

3. EXISTING ENVIRONMENT

3.1 Introduction

Included in this Scoping Report is a preliminary discussion of the environmental baseline for the Suir Catchment. The preliminary baseline has been divided by topic into the issues requiring assessment under the SEA legislation. As the SEA is a desk based study the quantity of available information is variable, for example more data is generally available regarding the River Suir than there is for its tributaries. The data was gathered from various sources which are listed in Appendix D. This Scoping Report provides an opportunity for public feedback where the baseline environmental characteristics will be further expanded in the Environmental Report which will be prepared over the coming months.

Section 3.2 to 3.9 below provides an overview of our understanding of the environmental characteristics of the catchment.

3.2 Biodiversity, Flora and Fauna

3.2.1 Habitats

The River Suir Catchment covers a large area of 3,546km², which represents approximately 4% of the land area of the island of Ireland. The catchment includes extensive lowland areas, particularly along the major river valleys such as those of the Suir, the Aherlow, the Multeen and the Anner; and upland areas including parts the Comeragh Mountains, the Knockmealdown Mountains and the Galtee Mountains, rising to an altitude of 919m at Galtymore. Bedrock includes large areas of Old Red Sandstones and Namurian Shales; Tournasian and Visean Carboniferous Limestones and also Ordovician Volcanics in the Commeraghs. With this large area, range of altitudes and diversity of rock types, the catchment will include a high diversity of terrestrial habitats.

The standard habitat classification in Ireland is the Heritage Council's *A Guide to Habitats in Ireland* (Fossitt, 2000). The guide classifies habitats at three levels. Level 1 lists habitats in very broad categories such as 'Freshwater' 'Woodland and scrub' and 'Coastland'; Level 2 subdivides these broad categories into general types, for example, 'Freshwater' in Level 1 is divided into 'Lakes and ponds', 'Watercourses', 'Springs' and 'Swamps' at Level 2; and Level 3 distinguishes individual habitat types such as 'Calcareous springs', 'non-calcareous springs', etc. It is considered highly likely that the Suir Catchment will include all of the Level 2 habitats with the exception of some of those listed under 'Coastland' in Level 1; and will include most habitats identified in Level 3, but again, excluding many coastal habitats.

The Suir Catchment includes 10 Natura 2000 site; one Special Protection Area and nine candidate Special Areas of Conservation (cSACs) and the majority of these are designated on the basis of the Habitats Directive Annex 1 (listed habitats that they support). Hence, the Suir Catchment as a whole will support a range of Annex 1 habitats. As a whole Ireland supports 60 Annex I habitats that require special conservation measures and, of these, 16 are priority types that are considered to be in danger of disappearance. The Appropriate Assessment prepared in conjunction with this Scoping Report will address impacts to Annex I habitats in more detail.

3.2.2 Designated Sites

Maps showing all of the Special Protected Area's (SPAs), candidate Special Area's of Conservation (cSACs) and proposed National Heritage Area's (pNHAs) in the Suir Catchment are presented in **Figure 3-1** and **Figure 3-2** in Appendix A. Table 3-1 provides an overview of the cSACs and SPAs.

European Designated sites i.e. SPAs and cSACs otherwise known as Natura 2000 sites are subject to Appropriate Assessment, for which a separate Screening Assessment has been prepared and accompanies this document in Appendix F. The purpose of Appropriate Assessment of plans or programmes is to ensure that protection of the integrity of European 'Natura 2000' (SPAs and cSACs) sites is included as an integral part of the process. By carrying out an Appropriate Assessment, the OPW also ensure that in adopting and implementing the Suir CFRAMS they are not likely to be in breach of the provisions of Articles 6(3) and 6(4) of the Habitats Directive. It should be noted that NHAs are site of national importance and do not fall within the remit of Natura 2000 sites and are therefore not subject to Appropriate Assessment.

Table 3-1: Designated SPAs and cSACs within the Suir Catchment

cSAC and SPAs	Site Code	County
Lower River Suir cSAC	002137	Tipperary, Waterford and Kilkenny
River Barrow and River Nore cSAC	002162	Kilkenny and Waterford
Hugginstown cSAC	000404	Kilkenny
Commeragh Mountains cSAC	001952	Waterford
Neir Valley Woodlands cSAC	000668	Waterford
Slievefelim to Silvermines Mountains SPA	004165	Tipperary
Kilduff, Devilsbit Mountain cSAC	000934	Tipperary
Moanmore Mountain cSAC	002257	Tipperary
Anglesey Road cSAC	002125	Tipperary
Galtee Mountains cSAC	000646	Tipperary, Limerick

Table 3-2 provides an overview of the pNHAs within the Suir Catchment, there are a total of 41 Natural Heritage Areas within the River Suir catchment. Natural Heritage Areas are designated under the Wildlife (Amendment) Act of 2000. The designation process is underway, including a consultation process with local landowners, but has not yet been completed for many of the sites. Of the sites listed in Table 3-2, only *Slievenamon Bog* NHA, Co Tipperary (site code 002388) is currently (Sept, 2009) listed as a fully designated NHA on the NPWS website (<http://www.npws.ie/en/ProtectedSites/NaturalHeritageAreasNHAs/>); the remainder are therefore best described as proposed Natural Heritage Areas (pNHAs) until such time as they appear on the website.

Both NHAs and pNHAs should be considered as sites of national biodiversity importance.

Table 3-2: Natural Heritage Areas within the River Suir Catchment

Site Name	Site Code	County
Galtee Mountains	000646	Tipperary / Limerick
Bansha Wood	002043	Tipperary
Scaragh Wood	000971	Tipperary
Cahir Park Woodland	000947	Tipperary
Mitchelstown Caves	000651	Tipperary
Shanbally Wood	000972	Tipperary

Site Name	Site Code	County
Glenboy Wood	000952	Tipperary
Marfield Lake	001981	Tipperary
Templtney Quarry	001982	Tipperary
Slievenamon Bog	002388	Tipperary
River Suir Below Carrick-on-Suir	000655	Tipperary
Lizzy Smith's Bog	001980	Tipperary
Grove Wood	000954	Tipperary
Moneypark Fethard	000966	Tipperary
Power's Wood	000969	Tipperary
Rockwell College Lake	000970	Tipperary
Quarryford Bridge	001526	Tipperary
Knockroe Fox Covert	000964	Tipperary
Annacarty Wetlands	000639	Tipperary
Dundrum Sanctuary	000950	Tipperary
Aughnaglanny Valley	000948	Tipperary
Inchinquillib and Downings Wood	000956	Tipperary
Ardmayle Pond	000945	Tipperary
Laffansbridge	000965	Tipperary
Killough Hill	000959	Tipperary
Cabragh Wetlands	001934	Tipperary
Templemore Wood	000942	Tipperary
Kilduff, Devilsbit Mountain	000934	Tipperary
Tiiberaghny Marshes	000411	Kilkenny
Grannyferry	000833	Kilkenny
Hugginstwon Fen	000404	Kilkenny
Lough Cullin	000406	Kilkenny
Fiddown Island	000402	Kilkenny / Waterford
Lower River Suir, Coolfinn, Portlaw	000399	Kilkenny / Waterford
King's Channel	001702	Waterford
Kilbarry Bog	001700	Waterford
Portlaw Woods	000669	Waterford
Comeragh Mountains	001952	Waterford
Toor Wood	001708	Waterford
Nier Valley Woodlands	000668	Waterford
Kilsheelin Lake	001701	Waterford

3.2.3 Mammals

The River Suir Catchment covers a very large land area (3,546km²); a range of altitudes from sea level to 919m above sea level at Galtymore; and supports a diverse range of habitat types. As a result, most of Ireland's mammal species will be present within the catchment. Hayden and Harrington (2000) present maps of the distributions of Irish mammal species by 20km squares. A review of these maps indicates that the only protected terrestrial species not likely to be present within the catchment are the EU Habitats Directive Annex 2 species lesser horseshoe bat, which is restricted to western counties; and the red and Sika deers which are restricted to areas of the west, north and east. The range for the bat species *Nathusius' pipistrelle* presented by Hayden and Harrington (2000) is out of date and this species is now known from a number of sites within the Suir Catchment (Bat Conservation Ireland *pers. comm.*).

