RPS

RBC Scientific Basis for Raised Bog Conservation in Ireland

Raised Bog Conservation Study

National Raised Bog SAC Management Plan
Strategic Environmental Assessment Environmental Report

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1 NON-TECHNICAL SUMMARY

1.1 INTRODUCTION (CHAPTER 2)

This Environmental Report has been prepared in accordance with national and EU legislation as part of the Strategic Environmental Assessment (SEA) of the proposed National Raised Bog SAC Management Plan for sites designated for protection under the EU Habitats Directive (92/43/EEC), which include:

Killyconny Bog (Cloghbally)	Clara Bog	Ballyduff/Clonfinane Bog	Coolrain Bog
Barroughter Bog	Ferbane Bog	Kilcarren-Firville Bog	Knockacoller Bog
Cloonmoylan Bog	Mongan Bog	Garriskil Bog	Carn Park Bog
Kilsallagh Bog	Moyclare Bog	Carrownagappul Bog	Crosswood Bog
Lisnageeragh Bog and Ballinstack Turlough	Raheenmore Bog	Lough Forbes Complex	Drumalough Bog
Lough Lurgeen Bog/ Glenamaddy Turlough	Sharavogue Bog	Corliskea/Trien/Cloonfelliv Bog	Ballynamona Bog and Corkip Lough
Shankill West Bog	Bellanagare Bog	Lough Corrib	Moneybeg and Clareisland Bogs
Sheheree (Ardagh) Bog	Carrowbehy/Caher Bog	Lough Ree	Ardagullion Bog
Ballynafagh Bog	Cloonchambers Bog	Callow Bog	Mount Hevey Bog
Flughany Bog	Derrinea Bog	River Moy	Tullaher Lough and Bog
All Saints Bog and Esker	Cloonshanville Bog	Mouds Bog	Brown Bog
Camderry Bog	Clooneen Bog	Corbo Bog	Curraghlehanagh Bog
Moanveanlagh Bog	Monivea Bog	Redwood Bog	Tullaghanrock Bog
Ardgraigue Bog			

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

1.2 DESCRIPTION OF THE PLAN (CHAPTER 3)

Ireland has nominated 53 sites as Raised Bog Special Areas of Conservation (SAC) under the EU Habitats Directive and therefore is required under the directive to put in place measures to protect these sites from deterioration. The EU Habitats Directive and the EU Birds Directive form the cornerstone of Europe's nature conservation policy. Together they give effect to the Natura 2000 network of protected sites and a strict system of species protection. The essential aim of both directives is to maintain, and where necessary restore, the favourable conservation status of natural habitats and species, thereby contributing to sustainable development and promoting the maintenance of Europe's biodiversity.

The ecological and eco-hydrological investigations have identified an overall decline in Active Raised Bog and High Bog areas within the national Raised Bog network in Ireland as summarised in **Table 1.1.** A significantly greater loss in the area of active raised bog has occurred relative to losses in High Bog. This is because the activities associated with the loss of High Bog such as turf cutting and associated drainage, has caused significant changes to the hydrological regime resulting in a lowering of the water table and causing large areas of the High Bog to dry out for long periods of time. Consequently, there has been a loss of the water dependent ecosystems present on the High Bog, the most important habitat being active raised bog.

Table 1.1: Summary of Raised Bog Status Changes

Bog Habitat	Resource	1994	2012	Change
		(ha)	(ha)	(ha)
Active Raised Bog (ARB)	**SAC network**	**1,940[A]**	**1,210**	**-730**
	NHA network	490[B]	284	-206
	Non Designated Sites	200	145	-55
	National Resource	**2,630**	**1,639**	**-991**
Degraded Raised Bog (DRB)	SAC network	650[C]	1,200	+550
	NHA network	520[D]	410	-110
	Non Designated Sites	625	520	-105
	National Resource	**1,795**	**2,130**	**+335**
High Bog	SAC network	10,740	10,515	-225
	NHA network	7,790	7,480	-310

Raised bogs are wetland ecosystems and so the main threats to their welfare arise from any actions that drain water from the bog and dry them out. The main threats include:

- Drainage of raised bog habitat or surrounding wetland habitats;
- Peat harvesting and turf cutting;
- Planting of commercial forestry;
- Burning; and
- Other damaging activities such as water abstraction from groundwater and quarrying which can have a significant impact on the raised bogs by lowering the regional groundwater level.

The national plan addresses the key pressures identified for SAC designated raised bog through the application of selected measures from a national measures toolkit to a programme of measures forming a strategy nationally for our raised bogs. It also sets the national conservation objective for raised bogs as: *To restore the favourable conservation status of active raised bog in Ireland.*

1.3 METHODOLOGY (CHAPTER 4)

The Environmental Report contains the findings of the assessment of the likely significant effects on the environment resulting from implementation of the National Raised Bog SAC Management Plan. It reflects the requirements of the SEA Directive (2001/42/EC) on the assessment of the effects of certain plans and programmes on the environment and also the transposed regulations in Ireland (S.I. 435/2004) as amended.

Integration of the SEA and draft National Raised Bog SAC Management Plan was achieved through close involvement of relevant team members in all stages of the project, including SEA scoping, review of the existing environment and public consultation. The study team for the National Raised Bog SAC Management Plan and associated SEA comprises RPS, an environmental and engineering consultancy, working with NPWS. It is noted that the National Raised Bog SAC Management Plan is informed by a wider project called the Scientific Basis for Raised Bog Conservation in Ireland Study. A Steering Group made up of representatives from the Department of Arts, Heritage and the Gaeltacht, Bord na Móna, the Irish Farmers Association, An Taisce, the Irish Peatlands Conservation Council, and peatlands experts from Trinity College Dublin and University College Dublin has met in relation to this wider project and also the SEA of the National Raised Bog SAC Management Plan.

1.3.1 Scoping the Relevant Environmental Aspects

The objective of scoping is to identify key issues of concern that should be addressed in the environmental assessment of the National Raised Bog SAC Management Plan so that they can be considered in appropriate detail. Scoping also helps determine the boundaries of the assessment in terms of geographical extent and the time horizon for the assessment.

Consultation was carried out with the statutory consultees (Department of Communications, Energy and Natural Resources, Department of Environment, Community and Local Government, Environmental Protection Agency, Department of Arts, Heritage and Gaeltacht, and Department of Agriculture, Marine and Food) and with the public and other stakeholders. Taking into consideration feedback from consultees, a broad assessment of the potential for the National Raised Bog SAC Management Plan to influence the environment was carried out. All of the environmental topics listed in the SEA Directive have been scoped in for the assessment of the draft National Raised Bog SAC Management Plan with the exception of air quality as the main air quality issue is likely to be generation of dust which is a more localised issue. The greater national level impact relates to impacts in relation to climate and consequently this aspect was scoped in. The environmental topics scoped in are: Biodiversity, Flora and Fauna; Population; Human Health; Climatic Factors; Soils; Material Assets; Water; Cultural, Architectural and Archaeological Heritage; and Landscape.

The National Raised Bog SAC Management Plan considered in this SEA addresses issues at a national level; therefore, the baseline data and assessment is focused at the national level. It is recognised that site specific management plans will be completed for each SAC in due course and more focussed baseline and assessment will be compiled at that stage. The National Raised Bog SAC Management Plan will cover the period from 2013 up to 2020. In line with the SEA Directive, medium and long-term impacts have been considered during the assessment. However, it was considered that short-term assessment would not be very constructive as implementation of the National Raised Bog SAC Management Plan will take time to show effect. Some consideration has been given to construction related impacts however.

Based on the requirements of the legislation and guidance, the following information in **Table 1.2** is provided in the Environmental Report.

Table 1.2: Information contained in the Environmental Report.

Requirement of SEA Directive (Article 5(1), Annex 1)	Section of Environmental Report
An outline of the contents and main objectives of the plan or programme, or modification to a plan or programme, and relationship with other relevant plans or programmes;	Chapter 3: Description of the Plan and Chapter 5 Other Plans and Programmes
The relevant aspects of the current state of the environment and the likely evolution thereof without implementation of the plan or programme, or modification to a plan or programme,	Chapter 6: Baseline Environment
The environmental characteristics of areas likely to be significantly affected	Chapter 6: Baseline

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

1.4 REVIEW OF RELEVANT PLANS, POLICIES AND PROGRAMMES (CHAPTER 5)

A review of plans, policies and programmes relevant to the National Raised Bog SAC Management Plan was carried out. The review focussed primarily on National, European and International plans and programmes. In reviewing other plans, the following questions were asked:

- Does the National Raised Bog SAC Management Plan contribute to the fulfilment of objectives and goals set out in other plans, policies and programmes?
- To what degree are the goals and objectives set in other plans, policies and programmes impacted by the National Raised Bog SAC Management Plan?

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

- The Birds and Habitats Directives,
- Water Framework Directive (WFD) and associated River Basin Management Plans;
- The EU Habitats and Birds Directives and the EU and National Biodiversity Strategies;
- The Floods Directive and associated Catchment Flood Risk Assessment and Management Studies

1.5 THE BASELINE ENVIRONMENT (CHAPTER 6)

As this SEA deals with the National Raised Bog SAC Management Plan for designated raised bog SAC, the baseline data is focussed at the national level.

Issue Area	Existing Environmental Pressures
Flora, Fauna and Biodiversity	*Raised bogs are protected under the EU Habitats Directive (92/43/EEC), and their conservation status is of significant concern, with less than 1% of active raised bog remaining in Ireland. Drainage, turf cutting, forestry and agricultural reclamation are the main causes of deterioration. These activities can compromise the hydrological integrity of a raised bog, leading to changes in the structure of the bog, resulting in the loss of unique raised bog ecology.*
Population and Human Health	*Over the past decade the population has been increasing in each of the counties in which raised bog SACs occur. This has put pressure on land use and intensification, particularly in relation to agriculture and associated activities. This has led to pressures on raised bogs through reclamation and use for forestry etc. this in turn has impacted on the bogs.* *Increasing population levels also has placed significant pressure on water quality and water supply. Raised bogs can contribute to maintaining good water quality by filtering contaminants, and can also help control the flow of water within a catchment, mitigating flooding downstream. However, agricultural activities and cutting of the bogs surface can lead to changes in the hydrological regime of bogs, increasing sediment and nutrient load to rivers, and having a negative impact on the raised bog itself. Raised bogs are a potential resource for eco-tourism and recreational activities, and can serve as an educational resource.*
Water	*Surface and groundwater quality is under pressure from activities such as agriculture, municipal discharges, waste from unsewered properties and physical modification, for example through drainage, and flooding events. Intact raised bogs can help to filter*

Issue Area	Existing Environmental Pressures
	contaminants, and therefore help achieve good water quality status, and help control the flow of water within a catchment.
Climate	*The key drivers of greenhouse gas emissions in Ireland relate to agriculture, energy industries, transport sector and the industrial / commercial sector. The drainage or cutting of bogs releases carbon dioxide into the atmosphere, while active raised bog acts as a carbon store and plays an important function in carbon sequestration. With restoration and conservation, bogs have the potential to contribute to Ireland's national target to reduce greenhouse gas emissions.*
Cultural Heritage	*Development resulting from economic growth and increasing population is placing pressure on sites or features of archaeological, architectural or cultural heritage interest. Bogs in Ireland are a particularly important to the historical record in terms of artefacts of human origin and our knowledge of the past in Ireland. Damage to bogs can result in disturbance of archaeological material preserved in the bog, resulting in impacts on the overall cultural heritage resource.*
Landscape	*Peatland landscape is a unique feature of the Irish landscape. The gradual altering of peatland habitats may have a cumulative effect on the national landscape.*
Material Assets	*Increased development, forestry and intensification of agriculture continue to put pressure on habitats such as raised bogs. Turf cutting and more intensive peat extraction has also put significant pressure on these habitats. Industrial turf cutting and the individual right to cut turf remains a highly sensitive issue.*
Soils and Geology	*Soil is removed by the action of cutting turf for use as a source of fuel. Turf cutting can also result in subsidence, sediment loss and collapse and failure of the peat bank as it dries out. The use of heavy machinery on bogs, for example for forestry use or industrial cutting of peat can cause compaction of soil.* *Eroded soil washed into rivers during heavy rainfall contains an increased nutrient content, which can damage the balance of nutrient poor, aquatic ecosystems by shifting their species composition, supporting more nutrient-loving species. This can lead to eutrophication of rivers and lakes. If contaminated soils are eroded and transported to sea, aquatic plants and animals can be severely damaged.*

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

Objective 1 BFF	**Y**								
Objective 2 BFF	**Y**	**Y**							
Objective 3 PHH	**Y**	**Y**	**Y**						
Objective 4 S	**Y**	**Y**	**Y**	**Y**					
Objective 5W	**Y**	**Y**	**Y**	**Y**					
Objective 6 CF	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**			
Objective 7 MA	**Y/N**	**Y/N**	**Y**	**Y**	**Y**	**Y/N**	**Y**		
Objective 8 CH	**Y/N**	**Y/N**	**Y**	**Y**	**Y**	**Y/N**	**Y/N**	**Y**	
Objective 9 L	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**
	Objective 1 BFF	**Objective 2 BFF**	**Objective 3 PHH**	**Objective 4 S**	**Objective 5 W**	**Objective 6 CF**	**Objective 7 MA**	**Objective 8 CH**	**Objective 9 BFF**
Y = Yes, compatible N = No, not compatible Y/N = May be compatible depending on how it is implemented									

Figure 1.1: Inter-relationship of SEA Topics

The National Raised Bog SAC Management Plan is aimed at protecting the raised bog resource in order to meet Ireland's obligations under the EU Habitats Directive. In the absence of the National Raised Bog SAC Management Plan the pressures identified above, e.g. drainage, forestry, peat harvesting, would continue to impact on these habitats, perpetuating the direct and indirect impacts associated with these threats.

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

There are essentially three types of Objectives considered as part of this SEA. The first relates to the Objectives of the European Communities Environmental Objectives, the second relates to wider Environmental Objectives, i.e. environmental protection objectives at a national, European and international level and finally there are the Strategic Environmental Objectives, which were devised to test the effects of the National Raised Bog SAC Management Plan on the wider environment

The **Strategic Environmental Objectives** reflect the existing environmental issues relevant to implementation of the Plan. They are focussed on protecting and enhancing the natural and human environment and on minimising negative effects. The objectives were developed to be consistent with the environmental protection objectives established by international, European and national environmental policies, objectives and standards. The selected objectives for this SEA are listed below:

BFF: Objective 1:	To restore the favourable conservation status of active raised bog in Ireland
BFF: Objective 2:	To preserve, protect and maintain the terrestrial, aquatic and soil biodiversity, particularly EU designated sites and protected species.
PHH :Objective 3:	To provide ecosystem services for communities and contribute to sustainable management of the natural resource
S: Objective 4:	Avoid damage to the function and quality of the soil resource.
W: Objective 5:	Ensure that the status of water bodies is protected, maintained and improved.
CF: Objective 6:	Minimise contribution to climate change by reducing emissions of greenhouse gasses associated with Plan implementation
MA: Objective 7:	Support economic activities such as eco-tourism without conflicting with the objectives of the Habitats Directive.
CH: Objective 8:	Protect and maintain cultural heritage resources.
L: Objective 9:	Protect and maintain the national landscape character.

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

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

1.7 ALTERNATIVES (CHAPTER 8)

The National Raised Bog SAC Management Plan includes measures aimed at achieving the conservation objectives set at a national level in accordance with the requirements of the EU Habitats Directive. The measures currently under consideration represent a range of options to address the identified pressures.

Two levels of assessment have been undertaken. The first is on a national toolkit of measures sourced from protection, restoration and relocation options. The second assessment focuses on a programme of measures representing a national strategy to achieve the conservation objective and targets identified for raised bog SAC in Ireland. A do nothing scenario was not assessed however a "do minimum" scenario was considered. This looked at the impacts of only implementing protection measures with no corresponding restoration or compensation.

