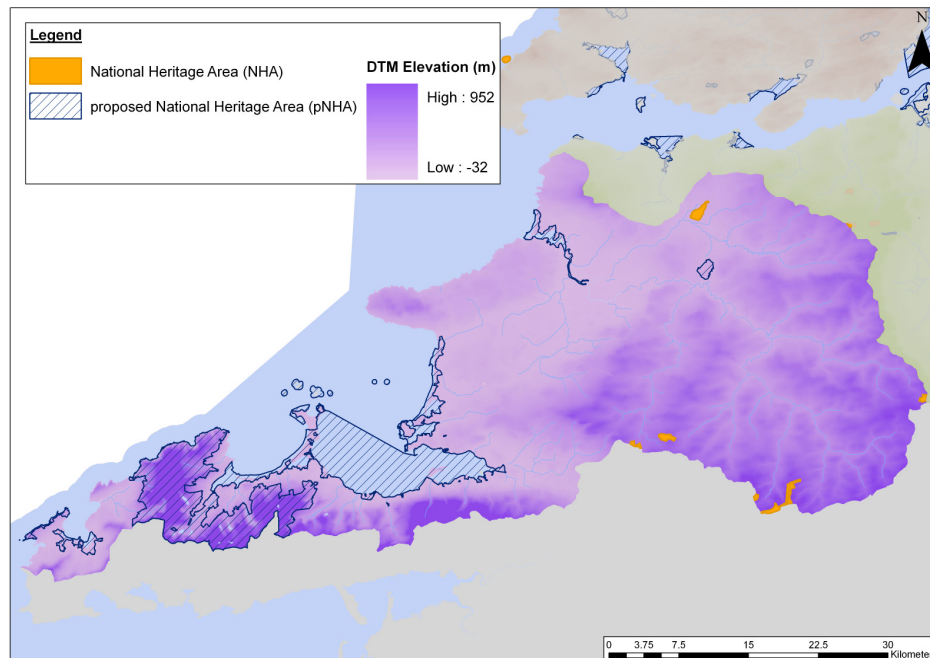


Figure 3.6.2 - Nationally designated nature conservation sites within UoM 23 (source: NPWS)

Many of the designated sites within this Unit of Management have water dependant and wetland habitats associated with them. The DECLG have published draft Guidance for Planning Authorities on Drainage and Reclamation of Wetlands for consultation which contains a listing of habitat types associated with wetlands. This Guidance will be consulted and specific habitat types associated with water dependant and wetland habitat will be detailed where relevant during the AA process.

The entire coastline of Ireland is designated as an OSPAR region. OSPAR is a Convention to protect marine environment of the North East Atlantic and Ireland has committed to establishing Marine Protected Areas (MPAs). Although no legislation is currently used in Ireland to protect these MPAs, the MPA in this Unit of Management (Tralee Bay and Magharees Peninsula, West to Cloghane) is also designated as a SAC and therefore afforded protection under the EU Habitats Directive.

Other designated ecological areas within this Unit of Management include:

- Tralee Bay: RAMSAR²² sites and a Statutory Nature Reserves²³;
- Mount Brandon: Statutory Nature Reserves; and
- Lough Gill: Wildfowl Sanctuaries²⁴.

²² RAMSAR is the Convention on Wetlands, which provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources

²³ Statutory Nature Reserve is an area of importance to wildlife, which is protected under Ministerial order.

²⁴ Wildfowl Sanctuaries are areas that have been excluded from the 'Open Season Order' so that games birds can rest and feed.

Annex I – Tralee Bay – Feale Unit of Management (UoM 23)

Table 3.6.1: European designated nature conservation sites within UoM 23 (Natura 2000 Sites)

Name	Site Code	Special Features ²⁵
SACs		
Akeragh, Banna And Barrow Harbour	000332	This large site is of major ecological interest due both to its range of floristically-rich coastal habitats and as a wintering site for significant numbers of waterfowl.
Ballyseedy Wood	002112	Is of prime importance for its Alder/Ash (<i>Alnus serrulata/ Fraxinus ornus</i>) - dominated woodland stands, a habitat that is rare and threatened in Europe, and listed, with priority status, on Annex I of the EU Habitats Directive.
Lower River Shannon	002165	This site is of great ecological interest as it contains a high number of habitats and species listed on Annexes I and II of the E.U. Habitats Directive, including the priority habitat lagoon, the only known resident population of Bottle-nosed Dolphin (<i>Tursiops truncatus (tursio)</i>) in Ireland and all three Irish lamprey species.
Moanveanlagh Bog	002351	Moanveanlagh Bog is significant in terms of its geographical location as it is at the extreme south-western range of raised bogs in Ireland, a rare habitat in the E.U. and one that is becoming increasingly scarce and under threat in Ireland.
Mount Brandon	000375	The site is of high ecological value due to the presence of six habitats listed on Annex II of the EU Habitats Directive. These include cliffs and alpine heath (which support five Red Data Book plants) and blanket bog, which features a unique scraw. Also of importance is the presence of the EU Habitats Directive Annex II species, Killarney Fern (<i>Trichomanes speciosum</i>) and Freshwater Pearl-mussel (<i>Margaritifera margaritifera</i>), and two EU Birds Directive Annex I birds, Chough (<i>Pyrrhocorax pyrrhocorax</i>) and Peregrine (<i>Falco peregrinus</i>).
Slieve Mish Mountains	002185	This site is of considerable conservation significance, particularly for the presence of several habitats and species that are listed on Annexes I and II, respectively, of the EU Habitats Directive. The presence of two bird species that are listed on Annex I of the EU Birds Directive and the populations of several rare or scarce plant species adds to the importance of the site.
Tralee Bay And Magharees Peninsula, West To Cloghane	002070	This site is of considerable ecological and conservation significance for the excellent diversity of habitats it contains, many of which are listed on Annex I of the E.U. Habitats Directive. The occurrence of a species listed on Annex II of the E.U. Habitats Directive adds further importance to the site. The presence of a number of Red Data Book species including the largest population of Natterjack Toads (<i>Bufo calamita</i>) in Ireland. This site is also notable for the occurrence of several species listed on Annex I of the E.U. Birds Directive.

²⁵ This information is extracted from the site synopsis documents (NPWS, various dates).