3.2.4 Breeding Birds

Due to the diverse range of habitats a large range of bird species will breed within the catchment including some species of high conservation concern. Lynas *et. al.*, (2007) have produced a 'red list' of bird species of high conservation concern in Ireland, and a number of species on this list are recorded by Gibbons *et. al.*,(1994) as breeding within the Suir catchment, including; Barn Owl, Curlew, Lapwing and Yellowhammer. In addition, species listed under Annex 1 of the EU Birds directive such as Kingfisher will breed within the catchment.

Special Protection Areas (SPAs) are designated under the EU Birds Directive for the conservation of rare birds species or for locations that support internationally important concentrations of birds. The Suir Catchment includes only one Special Protection Area (*Slievefelim to Silvermines Mountains* SPA, Co Tipperary), which is designated on the basis of its breeding population of the EU Birds Directive Annex 1 species Hen Harrier.

3.2.5 Non-Breeding (Wintering and Migrant) Birds

The Suir Catchment does not include any coastline other than the estuarine section of the River Suir, and this limits the number of wetland sites of importance to wintering wildfowl and waders.

The Irish Wetland Bird Survey (I-WeBS) is the scheme run jointly by BirdWatch Ireland and NPWS that monitors wintering waterbirds in Ireland. The survey runs from September to March each winter. Wetlands of all types and sizes are monitored, including estuaries, coastlines, bays, rivers, turloughs, lakes, streams and flooded fields. Data from the period 1994 to 2001 is summarised by Crowe (2005)¹ from which the data presented below is taken. IWeBS sites are categorized hierarchically as 'Internationally Important', 'Nationally Important', 'Other notable sites' and 'Other sites covered'. Table 3-3 lists all of the IWeBS sites within the River Suir Catchment that are considered 'Other Notable Sites' or higher.

Table 3-3: 'Notable' IWeBS sites within the River Suir Catchment

IWeBS Site Name	Importance Category	County	Location	Important Ornithological Features
River Suir Lower	Nationally Important	Co Kilkenny / Co Waterford	Covers the flood plain of the River Suir downstream of Carrick-on-Suir, between the confluences of the Clodiagh River and the Darrigal River.	Supports Nationally Important numbers of Graylag Goose, Golden Plover and Lapwing during the winter.

¹ Crowe, O. (2005). Ireland's Wetlands and Their Waterbirds: Status and Distribution. BirdWatch Ireland, Co Wicklow.

IWeBS Site Name	Importance Category	County	Location	Important Ornithological Features
Cabragh Wetlands	Nationally Important	Co Tipperary	On the River Suir flood plain 4km downstream of Thurles.	Supports Nationally Important numbers of the duck species Shoveler and (in some years) Teal and significant populations of a number of other species of wildfowl during the winter.
River Suir Middle	Nationally Important	Co Tipperary	The flood plain of the River Suir from Ballymacusk (between Thurles and Cashel) south to Newcastle (10km SW of Clonmel).	Supports Nationally Important numbers of Golden Plover in winter and numbers of Whooper Swan that approach National Importance in some years.
Marlfield Lake	Nationally Important	Co Tipperary	Western edge of Clonmel.	Supports Nationally Important numbers of the duck species Shoveler and significant populations of a number of other species of wildfowl during the winter.
River Suir Upper	'Other Notable Site'	Co Tipperary	3km N of Thurles.	A variety of waterbirds and occasionally Nationally Important numbers of Golden Plover and Lapwing during the winter.

3.2.6 Fish

A fishery survey of the River Suir Catchment and Management Recommendations was prepared by the Regional Fisheries Board on behalf of the SE Region Fisheries Board in 2006. The major objective of the assessment was to establish the status of fish stocks in relation to the ecology of the Suir and its tributaries, and to use this data to generate focused management programmes. The Suir is recognised as a premier brown trout angling fishery and also a major salmon fishery. In 2005 the Suir was ranked as the 4th best salmonid river in Ireland, based on angling returns (CFB, 2006).

The following river catchments formed part of the survey; Upper Suir Catchment, Suir Main Channel Suir Lower Main Channel, Drish Catchment, Upper Clodiagh, Multeen River Catchment, Ara River Catchment, Aherlow River Catchment, Tar River System, Anner River Catchment, Lingaun River Catchment, Portlaw Clodiagh River System and Blackwater Catchment.

A summary of the overall system is provided below (the Environmental Report will review the sub-catchments in further detail).

3.2.6.1 **Salmon Stocks**

All the tributary catchments and the main channel itself, that were examined, supported some level of salmon fry and parr. Several sub-catchments were notably more important in the role of salmon production than others and included the Multeen system, the Owenbeg branch of the upper Clodiagh, the Anner, Lingaun, Nier and Argio systems. Adult salmon were recorded along the Suir main channel from Ardfinnan to Clonmel.

3.2.6.2 **Trout Stocks**

The widespread distribution of salmon stocks recorded throughout the entire catchment was also noted for trout stock. All sub-catchments, as well as the main channel itself, showed good stocks of fry and parr while again the actual numbers recorded for individual sites surveyed varied greatly, reflecting the different types of habitats sampled. Of the four sites where no trout were found (2 on the Drish, 1 on the Anner and 1 on the Suir main channel) 2 can be attributed to poor water quality and two to unsuitable habitat type. The Anner, Drish, Tar and Clodiagh are all noted trout fisheries.

3.2.6.3 **Other Fish Species**

Nine other fish species were recorded during the course of the survey; pike (*Esox lucius*), perch (*Perca fluviatilis*), roach (*Rutilus rutilus*), flounder (*Pleuronectes flesus*), minnow (*Phoxinus phoxinus*), 3 spined stickleback (*Gasrerosteus aculeatus*), lamprey- brook/river (*Lampetra planeri/ fluviatilis*), stoneloach (*Barbatula barbatula*) and gudgeon (*Gobio gobio*). Of these only 3 showed signs of widespread distribution and included lamprey, stickleback and stoneloach.

Fish populations are protected and supplemented through routine Eastern and South Eastern Regional Fisheries Boards (ERBD) fisheries management measures, in addition to annual stocking by local angling groups. There are a number of local angling groups within the catchment which have a special interest in the river including; Rinnashark Sea Angling Club, Waterford and District Coarse Angling Club, Cappoquin Salmon and Trout Anglers Association, Waterford and District Coarse Angling Club and Tramore/Waterford Sea Angling Club.

3.2.6.4 **Protected Fish Species**

A number of fish species listed under Annex 2 of the EU Habitats Directive occur within the Suir catchment. These include Atlantic salmon (see above). All three lamprey species: sea lamprey (*Petromyzon marinus*), river lamprey (*Lampetra fluviatilis*) and brook lamprey (*Lampetra planeri*), which are likely to occur throughout much of the catchment. Allis shad (*Alosa alosa*) and Twaite shad (*Alosa fallax fallax*) which occur in Waterford Harbour and tidal sections of the lower River Suir at least as far upstream as Carrick-on-Suir (see: <http://www.npws.ie/en/media/Media,6272,en.pdf>).

3.2.7 Designated Salmonid Water

The Aherlow River is a designated Salmonid Water under the EU Freshwater Fish Directive.