1.8 ASSESSMENT (CHAPTER 9)

The following scenarios have been assessed in this SEA:

- National Toolkit of Measures
- Individual Programme of Measures
- Business as Usual

The approach used for assessing the alternatives under consideration for the draft Plan is an objectives led assessment in line with the national strategic nature of the plan. Site specific plans will be developed for the 53 raised bogs in due course. To assess the national toolbox of measures, a detailed high-level objectives led assessment was carried out, which was primarily qualitative in nature, with some assessment based on expert judgement. This qualitative assessment compares the likely impacts of each measure against the strategic environmental objectives to see if the alternative meets the strategic environmental objectives or if it contradicts these. A further assessment is then provided for the programme of measures. This assessment is focussed on the proposed national strategy to address the key pressures identified and to achieve the conservation objective and targets set for raised bog SAC in Ireland. A business as usual scenario is also assessed.

1.9 MITIGATION AND MONITORING (CHAPTER 10)

Article 10 of the SEA Directive requires that monitoring be carried out in order to identify at an early stage any unforeseen adverse effects due to implementation of the National Raised Bog SAC Management Plan, with the view to taking remedial action where adverse effects are identified through monitoring. Monitoring will focus on aspects of the environment that are likely to be significantly impacted by the National Raised Bog SAC Management Plan. Where possible,

indicators have been chosen based on the availability of the necessary information and the degree to which the data will allow the target to be linked directly with the implementation of the National Raised Bog SAC Management Plan.

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

A total of 21 mitigation measures are recommended, including a number of measures identified during the Habitats Directive Assessment, all of which are required.

1.10 NEXT STEPS (CHAPTER 11)

There is still some important work to complete before the National Raised Bog SAC Management Plan can be adopted. This will include recording, assessing and, where appropriate, taking on board comments received during consultations on the draft National Raised Bog SAC Management Plan and SEA Environmental Report. The next step in the SEA and National Raised Bog SAC Management Plan process will be a consultation period extending to April 2014. During this time comment on the findings of the Environmental Report, the Habitats Directive Assessment and the content of the draft National Raised Bog SAC Management Plan may be submitted for consideration. See **Chapter 11** of the main report for information on when the consultation period closes and contact details where written submissions can be sent.

1.11 KEY FINDINGS AND RECOMMENDATIONS

The measures assessed from the National Raised Bog SAC Management Plan are primarily directed at (1) reducing pressures at source, to ensure cessation of damaging activates and (2) restoration and / or provision of compensatory habitat to address losses to the resource since the 53 bogs were designated.

It is anticipated that the implementation of the National Raised Bog SAC Management Plan will result in improvement in the status of raised bogs in Ireland generally and in the raised bog SAC resource specifically leading to positive impacts to biodiversity, flora and fauna as well as water, soils and landscape. Negative impacts will be experienced in relation to material assets due to restrictions / prevention of activities such as turf cutting, peat extraction, forestry etc on these SAC sites in the immediate future. The requirement for education and awareness among all stakeholders using the raised bog resource will be required. Negative impacts are also likely in relation to cultural heritage,

specifically loss of traditional practices such as turf cutting. This is addressed through a compensatory scheme which includes the option for relocation or turf cutting rights or financial compensation. Where feasible, mitigation measures have been proposed in Chapter 9 of the main report.

2 INTRODUCTION

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

The development of the draft Plan is being informed by the Scientific Basis for Raised Bog Conservation in Ireland Study, which is being undertaken by RPS Consulting Engineers in association with key experts on behalf of the National Parks and Wildlife Service (NPWS) as part of the Department of Arts, Heritage and the Gaeltacht (DAHG). Further information on the study can be found at www.raisedbogconservation.com. The National Raised Bog SAC Management Plan will support the aims of the National Peatlands Strategy which is a separate strategy document.

2.1 BACKGROUND

Ireland has nominated 53 sites as Raised Bog Special Areas of Conservation (SAC) under the EU Habitats Directive and therefore is required under the directive to put in place measures to protect these sites from deterioration. The EU Habitats Directive and the EU Birds Directive form the cornerstone of Europe's nature conservation policy. Together they give effect to the Natura 2000 network of protected sites and a strict system of species protection.

The EU introduced the Birds Directive in 1979 and the Habitats Directive in 1992. The Birds Directive was anticipated by national legislation in the form of the Wildlife Act (1976) and its provisions which covered many of the requirements of the Birds Directive. The Habitats Directive was initially transposed into Irish law in 1997 by the European Communities (Natural Habitats) Regulations, 1997 (S.I. No. 94 of 1997) with later amendment regulations (S.I. No. 233 of 1998; S.I. No. 378 of 2005). Article 7 of the Habitats Directive makes the provisions of Article 6(3) and 6(4) applicable to SPAs.

The essential aim of both directives is to maintain, and where necessary restore, the favourable conservation status of natural habitats and species, thereby contributing to sustainable development and promoting the maintenance of Europe's biodiversity. For habitats listed in the Habitats Directive, Article 1 of the Directive provides a definition of favourable conservation status as follows:

> "*The **conservation status** of a natural habitat will be taken as "**favourable**" when: its natural **range** and **areas** it covers within that range, is **stable or increasing**, and the specific **structure and functions** which are necessary for its long-term maintenance **exist** and are **likely to continue to exist** for the foreseeable future.*

Special Areas of Conservation (SACs) are selected to protect habitats and species that are rare and threatened at a European scale. The EU Habitats Directive lists certain habitats (listed in Annex I) and species (listed in Annex II) that must be conserved by designating and appropriately managing SACs. Habitats and species on these lists that are considered to be particularly endangered are called "priority" habitats and species. There are 59 habitats listed in Annex I in Ireland, including raised bogs, blanket bogs, turloughs, sand dunes, limestone pavement, heaths, orchid-rich grassland, estuaries and reefs. Annex II species found in Ireland include salmon, otter, freshwater pearl mussel, Killarney fern and bottlenose dolphin. Each SAC is designated for one or more Annex I habitats and/or Annex II species. 429 SACs have been nominated for designation throughout the State. The Natura 2000 network was introduced by the Habitats Directive. It comprises the network of SACs and SPAs (Special Protection Areas for birds) throughout the EU.

SPAs are sites that have been selected and notified for the conservation and protection of bird species listed on Annex I of the Birds Directive and regularly occurring migratory species, and their habitats, particularly wetlands. Annex I birds are those that require special conservation measures because they are rare, in danger of extinction, or vulnerable to habitat changes in the EU. Ireland supports populations of 33 Annex I bird species. The SPA network includes important seabird colonies, wintering waterfowl sites, and sites supporting rare species (e.g. the corncrake).

As noted above, Ireland has designated 53 sites as SAC for raised bog habitat. For these habitats, conservation objectives are being set at different scales; however, they all follow the same principles of using attributes and targets by which favourable status can be evaluated.

2.2 RAISED BOGS IN IRELAND

Raised bogs are wetland ecosystems formed by accumulations of deep peat that originated in shallow lake basins or topographic depressions at the end of the last glaciation, 10,000 years ago. The water-logging that occurs in these areas provides anaerobic conditions that slow down the decomposition of plant material that in turn lead to an accumulation of peat. During development of raised bogs, the vegetation initially grows upward until it eventually loses contact with the groundwater beneath so that the bog wetland receives water only from rain.

The name raised bog is derived from the elevated surface that develops as raised bogs grow upwards creating a slight dome-shaped surface above that of its surrounding. The bog dome or high bog is primarily rainwater fed and isolated from the local groundwater table. The surface of a relatively intact raised bog is typically wet, acid and deficient in plant nutrients (as bogs receive most of nutrients through rainfall), and supports specialised plant communities that are low in overall diversity. One of the most common plant components is *Sphagnum* moss, although many other species can contribute. Grasses and sedges are abundant in damp places while small shrubs in the heather family grow in drier areas.

Today, raised bogs are found mainly in central Ireland, chiefly in the Shannon basin with some, generally smaller bogs extending into Ulster and Munster. The distribution and range of active and degraded raised bog in Ireland is recorded by NPWS and is illustrated in **Figure 2.1**. While turf-cutting has been carried out for centuries, the loss of raised bogs in Ireland escalated during the 20th century, with the removal of peat on a commercial scale for the production of fuel and horticultural peat. As a result, only about 16% of Ireland's former area of raised bog habitat remains today. The impact on the area of active bog has been more severe, with less than 1% of the original area now remaining.

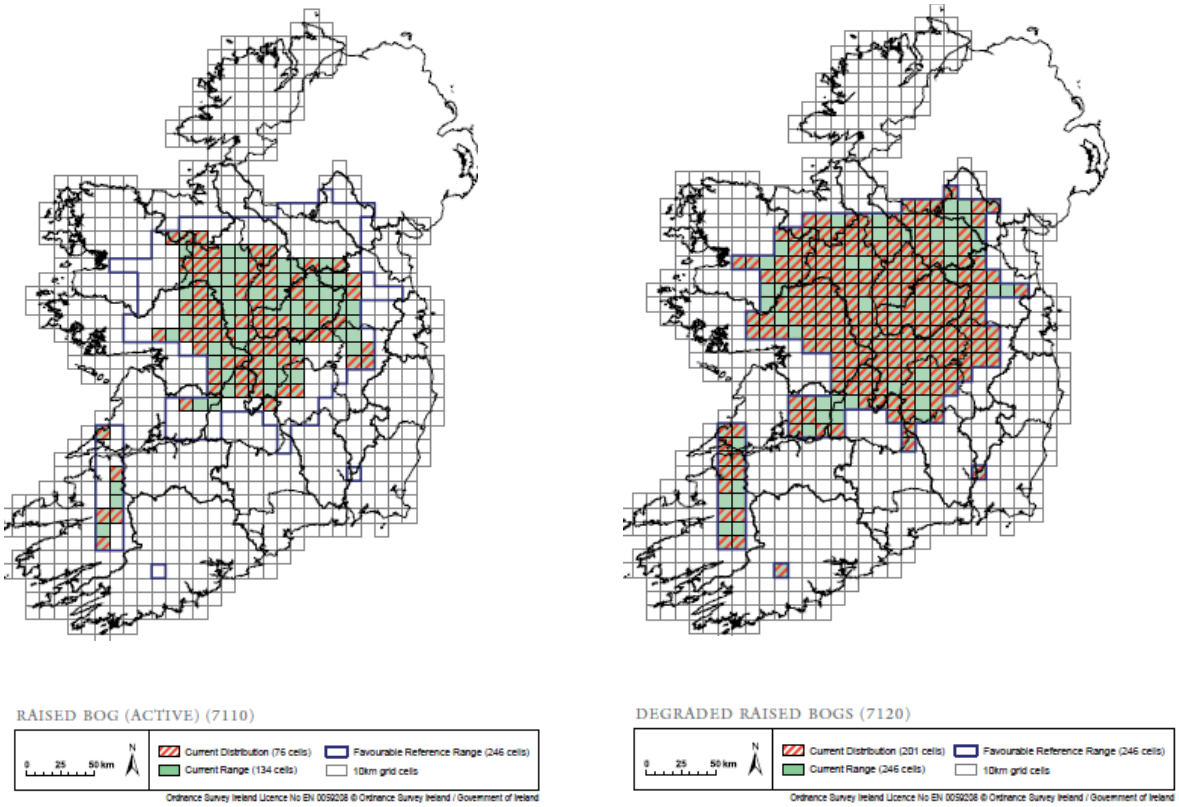


Figure 2.1: Distribution of Active and Degraded Raised bog in Ireland (NPWS)

2.3 ANATOMY OF RAISED BOG

At its simplest level, active raised bogs consist of two hydrological layers; an upper and thin layer, known as the acrotelm and a lower thicker layer known as the catotelm. The upper layer is usually less than 50cm deep and consists of the living stems of *Sphagnum* mosses, recently dead plant material and water. This acrotelm layer has high permeability to water (allows water to pass through it easily) close to the ground surface but becomes more impermeable with depth as the peat becomes more consolidated and decomposed. Under normal circumstances the water table in a raised bog is very stable and is usually within a few centimetres of the surface of the bog all the year round. Water

movement through this layer means that oxygen is present and thus the acrotelm is the "living layer" of a bog and it is critical to the normal development and functioning of a raised bog.

Below this acrotelm layer is the very much thicker bulk of peat, known as the catotelm, where individual plant stems have collapsed under the weight of *Sphagnum* mosses above them to produce a dark brown-coloured peat formed by the mass of dead *Sphagnum* fragments. By contrast with the acrotelm, catotelm peat is well consolidated and water cannot pass through this layer very easily it is permanently saturated with water. This is where most of the rain water is stored within the bog structure. **Figure 2.2** shows the typical structure of a raised bog.

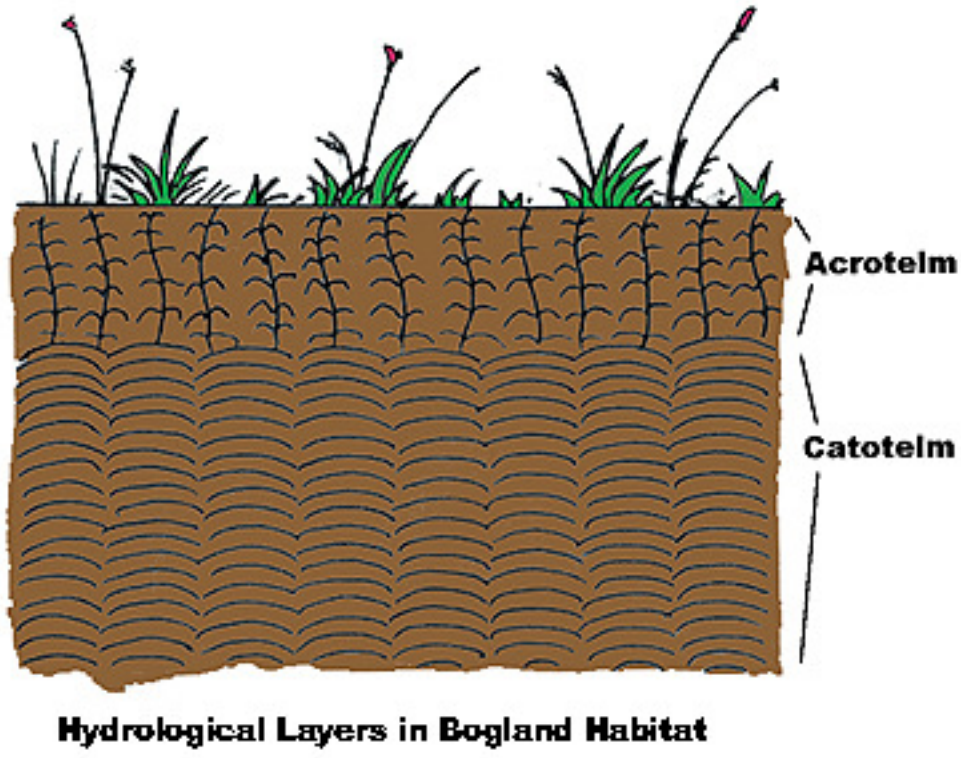


Figure 2.2: Structure of a Raised Bog [source: www.ipcc.ie]

2.3.1 The Status of Raised Bogs In Ireland

Raised bogs are rare wetland habitats across Western Europe. Over 50% of those remaining that contain functional raised bog wetland communities occur in Ireland (DAHG, 2012[1]). These areas have high conservation status, and between 1997 and 2002, Ireland nominated a total of 53 of these raised bog sites for designation as SAC (See **Table 2.1 and Figure 2.3**). These areas were selected

[1] National Raised Bog SAC Management Plan Proposed Approach (DAHG, 2012)

primarily for the presence of a habitat listed for priority protection under the Habitats Directive. This *active raised bog habitat* is in danger of disappearance within the EU, and within Ireland.

Raised bogs are extremely rare in global terms and are the last functioning remnants of the great bogs that once covered much of the midlands. What makes them so rare is that they still have substantial areas of active raised bog where the conditions are right for peat to continue to form and where the typical species of plants and animals can thrive. Land reclamation, drainage and peat extraction over time has left Ireland with less than 1% of the area of active raised bog we once had. These sites also represent some of the last remnants of this habitat still in existence in the Atlantic region of the EU. In addition, these sites contain large tracts of degraded raised bogs, which are the area of high, uncut bog, damaged by drainage. This is also an important habitat, as it can be transformed into active raised bog again through restoration measures. As can be seen from **Figure 2.3**, the majority of the designated raised bogs in Ireland occur within the Shannon International River Basin District (RBD) with very limited geographical occurrence in the Eastern, South Eastern and Western RBD.