Annex I – Tralee Bay – Feale Unit of Management (UoM 23)

Name	Site Code	Special Features ²⁵
SPAs		
Stacks to Mullaghareirks Mountains, West Limerick Hills and Mount Eagle SPA	004161	The site is of special conservation interest for Hen Harrier (<i>Circus cyaneus</i>), supporting the largest concentration of the species in the country.
Kerry Head SPA	004189	The site is of special conservation interest for the following species: Chough (<i>Pyrrhocorax pyrrhocorax</i>) and Fulmar (<i>Fulmarus glacialis</i>).
Dingle Peninsula SPA	004153	The Dingle Peninsula SPA is the most important site in the country for Chough and is of high importance for Peregrine (<i>Falco peregrinus</i>). It also supports a range of breeding seabirds, including a population of Fulmar of national importance. The presence of Chough and Peregrine, both species that are listed on Annex I of the E.U. Birds Directive, is of particular significance.
Tralee Bay Complex SPA	004188	<p>These sites were formerly split into Lough Gill SPA (004011), Tralee Bay SPA (004018) and Akeragh, Banna and Barrow Harbour SPA (004079) now combined to form the Tralee Bay Complex SPA (004188) there is no site synopsis for the combined sites as of Jan 2012.</p> <p>Lough Gill SPA - The site is of importance for three habitats listed on Annex I of the E.U. Habitats Directive, including one with priority status.</p> <p>Tralee Bay SPA - This large site is of major ecological interest due both to its range of floristically-rich coastal habitats and as a wintering site for significant numbers of waterfowl.</p> <p>Akeragh, Banna and Barrow Harbour SPA - Important for a range of wintering birds, with Brent Goose (<i>Branta bernicla</i>) occurring in numbers of international importance and a further eight species in numbers of national importance. The regular occurrence of Golden Plover (<i>Pluvialis apricaria</i>) and Bar-tailed Godwit (<i>Limosa lapponica</i>) is of particular note as these species are listed on Annex I of the E.U. Birds Directive.</p>

Table 3.6.2: Nationally designated nature conservation sites within UoM 23

Site Name	Site Code	Special Feature
NHAs		
Carrigkerry Bogs NHA	002399	Carrigkerry Bogs NHA is a site of high conservation value consisting of upland blanket bog with characteristic features and notable species of flora and fauna. Blanket bog habitat is a globally scarce resource.
Lough Gay Bog NHA	002454	Lough Gay Bog NHA is a site of considerable conservation value containing upland blanket bog.
Bunnaruddee Bog NHA	001352	Bunnaruddee Bog NHA is a site of considerable conservation significance comprising a raised bog, a rare habitat in the E.U. and one that is becoming increasingly scarce and under threat in Ireland.

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Site Name	Site Code	Special Feature
Knockatarriv/ Knockariddera Bogs NHA	002448	Knockatarriv/Knockariddera Bogs NHA is a site of considerable conservation significance consisting of upland blanket bog.
Mount Eagle Bogs NHA	002449	Mount Eagle Bogs NHA is a site of considerable conservation significance consisting of upland blanket bog.
pNHAs		
Church Hill, Tralee	001341	It is recommended that the site is included as a NHA of local importance. The major threat to the survival of this small area of calcareous grassland is the heavy application of fertiliser (favouring the growth of the Gramineae).
Tralee Bay and Magharees Peninsula, West to Cloghane	002070	No site synopsis available for this pNHA see SAC 002070
Sybil Point/Carrigbrean	001379	No site synopsis available for this pNHA see SPA 004153
Smerwick Harbour Sandhills and Marshes	001958	Chough occurs regularly on the dunes in the site; this is a rare species that is listed on Annex I of the E.U. Birds Directive. The conservation interest of the site lies in the variety of habitat types it contains, in the rich diversity of locally uncommon plant species that it supports and for its use by a population of Chough.
Cashen River Estuary	001340	No site synopsis available for this pNHA see SAC 002165
Moanveanlagh Bog	000374	No site synopsis available for this pNHA see SAC 002351
Akeragh, Banna And Barrow Harbour	000332	No site synopsis available for this pNHA see SPA 004188 & SAC 000332
Mount Brandon	000375	No site synopsis available for this pNHA see SAC 000375

The designated area of particular importance within this Unit of Management is Tralee Bay (SAC, SPA, MPA and RAMSAR designations).

The northern section of this Unit of Management is adjacent to the Lower River Shannon SAC which is of international ecological importance supporting three species of Lamprey, Bottlenose dolphin, Otter and Freshwater Pearl Mussel as well as a number of important bird species (refer to Annex II for further information).

Actions for Biodiversity, Ireland's National Biodiversity Plan 2011 -2016, recognises the role natural floodplains play in flood water retention, in addition to seeing possible biodiversity gain from wetland and/or flood plain retention or restoration in Flood Risk Management Plans. A target of this plan is "optimised benefits for biodiversity in Flood Risk Management Planning"²⁶

Adhering to first National Diversity Plan (NBP) Limerick, Cork and Kerry Development Plans highlight hedgerows, rivers, streams, lakes as well as associated riparian zones, canals, coastal and freshwater wetlands as being of particular biodiversity value, inside or outside of protected areas. These features can also act as important ecological corridors as outlined in Article 10 of the

²⁶ DAHG (2001), Action for Biodiversity 2011-2016, Ireland's National Biodiversity Plan.

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Habitats Directive which refers to ‘stepping stones and corridors’ of wildlife areas which make the Natura 2000 network a coherent ecological network.

The introduction or spread of invasive species can have a significant negative effect on wildlife and habitats (as well as the economy), and the significance of this is reflected in Ireland’s second National Biodiversity Plan (2010 – 2016) and recent EC (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477 of 2011). Giant Hogweed (*Heracleum mantegazzianum*) has become naturalised particularly along river banks within this Unit of Management, posing a risk to human health and the environment. Other terrestrial alien species found within this Unit of Management, include Giant Rhubarb (*Gunnera tinctoria*), Himalayan Balsam (*Impatiens glandulifera*), Japanese Knotweed (*Fallopia japonica*) and Rhododendron (*Rhododendron ponticum*), all which have a negative effect on native species.

3.6.2 Future trends

Increasing land-use change such as urbanisation, afforestation and its associated management and changing agricultural practices are likely to continue to pose risks to the quality and distribution of aquatic and terrestrial habitats and species, both within and outside protected sites. However, the continued implementation of measures required to achieve the WFD objectives is likely to benefit protected sites and the wider aquatic environment. In addition, the Conservation Management Plans and conservation objectives which are currently being developed by the NPWS for all Natura 2000 sites, as well as other management plans for declining species (e.g. Species Management Plans) will help protect and enhance biodiversity. It should be noted that the development of these Conservation Management Plans and site specific conservation objectives are unlikely to be developed for all of Natura 2000 site in this Unit of Management, but the NPWS will continue to be consulted in this context as a stakeholder of this CFRAM Study.

Agri-environmental schemes, such as REPS and AEOS, with individual environmental farm plans, will continue to influence farming practices to become more environmentally friendly and sustainable (refer to Section 3.3.1).

In addition to existing guidelines and legislation on Environmental Impact Assessment (EIA), in September 2011, the revision of the Planning and Development Regulations prompted Draft Guidance for Planning Authorities on Drainage and Reclamation of Wetlands, which sets new provisions for the control of drainage and/or reclamation of wetlands providing thresholds to trigger requirements for mandatory EIA. Of relevance to the FRMPs, is the threshold of 2ha for reclamation and/or drainage of wetland on agricultural land.

The EPA’s report on alien invasive species in Irish water bodies²⁷ and the continuing development of the Biological Data Centre National Invasive Species Database will aid in the documentation of the distribution of invasive species in Ireland. These reports and datasets will go towards preparing Ireland for the forthcoming European legislation on halting the spread of invasive species.