3.2.8 Protected Invertebrates

3.2.8.1 Freshwater Pearl Mussel

There is one sub-catchment the Clodiagh² sub-catchment within the River Suir Catchment for which NPWS have prepared a Freshwater Pearl Mussel Management Plan. The Clodiagh³ sub-catchment lies in the southeastern part of the Suir Catchment and is designated for Freshwater Pearl Mussel populations and for which sub basin management plans have been prepared (see **Figure 3-3**).

A full baseline survey of the Clodiagh River was undertaken and a monitoring programme initiated by NPWS in 2006 (Ross, 2006)⁴. The pearl mussel in the Clodiagh River was found to be present almost continually but in low numbers from Clonea to Portlaw. Pearl mussels were not found to be abundant in any stretch; density category levels were either occasional or frequent to common. The maximum density was just 3/m². No juvenile mussels were observed during the survey, with no juvenile recruitment and an aging adult population. If conditions to restore sustainable reproduction are not met, this population will be extinct following the death of this generation. Ross (2006) estimated a total population size of 2,412 individual mussels remaining, 97% of which are longer than 80mm in length. There are unlikely to be any living mussels present that are younger than 30 years of age.

3.2.8.2 White-Clawed Crayfish

This species, which is listed under Annex 2 of the EU Habitat Directive, occurs in watercourses widely throughout the Suir catchment, one of the main ones being the Multeen River.

3.2.8.3 Vertigo Snails

None of the three species of *Vertigo* whorled-snails listed under Annex 2 of the EU Habitats Directive are known in the Suir catchment.

(see: <http://www.npws.ie/en/PublicationsLiterature/HabitatsDirectivereport07/Species/>)

² NPWS (2009). Freshwater Pearl Mussel *Draft* Clodiagh (Suir) Sub-Basin Management Plan.

³ NPWS (2009). Freshwater Pearl Mussel *Draft* Clodiagh (Suir) Sub-Basin Management Plan.

⁴ Ross, E. (2006). *Initiation of a monitoring program for the freshwater pearl mussel, Margaritifera margaritifera (L.) in the Clodiagh River (Clodiagh)*. Report for the National Parks and Wildlife Service, Dublin.

3.2.8.4 Marsh Fritillary butterfly

This butterfly species which is listed under Annex 2 of the EU Habitats Directive has populations in east Co Limerick and south Co Tipperary (10km Grid Squares R72, R73, R92, S03, S04, S15, S15, S25, see: <http://www.npws.ie/en/media/Media,5277,en.pdf>). The butterfly inhabits wet or marshy grassland which is rich in its foodplant Devil's-bit Scabious (*Succisa pratensis*).

3.2.9 Plants

The River Suir Catchment supports a diverse range of habitat types as a result, a large range of flora species will be present and this will include some species listed under the Flora (Protection) Order of 1999.

The Irish Red Data Book (Curtis and McGough, 1988) lists Ireland's rare and threatened vascular plant species by habitat type. Within the Suir Catchment, species listed under the Grassland, Wetland, Woodland and Artificial habitat groups are likely to be present. Flora (Protection) Order species known to have important populations in the Suir Catchment include Meadow Barley (*Hordeum secalinum*) along the Suir Estuary, and Northern Rock Rose (*Arabis (Cardaminopsis) petraea*) in the Galtee Mountains. Other Flora (Protection) Order species are likely to be present elsewhere in the Catchment.

3.2.10 Key Biodiversity, Flora and Fauna issues relating to Catchment Flood Risk Management

- Need to protect and where possible improve the conservation status of European and national designated sites (cSACs, SPAs, pNHAs, NHAs etc);
- Need to be fully informed of the potential for the river channel, banks and flood plain, to support legally protected species or those of high conservation concern and design flood management measures accordingly;
- Need to protect species and habitat areas of conservation concern within the Suir Catchment;
- Managed flood levels can create opportunities for the expansion of wetland habitat, both freshwater and estuarine, with benefits to associated habitats and species, provided water levels meet the requirements of local flora and fauna.
- Conservation of existing wetlands and restoration of degraded wetlands, including bogs within the catchment (for example Kilbarry Bog, Slievenamon Bog and Cabragh Wetlands).
- Need to maintain natural channel form, where possible, for fisheries in all waters, including a diversity of habitats such as fast flowing riffles and deep pools;
- Need to maintain species and access for coarse fishing in the catchment and enhance where possible;
- Need to protect and improve where possible riparian zones and integrity of wetlands areas;

- Ensure no additional barriers to upstream migration area created to restrict access by salmon to their spawning grounds;
- Potential changes in estuarine (and coastal) processes due to flood risk management actions and resulting increased sedimentation could present risks to maintaining the quality standard for shellfisheries; and
- Need to manage and protect against the establishment and spreading of invasive species.

3.3 Water

3.3.1 Introduction

The main channel of the Suir has been sub-divided by the Central Fisheries Board into three segments, reflecting the differences in terms of channel width, volume discharge and salmonid potential. These areas refer to the main channel from source to upstream of Thurles (Upper), the channel between Thurles and Ballycamus (Middle) and finally everything downstream of Ballycamus (Lower) (CFB, 2006).

3.3.1.1 *Suir Upper Main Channel*

The River Suir rises in the Devils Bit Mountain near Moneygall and flows in a southerly direction towards Templemore. A number of small streams feed the Suir in this section (including the Mall stream). The dominant geology type within the upper Suir Catchment is Carboniferous limestone and landuse is generally described as pasture. There are a number of sub catchments within the Suir Catchment these are depicted in **Figure 3-4**, in Appendix 1.

3.3.1.2 *Suir Main Channel – Thurles to Ballycamus (Middle Reaches)*

The channel in this section is a well noted trout fishery. In general the river is slow flowing with deep glide and pool areas (>2m in places) which are occasionally broken by short zones of faster flowing riffles.

3.3.1.3 *Suir Lower Main Channel*

This section comprises everything downstream of Ballycamus, to the Multeen confluence, through the Comeragh Mountains and continues on through Waterford City until it enters the sea at Waterford Harbour. The river is tidal to a point at the Salmon Weir upstream of “Old Bridge”. The dominant geology type is Carboniferous Limestone with lesser areas of Old Red Sandstone. Several of the major sub-catchments enter the main channel of the Suir within this section. These include the Multeen, the Aherlow/Ara, the Tar and the Nier Systems. While the surrounding land use within this section is mainly pasture there are four urban areas within the catchment, namely Golden, Cashel, Cahir and Clonmel. Landuse along the Suir Lower Main Channel contains a number of marshes including Kilbarry, Portlaw and Coolfinn Marshes. This area of the Suir is the most important section of the River for trout and salmon angling.

3.3.2 Drish Catchment

The Drish rises in the Slieve Ardagh Hills and flows in a northerly direction before turning southeast on its course to the River Suir, which it enters upstream of Turtulla Bridge. A number of small tributary streams feed into the Drish. The largest of these is formed by the confluence of the Black and Clover streams, which enters the Drish upstream of Athlumman bridge. The Drish is a reasonably slow flowing lowland river which drains a low-lying and relatively fertile catchment to the east of the Suir.

3.3.3 Upper Clodiagh

The Clodiagh rises in the Keeper Hill range at a height of 330m above sea level. It flows in an easterly direction for about 25km before turning to follow a southerly course until it enters the River Suir immediately upstream of Ballycamus Ford. The principle tributary streams include the Fishmoyne, Cromoge, Farneybridge and the Owenbeg. Each of these drain relatively large catchment areas and receive other small tributary systems. The headwaters of nearly all of these catchments are of high gradient and are, in general, unpolluted waters. From Rathcardan to its confluence with the Suir the Clodiagh meanders along a gently sloping valley. Large sections of the mid to lower reaches of the Cromoge and Farneybridge system also are slow flowing due to low gradient values.

3.3.4 Multeen River Catchment

The Multeen system has two main branches, the Multeen West and the Multeen East. These two rivers meet just 2km upstream of where the Multeen joins the Suir main channel. A number of small relatively fast flowing tributaries join the Multeen West, while the Multeen East receives one significant tributary, the Aughnaglanny River, which drains an area to the west of the branch.