In addition to the 53 bogs designated as SAC, a further tranch of raised bogs have also been designated as Natural Heritage Areas (NHA) under the Wildlife Amendment Act 2000. Between 2003 and 2005, 75 raised bogs were designated covering some 23,000 hectares located mainly in the midlands. These sites were made statutory instruments as part of an undertaking in relation to EU EIA case C39296. The last Government indicated that turf-cutting would cease on these sites from 2014, however this decision is currently being reviewed in light of commitments given in the Programme for Government in 2011. While these sites are not regulated under the Habitats Directive, the Environmental Impact Assessment (EIA) Directive does apply.

While the focus of the National Raised Bog Management Plan is the SAC bogs, the NHA raised bogs are relevant as it was recognised that it would not be possible to wholly restore the area of SAC lost to date by converting degraded bog back to active bog on the SACs alone and so compensatory habitat is required. A review of a sub-set of NHAs, and other non-designated bogs deemed to be of conservation potential, to find potentially suitable compensation sites is therefore also part of the considerations of the Plan.

2.3.2 Threats to Raised Bogs in Ireland

Raised bogs are wetland ecosystems and so the main threats to their welfare arise from any actions that drain water from the bog and dry them out. The main threats include:

- Drainage of raised bog habitat or surrounding wetland habitats;
- Peat harvesting and turf cutting;

- Planting of commercial forestry;
- Burning; and
- Other damaging activities such as water abstraction from groundwater and quarrying which can have a significant impact on the raised bogs by lowering the regional groundwater level.

All of these damaging operations can compromise the hydrological integrity of a raised bog leading to the lowering of the water table which can cause shrinkage cracking, deformation, collapse or bursts. Such actions can result in peat being exposed to air as the water levels drop and the dead plants in the peat start to decompose, releasing carbon dioxide and other gases into the atmosphere. These changes to the structure of the raised bog result in the loss of the unique raised bog ecology.

The intensity of peat destruction in the 20th century in Ireland has meant that hydrologically and ecologically intact peatlands are rare. In fact, all raised bog sites in Ireland have been damaged or degraded to some extent (NPWS, 2006[2]). This has largely occurred due to peat extraction and agricultural improvement, together with the associated drainage and burning related to these land-uses. Degraded and damaged raised bog sites look very different to an intact site in that they have a network of drains and ditches on and surrounding the site and the natural characteristics of the lagg are generally severely affected. Water tables are lower, consequently causing drying out and shrinkage of the whole bog and significant reductions in the area of the active peat-forming layer or acrotelm. In severely impacted bogs, the acrotelm may be absent altogether as a result of peat cutting or degraded by drainage. The absence of the acrotelm and associated natural vegetation generally contribute to increased run-off from the bog.

Table 2.1: List of the 53 Raised Bog SAC in Ireland

Ref	SAC Site Code	Location	SAC Site Name
1	000006	Cavan/Meath	Killyconny Bog (Cloghbally)
2	000231	Galway	Barroughter Bog
3	000248	Galway	Cloonmoylan Bog
4	000285	Galway	Kilsallagh Bog
5	000296	Galway	Lisnageeragh Bog and Ballinstack Turlough
6	000301	Galway	Lough Lurgeen Bog/ Glenamaddy Turlough
7	000326	Galway	Shankill West Bog

[2] NPWS, 2006 Assessment of Impacts of Turf Cutting on Designated Raised Bogs

Ref	SAC Site Code	Location	SAC Site Name
8	000382	Kerry	Sheheree (Ardagh) Bog
9	000391	Kildare	Ballynafagh Bog
10	000497	Mayo/Sligo	Flughany Bog
11	000566	Offaly	All Saints Bog and Esker
12	000572	Offaly	Clara Bog
13	000575	Offaly	Ferbane Bog
14	000580	Offaly	Mongan Bog
15	000581	Offaly	Moyclare Bog
16	000582	Offaly	Raheenmore Bog
17	000585	Offaly	Sharavogue Bog
18	000592	Roscommon	Bellanagare Bog
19	000597	Roscommon	Carrowbehy/Caher Bog
20	000600	Roscommon	Cloonchambers Bog
21	000604	Roscommon	Derrinea Bog
22	000614	Roscommon	Cloonshanville Bog
23	000641	Tipperary	Ballyduff/Clonfinane Bog
24	000647	Tipperary	Kilcarren-Firville Bog
25	000679	Westmeath	Garriskil Bog
26	001242	Galway	Carrownagappul Bog
27	001818	Longford/Ros	Lough Forbes Complex
28	002110	Galway/Ros	Corliskea/Trien/Cloonfelliv Bog
29	000297	Galway/Mayo	Lough Corrib
30	000440	Ros/LD/WM	Lough Ree
31	000595	Roscommon	Callow Bog
32	002298	Mayo/Ros/Sligo	River Moy
33	002331	Kildare	Mouds Bog
34	002332	Laois	Coolrain Bog
35	002333	Laois	Knockacoller Bog
36	002336	Westmeath	Carn Park Bog
37	002337	Westmeath	Crosswood Bog
38	002338	Roscommon	Drumalough Bog
39	002339	Roscommon	Ballynamona Bog and Corkip Lough
40	002340	Meath/Westmeath	Moneybeg and Clareisland Bogs
41	002341	Longford	Ardagullion Bog
42	002342	Meath/Westmeath	Mount Hevey Bog
43	002343	Clare	Tullaher Lough and Bog
44	002346	Longford	Brown Bog
45	002347	Galway	Camderry Bog
46	002348	Longford	Clooneen Bog

Ref	SAC Site Code	Location	SAC Site Name
47	002349	Roscommon	Corbo Bog
48	002350	Galway	Curraghlehanagh Bog
49	002351	Kerry	Moanveanlagh Bog
50	002352	Galway	Monivea Bog
51	002353	Tipperary	Redwood Bog
52	002354	Roscommon	Tullaghanrock Bog
53	002356	Galway	Ardgraigue Bog

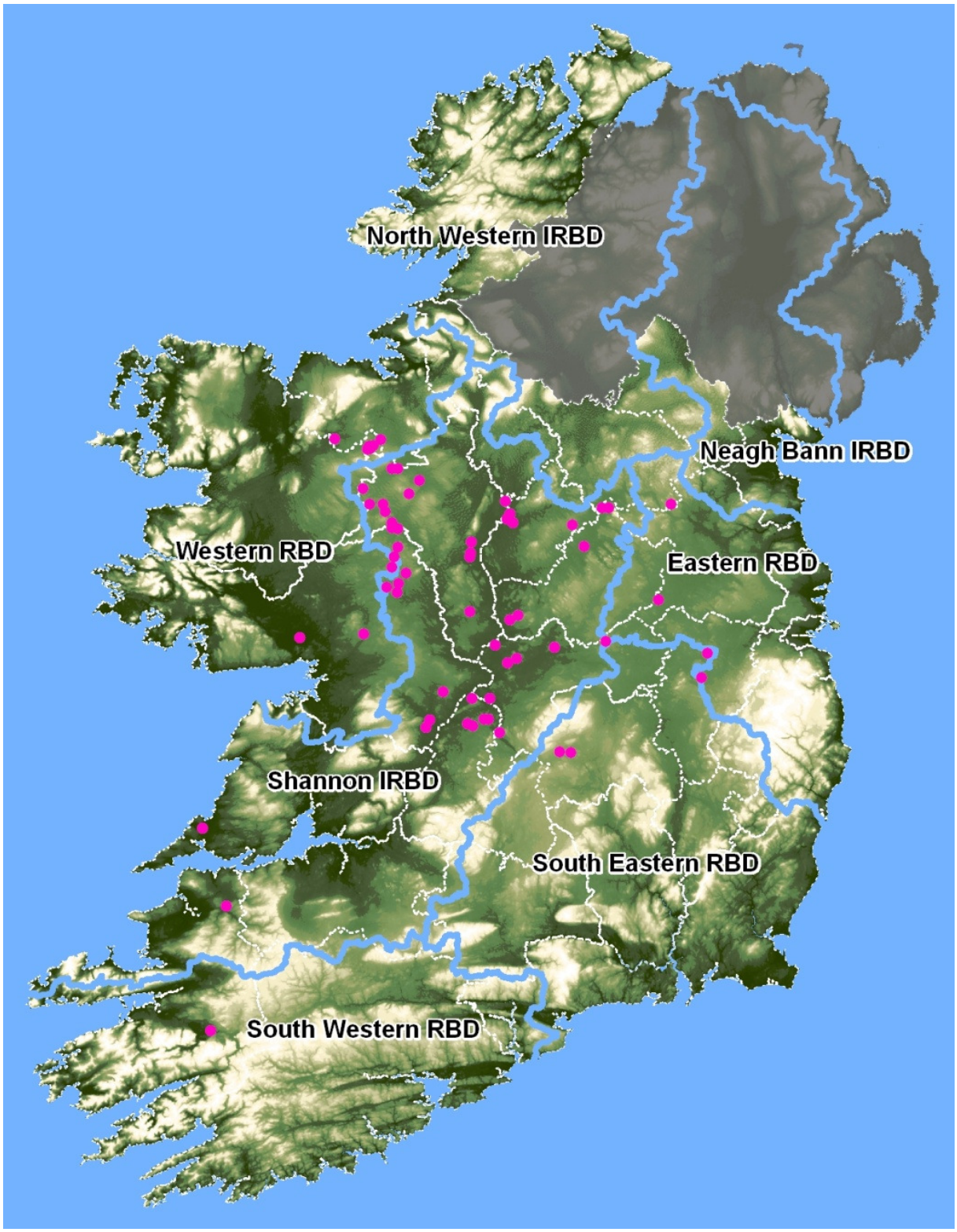


Figure 2.3: Map of Raised Bog SACs in Ireland (in the Context of River Basin Districts)

2.4 STRATEGIC ENVIRONMENTAL ASSESSMENT

Strategic Environmental Assessment (SEA) is a process for evaluating, at the earliest appropriate stage, the environmental effects of plans or programmes before they are adopted. It also gives the public and other interested parties an opportunity to comment and to be kept informed of decisions and how they were made. An early consideration of environmental concerns in the planning process creates an opportunity for environmental factors to be considered explicitly alongside other factors such as social, technical or economic aspects. The European Directive (2001/42/EC) on the Assessment of the Effects of Certain Plans and Programmes on the Environment (the SEA Directive), was transposed into national legislation through S.I. 435/2004 and S.I. 436/2004 as amended by S.I. 200/2011 and S.I. 201/2011. **Figure 2.4** shows an overview of the SEA Process.

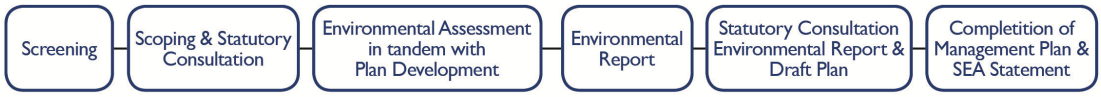


Figure 2.4: Overview of SEA Process

2.5 RESPONSIBLE AUTHORITY AND STUDY TEAM

This SEA is being carried out on behalf of the National Parks and Wildlife Service as the responsible authority for designation and protection of SAC habitat under the EU Habitats Directive.

The study team for the National Raised Bog SAC Management Plan and associated SEA comprises RPS, an environmental and engineering consultancy, working with NPWS. It is noted that the National Raised Bog SAC Management Plan is informed by a wider project called the Scientific Basis for Raised Bog Conservation in Ireland Study. A Steering Group made up of representatives from the Department of Arts, Heritage and the Gaeltacht, Bord na Móna, the Irish Farmers Association, An Taisce, the Irish Peatlands Conservation Council, and peatlands experts from Trinity College Dublin and University College Dublin has met in relation to this wider project and also the SEA of the National Raised Bog SAC Management Plan.

3 THE PLAN

The purpose of the National Raised Bog SAC Management Plan is to set out Ireland's strategic approach to the conservation and restoration of its raised bog SAC and to give clarity and confidence to all parties in regard to how Ireland will protect these sites in keeping with its legal obligations. It forms a "plan" within the meaning of Article 6(3) of the Habitats Directive and establishes the necessary conservation measures which the Directive requires to be achieved.

As part of the plan making process, a comprehensive scientific review of scientific understanding of raised bogs, both within and outside the SAC is being undertaken, and is applying new information and survey techniques to assess the current condition and future prospects for over 200 SAC, NHA and other bogs. The provisions of this National Plan, along with the associated NHA review and National Peatlands Strategy, will for the first time provide a coherent approach to the conservation of raised bogs in Ireland, while also addressing the needs of those most directly affected by the requirement to curtail turf-cutting.

The plan has two broad aims:

Conservation and Management of Raised Bog SACs

Ireland has nominated 53 sites as Raised Bog SACs under the EU Habitats Directive (Appendix 1) and therefore is required under the directive to put in place measures to protect these sites from deterioration. The aim of the National Raised Bog SAC Management Plan is to provide clarity to all parties regarding how these sites will be managed and restored into the future in co-operation with land-owners and local communities and in keeping with legal obligations under the directive.

Addressing the needs of Turf-Cutters & Land-Owners

The Plan also aims to set out how the needs of those who depend on these bogs will be addressed where it has been necessary to curtail activities for conservation purposes. The needs of effected turf-cutters' are being, and will be, largely addressed through compensation or relocation. The concerns and interests of land-owners within and around these sites will also be addressed, through the putting in place of Site Specific Plans and restoration plans for each raised bog SAC at a future date. The Site Specific Plans will be used to explore how the restoration and management of these sites can benefit local communities through their use as amenity areas, for education, and as a focus for conservation.

3.1 BACKGROUND

The development of a National Raised Bog SAC Management Plan was recommended by Mr. Justice John Quirke in 2012 following the Peatlands Forum. The Government accepted this recommendation, and the draft National Raised Bog SAC Management Plan has been prepared on foot of Justice Quirke's recommendation and the resolution from Dáil Éireann. The purpose of the plan is to provide the ability to explore whether there are any other options available for those sites where relocation is genuinely not possible. It also indicates how the 53 SACs are to be restored and managed into the future, which will be done in full consultation and partnership with those who own the bogs and surrounding land owners.

The plan will require the input of local communities and will have to be approved by the European Commission. The position of both the Government and the European Commission has been, and remains, that until this plan has been approved, continued unauthorised cutting cannot take place on any raised bog SAC. However, arrangements have been made to provide qualifying turf cutters with a supply of turf or a financial payment while the plan is being worked on.

3.2 SCIENTIFIC BASIS FOR RAISED BOG CONSERVATION IN IRELAND

In order to inform the development of the Plan, a wider study has been underway to undertake the scientific analysis required to underpin the National Raised Bog SAC Management Plan. The team includes experts in the scientific disciplines required to inform policy on conservation, restoration and hydrological management of these sites. This approach has been developed to provide an evidence base for identification of the strengths, weaknesses, opportunities and threats to the raised bog network in Ireland.

The scientific research that has been undertaken to produce this Plan, and the NHA review, for the first time, presents a comprehensive review of the entire resource of Ireland's remaining raised bogs of potential conservation value, applying new scientific method and survey techniques. Over 270 sites have been examined in detail and their current and potential value as conservation sites has been assessed. This has included the 53 raised bog SACs, the 75 Natural Heritage Areas and over 140 additional undesignated sites that are deemed to be of conservation potential. This has informed the development of a coherent network of conservation sites, including the 53 SACs and a number of compensatory sites.

As well as containing proposed programme of measures to address the conservation objectives of the sites, the draft Plan also contains measures to address the needs and rights of turf-cutters and land owners. The final plan, and the Site Specific Plans which will be developed through 2014 / 2015, will go further towards addressing turf-cutter and land owner needs in a practical way.