²⁷ EPA (2011) Alien Invasive Species in Irish Water Bodies. Synthesis Report for the STRIVE-funded project: 2007-W-MS-2-S1

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Box 3.6: Biodiversity – Key strategic issues relating to flood risk management

- Coastal squeeze associated with construction and maintenances of coastal flood defences maybe result in habitat loss;
- Requirement for ecological protection can pose restrictions on existing/future maintenance of flood defences;
- Floodplains have an important role for biodiversity, as they help remove nutrients, provide wetted habitats as well as acting as key aspects in many species' food chain. Currently, the spatial definition of floodplains is unclear, exacerbated by development, farming practices and drainage schemes;
- Wetlands may provide some level of natural flood protection (green infrastructure);
- Flood risk management options may affect winter flooding, which can be essential for some protected bird species;
- Consideration of potential impacts on Natura 2000 sites and protected species outside these designated sites will be required;
- Consideration of non-designated biodiversity features e.g. habitats along watercourses and coastal areas, and locally important habitats and species;
- Flood measures can contribute to habitat fragmentation and impact on ecological corridors / networks e.g. riparian habitat and wetted areas;
- Flood storage options can enhance both biodiversity and recreational/tourism value of an area;
- Activities associated with the implementation of flood risk management plans should not result in the spreading or introduction of invasive species;
- Changes to flood regimes may adversely affect water quality resulting in changes in the balance of aquatic ecosystems and eutrophication of water bodies; and
- Flood risk management measures can pose barriers to fish migration. The maintenance and retention of bridges, bridge sills and fish passes is important to fish passage.

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3.7 Fisheries, Aquaculture and Angling

3.7.1 Existing conditions

Fisheries

Fish are an important indicator species of water quality. Within this Unit of Management the main rivers support, and are capable of supporting salmonid species such as the salmon and brown trout. Five watercourses within this Unit of Management were monitored / surveyed to help determine the draft fish ecological status for the purpose of the WFD, the results of which are outlined in Table 3.7.1.

Table 3.7.1: WFD fish monitoring/ survey results recorded for UoM23²⁸

Water body	Draft Fish Ecological Status	Species Present
Rivers		
Tyshe River <i>Bridge near Banna House</i> (23T020500)	Bad	European Eel, Flounder and spined stickleback
Tyshe River <i>West bridge Ardfert</i> (23T020400)	Poor	European Eel and spined stickleback
Owveg River <i>Owveg Bridge</i> (23O050200)	Good	Brown Trout and Salmon
Smearlagh River <i>Ford u/s Feale River confl (LHS)</i> (23S020700)	Good	Brown Trout, European eel, Lamprey, Minnow, Salmon Sea trout
River Feale <i>Bridge of Duagh</i> (23F010500)	High	Brown Trout, European eel, Lamprey, Minnow, Salmon Sea trout
Transitional (estuarine)		
Cashen	Good	Brill; Common goby; European eel; Fifteen-spined stickleback; Five-bearded rockling; Flounder; Lesser sandeel; Nilsson's pipefish; Plaice; Salmon; Sand goby; Sprat; Thick-lipped grey mullet; Three-spined stickleback
Lee K Estuary	Bad	Common goby; Five-bearded rockling; Flounder; Thick-lipped grey mullet
Lower Shannon Estuary	Good	Ballan wrasse; Black goby; Cod; Common goby; Common sole; Conger eel; Corkwing wrasse; Cuckoo wrasse; Dab; Dragonet sp.; European eel; European seabass; Fifteen-spined stickleback; Five-bearded rockling; Flounder; Greater pipefish; Gunnel (Butterfish); Lesser spotted dogfish; Nilsson's pipefish; Plaice; Pogge; Pollack; Poor cod; Sand goby; Sand smelt; Short-spined sea scorpion; Snake pipefish; Sprat; Thick-lipped grey mullet; Three-spined stickleback; Two-spotted goby

²⁸ Inland Fisheries Ireland <http://www.ifigis.ie/WFDFishMap/>

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Within this Unit of Management, the Feale River and its tributary, the Smearlagh River support salmon, brown trout and lamprey species. The Owveg River currently supports brown trout and salmon. There are no records of salmon or lamprey species in the Tyshe River. The Feale and the Lee Rivers are designated Salmonid Rivers under the European Communities (Quality of Salmonid Waters) Regulations, 1988.

In 2012 the Standing Scientific Committee (SSC) of the IFI published their assessment of salmonid rivers throughout Ireland and advised that a number of rivers should be 'closed' to salmon and sea trout fishing as they were not achieving a surplus above their calculated conservation limit. No rivers within this Unit of Management were identified for closure.

There are no IFI fish farms located within this Unit of Management.

There is currently no commercial eel fishing in this Unit of Management. In 2008 the Department of Communications, Energy and Natural Resources (DCENR) published their National Eel Stock Recovery Plan which contained the following objectives:

- An immediate cessation of the commercial eel fishery and closure of the market;
- Mitigation of the impact of hydropower, including a comprehensive silver eel trap and transport plan;
- Ensuring upstream migration of juvenile eel at barriers; and
- The improvement of water quality in eel habitats.

Prior to this cessation of commercial eel fishing an Eel Management Plan was established for the Shannon RBD and included areas on the Feale where eel fishing took place.

The following angling clubs operate on approximately 50% of the River Feale and the Smearlagh River:

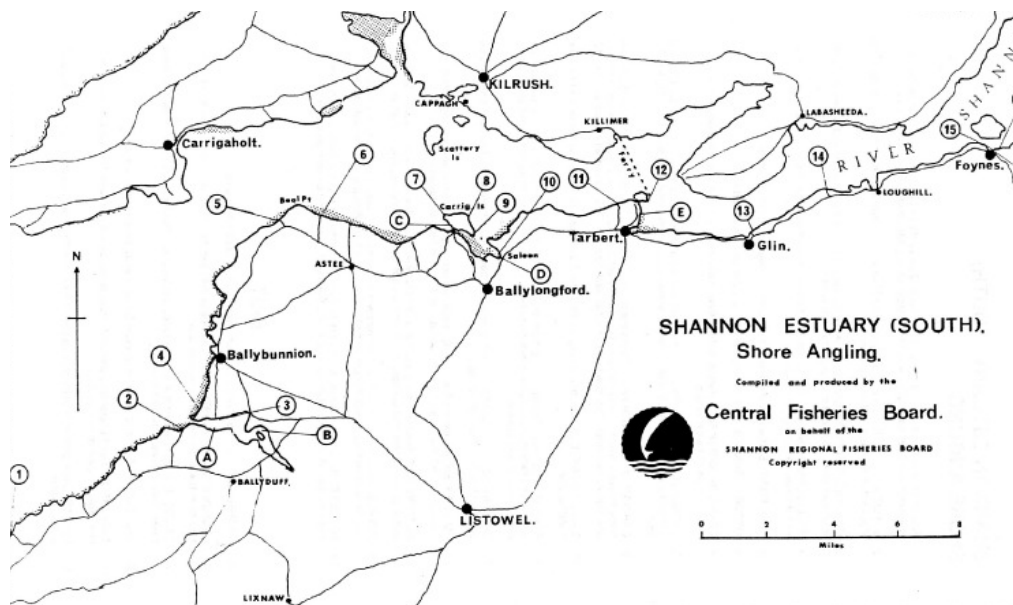
- Killoccrim/Finuge Angling Club – access to approximately 6.5 km of water downstream of Listowel;
- The North Kerry Anglers Association - access to approximately 15 km of fishing in the vicinity of Listowel; and
- Brosna / Mountcollins Angling Club - access to approximately 13 km of double bank fishing from below the Owveg River confluence.