The geology of the upper Multeen system is mainly Old Red Sandstone which changes to Lower Carboniferous limestone throughout much of the lower sections.

3.3.5 Ara River Catchment

The Ara River joins the Aherlow River before they enter the main channel of the Suir, it is a major tributary and, as such, is considered a sub-catchment itself. The dominant geology is Lower Carboniferous limestone. Long sections of this system were drained in the past. The river bed level was lowered significantly along many parts, such that the banks now fall steeply into the river, and some of the unfenced banks remain treeless and sparsely vegetated.

3.3.6 Aherlow River Catchment

The Aherlow river rise in the Galtee Mountains, and, for most of its course, flows through the valley formed between the Slievenamuck and the Galtee mountain range, known as the Glen of Aherlow. Old Red Sandstone is the main bedrock type in this catchment, with only the lower reaches of the river flowing over Lower Carboniferous limestone. The majority of the tributaries feeding the Aherlow (excluding the Ara flowing directly from the mountains on either side).

3.3.7 Tar River System

The Tar is a major tributary system to the Suir. It enters the main channel of the Suir from the west, 2km north of Newcastle. The catchment encompasses a number of important tributaries. The most significant of these include the Burncount, Shanbally and the Duag rivers. In general the Tar system is characterised by fast flowing clean waters with a river bed of cobbles and/or gravel.

3.3.8 Anner River Catchment

The Anner is one of the largest sub-catchments within the Suir Catchment. Rising in the Slieve Ardagh Hills its flows in a south-easterly direction to Kilvemnon then turns west and finally south to the River Suir which it enters 3km downstream of Clonmel. There are several tributary streams within this catchment. Those draining the Slieve Ardagh Hills are generally meandering and relatively slow flowing, while those from the Slievenamon are all short and torrential in flow. The Clashawley and the Moyle rivers are the most significant tributaries.

3.3.9 Lingaun Catchment

The Lingaun River rises on the slopes of Slievenamon and enters the River Suir downstream of Carrick-on-Suir. It receives a large number of small relatively fast flowing tributaries in its upper reaches. In the middle and lower reaches, where the gradient is lower, fewer tributaries are present. Geology of the upper system is sandstone, but changes to limestone as one moves downstream.

3.3.10 Portlaw Clodiagh River System

The Portlaw Clodiagh rises in the Comeragh Mountains. In its upper reaches the flow can be torrential. A few kilometres from its source the river follows a slow flowing meandering course. It finally joins the Suir River in its tidal reaches upstream of Waterford City. The geology of this catchment changes from the Silurian rocks of the Comeragh Mountains to sandstone formations in its lower reaches.

3.3.11 Blackwater Catchment

The Blackwater enters the Suir estuary from the north bank, west of Waterford City. The dominant geology type of the upper to mid reaches is Old Red Sandstone changing to limestone in the lower parts. Most of the surrounding area is used for pasture and heavy tree cover is present from the mid reaches downstream.

3.3.12 Water Quality

Water quality is determined through biological assessment of a water body by the EPA who then report in the form of a 'Q-Value' rating which indicates the relative proportions of the various organisms that have different pollution tolerances in a water sample; water quality is inferred by a comparison of this data with that which might be expected from an unpolluted habitat of the same type.

A water quality map of the Suir Catchment is presented in **Figure 3-5**; Surface Water Status in Appendix A where the data is taken from the Water Framework Directive website which bases its determination of water quality on the EPA Q-Values and is the most up to date data available. Overall the water quality of the River Suir Catchment ranges from Poor to Moderate with fewer areas of Good to High water quality.

All rivers, lakes, estuaries, coastal waters and groundwaters must achieve 'good ecological status' (GES) by 2015 under the terms of the EU Water Framework Directive (WFD). As part of the implementation of the WFD, Ireland has been divided into eight river basin districts. The study area falls largely within the South Eastern River Basin District (ERBD). The RBDs have recently developed a programme of measures to facilitate achievement of improving and protecting water quality and ecology and reaching these targets.

Table 3-4 provides a summary of the 2005 risk assessment for each of the water body types considered, e.g. river, lakes, coastal and transitional. Eighty-three percent of the river water bodies in the RBD (85.7% by area) were classified as At Risk or Probably At Risk. Some 58.3% of the lake water bodies in the RBD (77% by area) were classified as either At Risk or Probably at Risk. Within the RBD 85.7% of the transitional water bodies (98.9% by area) were classed as At Risk or Probably at Risk. Last, 66.7% of the coastal water bodies in the RBD (18% by area) were classified as either At Risk or Probably at Risk.

Table 3-4: River Water Bodies Risk Assessment Summary for SERBD

Reporting Category	Number of Waterbodies	% of Total	Km Affected	% Area of RBD
1a At Risk	297	45.3	2201.9	58.2
1b Probably at Risk	249	38	924.4	27.5
2a Probably not at Risk	75	11.5	425.4	9.8
2b Not at Risk	34	5.2	243.0	4.5
Total At Risk (1a and 1b)	546	83.3	3126.3	85.7

Figure 3-6 Surface Water Risk Assessment, in Appendix A provides a summary of the overall risk assessment within the Suir Catchment. Initial assessments of the Suir Catchment recorded on the Water Framework Directive website indicate that the majority of the catchment is either at risk or probably at risk of failing to meet this target. In particular areas around Carrick-on-Suir, Clonmel, Cahir, Tipperary Town, Thurles and Waterford City are at Risk.

Under the Water Framework Directive it is an objective to 'Restore' most water bodies within the Suir Catchment and 'Protect' all others which are predominantly situated to the south of Clonmel, Cahir and Thurles, to the north-west of Carrick-on-Suir and along the south western boundary of the Suir River Catchment. **Figure 3-7 Surface Water Objectives, in Appendix A** provides an overview of the Water Framework Directive Objectives for the Suir Catchment.

More specific data relating to rivers within each of the APSRs will be sought during future stages of this study. Significant pressures identified within the South Eastern RBD area include point and diffuse sources of pollution, physical modifications, abstractions, climate change, aquaculture and alien species.

Those water bodies within the study area requiring measures to address pressures due to physical modifications are most relevant to this study. Where these pressures are due to flood risk management actions, the DoEHLG are proposing new regulations for the consenting these freshwater and marine morphology activities (SERBD, 2009).

The WFD also identifies water related Protected Area within the study area, which may acquire the achievement of more stringent standards than GES/GEP to meet the requirement of other, related, EU Directives. Those within the study area include:-

- Natura 2000 sites (SPAs and cSACs, See Section 3.1 above).
- Bathing Waters: there are 3 protected bathing waters within close proximity to the Suir Catchment which may be indirectly affected through flood alleviation measures. These are the Duncannon (Water quality Status Sufficient) and Dunmore East, Main (Water Quality Status Good and Dunmore East, Counsellors Strand (Water Quality Status Sufficient. (EPA, 2008) The waters of the South Eastern RBD are used extensively for recreational activities, with the region being popular for fishing, sailing, windsurfing and surfing.
- Shellfish waters (Waterford Harbour).
- Nutrient Sensitive Areas (Suir Estuary Upper; River Suir downstream of Thurles sewage outfall to Twoford Bridge; and River Suir downstream of Clonmel sewage outfall to Coolnamuck Weir).
- Nitrate Vulnerable Zone, a Nitrates Action Programme has been prepared in accordance with Article 5 of the Nitrates Directive and is to be applied to the state as a whole (EU Nitrates Directive 91/676/EEC).

Both surface and groundwaters that support Protected Areas must enable the Protected Areas to achieve their stricter status standards. The whole Country of Ireland has been designated as a Protected Area for Groundwater (See Section 3.2.3 for further information on groundwater). Table 3-5 below provides an overview of some of the monitoring locations for the various catchments.