3.3 APPROACH TO DETERMINATION OF STATUS

The current condition of Ireland's Raised Bog Network was determined from an ecological and an eco-hydrological assessment of Ireland's network of raised bog SACs, NHAs and other non-designated raised bogs of significant conservation value. The non-designated bogs were selected as the remaining raised bogs of significant conservation value, based on recommendations from Bord na Móna, the Turf Cutters and Contractors Association (TCCA) and the Irish Peatland Conservation Council (IPCC), and other available wetland surveys from National Parks and Wildlife Service (NPWS) and Local Authorities.

3.3.1 Ecological Assessment

The current condition of Ireland's Raised Bog Network has been determined from an ecological assessment of Ireland's network of raised bog SACs, NHAs and other non-designated raised bogs of significant conservation value. The assessment considered the following six attributes for each bog:

- Area (of ARB)
- Range (Geographic)
- Habitat quality
- Range (ecological diversity) relating to each of the following three features:
    - Diversity of marginal habitats adjoining the high bog
    - Local distinctiveness (presence of features that represent the range of variation of the habitat)
    - Presence of other EU Habitats and Birds Directive species
- The occurrence of 'negative species'
- The occurrence of 'negative features', notably the frequency and severity of burning

Ecological mapping was available for 72 of the NHA, mostly surveyed in 2003. More recent surveys were available for only four raised bog NHA. Ecological data for the non-designated sites was limited to sites owned by Bord na Móna and a further 30 sites where targeted field surveys were undertaken. The raised bog network was assessed for each of the six attributes and assigned one of three categories: 'high (green)', 'moderate (amber)' or 'low (red)' (**see Table A1 in Appendix A**).

3.3.2 Eco-hydrological Assessments

Eco-hydrological assessments were also undertaken to assist with the understanding of the Raised Bogs' current condition and to determine their restoration potential. The ecological condition of Raised Bogs is fundamentally dependent on the hydrology. The physical conditions under which

active raised bog survives and develops were assessed by modelling specific bogs to understand their hydrological function. The modelling process involved relating suitable supporting topographic conditions (including surface shape, slope and drainage patterns) to locations where active raised bog was found. These conditions were, in turn, used to forecast potential restoration areas where topography is suitable for active raised bog to be restored following engineered measures such as drain blockage (**see Table A2 in Appendix A**).

3.3.3 Summary of Results

The ecological and eco-hydrological investigations have identified an overall decline in Active Raised Bog and High Bog areas within the national Raised Bog network in Ireland as summarised in **Table 3.1.** A significantly greater loss in the area of active raised bog has occurred relative to losses in High Bog. This is because the activities associated with the loss of High Bog such as turf cutting and associated drainage, has caused significant changes to the hydrological regime resulting in a lowering of the water table and causing large areas of the High Bog to dry out for long periods of time. Consequently, there has been a loss of the water dependent ecosystems present on the High Bog, the most important habitat being active raised bog.

Table 3.1: Summary of Raised Bog Status Changes

Bog Habitat	**Resource**	**1994**	**2012**	**Change**
		(ha)	(ha)	(ha)
Active Raised Bog (ARB)	**SAC network**	**1,940[A]**	**1,210**	**-730**
	NHA network	490[B]	284	-206
	Non Designated Sites	200	145	-55
	National Resource	**2,630**	**1,639**	**-991**
Degraded Raised Bog (DRB)	SAC network	650[C]	1,200	+550
	NHA network	520[D]	410	-110
	Non Designated Sites	625	520	-105
	National Resource	**1,795**	**2,130**	**+335**
High Bog	SAC network	10,740	10,515	-225
	NHA network	7,790	7,480	-310

3.4 CONTENTS OF DRAFT NATIONAL SAC MANAGEMENT PLAN

The draft Plan is laid out as follows:

Chapter	Title	Contents	Assessed in the SEA?
1	Aims and Background to the Plan	• Aims of the plan • Background to the development of the plan • Guiding principles	No. This is factual Information
2	Current Condition of Ireland's Raised Bog Network	• Scientific analysis of the raised bogs • Current condition/status and trends	No. This is factual Information
3	Conservation Objectives of the Plan	• National and SAC conservation objectives	Yes. See Chapter 8 of this report
4	Options to Achieve Conservation Objectives	• Potential protection, retoration and compensatory measures to achieve conservation objectives	Yes. See Chapter 8 of this report
5	Proposed Programme of Conservation Measures	• Proposed strategies and summary programme of measures to achieve conservation objectives	Yes. See Chapter 8 of this report
6	Addressing the Needs of Those Effected by the Plan	• Measures to address the needs of those affected by the plan	Yes. See Chapter 8 of this report
7	Benefits of the Plan	• Beneficial impact of Plan through recovery of ecosystem services	No however the beneficial impacts are reflected in the assessment in chapter 8.
8	Next Steps	• Next steps involved in finalisation and implementation of the plan	No. This is factual Information

The Draft National Raised Bog SAC Management Plan has two broad aims:

- Conservation and Management of Raised Bog SACs

  Ireland has nominated 53 sites as Raised Bog SACs under the EU Habitats Directive and is required under the directive to put in place measures to protect these sites from deterioration. The aim of the plan is to provide clarity to all parties regarding how these sites will be managed and

restored into the future in co-operation with land-owners and local communities and in keeping with legal obligations under the directive.

- Addressing the needs of Turf-Cutters & Land-Owners

The plan also aims to set out how the needs of those who depend on these bogs will be addressed where it has been necessary to curtail activities for conservation purposes. The needs of affected turf-cutters' are being, and will be, largely addressed through compensation or relocation. The concerns and interests of land-owners within and around these sites will also be addressed, through the putting in place of site-specific management and restoration plans for each raised bog SAC in consultation with them and in keeping with the requirements of the plan. The site-specific plans can also be used to explore how the restoration and management of these sites can benefit local communities through their use as amenity areas, for education, and as a focus for conservation.

3.4.1 Review of the Raised Bog Network

A key part of the development of the draft Plan was a comprehensive review (ecological and eco-hydrological assessments) of Ireland's remaining raised bogs of potential conservation value to quantify the extent of the damage and loss that has been sustained. Over 270 sites were examined in detail, including the 53 raised bog SACs, the 75 NHA raised bog sites, and more than 140 additional non-designated sites which are deemed to be of conservation potential. The current condition of Ireland's raised bog network was established, and the area of raised bog damaged and lost since designation was quantified through comparison with past assessments. This enabled conservation objectives to be set and a programme of conservation measures to achieve these objectives to be proposed. The draft Plan also outlines the options available to address the rights and needs of those affected by the proposed conservation measures (specifically turf-cutters and land owners). The bogs included in the review are illustratedin **Figure 3.1**.

Three aspects of the Plan lend themselves to assessment under SEA. These are the:

1. Conservation Objectives of the Plan;

2. Options to achieve the Conservation Objectives of the Plan; and

3. Proposed Programme of Conservation Measures.

Chapter 9 of this Environmental Report presents the assessment of these elements in relation to the environment, taking into account biodiversity, flora, fauna, water, landscape, material assets, population, human health, soils and their interaction.

The draft Plan acknowledges that there are implications for a large number of people not just those concerned with conservation of the bogs or those concerned with exploitation of the resource. Those most directly and most immediately effected will be those who use these bogs for activities such as turf-extraction and landowners within and adjacent to the SACs who may be affected by the Plan's provisions. The draft Plan raises the possibility of continued cutting on some SAC subject to achieving the following criteria:

1. Would the cutting lead to the direct loss of protected habitat?

2. Would the cutting lead to the indirect loss of protected habitat?

3. Would the cutting, necessary drainage, and saving of the turf prevent or impede restoration works that will be necessary on the site?

If the answer to any of these questions is yes, or if the possibility of such an impact cannot be ruled out, then giving consent to turf-cutting would not be possible under Article 6(3). These cases will be explored further with turf-cutters in the context of putting in place the Site Specific Management Plans for each of the sites. Consequently this aspect of the draft Plan has not been assessed as part of the SEA.

Further, the draft Plan considers continued turf cutting on SAC subject to Art. 6(4) of the Habitats Directive which allows for damaging activity to be undertaken on SAC in exceptional circumstances where certain tests provided for in Article 6(4) of the Directive can be met. In short these are as follows:

1. That no alternative exists than to undertake the proposed action

2. That Imperative Reasons of Overridine Public Interest (IROPI) exist that would justify the damage to the SAC

3. That Compensatory measures can be taken to ensure the integrity of the SAC network

4. Where priority habitats (such as active raised bog) are affected, an opinion of the European Commission is required before consent can be give to a damaging activity.

As above, these cases will be explored further with turf-cutters in the context of putting in place the Site Specific Management Plans for each of the sites. Consequently this aspect of the draft Plan has not been assessed as part of the SEA.

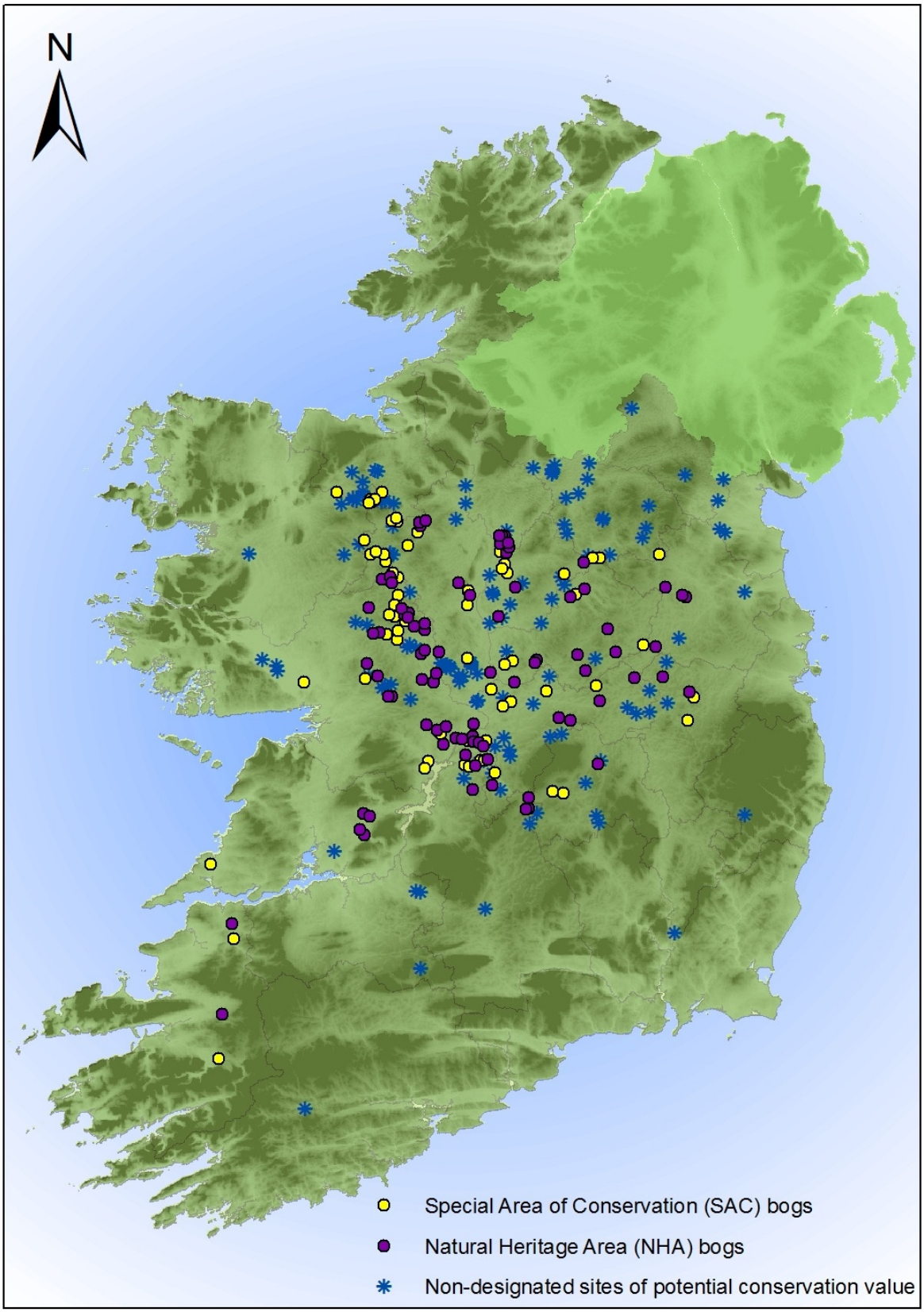


Figure 3.1: Raised Bog Network Considered in the Draft Plan

4 METHODOLOGY

The SEA Directive requires that certain Plans and Programmes, which are likely to have a significant impact on the environment, be subject to the SEA process. The SEA process is broadly comprised of the following steps (and the status of each step in relation to the plan is outlined in **Table 4.1**):

- **Stage 1: Screening:** Purpose is to provide a decision on whether or not an SEA of a Plan/Programme is required.

- **Stage 2: Scoping:** Purpose is to engage with the defined statutory bodies on the scope and level of detail to be considered in the assessment.

- **Stage 3: Environmental Assessment**: Purpose is to undertake an assessment of the likely significant impacts on the environment as a result of the Plan, culminating in the production of an Environmental Report.

- **Stage 4: Consultation:** Purpose is to undertake consultation on the draft Plan and associated Environmental Report.

- **Stage 5: SEA Statement**: Purpose is to identify how environmental considerations and consultation have been integrated into the Final Plan/Programme culminating in the production of an SEA Statement.

- **Stage 6**: **Monitoring, Follow-up and Review**: Purpose to ensure that the implementation of the plan is not having unforeseen impacts on the receiving environment.

Table 4.1: SEA Process and Status in Relation to National Raised Bog Management Plan

SEA Stage	Status
Stage 1: Screening	Completed Q3 2013
Stage 2: Scoping	Completed in Q4 2013.
Stage 3: Environmental Assessment	Completed in Q4 2013.
Stage 4: Consultation	Q1 2014

Stage 5: SEA Statement	Following consultation
Stage 6: Monitoring, Follow-up and Review	2014 - 2019

4.1 GUIDANCE

The following guidance / methodology documents have been referred to during the SEA process:

- Article 8 (Decision Making) of EU Directive 2001/42/EC on Strategic Environmental Assessment as amended, Circular Letter PL 9/2013 Department of Environment, Community and Local Government.

- Further Transposition of EU Directive 2001/42/EC on Strategic Environmental Assessment (SEA) Circular Letter PSSP 6/2011 Department of Environment, Community and Local Government.

- Development of Strategic Environmental Assessment (SEA) Methodologies for Plans and Programmes in Ireland. Synthesis Report. 2003. Environmental Protection Agency.

- GISEA Manual, Current Practice And Potential On The Application Of Geographic Information Systems As A Support Tool In Strategic Environmental Assessment Of Irish Land Use Plans 2009 Environmental Protection Agency.

- Implementation of SEA Directive (2001/42/EC). Assessment of Certain Plans and Programmes on the Environment. Guidelines for Regional Planning Authorities. November 2004. Department of Environment, Heritage and Local Government.

- Strategic Environmental Assessment and Climate Change: Guidance for Practitioners, May 2004, Environmental protection Agency.

- Strategic Environmental Assessment (SEA) Checklist - Consultation Draft. January 2008 (updated 6th September 2011). Environmental Protection Agency.

- Strategic Environmental Assessment (SEA) Pack. (Updated in 24th April 2013). Environmental Protection Agency.

4.2 SCREENING

A decision was taken in Q2 of 2013 to progress with the SEA process based on the following:

- It was anticipated that the principal beneficial effect of the Plan would be the improvement in the status of raised bog SAC's in Ireland and improvement in the status of raised bogs within the Europe Community.

- Relocation of turf cutting activities away from the 53 Raised Bog SACs to other bog areas is likely to give rise to negative impacts on flora and fauna at the receptor locations.

- The Plan may give rise to negative effects on birds through disturbance or deterioration of bird habitat at the 53 SAC sites and / or the relocation sites and / or compensatory habitat.