The IFI provides mapped locations of easy access angling points for boats and family access to support recreation and tourism in the area. There are currently no such sites mapped for this Unit of Management²⁹.

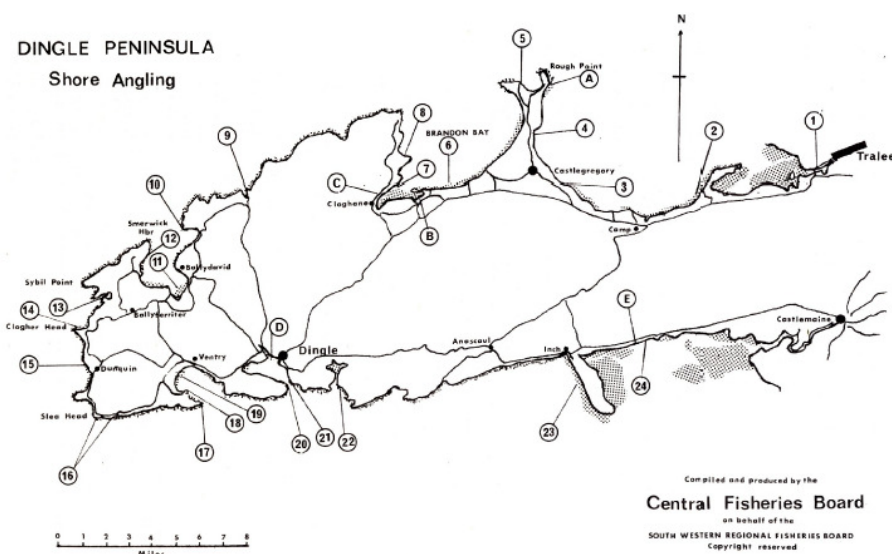
A series of shore angling maps developed by the IFI in the 1980's illustrate the angling "hot spots" in this Unit of Management, including the Shannon Estuary, Dingle Peninsula and Fenit. An extract of this map illustrating the location of shore angling spots within this Unit of Management is presented in Figure 3.7.1(a-c).

²⁹ Inland Fisheries Ireland <http://www.ifigis.ie/AccessibleAnglingMap/>

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**Figure 3.7.1 (a) – Shore Angling Locations within UoM 23-Shannon Estuary
(source: IFI)**



**Figure 3.7.1 (b) – Shore Angling Locations within UoM 23-Dingle Peninsula
(source: IFI)**

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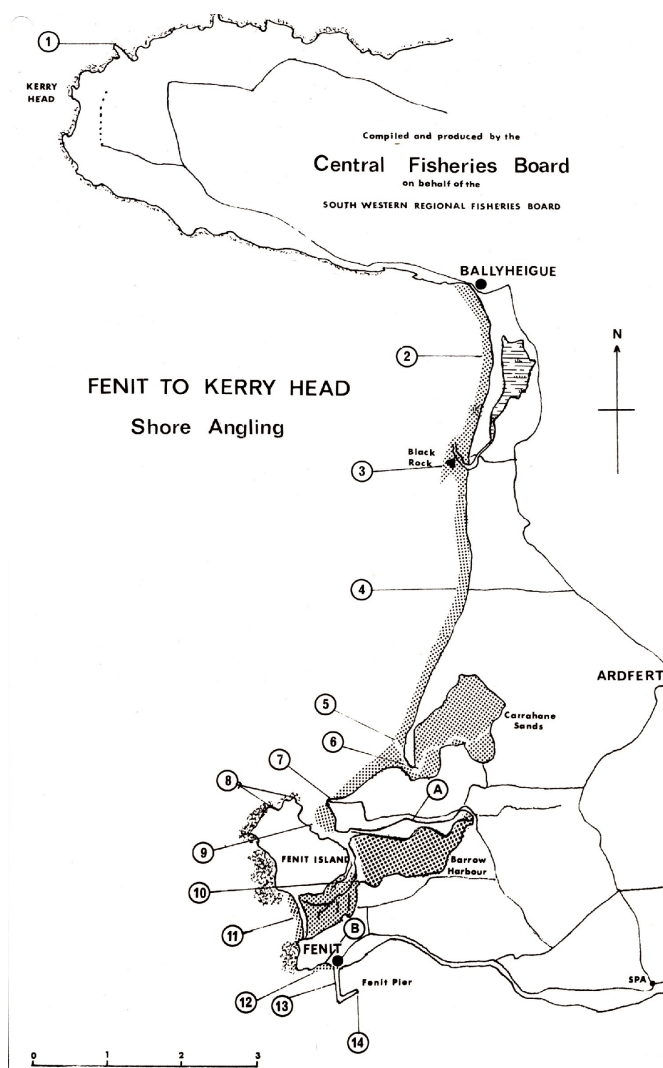


Figure 3.7.1 (c) – Shore Angling Locations within UoM 23-Fenit (source: IFI)

There are two designated shellfish area within this Unit of Management³⁰:

- The Inner Bay, Maharees, Co. Kerry; and
- Tralee Bay Co. Kerry.

The bulk of the shellfish production is in the western Shannon Estuary comprising bag and trestle cultured Pacific Oysters. In accordance with Article 5 of the Shellfish Directive (2006/113/EC) and Section 6 of the S.I. No. 268 of 2006, the DECLG has established a Pollution Reduction Programme (PRP) for shellfish designated areas in order to protect and improve water quality in these areas. The Inner Bay, Maharees PRP has identified that there are currently no key or secondary pressures associated with designated shellfish area. However, the Tralee Bay PRP has

³⁰ Designated under the EC (Quality of Shellfish Waters) Regulations S.I. No. 268 of 2006 and S.I. No 55 of 2009.

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identified primary pressures as a result of WWT systems and OSWWTS. They have also identified secondary pressures as a result of agriculture and port activities. The PRPs also include a number of measures required for the conservation of these areas.

3.7.2 Future trends

The implementation of the WFD programme of measures in addition to ongoing programmes and studies such as the Shellfish Pollution Reduction Programme and the National Salmon Monitoring Programme will positively influence the quality of the aquatic environment, and this will in turn improve the quality of aquatic resources for angling, aquaculture and commercial fisheries. These measures are also likely to have indirect beneficial impacts on recreation and tourism.

Box 3.7: Fisheries, Aquaculture and Angling – Key strategic issues relating to flood risk management

- Flooding and flood risk management measures can result in changes to morphological features and associated habitat supporting fisheries;
- Flooding may result in the introduction of pollutants and/or nutrient loads to waters supporting fisheries;
- Waterside access and variety of water depths are important features for anglers;
- Flood risk management options may present the potential for enhancement opportunities for commercial fisheries, aquaculture and/or angling, but can also pose restrictions to the current operation and/or expansion of these activities; and
- Sea level rise can adversely impact on fishing harbours and their local communities.

Annex I – Tralee Bay – Feale Unit of Management (UoM 23)**3.8 Landscape and Visual Amenity****3.8.1 Existing conditions**

The landscape within this Unit of Management is dominated by agricultural lowlands, with commercial forestry (on hill slopes or boggy / heath uplands) and bogland dominating the southern and a large portion of the north-eastern sections of this Unit of Management. A prominent landscape feature in this Unit of Management is the Kerry coastline, its beaches and Dingle Peninsula. The River Feale catchment drains the agricultural lowlands and together with the undulating hills in the east surrounding Abbeyfeale and the Kerry coastline, this Unit of Management offers a variety of landscapes which are very important in defining landscape character and play an important role for recreation and amenity.