Table 3-5: Sample Summary of Water Quality of the Various Catchments

River Catchment	Waterbody Code	Overall Status	Overall Objective	Overall Risk
Suir	IE_SE_16_4181	Poor	Restore	1a At Risk
Drish	IE_SE_16_3521	Poor	Restore	1a At Risk
Anner	IE_SE_16_2342	Poor	Restore	1a At Risk
Lingaun	IE_SE_16_4197	Moderate	Restore	2A Probably not at Risk
Clodiagh Mid	IE_SE_16_1141	Moderate	Restore	1b Probably at Risk
Clodiagh Lower	IE_SE_16_3698	Moderate	Restore	1a At Risk
Clodiagh Upper	IE_SE_16_1236	Moderate	Restore	1b Probably at Risk
Tar	IE_SE_16_2532	Good	Protect	2b Not at Risk
Multeen	IE_SE_16_3825	Good	Protect	2b Not at Risk
Ara	IE_SE_16_2303	Moderate	Restore	1a At Risk
Aherlow	IE_SE_16_1178	Moderate	Restore	1a At Risk
Nier	IE_SE_16_1059	Good	Protect	2b Not at Risk

3.3.13 Groundwater

Under the Water Framework Directive groundwater has been classified on a system that combines chemical and quantitative status. In accordance with the Water Framework Directive, the Classification Schemes identify Status Classes, which indicate how much human activity has impacted on our waters, where groundwaters are classified as good or poor. Groundwater quality within the Suir Catchment is considered good with the exception of the area around Waterford City and the area around Ballingarry, which are both considered poor. It is an objective of the Water Framework Directive to restore areas of poor groundwater quality and protect areas of good water quality.

Most of the groundwater in the Suir Catchment is expected to achieve good ecological status by the WFD deadline of 2015. A map showing the catchments groundwater vulnerability is given in **Figure 3-8 Groundwater Vulnerability Map for the Suir Catchment**, the map depicts much of the study area as unsurveyed High to Low groundwater vulnerability with the exception of areas around Waterford which are depicted as moderate vulnerability and Newcastle, Galbally, Mullinahone and Borrisoleigh which are depicted as having High to Extreme Vulnerability.

A Map showing groundwaters at risk is presented in **Figure 3-9 Groundwater Risk Assessment** in Appendix A. Groundwater to the north of Thurles and in the environs of Waterford City is at risk of not achieving good ecological status by 2015. **Figure 3-10** shows the groundwater body types within the Suir Catchment, areas in the centre area considered "Karistic", the area around Waterford City is considered "Productive Fissured Bedrock to the south and "Poorly Productive" along the coast. The majority of County Tipperary is considered "Poorly Productive". **Figure 3-11 Groundwater Objectives, in Appendix A** shows the Water Framework Directive objectives for groundwater for 2015. It is an objective of the WFD to protect all groundwaters within the Suir Catchment with the exception of groundwater surrounding Waterford City and to the south east of Thurles.

3.3.14 Drinking Water Quality

The European Communities (Drinking Water) Regulations (No.2), 2007 came into force in March 2007. In accordance with these regulations, the local authority must notify the EPA where there has been a failure to meet a quality standard. Table 3-9 presents information on the overall drinking water compliance rate within the various counties throughout Ireland, as recorded in the EPA (2008) report: ***The Provision and Quality of Drinking Water in Ireland, a Report on the Years 2007-2008***. Table 3-6 provides a summary of the overall compliance records for the various counties within the Suir Catchment in 2007.

Table 3-6: Drinking Water Quality

County	Overall Compliance Rating
Waterford	The overall rate of compliance in Co. Waterford, 95.2%, was below the national average though it did improve marginally from 94.2% in 2006
Waterford City	Overall compliance rate of 99.0%. Above the National average and Relatively unchanged.
North Tipperary	The overall rate of compliance in North Tipperary, 98.9% in 2007, was above average and improved from 98.6% in 2006
South Tipperary	The overall rate of compliance in South Tipperary, 98.0%, was above the national average and improved from 97.6% in 2006.
Kilkenny	The overall rate of compliance in Co. Kilkenny, 97.6%, was above the national average, though improved marginally compared to 2006 (up from 97.3% compliance).
Limerick	The overall rate of compliance in Co. Limerick, 98.1%, was above the national average in 2007 and improved from 96.6% in 2006

Risk of Cryptosporidium Contamination - Cryptosporidium is a protozoal parasite that causes a diarrhoeal illness in humans. Both humans and animals are potential receptors. Surface water supplies with inadequate treatment (chlorination only) are at risk of failing to remove Cryptosporidium oocysts in the treatment process if present in the raw water. An outbreak of Cryptosporidium occurred in County Waterford in December 2006. A total of 8 cases of the disease were reported and remedial action has been undertaken to reduce the likelihood of re-occurrence. A review of the counties within Ireland identified a number of plants in the Suir Catchment as having risk of Cryptosporidium contamination, if they are not upgraded (EPA, 2007). A number have been upgraded and work is ongoing.

3.3.15 Key Water Quality issues relating to Flood Risk Management

- Need to maintain adequate quality and quantity of drinking water;
- Need to achieve the requirements of the WFD, while at the same time achieve compliance with the Floods Directive. Strategic flood risk management options must not constrain the achievement of good ecological status and chemical status/potential for all water bodies by 2015;
- Flooding of WWTPs and IPPC facilities presents a pollution risk to receiving watercourses with associated impacts on human health, water quality and ecology;
- Strategic flood risk options should not pose a risk to existing licensed discharges and abstractions;
- Opportunities for harvesting water power for energy should be considered during the design of flood risk management options, where appropriate;
- Ensure water quality protection during channel maintenance, conveyance improvement, construction of schemes;
- Water impoundments-flood attenuation basin; and
- Proposed flood risk management measures must be compatible with any WFD requirements to restore the natural morphology of water bodies "at risk" due to structural alterations.

3.4 Landscape and visual Amenity

3.4.1 Introduction

In terms of Landscape, townscapes and visual amenity, local authorities in Ireland conserve and protect scenic value as Areas of High Amenity, Areas of Outstanding Natural Beauty and Protected Views. Each local authority is responsible for the designation of these within their jurisdictions, with each Development Plan providing objectives to protect such views. Specific landscape features within the counties are often not listed within these plans, as such it is difficult to provide a list of these within this baseline. Therefore a summary description of the landscape character of each of the main counties in the Suir Catchment is described below.

3.4.2 County Waterford Landscape Character

The landscape of County Waterford is a valuable resource in that it sustains agriculture and fishing, forestry, mineral extraction and is the location of homes and communities, while providing the routes and corridors for vital infrastructure. Over time landscape will change in response to society's evolving needs and uses. The Waterford City Local Area Plan area covers the rural agricultural hinterland from Kilmeaden to the City boundary along the route of the N25 and continues along the environs outside Waterford City extending eastward to Woodland Pill. The existing zoned settlements within the study area are Kilmeaden, Butlerstown, and Bawnfunne. The study area can be described under 5 distinct landscape types; Valleys and River Environs, Exposed agricultural land above 50m, Mount Congreve Estate, Woodland and agricultural land. Two demesne landscapes occur within the study area, Mount Congreve and Whitfield Court. Ballycashin, Ballycanvan, River Suir are designated as Visually Vulnerable while Mount Congreve, Ballyhoo, Duagh, Ballinamona, Moanmintra, Kilcaragh are Sensitive landscapes. On the northern bank of the River Suir in Co. Kilkenny the waterway corridor is designated an Area of High Amenity and a protected view is listed from Granagh Castle SW towards the Comeraghs.