- The Plan may have negative impacts on Annex IV Species under the Habitats Directive as a result of disturbance or deterioration of habitat at the 53 SAC sites and / or relocation sites and / or compensatory habitat.

- It is anticipated that the principal negative impact from the Plan other than biodiversity would relate to the significant land use changes which would need to be applied in order to protect the biodiversity and ecological functioning of the bogs, with particular reference to turf cutting. This would have negative impacts for material assets and also for cultural heritage as land uses incompatible with the conservation of raised bogs have been ongoing at the sites for decades if not centuries.

- In addition, there were likely to be impacts to flooding regimes; water quality; soil function, and local biodiversity.

- An SEA was required because the Plan falls under the scope of Regulation 9(2) and 9(3) of the Regulations and is likely to have significant environmental effects.

4.3 SCOPING

Scoping was undertaken in July / August 2013 with formal statutory consultation running from September 1st to October 1st, 2013. The objective of scoping was to identify key issues of concern that should be addressed in the environmental assessment of the Plan so that they could be considered in appropriate detail. Scoping also helped determine the boundaries of the assessment in terms of geographical extent and the time horizon for the assessment. **Figure 4.1** outlines how these elements combine to help shape the SEA.

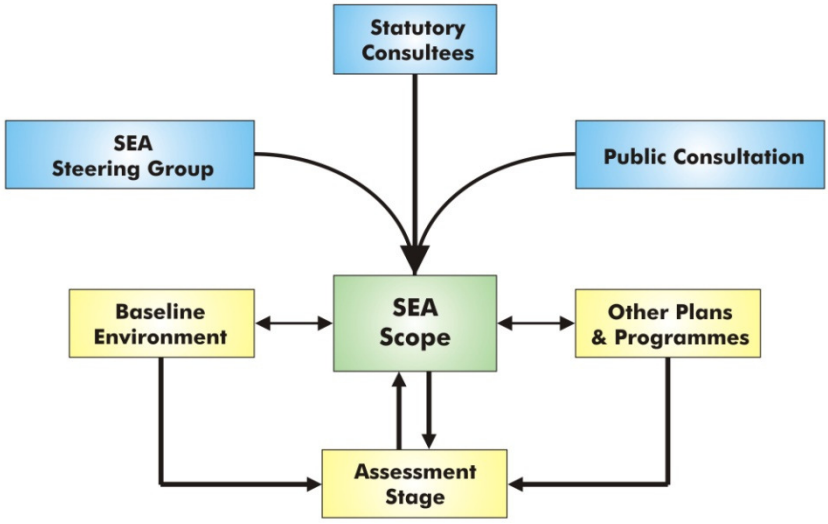


Figure 4.1: Overview of the Scoping Process.

The following outlines the scope proposed for the Environmental Assessment of the National Raised Bog SAC Management Plan.

Table 4.2: Scope of the SEA

Geographic Scope	The National Raised Bog SAC Management Plan relates to management of a total of 53 SACs designated for raised bog. In addition the plan addresses turf cutting where turf cutters from the SAC bogs will be relocated and also Raised Bog NHA and other undesignated raised bog which may be used to provide compensatory habitat for SAC bogs which are deemed to be beyond rehabilitation. In this regard, the scope of the assessment takes into account both the subject sites (i.e. the 53 raised bog SAC) and sites likely to be involved in the suite of measures developed (i.e. compensatory sites, renewed or intensified turf cutting sites).
Temporal Scope	Given that the Plan directly relates to sites designated under the EU Habitats Directive, it is proposed that the Plan will cover a period of 6 years, in line with the reporting period for each Member State under Article 17 of the EU Habitats Directive. It is proposed that the Plan will have ongoing 6-yearly reviews. In line with the SEA Directive, short, medium and long-term impacts (including reference to secondary, cumulative, synergistic, permanent and temporary, positive and negative effects) will be considered during the

	assessment.
Level of Detail of the Plan	The National Raised Bog SAC Management Plan represents a higher level national plan and will inform regional and county development plans and other local level planning strategies. As such, site specific information is not contained within this level of plan and this is reflected in the baseline descriptions and level of detail of the assessment of the plan.
Level of Detail of Assessment	The assessment will be at a national level reflecting the position of the National Raised Bog SAC Management Plan in the planning hierarchy. No site specific measures will be included.
Assessment Parameters	In line with the SEA Directive, short, medium and long-term impacts (including reference to secondary, cumulative, synergistic, permanent and temporary, positive and negative effects) have been considered during the assessment. It was considered that short-term assessment would not be very constructive as implementation of the National Raised Bog SAC Management Plan will take time to show effect. Some consideration has been given to construction related impacts however.
Scoping of SEA Environmental Topics	The environmental topics that have been scoped in for the assessment of the Plan following SEA scoping in consultation with the statutory consultees for SEA are: Biodiversity, Flora and Fauna (BFF); Water (W); Soil (S); Climate Factors (CF); Population and Human Health (PHH); Material Assets (MA); Cultural, Architectural and Archaeological Heritage (CH); and Landscape(L). Only air quality was scoped out on the understanding that an assessment in this regard would be best focussed at the project level where detailed activities would be better understood.

4.3.1 Appropriate Assessment Screening

As required under the EU Habitats Directive, any plan or project with the potential to impact on the qualifying features of a Natura 2000 site must be subject to an Appropriate Assessment (AA) of the impacts. While plans or projects for the management of Natura sites (as in this case) do not automatically require consideration, under this legislation, it was acknowledged early on in the process that the options and measures proposed in the National Raised Bog SAC Management Plan could have direct and indirect impacts on qualifying features (habitats and species) other than raised bog. As such, an AA screening process was undertaken. The potential impacts associated with the

implementation of the Plan were considered in the context of the Natura 2000 sites, their Qualifying Interests and conservation objectives.

It was concluded that the proposed plan, as it stands:

- Is directly connected to, and necessary for, the management of a Natura 2000 site

  and

- May have significant effects, alone or in combination with other plans and projects, on the qualifying interests of the 53 Raised Bog SACs

- May have significant effects, alone or in combination with other plans and projects, on the qualifying interests of other SACs and of SPAs

A number of Natura 2000 sites were screened out of further assessment as there is no connectivity or likely impacts. Therefore, adopting the precautionary approach, it is concluded that Stage 2 (Appropriate Assessment) must be carried out.

4.3.2 Consultation on Scoping

Scoping for the SEA was carried out from 1st September to 1st October 2013. Under Article 6 of the SEA Directive, the competent authority preparing the plan or programme is required to consult with specific "environmental authorities" (statutory consultees) on the scope and level of detail of the information to be included in the Environmental Report.

The SEA amendment regulations (S.I. 201 of 2011) have made alterations regarding the scoping process. Previously under S.I. 436 of 2004 three statutory consultee environmental bodies were identified, those being the Environmental Protection Agency, the Department of Environment, Heritage and Local Government and the Department of Communications, Energy and Natural Resources (formerly Communications, Marine and Natural Resources). The amended regulations now list five environmental statutory consultees which are outlined in Article 13A (4) (a) of S.I. 201 of 2011, as follows;

i. the Environmental Protection Agency

ii. the Minister for the Environment, Community and Local Government,

iii. where it appears to the planning authority that the plan or programme or modification of the plan or programme, might have significant effects on fisheries or the marine environment, the

Minister for Agriculture, Marine and Food, and the Minister for Communications, Energy and Natural Resources,

iv. where is appears to the competent authority that the plan or programme or amendment to a plan or programme, might have significant effects in relation to the architectural or archaeological heritage or to nature conservation, the Minister for Arts, Heritage and Gaeltacht Affairs, and

v. any adjoining planning authority whose area is contiguous to the area of a planning authority which prepared a draft Plan, proposed variation or local area plan.

In addition, a scoping meeting was arranged with the statutory consultees on November 15th 2013 and this was attended by the EPA.

Members of the public and all interested parties were also offered the opportunity to comment on the SEA Scoping Report and proposed National Raised Bog SAC Management Plan. Consultation with the public at this stage is not required by the legislation but is considered good practice and provides an opportunity for the views of the public and all interested parties to influence the development of the draft Plan. A summary of the responses received is included in **Table 4.3**.

Table 4.3: Summary of Number of Responses and Submissions

Type	Number	Stakeholder category
Group submissions	1 (210)	Concerned residents & Kildare Turf Cutters Association Members
Individual letters	19	11 members of the public (all turf cutters or bog owners) 1 Local Authority 1 business owner 1 state agency 3 NGOs 1 bog committee 1 government department
Emails	8	2 Local Authorities 1 member of the public (turf cutter) 1 association of turf cutters 2 NGOs

Type	Number	Stakeholder category
		1 government department
Phonecalls	2	2 members of the public (turf cutters)
Total	**28 (237)**	

A summary of the issues raised during this consultation is included in **Appendix B** of this document.

4.3.3 Environmental Assessment and Environmental Report

Based on the legislation and guidance, the Environmental Report must include the information outlined in **Table 4.4.**

Table 4.4: Key Elements of the Environmental Report

Requirement of SEA Directive (Article 5(1), Annex 1)	Section of Environmental Report
An outline of the contents and main objectives of the plan or programme, or modification to a plan or programme, and relationship with other relevant plans or programmes;	Chapter 3: Description of the Plan and Chapter 5 Other Plans and Programmes
The relevant aspects of the current state of the environment and the likely evolution thereof without implementation of the plan or programme, or modification to a plan or programme,	Chapter 6: Baseline Environment
The environmental characteristics of areas likely to be significantly affected	Chapter 6: Baseline Environment
Any existing environmental problems which are relevant to the plan or programme, or modification to a plan or programme, including, in particular, those relating to any areas of a particular environmental importance, such as areas designated pursuant to the Birds Directive or the Habitats Directive	Chapter 6: Baseline Environment

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

4.3.4 SEA Statement

The SEA Statement for the National Raised Bog SAC Management Plan will be compiled after the statutory consultation on the Plan and Environmental Report has been completed.

The main purpose of the SEA Statement will be to provide information on the decision-making process and to document how environmental considerations, i.e. the views of consultees and the recommendations of the Environmental Report, have been taken into account in the adopted

Development Plan. The SEA Statement will illustrate how decisions were taken, making the process more transparent.

4.4 APPROPRIATE ASSESSMENT OF NATURA 2000 SITES

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

The National Raised Bog SAC Management Plan is directly connected to the conservation and management of the 53 Raised Bogs designated as SAC for Raised Bogs. However, it is recognized that there is potential to indirectly impact on other listed species in these SAC as a result of measures to protect and conserve the Raised Bogs e.g. otter, birds. It was therefore determined that the National Raised Bog SAC Management Plan would undergo appropriate assessment in a parallel process to the SEA. The AA has influenced the biodiversity, flora and fauna aspect of the SEA in particular and the impact assessment and mitigation proposed in **Chapters 9 and 10** of this report.

4.5 DIFFICULTIES AND DATA GAPS

The following difficulties and data gaps were encountered:

- Lack of site specific monitoring data to identify pressures.

The Scientific Basis for Raised Bog Conservation in Ireland Study is currently gathering information on site specific SAC bogs and also on possible NHA and non designated sites which might be proposed as compensatory habitat for raised bog SAC which has been lost or is beyond restoration. These further investigations, will improve the available information going forward and consequently it is proposed that site specific restoration and management plans will be developed in due course for each of the 53 raised bog SAC in Ireland.

- During development of the draft Plan and the evidence base to support it the Plan team sought to get a full understanding of both the bog status and the needs of those using the bog resource. In some cases, this information was not forth coming

Such information relates to the number of turf-cutters who would be prepared to relocate to undesignated sites, the number who qualify for compensation or relocation, the number who might prefer financial compensation and whether the NHA review has opened up new relocation possibilities for certain SAC. It is not possible to definitely establish an absence of relocation possibilities without establishing this information.

This period of public consultation and the finalising of this plan will provide a further opportunity for proposals to be considered where relocation solutions have not yet been fully explored.

- Research on how predicted climate change might impact on raised bogs specifically is not yet developed.

It is intended that the plan will be reviewed on a 6 yearly cycle. Advances in knowledge will be taken into account in these future cycles.

5 OTHER RELEVANT PLANS AND POLICIES

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

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

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

- Does the Plan contribute to the fulfilment of objectives and goals set in other Plans?
- To what degree are the goals and objectives set in other plans and programmes impacted by the Plan?

Appendix A summarises the key legislation, Plans and Programmes considered most relevant to the National Raised Bog SAC Management Plan. It is not an exhaustive list of all legislation, Plans and Programmes but rather is focussed on those considered key to the plan, and taking on board comments made during the scoping stage.

5.1 HIEARCHY OF PLANS

The National Raised Bog SAC Management Plan sits in a hierarchy of documents dealing with the issues of peatlands in Ireland with particular reference to raised bog sites. At the top of the hierarchy is the **EU Habitats (92/43/EC) Directive**. This has been transposed into Irish law through the European Communities (Birds and Natural Habitats) Regulations 2011 which consolidates the European Communities (Natural Habitats) Regulations 1997 to 2005 and the European Communities (Birds and Natural Habitats)(Control of Recreational Activities) Regulations 2010, as well as addressing transposition deficiencies in the original implementing legislation. Also relevant to the Plan is the EU Biodiversity Strategy, which aims to prevent and eliminate the causes of biodiversity loss and maintain and enhance current levels of biodiversity (see also **Section 2.1**).

Other related EU Directives include the **Floods Directive (2007/60/EC)** and the **Water Framework Directive (2000/60/EC)**. The EU Directive on the assessment and management of flood risks [2007/60/EC] is a framework directive that requires Member States to undertake a Preliminary Flood Risk Assessment, to identify areas of existing or foreseeable future potentially significant flood risk, to prepare flood hazard and risk maps and to prepare flood risk management plans setting objectives for managing the flood risk within areas identified for further assessment.

The Directive requires that flood management activities are prepared in cooperation and coordination with neighbouring states in cross-border river basins, and with the implementation of the Water Framework Directive. The 'Floods' Directive was transposed into Irish law by the European Communities (Assessment And Management Of Flood Risks) Regulations 2010. (SI 122/2010). The Regulations set out the responsibilities of the OPW and other public bodies in the implementation of the Directive, on consultation, and details the process for implementation of the measures set out in the flood risk management plans.

Ireland's raised bogs can contribute to protection against floods and drought through their capacity to absorb, retain and slowly release rain water. Under certain geographical conditions, they can control the flow of water within a catchment, mitigating flooding downstream.

The Water Framework Directive aims at improving the water environment. It applies to rivers, lakes, groundwater, estuaries and coastal waters. Member States are required to achieve good status in all waters by 2015 and must ensure that status does not deteriorate in any waters. The Directive requires that water quality management be centered on river basins, which are natural geographical areas that occur in the landscape. On the island of Ireland, eight river basin districts were identifed. Raised Bog SAC occur in 5 of the 7 RBD in the republic of Ireland but the greatest representation is in the Shannon RBD. Bogs can also play an important role in regulating water within a catchment and in maintaining water quality. Mosses, which are the main vegetation component of a healthy raised bog, can hold twenty times their own weight in water and together with the peat mass, they help to filter contaminants and release 'clean' water. Raised bogs may fulfillll an essential role as source areas for rivers, especially in maintaining low flows during dry periods. As such the objectives of the Water Framework Directive are also relevant to the current plan.

One further interesting link is to the **Environmental Liabilities Directive (2004/35/CE)** which implements the "polluter pays principle". The aim of the Directive is to hold those whose activities have caused environmental damage financially liable for remedying this damage. The directive was transposed into Irish law in 2009 by the European Communities (Environmental Liability) Regulations and comes under the remit of the EPA. Environmental damage under this legislation specifically relates to: water damage with a significant adverse effect on water status under the Water Framework Directive; land damage that creates a significant risk to human health; and damage to protected species and natural habitats. Illegal activities on designated SAC bogs may fall under the remit of this legislation.