In accordance with the Planning and Development Act 2010 requires all Local Authorities to identify Landscape Character Areas (LCA) within their Development Plans to ensure that defining features are protected and managed. There is no national classification system for LCAs as these are geographically specific and have their own distinctive character based on its location and surrounding environment. Limerick and Cork County Councils have defined LCAs in their County Development Plan and Draft Landscape Strategy respectively. Kerry County Council has yet to formally document LCAs.

Local Authorities have also incorporated landscape designation into their Development Plans in the form of views, prospects, landscape conservation areas and scenic routes. Similarly to LCAs, there is no national standardised approach for designating these landscape features/sites.

Data relating to the various landscape designations is being collated in consultation with Local Authorities, and these sites/features will be considered further during the next stages of the SEA process.

The National Scenic Landscapes Map drafted by Bord Fáilte in 1994 identifies one draft national scenic landscapes within this Unit of Management; the Dingle Peninsula.

3.8.2 Future trends

In September 2011, the DAHG published a strategic issues paper for consultation on 'A National Landscape Strategy for Ireland'. This is in line with Ireland's ratification of the European Landscape Convention (2000). One main aim of this strategy is the sustainable management of change affecting landscape, and is relevant to both terrestrial and aquatic environments.

As part of the Heritage Council 2010 report Proposals for Ireland's Landscapes they recommended the introduction of a Landscape Ireland Act. This has been included as an objective in the recent Heritage Council Strategic Plan 2012-2016.

The existing landscape is not expected to change significantly in the immediate future. Landscape protection has been recognised in the County Development Plans, but as noted above, the classification for areas of scenic landscapes, scenic routes, views and prospects etc differ between counties. Relating to this, Fáilte

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Ireland has produced a feasibility study³¹ which provides a framework for the development of a national landscape map for the whole country.

Box 3.8: Landscape and Visual Amenity - Key strategic issues relating to flood risk management

- Flood risk management options can have positive and negative effects on visual amenity;
- Development pressures around lakeshore and floodplains can deteriorate landscape;
- Future planning restrictions on development within areas at risk from flooding such as river valleys, estuaries and coastlines could help to protect the landscape character as well as the view within and from, such important landscapes:
- Failure to protect or manage flood risk areas may lead to short-term or medium-term harm to landscape and visual amenity of areas surround flood risk centre (e.g. abandonment of buildings); and
- Flood risk management can provide opportunities to enhance landscape and visual amenity by restoring more natural river forms and links between watercourses and their flood plains. Opportunities for reed-bed / wetland retention and/or enhancement can be considered

³¹ Failte Ireland Scenic Landscape Feasibility Study 2007

Annex I – Tralee Bay – Feale Unit of Management (UoM 23)**3.9 Material Assets (economic), Development and Infrastructure****3.9.1 Existing Conditions**

The growing population in this Unit of Management (see Section 3.2) and the strong tourism industry resulted in significant demand for development in recent years. This growth was concentrated within and around the key towns such as Tralee, Abbeyfeale and Listowel.

Within this Unit of Management there are several dominating industry sectors: tourism, retail and agriculture.

The major road infrastructure in the area comprise the N69 Limerick to Tralee and the N21 running through Abbeyfeale with both road networks crossing a number of watercourses in this Unit of Management. Many of the existing roads, including national roads are located close to and along river networks, and have a history of flooding (refer to Section 2.2). Significant improvements have been made to the road network in the past decade and planned development is proposed to continue, however some planned road schemes have been suspended at present, e.g. N21 Abbeyfeale to Adare (NRA).

The only railway line transecting this Unit of Management serves Tralee via Limerick Junction.

There is one canal located within this Unit of Management in Tralee. This canal is used for navigation and runs from Tralee town centre to Blennerville.

Section 3.4 of this Annex details the number of important infrastructure types such as wastewater and water treatment plants.

Within this Unit of Management, agriculture is also acknowledged as a material asset as it has an important role to play in the region's economy. This Unit of Management also has many quality scenic landscapes and offers great opportunities for recreation and tourism (including ecotourism).

The generation of renewable energy has been increasing over the past ten years, with a growth in the number of wind farms arising around the country. There are 14 wind farms currently operational within, or in close proximity to this Unit of Management.

3.9.2 Future trends

County Development Plans present economic development policies which respond to the economic downturn and recognise the importance of taking advantage of emerging and likely future trends and economic opportunities.

There are up to 25 prospecting mining licences in this Unit of Management which are granted by the DCENR. Mining prospects within this Unit of Management are generally concentrated on limestone and marble and base metals, lead and silver.

The National Roads Authority (NRA) reports that planned road upgrades and infrastructure for this region are in the 'planning' stage. However, in November 2011, the Irish Government suspended large scale infrastructure spending. It is

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unknown at this stage if this suspension will significantly affect this Unit of Management.

There are a number of national strategies and plan in place for Ireland's energy needs with specific plans developed regarding renewable energy. One of the most recent is the government publication of the DECNR Offshore Renewable Energy Development Plan (public consultation, 2010). EirGrid have undertaken a number of studies on the development of electricity grid in Ireland including GRID 25, EirGrid's strategy for the development of Ireland's transmission grid. This strategy proposes to support economic growth and provide the infrastructure to enable Ireland to realise its renewable potential and achieve the challenging 2020 target of having 40% of our electricity generated from renewable sources. This strategy includes proposals for projects to be developed within this Unit of Management

The Sustainable Energy Authority Ireland (SEAI) Strategic Plan 2010-2015 promotes renewable energy both on a large commercial scale and as micro-generation. In addition County Development Plans have outlined potential wind energy development areas which will be further detailed as required in the next stage of the SEA process.

County Kerry intend to vary its current County Development Plan to include a Renewable Energy Strategy.

The Government has recently proposed reforms of the water sector which include the establishment of a State-led utility and a water metering programme (private wells will remain un-levied). This will inevitably influence the prospects for and management of water-related infrastructure.

Box 3.9: Development, Infrastructure and Material Assets – Key strategic issues relating to flood risk management

- Vulnerability of material assets to existing and future flood risk can result in adverse effects to human health, economy safety, water status etc;
- Future development including ancillary infrastructure such as access bridges can offer opportunities and constraints for flood risk management; and
- Construction of renewable energy options including those outside flood plains e.g. wind farms can influence changes to morphology and run-off characteristics of a catchment.

Annex I – Tralee Bay – Feale Unit of Management (UoM 23)**3.10 Tourism and Recreation****3.10.1 Existing conditions**

The natural heritage in this Unit of Management is characterised by a range of scenic landscapes which offer extensive tourism and recreational opportunities such as walking, cycling, and driving routes, as well as water-based activities such as fishing, sailing and windsurfing. Kerry supports an established inventory of tourism infrastructure, and it is reported that 15% of the county's workforce are employed in this sector.