3.4.3 County Tipperary Landscape Character

The relatively large size of County Tipperary resulted in it being split into two "Ridings" in 1838. The Landscape of North Tipperary comprises the Nenagh plain to the west which is fringed by the Slievenamon Mountains to the south, the Arra Mountains to the southwest and the Devil's Bit to the east, and is formed by rivers such as the Nenagh, Ollatrim and Ballintotty. The Landscape of South Tipperary is largely underlain by limestone with the higher terrain of the County composed of geological deposits dating from the Silurian and Devonian periods. Over the centuries the valleys and hills formed into rich peatlands, which occupy approximately 28,333 hectares (70,000 acres) or 13% of the total area of the County.

3.4.4 County Kilkenny Landscape Character

The landscape of County Kilkenny consists of direct access to the sea via Belview Port on the Suir Estuary and via New Ross on the River Barrow. The county has a highly fertile central plain with uplands in the northeast, the northwest and in the south. The land is well drained by its extensive river network. The River Nore bisects the county on a north/south axis. The Rivers Barrow and Suir are natural boundaries to the east and the south of the County respectively, and their estuaries converge at the extreme south east of the county.

Details of scenic routes within each of the counties is included in Appendix E.

3.4.5 Landuses

The majority of the Suir Catchment is rural in nature consisting of mixed forest and land occupied by agriculture (pasture and arable lands) and natural vegetation. Other landuses within the area include marshes at Portlaw, Kilbarry and Coolfinn.

Urban development is evident along old fording points along the river or in low-lying areas. The various land uses within the catchment can be seen in the Corine land use map in **Figure 3-12** in Appendix A.

3.4.6 Key Landuse, Landscape and Visual amenity issues relating to Flood Risk Management

- Flood risk management options need to be in keeping with the existing landscape character, whether protected or not, and the visual amenity of the catchment;
- Flood risk management options may present opportunities to enhance the existing landscape and/or townscape and landuse; and
- Future restrictions on development within areas at risk from flooding such as undeveloped river valleys, estuaries and the coastline may help protect the landscape character of, and views within and from, these important landscapes.

3.5 Archaeology and Cultural Heritage

The Suir Catchment has a wealth of archaeology, architecture and cultural heritage. Evidence of its rich archaeological heritage is contained in the national Sites and Monuments Record (SMR), Recorded Monuments on the Records of Monuments and Places (RMP), and the Record of Protected Structures (RPS). These are presented in **Figure 3-13** in Appendix A, Designated Areas and Features of Cultural Heritage. Features include historic weirs, mills, bridges, forts, churches and castles many of which are located in close proximity to watercourses.

The main issue regarding cultural heritage is the potential for some possible flood risk management options to impact on unknown sites of cultural heritage and underwater archaeology. The ownership of land and weirs may become an issue if purchase/acquirement of these are required to carry out certain flood defence options. EIAs/EIS or AA for some options maybe required before implementation.

It should be noted that the archaeological heritage of the study area also encompasses unrecorded archaeological sites and historic landscapes in addition to the identified features. Much of the archaeological resource in the study area remains undiscovered or lies underwater in river and estuarine areas. River corridors are often archaeologically rich and are likely to result in discoveries should works be carried out within the river corridor.

3.5.1 Cultural Heritage issues relating to Flood Risk Management

- Any flood risk management structures proposed within rivers or tidal estuaries should take into consideration the potential for archaeological discoveries and the need to fulfil the requirements of the National Monuments Act 1930-2004.
- Specific impacts on individual features and further consideration of undiscovered archaeological resources will be addressed at the next stage of the study prior to or during the development of detailed projects requiring EIA.
- Potential positive affect of reducing the risk from flooding to existing cultural heritage features.
- Flood risk management measures should also ensure protection of the setting of areas of existing archaeological and architectural value e.g. ACAs, Protected Structures, National Monuments and Recorded Monuments.

3.6 Material Assets (Development and Infrastructure)

3.6.1 Introduction

The assets at risk from flooding can be varied and include domestic residence, transport and public service infrastructure, public lighting, commercial and industrial enterprises and agricultural land. Therefore the implementation of the CFRMP will have a positive impact on material assets in the catchment. The damage to property from severe flood events can cause extensive material damage. As part of the Suir CFRAM Study proactive flood risk mapping will be developed. This mapping will be based on hydraulic modelling; the flood depth, extent and velocity for a number of flood flow events will be predicted. The maps will also show the extent of damage to property, industry and infrastructure that have occurred from extreme flood events. Flood maps showing extent, depth and flows for possible future flood events based on hydraulic model outputs from the CFRMP are being developed.

3.6.2 Transport

3.6.2.1 Roads

The study area is served by the following National Primary and National Secondary Roads/routes:-

- N8: Cork - Portlaoise
- N9: Waterford – Jn N7 Lewistown
- N24: Waterford - Limerick
- N25: Rosslare Harbour – Cork
- N29: Kilmurry Jn N25 – Belview Port
- N62: Tipperary – Cashel
- N74: Thurles - Cashel
- N75: Thurles - Turnpike
- N76: Clonmel – Kilkenny

There are a large number of regional and local roads within the study area e.g. R670, R665 and R660. There are also two railway lines; the Waterford – Dublin line and the Waterford – Rosslare Harbour line.

3.6.3 Telecom and Infrastructure

RPS will consult with key telecommunication providers including Bord Gais Eireann, ESB Networks and local area engineer, once details of proposed flood relief options within the Areas of Potential Flood Risk are known.

3.6.4 Forestry

Forestry accounts for just over 10% of Ireland's land area, with an objective to expand cover to 17% over the next 30 years. Forestry cover within the Suir is approximately 10% (Forest Service, 1998). **Figure 3-14, in Appendix A** provides an overview of forestry cover within the Suir Catchment.

It is considered in some cases that forestry and its implications for runoff has contributed to flooding. The potential for forestry to contribute to flooding will be assessed in greater detail within the Environmental Report.

3.6.5 Water

There are 17 wastewater treatment plants within the Suir Catchment, most of which treat using primary and secondary measures. The majority of these WWTP discharge to rivers, however a few discharge to lakes, transitional and coastal waters. The locations of the WWTP within the catchment are shown on **Figure 3-15, in Appendix A**.

Abstractions within the catchment are taken from a mix of groundwater, lake and river sources and are used for both public and private water supplies. There are 111 known abstraction locations within the catchment and 31 water treatment works as shown on **Figure 3-15, in Appendix A**.

3.6.6 Waste

There are approximately nine open facilities with IPPC licences to discharge into the watercourses of the Suir Catchment. There are two landfill sites, the Suir Hardbog Landfill in South Tipperary and Kilbarry Landfill in County Waterford. There are 31 Section 4 sites within the Suir Catchment.

These sites may have the potential to be affected by flooding in the study area, with potential effects on water quality and the achievement of good ecological and chemical status of water bodies under the WFD. IPPC, Landfills and Section 4 sites are all depicted on **Figure 3-16 in Appendix A**.

3.6.7 Key Material Asset issues relating Flood Risk Management

- Forests can have both positive and negative impacts on the environment. Negative impacts are largely related to poor management or to planting on unsuitable soils, with many of the current water problems associated with afforestation being a legacy of old practices, which have been subsequently amended. Many of these afforested areas are located in sensitive salmon and trout spawning catchments.
- Increased development including residential and industrial expansion continues to put pressures on existing water sources and results in an increased speed and volume of run-off, potentially changing the pattern, frequency and timing of flood flows, unless adequate measures are provided to offset these measures. There is a need to ensure that Flood impact assessments are undertaken for all developments that are likely to impact river levels.
- The current flood risk to existing development and infrastructure in the floodplain needs to be managed.
- Future development on the floodplain needs to be prevented or, as a minimum, loss of floodplain compensated for elsewhere. There is a need for a production of flood risk assessments and the enforcements of conditions.
- Critical infrastructure needs to be identified and protected from flood risk.