At the national level, the hierarchy continues with the **National Biodiversity Strategy** and Action Plan which follows on from the EU Biodiversity Strategy in it aim to prevent and eliminate the causes of biodiversity loss and maintain and enhance current levels of biodiversity. This informs the **National Peatlands Strategy** which is being prepared separately by the Peatlands Council, an independently chaired body tasked with assisting the Government and stakeholders regarding issues related to the management of Ireland's peatlands, in particular bogs designated as Special Areas of Conservation and Natural Heritage Areas. The strategy is being developed to give direction to Ireland's approach to all peatland management (not just SACs), including bog conservation and restoration, over the coming decades. The Peatlands Strategy will be prepared within the framework set out in ***Our Sustainable Future, a Framework for Sustainable Development for Ireland*** **(DECLG, 2012),** the objectives of which are to ensure that future development in Ireland occurs in a sustainable manner.

The National Raised Bog SAC Management Plan is being produced to outline the approach to be taken specifically for the conservation and management of the 53 Raised Bog SAC sites but it will be informed by and will support the aims of the National Peatlands Strategy. The plan will develop a suite of measures which can be applied at the various sites alone or in combination informed by evidence based studies of the ecology and eco-hydrogeology of the bogs. Following completion of this work, and development of a national suite of measures, it is intended that a Site Specific Management Plan will be developed for each of the 53 SAC sites, which will identify the specific measures to be applied to the specific site.

Figure 5.1: Draft Hierarchy of Plans and Policies

6 BASELINE ENVIRONMENT

6.1 BASELINE AND RELEVANT ENVIRONMENTAL PROBLEMS

6.1.1 Biodiversity, Flora and Fauna

Designated Sites

Ireland has designated sites and species of conservation value and/or concern in an effort to protect its biodiversity resource. Designated conservation areas are areas containing habitats or species of national or international conservation importance. There are four types of designations considered here for the National Raised Bog SAC Management Plan: Special Areas of Conservation, Special Protection Areas, Ramsar Sites and Natural Heritage Areas. There are over 2000 of these sites nationally.

Table 6.1 gives the numbers of each designation in proximity to the 53 designated raised bog SAC sites. In order to recognise potential indirect effects beyond the 53 SAC sites, a buffer of 15km was added. This is consistent with the approach used in the Appropriate Assessment.

Status of EU Protected Habitats and Species

In 2008 the National Parks and Wildlife Service published a report detailing the conservation status in Ireland of habitats and species listed in the EU Habitats Directive (92/43/EEC). There are 59 habitats in Ireland that are listed under Annex I of the Habitats Directive. 16 of these habitats are, or can be, priority habitats, which are those that the EU considers require particular protection because their global distribution falls within the EU, and they are in danger of extinction. Species listed in Annex II of the Habitats Directive are animal or plant species whose conservation requires the designation of SAC. There are 26 Annex II species in Ireland. There are 41 species of animals and plants listed in Annex IV of the Habitats Directive, which require strict protection; and finally there are 48 Annex V species, whose taking in the wild may be subject to management measures. The conservation status of a habitat is defined in Article 1 of the Directive as *the sum of the influences acting on a natural habitat and its typical species that may affect its long-term natural distribution, structure and functions as well as the long-term survival of its typical species*.

Table 6.1: Designated Conservation Areas In Proximity to Raised Bog SAC

Raised Bog	Relevant RBD	SPA*	SAC*	Ramsar	NHA	pNHA
All Saints Bog and Esker SAC	SIRBD	4	12	0	2	8
Ardagullion Bog SAC	SIRBD	2	4	0	0	3
Ardgraigue Bog SAC	SIRBD	4	10	0	1	7
Ballyduff/Clonfinane Bog SAC	SIRBD	4	11	0	2	7
Ballynafagh Bog SAC	SERBD	0	5	0	0	3
Ballynamona Bog and Corkip Lough SAC	SIRBD	3	12	1	0	5
Barroughter Bog SAC	SIRBD	3	11	0	0	7
Bellanagare Bog SAC	SIRBD	0	11	1	1	9
Brown Bog SAC	SIRBD	2	5	0	0	5
Callow Bog SAC	SIRBD	2	14	1	0	13
Camderry Bog SAC	SIRBD	0	17	0	2	8
Carn Park Bog SAC	SIRBD	3	11	2	0	8
Carrowbehy/Caher Bog SAC	SIRBD	1	15	0	1	9
Carrownagappul Bog SAC	SIRBD	0	10	0	4	7
Clara Bog SAC	SIRBD	0	8	2	0	5
Cloonchambers Bog SAC	SIRBD	1	19	0	1	12
Clooneen Bog SAC	SIRBD	2	3	0	0	5
Cloonmoylan Bog SAC	SIRBD	3	11	0	0	6
Cloonshanville Bog SAC	SIRBD	2	7	1	0	6
Coolrain Bog SAC	SERBD	0	4	0	0	2
Corbo Bog SAC	SIRBD	2	7	0	0	5
Corliskea/Trien/Cloonfelliv Bog SAC	SIRBD	1	17	0	3	10
Crosswood Bog SAC	SIRBD	3	11	1	0	8
Curraghlehanagh Bog SAC	SIRBD	0	10	0	3	7
Derrinea Bog SAC	SIRBD	2	11	1	0	12
Drumalough Bog SAC	SIRBD	2	17	1	1	11
Ferbane Bog SAC	SIRBD	2	9	2	0	8
Flughany Bog SAC	SIRBD	1	10	1	0	8
Garriskil Bog SAC	SIRBD	2	7	0	0	4
Kilcarren-Firville Bog SAC	SIRBD	5	14	0	2	10
Killyconny Bog (Cloghbally) SAC	ERBD	0	2	0	0	1
Kilsallagh Bog SAC	SIRBD	0	14	0	3	10

Raised Bog	**Relevant RBD**	**SPA***	**SAC***	**Ramsar**	**NHA**	**pNHA**
Knockacoller Bog SAC	SERBD	0	4	0	0	2
Lisnageeragh Bog and Ballinastack Turlough SAC	SIRBD	0	14	0	3	9
Lough Corrib SAC	WRBD	1	42	1	5	18
Lough Forbes Complex SAC	SIRBD	2	7	0	0	6
Lough Lurgeen Bog/Glenamaddy Turlough SAC	WRBD	0	13	0	3	8
Lough Ree SAC	SIRBD	4	22	1	0	12
Moanveanlagh Bog SAC	SIRBD	0	2	0	0	1
Moneybeg and Clareisland Bogs SAC	SIRBD	2	6	0	0	3
Mongan Bog SAC	SIRBD	3	11	1	0	4
Monivea Bog SAC	WRBD	0	3	0	2	1
Mouds Bog SAC	ERBD	0	6	0	0	2
Mount Hevey Bog SAC	ERBD	0	2	0	0	2
Moyclare Bog SAC	SIRBD	4	10	1	1	8
Raheenmore Bog SAC	SIRBD	0	5	1	0	2
Redwood Bog SAC	SIRBD	4	11	0	2	9
River Moy SAC	Western RBD	2	46	1	0	17
Shankill West Bog SAC	SIRBD	0	9	0	4	7
Sharavogue Bog SAC	SIRBD	5	11	0	2	6
Sheheree (Ardagh) Bog SAC	SWRBD	0	5	0	0	1
Tullaghanrock Bog SAC	SIRBD	2	14	1	0	13
Tullaher Lough and Bog SAC	SIRBD	0	5	0	0	1

The conservation status of a species is defined as *the sum of the influences acting on the species concerned that may affect the long-term distribution and abundance of its populations within the territory of the member states*. The conservation status of a species will be taken as favourable when:

- Population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats;
- The natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

The NPWS Conservation Status report indicated that many Irish species of flora and fauna have a moderately satisfactory conservation status; however, a small number are in urgent need of concerted efforts to protect them.

Raised bogs are on the list of priority habitats under the Habitats Directive because they are threatened with extinction in Europe. Raised bog landscapes are currently only present in remote areas of Europe and the remaining bogs, including those under conservation, are known to be mostly damaged and undergoing further degradation. This has repercussions for the species that live in these habitats. Bog species have become rare and endangered simply because of the massive decline of their naturally wet habitats. Several Annex V species are associated with raised bog, including the moss *Leucobryum glaucum, Sphagnum* mosses and *Cladonia* lichens. Other species associated with wetland habitats, including raised bog, that are listed in Annex II of the habitats Directive include Whorl Snail species (*Vertigo spp.*) and Marsh Fritillary (*Euphydryas aurinia*). Red Grouse (*Lagopus lagopus*) are also associated with the raised bog habitat, and are included in the Irish Red List of Birds of Conservation Concern.

The NPWS Conservation Status report noted that the status of raised bog in Ireland is of 'significant concern', with less than 1% of active, living raised bog remaining in Ireland. Drainage, turf-cutting, forestry activities and agricultural reclamation are the principal causes of the general deterioration of these sites that has been observed over recent years. This has included a significant decrease in the area of active bog in most of these sites and the loss of smaller areas of degraded bog capable of restoration, principally through turf-cutting.

Typically three raised bog habitats are protected under EU legislation:

**Wet Raised Bog or Active Raised Bog (Habitat code 7110): ** Wet bog has a soft, spongy surface, with pools of open water and flat lawns of coloured bog mosses. The wettest areas are usually found in the central part of the high bog, where you often find hummocks, pools, *Sphagnum* lawns, flushes

and soaks. Sometimes, wet bog can develop in the cutover areas, wherever drainage is poor. This habitat type is listed as a priority habitat in Annex I of the EU Habitats Directive and is described as "still supporting a significant area of vegetation that is normally peat-forming" (EC, 1996).

Dry Raised Bog or Degraded Bog (Habitat code 7150): The surface of dry raised bog tends to be firm underfoot, with little surface water to be seen. Heathers and bog cotton species are present as are lichens and bog asphodel. Bog mosses are scarce and these areas are no longer actively peat-forming. This habitat forms when wet raised bog has been affected by drainage. The aim of restoration is to re-wet dry areas and to create, wherever possible, the conditions for active peat formation in future. Degraded raised bogs are therefore considered to be areas of high bog where active peat formation has ceased, but with proper management, may be restored in the foreseeable future. This habitat type is recognized as an EU Annex I Habitat – Degraded Raised Bog. Degraded raised bog can also occur on cutover, where there is re-wetting and regeneration of raised bog species. Cutover that consists largely of bare peat or is dominated by agricultural grasses of closed canopy woodlands is not considered to qualify as degraded raised bog habitat (EC, 1996).

Bog Woodland (Habitat code 91D0): Naturally-growing native woodlands dominated by birch have always been a feature of Irish raised bogs. These woodlands often occur in the margins of raised bogs where the peat is shallow. Typical species are birch, willow and Scots pine, with ferns and mosses. In Ireland either *Betula pubecens* or *Pinus sylvestris* dominate strands that may be of interest (EC, 1996). This habitat type does not include the drier Birch woodland found on cutover bog. Wet birch woodland on permanently waterlogged peat soils corresponds to EU Priority Annex I habitat – Bog Woodland.

Status of Raised Bog SAC Sites in Ireland

As part of the development of the National Raised Bog SAC Management Plan, a study entitled A Scientific Basis for Raised bog Conservation was undertaken. This evidence based study reviewed the ecology and eco-hydrology of the 53 raised bog SAC in Ireland and has determined the overall status as follows in **Table 6.2**.

Table 6.2: Status of Designated Raised Bog SAC Sites

Bog Habitat	Resource	1994	2012	Change
		(ha)	(ha)	(ha)
Active Raised Bog (ARB)	SAC network	1,940	1,210	-730
	NHA network	550	320	-230
	Non Designated Sites	200	145	-55

	National Network	**2,690**	**1,675**	**-1,015**
Degraded Raised Bog (DRB)	SAC network	650	1,200	+550
	NHA network	520	405	-115
	Non Designated Sites	625	520	-105
	National Network	**1,795**	**2,125**	**+330**
High Bog	SAC network	10,740	10,515	-225
	NHA network	7,790	7,480	-310

The total raised bog resource considered in the draft Plan is shown on **Figure 3.1.**

In a 2011 Birdwatch Ireland Report entitled Action Plan for Raised Bog Birds in Ireland 2011-2020. *BirdWatch Ireland's Group Action Plans for Irish Birds*, 13 bird species were identified as important for raised bogs and these included:

Cygnus cygnus **Whooper Swan**	***Actitis hypoleucos*** **Common Sandpiper**
Anser albifrons flavirostris **Greenland White-fronted Goose**	***Tringa totanus*** **Redshank**
Lagopus lagopus **Red Grouse**	***Asio flammeus*** **Short-eared Owl**
Circus cyaneus **Hen Harrier**	***Alauda arvensis*** **Skylark**
Falco columbarius **Merlin**	***Locustella naevia*** **Grasshopper Warbler**
Vanellus vanellus **Lapwing**	***Gallinago gallinago*** **Snipe**
Vanellus vanellus **Lapwing**	

Five of the listed species are listed on Annex I of the European Birds Directive and all 13 species are listed in the Birds of Conservation Concern in Ireland (BoCCI) list. Habitats of importance associated with these species include not only active raised bog but also cutaway and cutover bog.

Existing Environmental Pressures / Problems: Biodiversity, Flora and Fauna

Throughout Ireland there has been a decline in many of the native species through habitat degradation or destruction due to anthropogenic affects including, forestry, land reclamation, urban sprawl, road construction, disturbance, water pollution, climate change and agriculture. Irish legislation protects some of these species. In Ireland, 18 species of plant and animal have been identified as endangered and a further 52 are recorded as vulnerable (EPA, 2006).

The particular threats to raised bog habitat stem from:

- Drainage of raised bog habitat or surrounding wetland habitats
- Peat harvesting and turf cutting
- Planting of commercial forestry
- Burning; and
- Other damaging activities such as water abstraction from groundwater and quarrying which can have a significant impact on the raised bogs by lowering the regional groundwater levels.

All of these damaging operations can compromise the hydrological integrity of a raised bog leading to the lowering of the water table which can cause shrinkage cracking, deformation, collapse or bursts. Such actions can result in peat being exposed to air as the water levels drop and the dead plants in the peat start to decompose, releasing carbon dioxide and other gases into the atmosphere. These changes to the structure of the raised bog result in the loss of the unique raised bog ecology.

The degradation of raised bog habitat can encourage invasive species to outcompete the specialist flora & fauna.

There are a number of species of bird which use cutover, cutaway and active raised bogs.

Changes to any of these habitats is likely to have implications for the relevant species.

6.1.2 Population and Human Health

Population

The population of Ireland was over 4.5 million in 2011, and has been increasing at ever growing rates. However the population density is still relatively low from a European perspective and the overall population still remains below that of the island in the early 19th century. **Table 6.3** shows the population of each County where a raised bog SAC site occurs. There has been an increase in population in each county relevant to the plan, with a marked increase of 20% from 2006-2011 in County Laois.

Table 6.3: Trends in Population for Counties Containing Designated Raised Bog SAC Sites

Counties Which Have a Designated Raised Bog SAC Site	2002	2006	2011	% Change '06 - '11
Cavan	56,546	64,003	73,183	13.9
Clare	103,277	110,950	117,196	5.3
Galway	209,007	231,670	250,653	8.1
Kerry	132,527	139,835	145,502	3.7
Kildare	163,944	186,335	210,312	12.7
Mayo	117,446	123,839	130,638	5.4
Laois	58,774	67,059	80,559	20.0
Longford	31,068	34,391	39,000	13.3
Meath	134,005	162,831	184,135	13.0
Offaly	63,663	70,868	76,687	8.4
Roscommon	53,774	58,768	64,065	8.7
Sligo	58,200	60,894	65,393	7.2
North Tipperary	61,010	66,023	70,322	6.4
Westmeath	71,858	79,346	86,164	8.3

Source: Census of Population, Ireland 2002, 2006 and 2011

Drinking Water Quality

The European Communities (Drinking Water) Regulations (No. 2), 2007 came into force in March 2007. In accordance with these regulations, the local authority must notify the EPA where there has been a failure to meet a quality standard. **Table 6.4** shows the overall drinking water compliance rate

within each County where a Raised Bog SAC occurs, as recorded in the EPA report, *The Provision and Quality of Drinking Water in Ireland, A Drinking Water Report for the Year 2011*.