A recent attraction in this Unit of Management is the Tralee Bay Wetlands Centre which is reported to attract up to 70,000 people per year. This is located on the banks of the River Lee and incorporates both activity and nature zones (the latter of which incorporates the Tralee Bay Nature Reserve).

The high number of amenities such as walking, driving and cycling trails, beaches and recreational activities throughout this Unit of Management is a good reflection of the strong tourism industry established. Some key amenities are listed below:

Walking Routes:

- The Dingle Way - 179 km loop between Tralee and the Dingle Peninsula;
- The North Kerry Way - 48 km from Tralee to Ballyheige via a loop of Kerry Head;
- Listowel Loop Walk – 4 km along the banks of the River Feale; and
- Tralee Lee Valley - 5 km from the Tralee Ship Canal to Blennerville Village.

Cycling Routes:

- Kerry Head;
- Ardfert – Kilmoley – Abbedorney;
- Ballyfinnae – Ballyhar – Killarney – Tralee;
- Camp – Annascaul – Castlemaine – Tralee;
- Castleisland – Abbeyfeale – Listowel;
- Castleisland – Farranfore – Tralee;
- Listowel – Ballyduff – Abbeydorney;
- Milltown – Killarney – Barraduff – Castleisland; and
- Resngowan – Knockagoshel – Castleisland – Tralee.

Driving Routes:

- Conor Pass in the Dingle Peninsula; and
- The Dingle Sleah Head Drive in the Dingle Peninsula.

Boating:

- Located at Fenit is the Fenit Harbour Marina which is also a commercial Port which includes commercial fishing.
- Lough Gill is considered a recreational lake in this Unit of Management for boating and angling.

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Swimming, Beaches and other recreational activities/areas:

- Green (G) & Blue (B) Flag Beaches awarded in 2011;
 - Fenit (B)
 - Maherabeg on the Dingle Peninsula (B)
 - Ardfert Banna (B)
 - Ballybunion (B)
 - Beal Ban on the Dingle Peninsula (G)
- Various beaches along the Dingle peninsula
- Sailing and windsurfing clubs/schools including the Irish Windsurfing Association, Jamie Knox windsurfing School Tralee Bay Sailing Club and STV Jeanie Johnston;
- Golf courses including Castegregory Golf and Fishing Club, Tralee Golf Club, Listowel Golf Club Ardfert Golf Club, Abbeyfeale Golf Course and Ballyheige Castle Golf Club;
- There are a number of access points along the Unit of Management coastline (slipways, piers jetties) which have been mapped by the Heritage Council.

Many of the above routes and areas are located adjacent to water courses.

The National Trails Office promotes the use of recreational trails in Ireland. Those defined for this Unit of Management are illustrated in Figure 3.10.1.

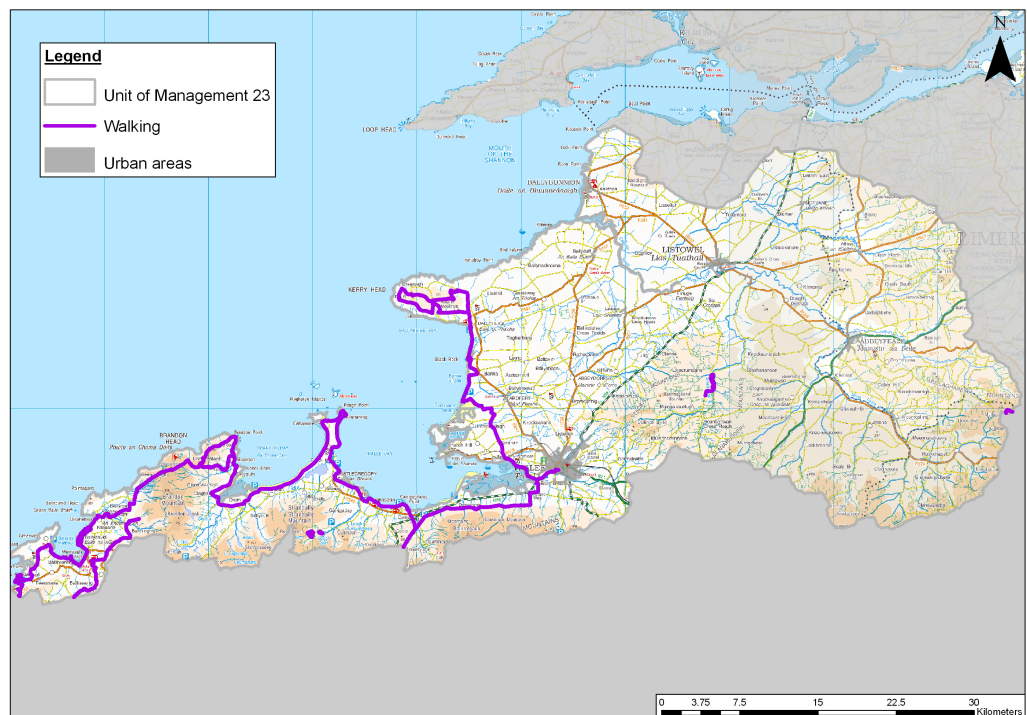


Figure 3.10.1 - National Trails within UoM 23 (source: National Trails Office)

Recreational lakes in this Unit of Management include Lough Gill, which supports both boating and angling activities. The fishing resource of this Unit of Management, including angling is discussed in Section 3.7

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3.10.2 Future trends

The tourism industry will remain a significant industry in this Unit of Management, particular within County Kerry.

Walking and cycling trails will continue to be developed with the Unit of Management with many of these located adjacent to watercourses.

The National Development Plan 2007 – 2013 (NDP) outlines the Government's Policy to significantly increase revenue from overseas and domestic tourism and achieve a wider distribution of tourists within this period. This NDP policy is supported by policies and objectives in County Development Plans.

Complimenting the roles of Fáilte Ireland and Tourism Ireland to market and promote Irish tourism, Shannon Development commit to initiating and supporting tourism development as a 'key element in the achievement of overall economic growth throughout the Shannon region'³². 'Ireland's Shannon Region Tourism Plan Summary 2011' outlines a set of key targets which are likely influence tourism in the coming years throughout this Unit of Management.

Box 3.10: Tourism and Recreation – Key strategic issues relating to flood risk management

- Flood risk management options could contribute to the protection of existing tourist attractions and facilities currently at risk from flooding as well as providing opportunities to enhance/create related activities;
- Flooding may restrict, or reduce the quality of resources important for recreation and/or tourism;
- Flood risk management options may affect angling facilities, boating activities and/or associated resources;
- Flood storage options can potentially provide opportunities for enhancing/creating recreational areas; and
- Access to waterways is an important issue to consider e.g. access to rivers for anglers.

³² <http://www.shannondevelopment.ie/Tourism/>

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3.11 Archaeology and Cultural Heritage

3.11.1 Existing Conditions

Archaeological sites are legally protected by the provisions of the National Monuments Acts, the National Cultural Institutions Act 1997 and the Planning and Development Acts. The National Record of Monument & Places (RMP) (formerly the Sites and Monuments Record (SMR)) is a statutory list of all known archaeological monuments provided for in the National Monuments Acts. There are over 3,400 archaeological, architectural and cultural heritage sites within this Unit of Management, recorded in the RMP. The records contain details of the site, including location, description and unique identification number. Many of the sites are located adjacent to watercourses, with some present within the watercourses. This Unit of Management contains a wide range of monuments types including:

- Barrows;
- Chapels;
- Fulacht fias;
- Kilns;
- Ogham stones;
- Round towers; and
- Souterrains.