3.7 Tourism and Recreation

The River Suir Catchment is a valued tourism and recreational resource. The resources vary from angling, kayaking, rowing, monastic sites along its banks, river valleys, planned settlements (e.g. Portlaw) and coastal estuaries. The catchment also enjoys a wide variety of landscapes, and therefore, has specific advantages in the tourism sector.

In particular, angling is a valued asset to the Suir Catchment. Together with the River Nore and the River Barrow, the river is one of the trio known as The Three Sisters which is Popular with anglers as it holds plentiful reserves of brown trout and salmon. The Suir is considered one of Europe's finest dry fly rivers for wild brown trout. For this reason, amongst others, the Suir Catchment is a valued tourism asset to the region.

The best of the salmon fishing is said to extend downstream from Ardfinnan towards Carrick-on-Suir (both of which are FRAM Priority Areas). The Suir has the distinction of having produced Ireland's record rod-caught salmon.

3.7.1 Key Tourism and Recreational issues relating to Flood Risk Management

- Existing angling and fishery resources need to be maintained, protected and enhanced, where possible.
- Existing watersports facilities need to be maintained, protected and enhanced, where possible.

- Opportunities for recreation (e.g. to improve access along river corridors and the shoreline and potential routes for footpaths and cycles routes), for tourism (e.g. developing wetlands and linear parks) and to promote sustainable leisure activities should be investigated where possible;
- Areas of floodplain used to store floodwaters could also be used for compatible public access and recreational activities when not in use; and
- Flood risk management actions could contribute to the protection of existing tourist attractions and facilities currently at risk from flooding.

3.8 Population and Human health

3.8.1 Current Population Trends

The 2006 census indicated that the main counties within the Suir Catchment namely County Waterford, North Tipperary, South Tipperary and Kilkenny had a combined population of 344,763. The population and population growth figures of the relevant districts to this study are outlined in **Table 3-7** and **Figure 2-1**, in **Appendix 1** shows the main population centres within the Catchment. Current population figures were obtained from the central statistics office and the relevant county development plans. The CFRMP will designate areas along the river as natural floodplains and recommendations will be made to the planning authorities for the prevention of building on certain sites along the Suir.

Table 3-7: Population

County	1996 Population	2002 Population	% Change 1996-2002	2006 Population	% Change 2002-2006
Waterford	52,140	56,592	9.2	62,213	9.2
Waterford City	42,540	44,594	4.8	45,748	2.6
North Tipperary	58,021	61,010	5.2	66,023	8.2
South Tipperary	75,514	79,121	4.8	83,221	5.2
Kilkenny	75,336	80,339	6.6	87,558	9.0
Limerick	113,003	121,281	7.3	131,516	8.4
Cork	293,323	324,767	10.7	361,877	11.4

Reducing the risk of flooding will improve the population's quality of life by creating a more stable environment for them to live in.

3.8.2 Future Trends

Kilkenny, South Tipperary, Waterford and Waterford City (and also Carlow and Wexford, outside the study area) forms the South East Region within the National Spatial Strategy (NSS), and as part of the implementation of NSS, the DoEHLG sets population targets for each region with the aim of achieving balanced regional development. The DoEHLG Population Targets for the South-East Region in January 2009 are presented in Table 3-8:-

Table 3-8: South East Regional Planning Guidelines Predictions

	2008	2010	2016	2022
South East	487,800	507,900	542,200	580,500- 596,500

Planning Regional Guidelines for the South East Region 2010-2022

Counties Clare, Limerick and North Tipperary, and the City of Limerick, form the Mid West Region. In January 2006, the DoEHLG published regional population targets to be used in the review of the guidelines, Table 3-9 below summarizes these targets in comparison with other work done by the Central Statistic Office (CSO) and previous regional guidelines.

Table 3-9: Mid West Regional Planning Predictions

	2008	2010	2016	2021 Low	2021 High
DOEHLG Jan 09	371,900	383,800	427,200	462,300	475,000
CSO Dec 08	371,900	(389,000)	416,000	394,000	439,000
CSO Dec 08 (No Ext Migration)	371,900	373,000	386,000	394,000	403,000
Current Mid-West Guidelines	371,900	-	-	375,000	400,000
Previous DOEHLG Advice (06)	371,900	-	-	424,552	444,975

Regional Planning Guidelines Review 2010-2022, Feb 2009 (Mid West Regional Authority)

3.8.3 Human Health

The major hospitals located within the catchment are Waterford Regional Hospital, South Tipperary General Hospital Clonmel, Our Lady's Hospital Cashel and St Lukes Hospital Kilkenny. Other health care services within the catchment include nursing homes and health centres. These are numerous and well dispersed throughout the catchment, many of which are located in low-lying areas.

3.8.4 Key Issues Relating to Population and Human Health

There are numerous negative effects to population and human health associated with flooding. The depth and velocity of flood waters pose dangers to people who are forced to wade through them. They may hide other hazards for wading pedestrians, such as manhole openings where covers have been lifted by flood waters and floating debris (Lancaster *et al.*, 2004). Vehicles can be washed away which increases the potential for fatalities. The potential impacts from flooding have been outlined by Lancaster *et al.* (2004) under the headings of Direct Impacts and Indirect Impacts as follows:-

Flooding also poses a threat to drinking water supplies (See Section 3.3.12 above).

Direct Impacts

- Climate Change and urbanisation;
- Drowning, injuries and falls resulting from direct exposure to deep and/or flowing flood waters, lack of adequate warning and fast flowing water carrying debris.

- Respiratory disease, shock hypothermia and cardiac arrest may occur as a result of flooding.
- Contact with polluted waters (including inadequately treated waste water) and damp conditions can lead to wound infections, dermatitis, conjunctivitis, gastrointestinal illness, ear/nose/throat infections and the possibility of serious waterborne diseases.
- There could be contamination to water supply from combined sewer overflows. A disruption to services such as electricity, gas, public lighting and water could occur.
- Physical and emotional stress can occur due to loss of property, evacuation and disturbances as a result of injury.
- A growing population will potentially increase the numbers of people at risk from flooding.
- Need to maintain adequate quality and quantity of drinking water.
- There is potential to impact the three bathing waters within the area and there is therefore a need to protect the status of these waters (See Section 3.3.12 above).

Indirect Impacts

- Actions taken to manage flood risk may have impacts on both individuals and communities (disturbance during construction works).
- Changing trends in water use within the study area is leading to an increased demand for wastewater treatment and drinking water. As the availability of a drinking water supply is crucial for public health, future changes in flood-risk should ensure that there are no impacts on sources of drinking water for the local community.
- Possibility of waterborne infection as a result of damage to water supply and sewage systems.
- Access to healthcare services, evacuation plans and other emergency services (fire ambulance, communications, power etc) needs to be maintained during flood events.

3.9 Air/Climatic Factors

The Air Framework Directive deals with each Member State in terms of Zones and Agglomerations. For Ireland, four zones, A, B, C and D are defined in the Air Quality Regulations. The main areas defined in each zone are: Zone A: Dublin Conurbation, Zone B: Cork Conurbation, Zone C: Other Cities and Large Towns (comprising Galway, Limerick, Waterford, Clonmel, Kilkenny, Sligo, Drogheda, Wexford, Athlone, Ennis, Bray, Naas, Carlow, Tralee, Dundalk, Navan, Letterkenny, Celbridge, Newbridge, Mullingar and Balbriggan.) and Zone D: Rural Ireland, i.e. the remainder of the State excluding Zones A, B and C. The Suir Catchment is situated within Zone C (Waterford City) and Zone D (the remainder of the Catchment including monitoring stations at Clonmel and Kilkenny). Table 3-10 below provides an overview of air quality for Waterford City.