Mosses, which are the main vegetation component of a healthy raised bog can hold twenty times their own weight in water and together with the peat mass, they help to filter contaminants and release 'clean' water. Damage to bogs, for example, from cutting, drainage and loss of vegetation, can increase the amount and speed of water leaving the bog. This drained water contains higher amounts of dissolved organic carbon and particulate organic carbon (brown water) than natural bog water and leads to leaching of nutrients from the decomposing peat. In cases where this brown water is used as a source for drinking water, the treatment required to remove the colour becomes very expensive. The restoration of raised bogs therefore has the potential to improve the quality of private drinking water supplies, and also the quality of surface water downstream.

Table 6.4: Drinking Water Quality Compliance Within Each County Where a Designated Raised Bog SAC Occurs

County / City	Micro Compliance Rate	Chemical Compliance Rate	Reason for non-compliance
Cavan	100%	97.9%	Trihalomethanes non- compliances were primarily due to the chlorination of water with elevated levels of organic matter present. The bromate exceedance was determined to be a disinfection byproduct linked to the type of treatment used at the plant. Fluoride non-compliances were due to elevated levels of fluoride above the Irish standard. However, all samples were below the EU fluoride standard of 1.5 mg/l.
Clare	100%	100%	N/A
Galway City	100%	100%	N/A
Galway County	100%	99.6%	Trihalomethanes non-compliances were primarily due to the chlorination of water with elevated levels of organic matter present.
Kerry	99.9%	96.9%	Trihalomethanes non-compliances were primarily due to the chlorination of water with elevated levels of organic matter present while nitrites (at WTP) and tetrachloroethene & trichloroethene non-compliances were once off occurrences and follow up samples were clear. The fluoride non-compliances were due to elevated levels of fluoride above the Irish standard. However, all samples were below the EU fluoride standard of 1.5 mg/l. The pesticides exceedances were due to elevated levels of pesticides (MCPA) in the source water.
Kildare	100%	100%	N/A
Mayo	100%	99.3%	Trihalomethanes non-compliances were primarily due to the chlorination of water with elevated levels of organic matter present. Fluoride non-compliances were due to elevated levels of fluoride above the Irish standard. However, all samples were below the EU fluoride standard of 1.5 mg/l.
Laois	99.6%	99.8%	The microbiology non-compliance was due to 1E-coli non-compliance. The fluoride non-compliances were due to elevated levels of fluoride above the Irish standard. However, all samples were below the EU fluoride standard of 1.5 mg/l. The mercury non-compliance was due to elevated levels of

County / City	Micro Compliance Rate	Chemical Compliance Rate	Reason for non-compliance
			mercury in the source water, however all previous and subsequent samples were compliant.
Longford	100%	96.8%	Trihalomethanes non-compliances were primarily due to the chlorination of water with elevated levels of organic matter present. The fluoride non-compliance was due to elevated levels of fluoride above the Irish standard. However, all samples were below the EU fluoride standard of 1.5 mg/l. The pesticide exceedance was due to elevated levels of pesticides (MCPA) in the source water.
Meath	100%	100%	N/A
Offaly	100%	99.3%	Trihalomethanes non-compliance was primarily due to the chlorination of water with elevated levels of organic matter present. The fluoride non-compliances were due to elevated levels of fluoride above the Irish standard. However, all samples were below the EU fluoride standard of 1.5 mg/l. The pesticide exceedance was due to elevated levels of pesticides (Mecoprop) in the source water.
Roscommon	99.7%	99.2%	The microbiology non-compliance was due to 1E-coli non-compliance. The trihalomethanes non-compliances were primarily due to the chlorination of water with elevated levels of organic matter present whilst the nitrites (at WTP) non-compliance was a once off occurrence and all follow up samples were clear. The fluoride noncompliance was due to elevated levels of fluoride above the Irish standard. However, levels were below the EU fluoride standard of 1.5 mg/l. The lead noncompliance was due to the presence of lead communication pipes in the supply.
Sligo	100%	98.8%	Lead non compliances were due to the presence of lead in the communication pipe, service pipe and/or internal plumbing of consumer's premises. The trihalomethanes non-compliances were primarily due to the chlorination of water with elevated levels of organic matter present.
North Tipperary	100%	100%	N/A
Westmeath	100%	99.7%	Trihalomethanes non-compliance was primarily due to the chlorination of water with elevated levels of organic matter present. The copper non-compliance was a once off occurrence and all follow up samples were clear.

Flood Risk

Catchment Flood Risk Assessment and Management (CFRAM) Studies and Plans are currently being prepared at the River Basin district level in line with the EU Floods Directive. The RBD relevant to the current plan are: the Western River Basin District, Shannon International River Basin District, the South Western River Basin District, the South Eastern River Basin District and the Eastern River Basin District. There will be legislative and policy linkage between the Plan and River Basin Management Plans and CFRAM studies. The majority of the 53 SAC sites are situated in the Shannon International River Basin District.

Raised bogs play an important part in regulating water within a catchment and in maintaining water quality. The ability of intact raised bogs to help to filter contaminants and release 'clean' water means that they have the potential to fulfil an essential role as source areas for rivers, especially in maintaining low flows during dry periods. Under certain geographical conditions, raised bogs can control the flow of water within a catchment, mitigating flooding downstream. The storage capacity of a natural bog is, however, limited and depends on the composition of the top layer of the bog and the quality (presence or absence of drainage and cutting) of the bog margins. Damage to bogs, especially where channels have been created from cutting, drainage and loss of vegetation, can increase the amount and speed of water leaving the bog.

There are currently no co-ordinated national datasets relating to flood risk, although these are in preparation through the CFRAM Studies. The location of major water bodies in relation to areas of human population are illustrated in the maps in **Figure 6.1.**

The overall aim of the national Raised Bog SAC management Plan is to restore and conserve the 53 designated sites and as part of the restoration process, the main objective will be to restore the water table to lie as close as is achievable to the surface of the raised bog through rewetting and by blocking surface drains, among other measures. This constitutes a sensitive issue for landowners as the rewetting will return degraded raised bog to a more natural state. However, this may be considered a form of flooding, as in some cases affected landowners utilised the reclaimed bog land for agricultural purposes.

Increasing water levels close to the surface of the bog may also have potential to impact the raised bog ecosystem on a micro habitat level, and in turn affect the requirements of some protected species within the raised bog SACs such as *Vertigo* and Marsh Fritillary, and protected bird species such as Red Grouse.

Eco-tourism and Recreation

Bogs provide an opportunity for eco-tourism, recreation and education in Ireland. Ecotourism has been defined by the International Tourism Society as 'responsible travel to natural areas that conserves the environment and improves the welfare of local people', and is a market which appears to have growth potential in Ireland.

Raised bogs are a unique landscape that cannot be replicated by other habitats. They are a living landscape and because they provide a natural support for unique flora and fauna, they provide recreational opportunities including wildlife watching. Nature as a source of well-being is now generating an economic value. Outdoor experiences in the open landscape (and bogs are ideal places) are increasingly used and have provided inspiration throughout history for poets, painters, artists.

Bogs can also be used as an educational resource with diverse potential subjects of learning including the natural environment, arts and crafts and local heritage. The Clara Bog Visitor Centre and Nature Reserve provides a good example of the educational potential of bogs. The Visitor Centre is open for six months of the year and provides multimedia displays and presentations along with picture board information; while interpretation boards are installed along the bog boardwalk to increase understanding of the bog environment. The Centre also provides guided walks and children's activities such as nature arts and crafts sessions and summer camps.

Increased awareness and understanding of the importance of raised bogs will be achieved through a national Raised Bogs Education and Awareness Programme, which is one of the proposed measures of the Plan. However, disturbance to the species supported within the raised bog sites is likely to increase where there is an increase in activity levels from recreation and amenity. It is particularly important that measures to be undertaken within areas with the known presence of protected bird species for breeding or feeding grounds are undertaken in a sensitive way.

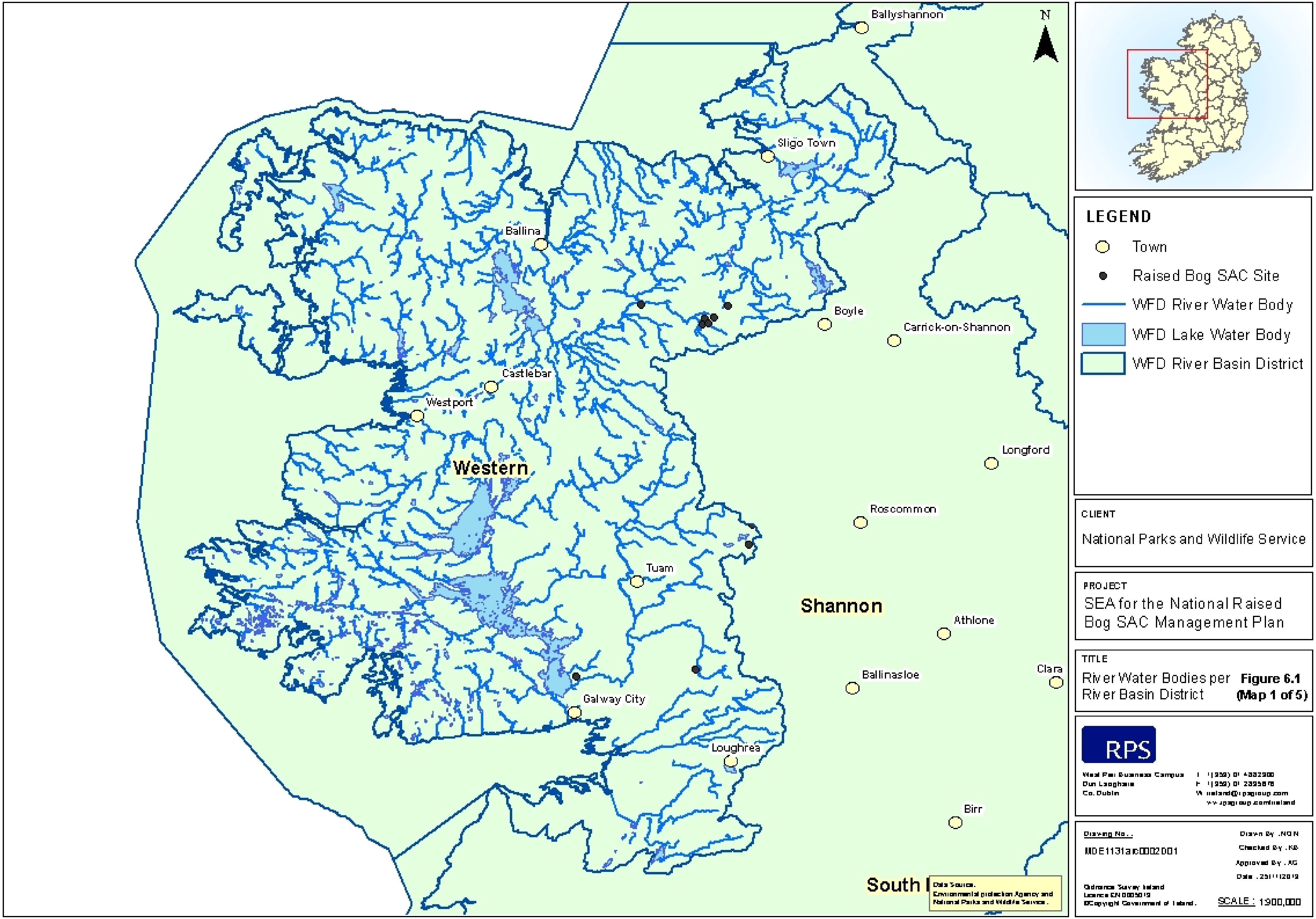
Existing Environmental Pressures / Problems: Population and Human Health

Ireland's economy experienced unprecedented economic growth for over a decade from the early 1990's. Traditionally based around agriculture, particularly livestock farming, it is now dominated by services and industry. Ireland has seen expansion in other sectors throughout this time, particularly construction. This brought new individual houses and housing clusters, reliant on septic tanks. Significant growth in population has occurred in rural areas adjacent to towns. This growth is resulting in individual houses in the countryside and housing clusters in small villages throughout much of the country. This has resulted in significant pressures on water quality as a result of wastewater and water supply requirements in these areas.

Other potential constraints in relation to PHH include possible damaging activities influencing flooding and climate change. These include agricultural activities such as drainage and the development of settlements and industries in the flood plains of rivers and coastal area. Additionally, pressure from abstractions can reduce flow in springs and lower water levels in lakes, wetlands and wells. This can make the water supply itself unsustainable and have an indirect impact on aquatic plants and animals as well as wetland areas. In extreme cases riverbeds may dry up, lakeshores can become exposed and, in coastal areas, salt water may intrude into groundwater. In addition, the introduction of water charges for the farming sector may see a return to the use of private wells, which may give rise to localised abstraction issues.

Agriculture is an important activity in all regions containing raised bog SAC. Agricultural practices can contribute to changes in the hydrological regime which can be damaging to

raised bogs. Reclamation of raised bog for agriculture has resulted in bogs being drained which lowers the water table and the living top layer of the bog disappears, ceasing active peat formation. Any practice that leads to exposure of bare ground can increase the fine sediment and nutrient load to the river.



Ballyshannon
N
Sligo Town
Ballina
Boyle
Carrick-on-Shannon
Castlebar
Westport
Western
Longford
Roscommon
Tuam
Shannon
Athlone
Ballinasloe
Clara
Galway City
Loughrea
Birr
South
Data Source.
Environmental protection Agency and National Parks and Wildlife Service.
LEGEND
Town
Raised Bog SAC Site
WFD River Water Body
WFD Lake Water Body
WFD River Basin District
CLIENT
National Parks and Wildlife Service
PROJECT
SEA for the National Raised Bog SAC Management Plan
TITLE
River Water Bodies per River Basin District
Figure 6.1
(Map 1 of 5)
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SCALE :

LEGEND

- Town
- Raised Bog SAC Site
- WFD River Water Body
- WFD Lake Water Body
- WFD River Basin District

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PROJECT

SEA for the National Raised Bog SAC Management Plan

TITLE

River Water Bodies per River Basin District **Figure 6.1 (Map 2 of 5)**

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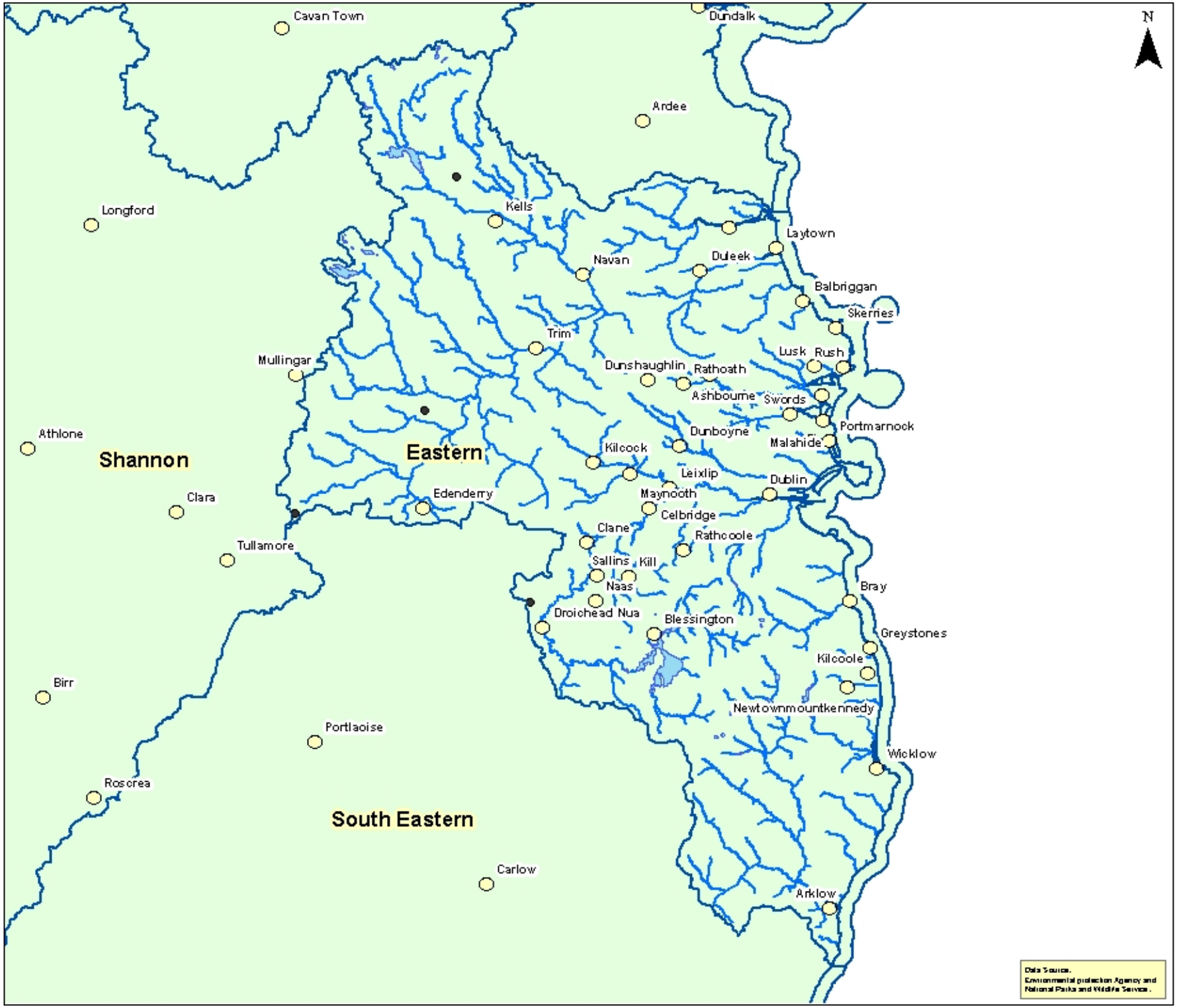