The locations of the known archaeological, architectural and cultural heritage sites within this Unit of Management are presented in Figure 3.11.1.

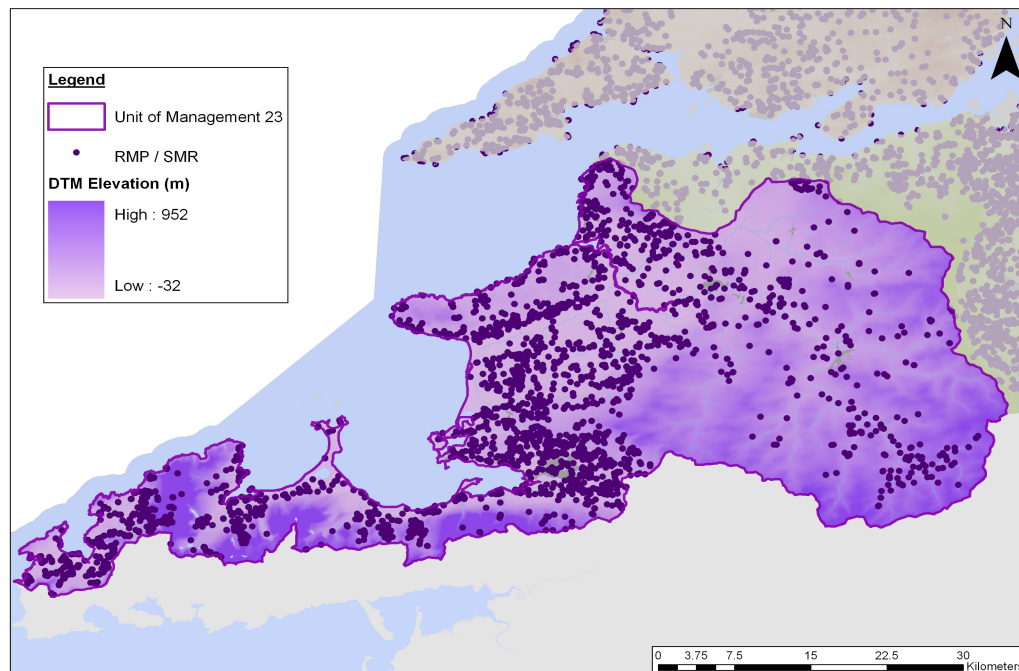


Figure 3.11.1 - Record of Monuments and Places / Sites and Monuments Record within UoM 23 (source: NMS)

As some monuments and structures are located within and close to watercourses, the Underwater Archaeology Unit records and the Register of Battle sites held by

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the DAHG will be consulted to establish any zones of potential archaeological importance in the next stages of the SEA.

The National Inventory of Architectural Heritage (NIAH) was established on a statutory basis under the provisions of the Architectural Heritage (National Inventory) and Historic Monuments (Miscellaneous Provisions) Act 1999. The purpose of the NIAH is to identify, record, and evaluate the post-1700 heritage of Ireland. There are almost 500 listings on the NIAH within this Unit of Management.

Architectural Conservation Areas (ACAs) are designated under Section 81 of the Planning & Development Act 2000-2010 (as amended) for the protection of areas for their special characteristics and distinctive features. There are a number of ACAs within this Unit of Management and these are detailed in the County and Local Area Development Plans (some of which are pending designation). Consultation with the relevant Local Authorities will continue during the next stage of SEA process to obtain further details of these ACAs.

The Planning & Development Act 2000 introduced legislation and methods for protecting the Architectural Heritage and introduced the Record of Protected Structures (RPS). There are approximately 800 Protected Structures recorded in this Unit of Management. These are listed in the County Development Plans, but are not available as yet in digital map format. Following consultation with the DAHG, it is acknowledged that the register of protected structures documented these Plans may not represent all Ministerial recommended sites/structures (which are included in the NIAH). The locations of NIAH sites recorded within this Unit of Management are presented in Figure 3.11.2.

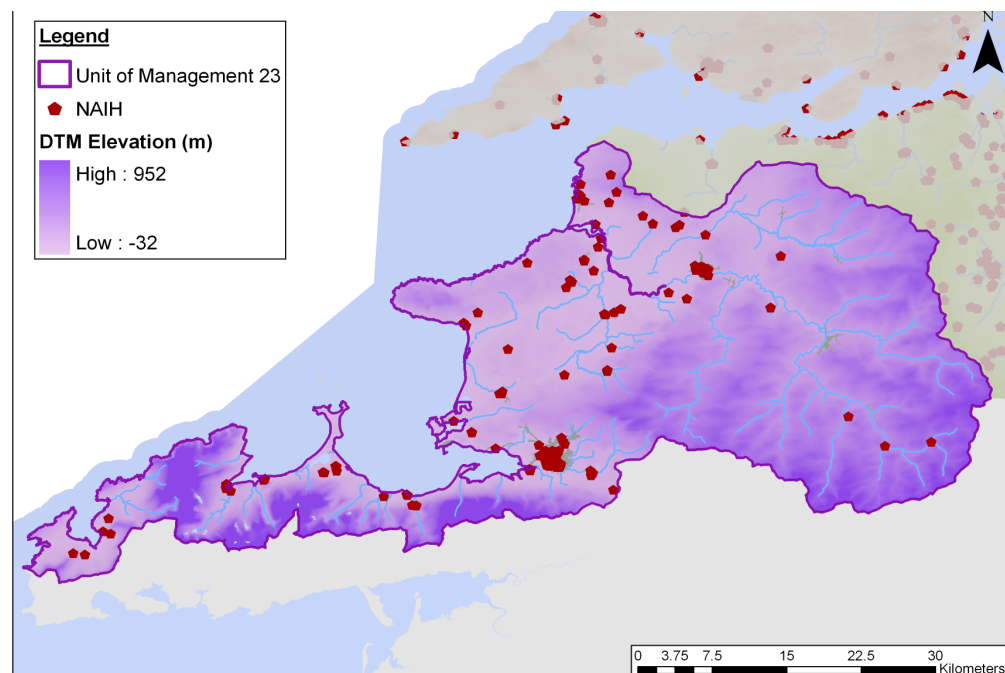


Figure 3.11.2 - National Inventory of Architectural Heritage within UoM 23
(source: NMS)

There are no designated UNESCO World Heritage Sites located in this Unit of Management. However, a Tentative List of sites for Ireland submitted to UNESCO

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includes one tentative site within this Unit of Management: Western Stone Forts at Benagh.

The draft Preliminary Flood Risk Assessment report (OPW, 2011) presented a methodology for classifying the vulnerability of National Monuments from flooding in Ireland. The report classifies each monument type with a 'vulnerability' rating (low to extreme) based on the monuments importance and the potential damage that could occur due to flooding. This rating will inform the SEA process for the FRMPs with regards to archaeological monuments and sites.