There are four EPA Air Monitoring Stations within the Suir Catchment at the following locations:-

- Zone C-Waterford City at the Mall on Bolton Street;
- Zone D- Clonmel;
- Zone D- Kilkenny at Fire Station on Gaol Road; and
- Zone D- Kilkenny at Butts Green.

Current air quality monitoring results at these stations indicate that air quality is “Very Good” for Waterford City, Kilkenny and Clonmel (EPA, 2010).

Table 3-10: Air Quality within Zone C – 2007 (EPA, Air Quality in Ireland 2008)

Annual Mean	SO ₂	Lead	NO ₂
Waterford Zone C (Annual Mean)	5ug/m ³	0.01ug/m ³	22ug/m ³

(EPA, Air Quality in Ireland 2008)

Air quality will not be directly influenced or be affected by the recommendations of this Suir CFRAMS. Specific issues will be considered as part of the environmental assessment of any detailed projects arising from the CFRMP.

Future changes in climate and associated impacts on river flows and tide levels are likely to change the frequency, extent, distribution and pattern of flooding in the future. The Suir CFRAMS will estimate these changes, using best available research data and policy guidance, to determine the likely influence of future climate changes on flood risk in the Suir Catchment. The proposed strategies will consider climate change however, the implementation of these will not impact on climate directly and therefore climate will not be investigated further.

3.9.1 Key Issues Relating to Air and Climate

- Air quality within the study area is considered Poor within the vicinity of the Suir Catchment.
- Best available climate change predictions will be used to quantify potential changes in the short to long term and identify future impacts on flood risk.
- There is a recognized need to retain flexibility and adaptability within proposed CFRMP to adapt to unforeseen climate changes (in terms of temperature, storm surges, floods and droughts) and associated impacts including changes in sea level rise predictions.
- Ensure the Plan takes into account the policies and objectives of the European Commission White Paper on Adapting to Climate Change: Towards a European Framework for Action, Climate Change and Water, Coasts and Marine (SEC (2009) Issues and the National Climate Change Strategy 2007-2012.

3.10 Soil, Geology and Lanuse

3.10.1 Bedrock Geology

The dominant geology type for the catchment is Carboniferous limestone and Old Red Sandstone, with lesser areas of Silurian quartzite, rhyolites, shales and slate. The purer limestone formations contain areas that are karstified which are particularly evident in parts of the catchment south of Cashel. This type of geology is characterised by swallow holes, sinking streams and caves, with the result that the base flows can disappear completely in dry conditions for long stretches of the channel. Particularly good examples of this are evident in parts of the Moyle, Clashawley and Thonoge rivers. The bedrock geology of the catchment is seen in **Figure 3-17** in Appendix A.

3.10.2 Soils

From the EPA's ENVision website soil type can generally be described as comprising grey brown podzolics in the central Suir plain and acid brown earths from Clonmel to Waterford Harbour. While significant peat cover is found to the northwest, northeast, south and mountainous areas, with some brown podzolics changing to gleys also present (**See Figure 3-18** Subsoils, in Appendix A).

3.10.3 Aquifer Potential

Figure 3-19 in Appendix A depicts the aquifer potential within the Suir Catchment. The aquifer potential within the study area varies throughout the catchment. The aquifer potential in the vicinity of Waterford City is considered to be a Regionally Important Fissured aquifer, areas around Clonmel, Tipperary and Thurles comprise a Regionally Important Aquifer Karstified, while the remainder of the study area is largely underlain by a Locally Important Aquifer- bedrock which is moderately productive in local zones only.

3.10.4 Key Issues Relating to Geology, Soils and Land Use

- Maintaining a significant area of land as pasture within the study area will be beneficial for managing run-off. The drainage of land for agriculture can influence runoff either directly by creating/widening drainage ditches or indirectly by reducing surface water infiltration.
- There may be opportunities for wetland habitat creation (and associated flood risk management benefits) on agricultural land, though any opportunities should be balanced with the potential loss of high grade agricultural land.
- Flooding of contaminated sites and potentially, landfills, present a pollution risk to adjacent watercourses with associated impacts on human health, water quality and ecology.
- Pluvial and groundwater flooding.

3.11 Gaps in Baseline Data

At this stage it is difficult to ascertain if gaps in the baseline data exist as data gathering is an ongoing process. If gaps in baseline data arise during the environmental assessment stage short, medium and long term priorities will assigned to the relevant gaps.

It is noted at this stage that an inventory of wetlands within the study area would be of benefit and is assigned medium priority for the purposes of this assessment.

It should be noted at this stage that given the timeframe for this project (2009-2012) some baseline data reported in this Scoping Report will be out of date during the next stages. The Environmental Report will update any changes to baseline data to reflect the most current existing environment.

3.12 Inter-Relationships

In accordance with the SEA directive, the inter-relationship between the SEA environmental factors must be taken into account. **Table 3-11** highlights the inter-relationships between the SEA topics. The inter-relationships will be further analysed during the environmental appraisal of the various flood risk options.

Table 3-11: Potential Inter-Relationships Between SEA Aspects

Biodiversity, Flora & Fauna								
Population & Human Health	√							
Soils/ Geology	√	√						
Water	√	√	√					
Air & Climatic	X	X	X	X				
Material Assets	√	√	√	√	X			
Cultural Heritage	√	√	√	√	X	√		
Landscape	√	√	√	√	X	√	√	
	Biodiversity, Flora and Fauna	Population and Human Health	Soils/ Geology	Water	Air and Climatic Factors	Material Assets	Cultural Heritage	Landscape

√ = interrelationship Anticipated X = no interrelationship anticipated

3.13 Conclusion/ Scoping In/Out of SEA Issues

At this stage it was possible to scope out air and noise as SEA issues as there will not be any likely significant environmental effects on these issues from the implementation of the possible key recommendations of the plan. The draft scoping report has considered whether the environmental effects (positive and negative) are likely to be significant. A summary of the conclusions are given in **Table 3-12** below.

Table 3-12: Scoping of SEA Issues

SEA Issues	Scoped In	Scoped Out	If Scoped Out Why	Summary of Potential Issue
Biodiversity, Flora, Fauna (including Fisheries)	Yes			<p>Need to protect and improve the conservation status of designated sites and habitats and species of conservation concern.</p> <p>Avoid disturbance to locally important habitats, species and ecological process.</p> <p>Protect ecological corridors.</p> <p>Protect existing fishery resources.</p> <p>Identify opportunities for improvements to fishing and angling.</p> <p>Avoid the creation of instream barriers to fish migration.</p>
Water	Yes			<p>Meet the objectives of the Water Framework Directive.</p> <p>Ensure flood risk management options do not affect licensed discharges and abstractions, including drinking water.</p>
Land Use, Landscape and Visual	Yes			<p>Avoid adverse impacts to visual amenity, landscape character and designated landscape.</p> <p>Seek opportunities for landscape enhancement.</p>
Material Assets	Yes			<p>Manage flood risk to/from existing and future development and infrastructure.</p>
Population and Human Health	Yes			<p>Reduce flood risk to people and property.</p> <p>Reduce potential impacts to water quality from run-off during floods.</p>

SEA Issues	Scoped In	Scoped Out	If Scoped Out Why	Summary of Potential Issue
Air and Noise		Yes	Recommendations of the Suir CFRAMS unlikely to have any direct impact on these.	
Soils and Geology	Yes			Beware of types of landuse and management which will influence flood risk. Explore opportunities for habitat creation.
Climate	Yes			Retain flexibility within proposed CFRAMS to adapt to unforeseen climate change.
Tourism and Recreation	Yes			Manage flood risk to recreational, tourist and amenity facilities and identify opportunities for improvement.
Cultural Heritage	Yes			Identify and manage flood risk to and impacts on known and unrecorded archaeological features. Explore opportunities for enhancement of the catchment's cultural heritage.