3.11.2 Future trends

The archaeological, architectural and cultural heritage of this Unit of Management is a finite resource, and protection of this resource from flooding and flood risk management related development will continue to be required. There also remains the possibility for the presence of unknown, undesignated archaeological and architectural remains to be discovered within this Unit of Management during any future developments.

Linking with the climatic factors discussed in Section 3.4 of this Annex, the Heritage Council and Fáilte Ireland commissioned a review of research carried out in relation to the potential impacts of climate change on Ireland's maritime and inland waterways heritage³³. River and coastal flooding exacerbated by climate changes are reported to present serious consequences for heritage (and socio-economic activity).

Box 3.11: Archaeology and Cultural Heritage – Key strategic issues relating to flood risk management

- Some structures are located within and adjacent to water courses. These can act as a hydraulic restriction within a watercourse and/or constrain flood risk management at a location;
- Existing management plans may require bridges to be repaired/maintained using traditional methods/materials and therefore restrict options for flood risk management;
- Flood risk management options can be constrained by the need to protect the character of areas of existing archaeological and architectural value e.g. ACAs, Protected Structures, National Monuments and RMPs;
- Flood risk management options can potentially reduce the risk from flooding to existing archaeological and architectural features; and
- The development of flood risk management options will need to consider the potential for unknown archaeological discoveries, above and below water level (and across flood plains).

³³ Heritage Council and Fáilte Ireland (2009). Climate Change, Heritage and Tourism: Implications for Ireland's Coast and Inland Waterways.

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3.12 Conclusion

This scoping exercise has identified that impacts on air quality can be scoped out of the SEA for the Shannon CFRAM Study, as it will not influence or be affected by the recommendations of this study. All of the remaining topics including climate are relevant to the next stage of the SEA and Unit of Management 23.

References

- Bord na Móna (2010), Biodiversity Action Plan 2010-2015
- Cork County Council (2009), Cork County Development Plan 2009- 2015
- Department of Agriculture, Fisheries and Food (2007), Ireland Rural Development Programme 2007-2013
- Department of Arts, Heritage and the Gaeltacht (2011), A National Landscape Strategy for Ireland
- Department of Arts, Heritage and the Gaeltacht (2011), Actions For Biodiversity 2011-2016, Ireland's National Biodiversity Plan
- Department of Arts, Heritage, Gaeltacht and the Islands (1999), Framework and Principles for the Protection of the Archaeological Heritage
- Department of Communications, Energy and Natural Resources - Inland Fisheries Division (2008), National Report for Ireland on Eel Stock Recovery Plan - Including River Basin District Eel Management Plans
- Department of Communications, Marine and Natural Resources, Government White Paper (2007), Delivering a Sustainable Energy Future for Ireland - The Energy Policy Framework 2007-2020
- Department of Environment, Heritage and Local Government (2004), Architectural Heritage Protection – Guidelines for Planning Authorities
- Department of Environment, Heritage and Local Government (2008), Programme of Measures Unsewered Wastewater Treatment Systems National Study
- Department of Finance (2007), National Development Plan (NDP) 2007-2013
- Department of the Environment (1997), Sustainable Development - A Strategy for Ireland
- Department of The Environment and Local Government (2002), Making Ireland's Development Sustainable - Review, Assessment and Future
- Department of Transport (2008), Shannon Airport Catchment Area Economic & Tourism Development Plan
- Eirgrid (2008), (Draft) Transmission Development Plan 2008-2012
- Environmental Protection Agency (2009), Code of Practice - Wastewater Treatment and Disposal System Serving Single Houses
- Environmental Protection Agency (2010), Air Quality in Ireland Report
- Environmental Protection Agency (2011), Alien Invasive Species in Irish Water Bodies. Synthesis Report for the STRIVE-funded project, 2007-W-MS-2-S1
- Environmental Protection Agency (2012), Focus on Urban Waste Water Discharge in Ireland
- Fáilte Ireland (2007), Scenic Landscape Feasibility Study

Annex I – Tralee Bay – Feale Unit of Management (UoM 23)

- Fire Services and Emergency Planning (2006), Department of Environment, Heritage and Local Government - Working Draft Guidance Document 11 A Guide To Flood Emergencies A Framework For Major Emergency Management
- Forest Service (2000), Department of the Marine and Natural Resources - Code of Best Forest Practice - Ireland
- Geological Survey Ireland (2006), Irish Landslides Working Group Landslides in Ireland
- Heritage Council and Fáilte Ireland (2009), Climate Change, Heritage and Tourism: Implications for Ireland's Coast and Inland Waterways
- Irish Peatland Conservation Council (2009), Ireland's Peatland Conservation Action Plan 2020 - Halting the Loss of Peatland Biodiversity
- Kerry County Council (2009), Kerry County Development Plan 2009-2015
- Limerick County Council (2010), Limerick County Development Plan 2010-2016
- Mid-West Regional Authority (2009), Mid-West Regional Planning Guidelines 2010-2022
- Office of Public Works (OPW) (2010), Flood Risk Assessment and Management Programme National Pluvial Screening Project for Ireland. HR Wallingford Ltd.
- South West Regional Authority (2009), South West Bioenergy Plan 2009-2020
- South-West Regional Authority (2009), South-West Regional Planning Guidelines 2010-2022
- The Sustainable Energy Authority of Ireland (SEAI) (2010), 5 Year Strategic Plan 2010-2015
- Western River Basin District (2008), Programme of Measures and Standards for Forest and Water

Annex I – Tralee Bay – Feale Unit of Management (UoM 23)

Websites:

- Central Statistics Office - <http://www.cso.ie>
- Environmental Protection Agency - <http://www.epa.ie>
- EPA (2007) River Quality Surveys, Biological - <http://www.epa.ie/qvalue/webusers/>
- EPA GeoPortal - <http://gis.epa.ie>
- Floodmaps - <http://floodmaps.ie/>
- Geological Survey of Ireland - <http://www.gsi.ie>
- Health Service Executive - <http://www.hse.ie>
- Inland Fisheries Ireland (Shannon Regional Fisheries Board) Game Angling Guide - River Deel & Lakes, Co Limerick - <http://www.shannon-fishery-board.ie/guides/game/river-deel.htm>
- Inland Fisheries Ireland - <http://www.ifigis.ie/AccessibleAnglingMap/>
- Inland Fisheries Ireland - <http://www.ifigis.ie/WFDFishMap/>
- Irish Wind Energy Association - <http://www.iwea.com/index.cfm/page/windfarmsinireland>
- National Flood Hazard Mapping website - <https://www.floodmaps.ie>
- National Monument Service - <http://www.archaeology.ie/>
- National Parks and Wildlife Service - <http://www.npws.ie>
- National Trails Office - <http://www.irishtrails.ie>
- Pollution Reduction Programmes, Characterisation Reports and Maps - <http://www.environ.ie/en/Environment/Water/WaterQuality/ShellfishWaterDirective/ShellfishWatersFinalCharacterisationReportsandPRPs/Clare-Kerry/>
- Shannon Development - <http://www.shannondevelopment.ie>
- Shannon Region Trails - <http://www.shannonregiontrails.ie/>
- Transport 21 - <http://www.transport21.ie>
- WFD Ireland Document Store - http://www.wfdireland.ie/docs/1_River%20Basin%20Management%20Plans%202009%20-%202015/ShIRBD%20RBMP%202010/