LEGEND

- Town
- Raised Bog SAC Site
- WFD River Water Body
- WFD Lake Water Body
- WFD River Basin District

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River Water Bodies per River Basin District **Figure 6.1 (Map 3 of 5)**

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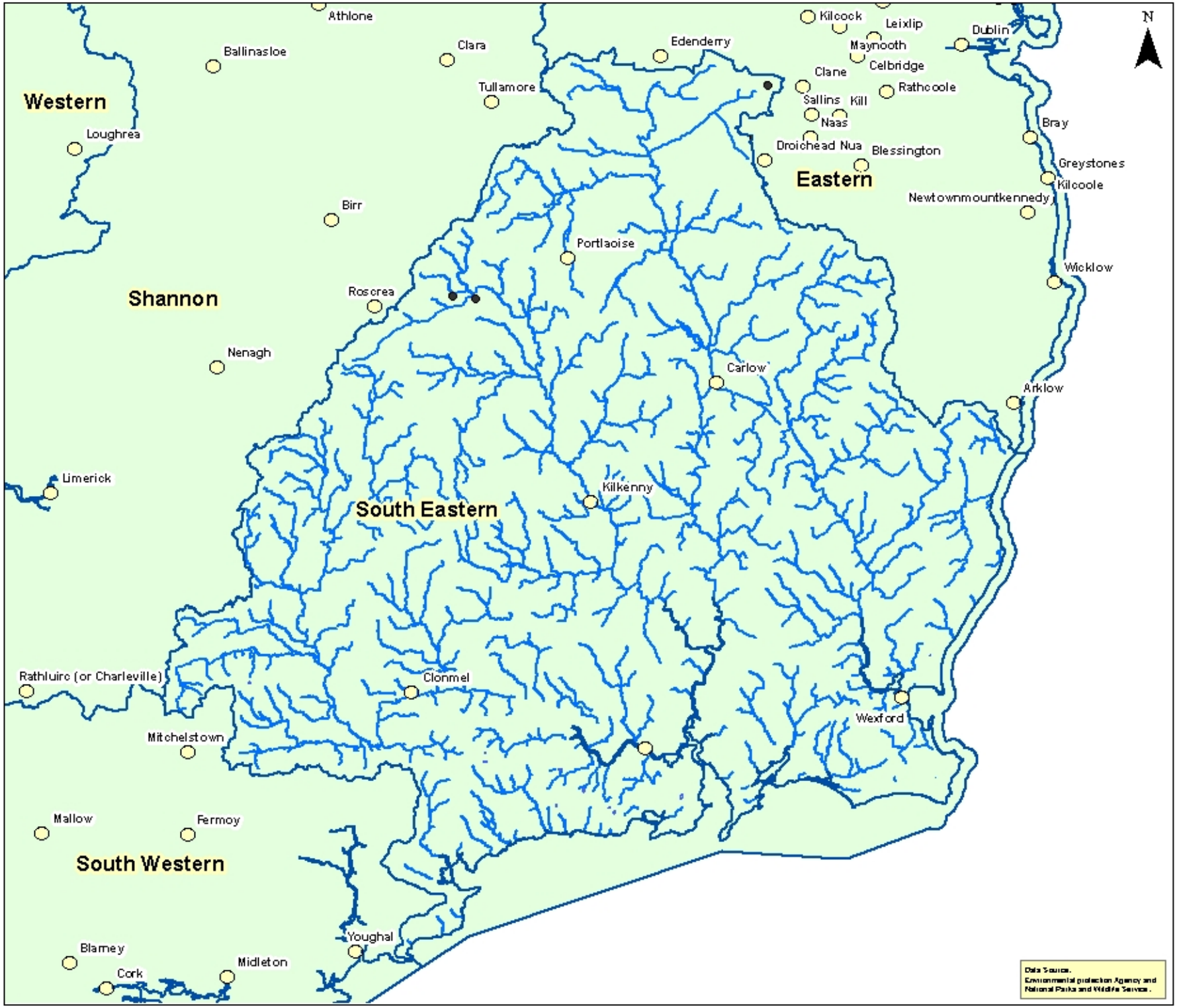

LEGEND

- Town
- Raised Bog SAC Site
- WFD River Water Body
- WFD Lake Water Body
- WFD River Basin District

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SEA for the National Raised Bog SAC Management Plan

TITLE

River Water Bodies per River Basin District **Figure 6.1 (Map 4 of 5)**

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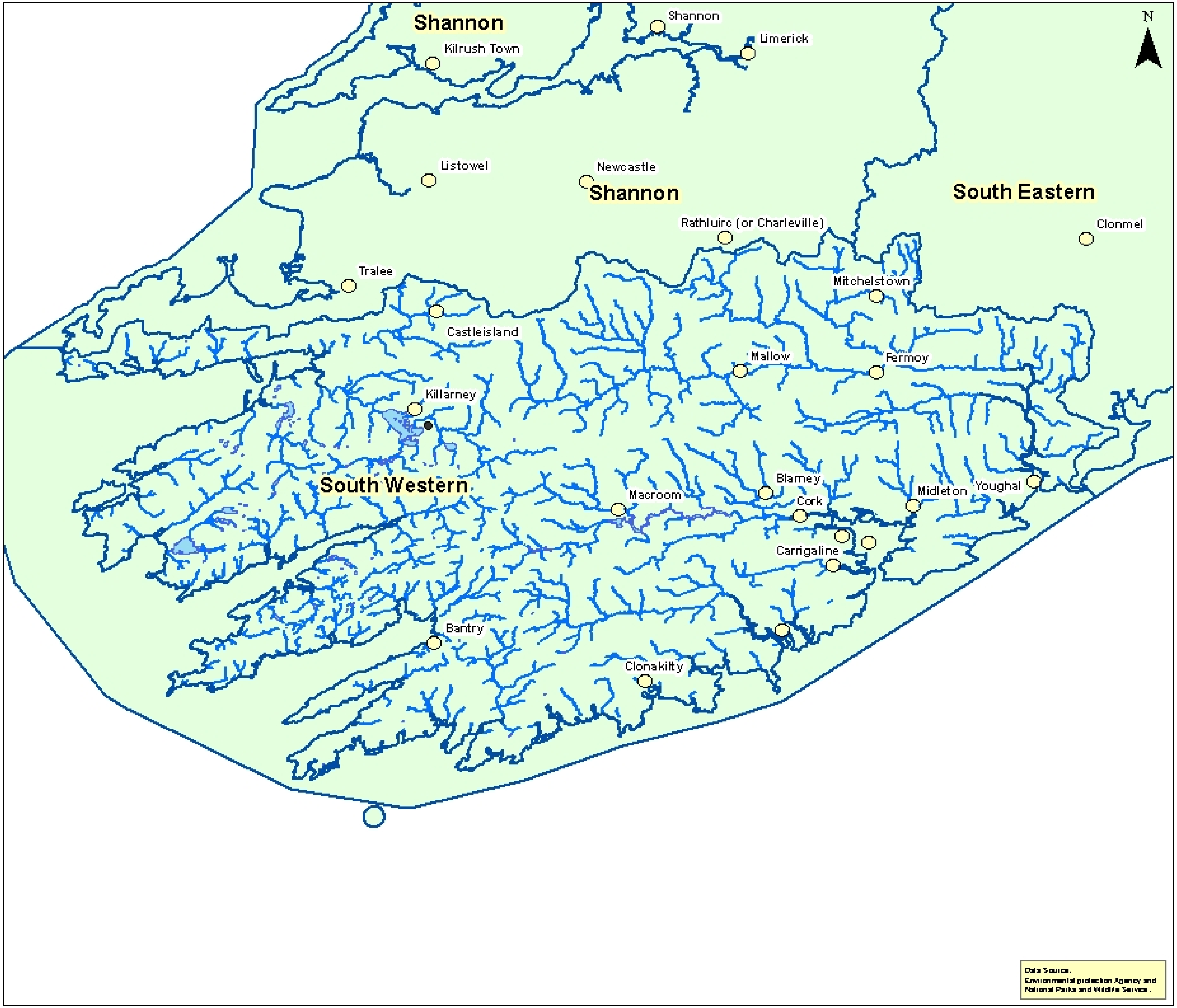

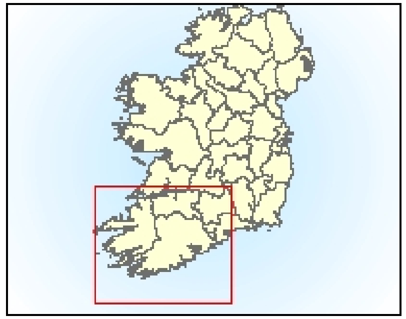

LEGEND

- Town
- Raised Bog SAC Site
- WFD River Water Body
- WFD Lake Water Body
- WFD River Basin District

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TITLE

River Water Bodies per River Basin District

Figure 6.1 (Map 5 of 5)

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6.1.3 Soil

Soils issues in relation to the National Raised Bog SAC Management Plan include disturbance to soils, erosion (e.g. through cutting machine damage) and nutrient movement as a result of land uses such as turf cutting, agriculture and forestry. In addition, nutrient movement and storage within soils is dependent upon the soil types, topography, degree of nutrient addition/cycling, together with climatic factors.

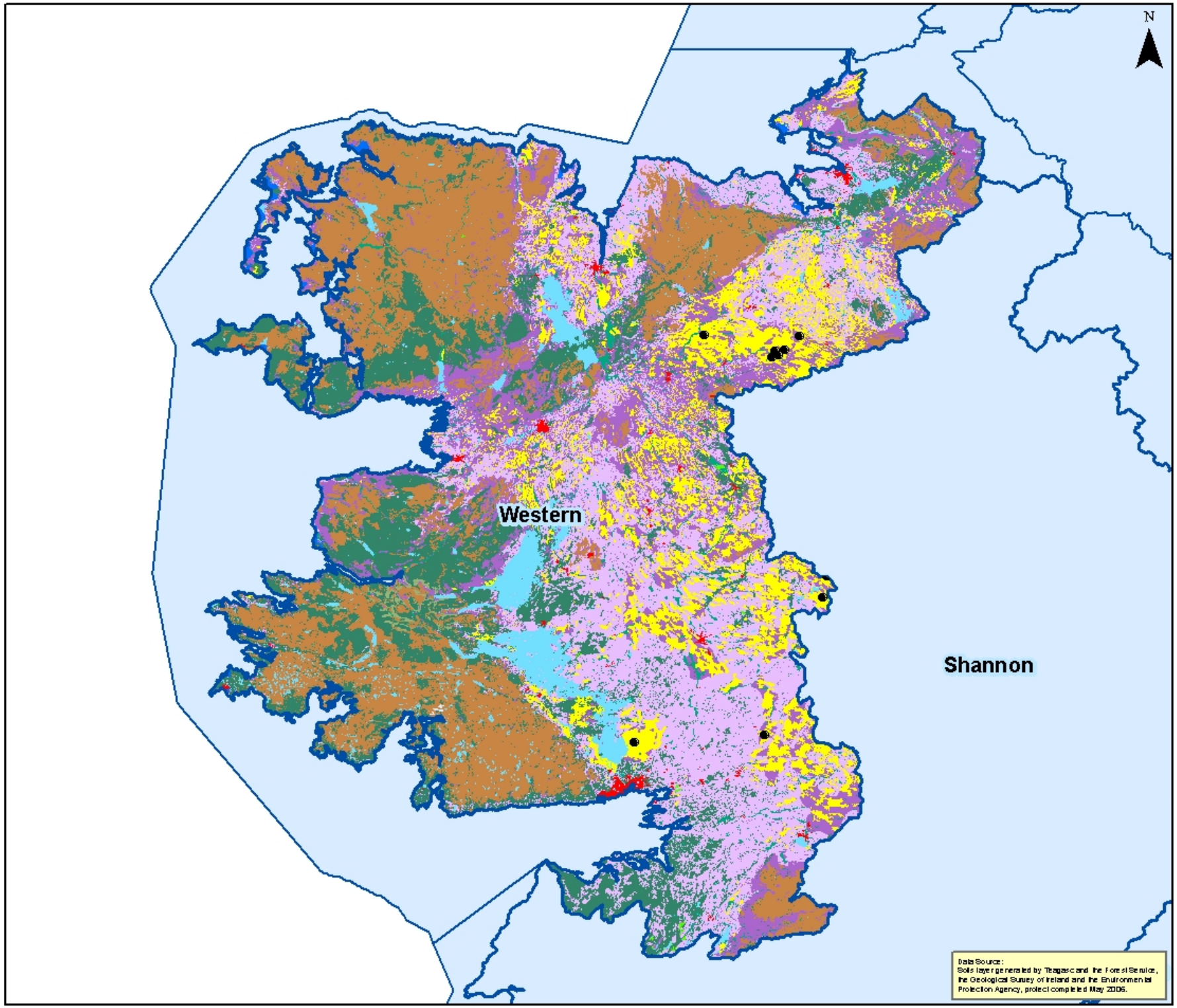
6.1.3.1 Nutrient Movement

Raised bogs by their nature tend to be nutrient poor and acidic, and are fed primarily through rainwater. The movement of nutrients through soil layers and into surface and groundwaters is primarily related to agricultural and forestry activities in the form of applied fertilisers. In addition, nutrients and pathogens are also transported to water bodies through the soil layer from livestock grazing along water body edges.

6.1.3.2 Soils Quality

As is the case on most of the Raised Bog SAC sites, when water levels within the raised bog wetland are artificially maintained at lower than natural levels by undertaking drainage of the wetland, the peat substrate is exposed to oxygen levels that are not normal in these natural bog wetlands systems. This oxygenation of the peat substrate results in the breakdown of the peat.

Raised bog soils are sensitive to compaction, and heavy plant machinery accessing the high bog for works at cut bank faces or re-profiling work has the potential to cause degradation and damage to the bog through compaction to the soil, and removal of habitats at the micro-habitat level. In addition, use of plant machinery on high bog can impact on the site hydrology and the interaction between the acrotelm and the catotelm. Soil maps for the areas covered by the 53 raised bog SAC sites are shown in **Figure 6.2.**



LEGEND

- WFD River Basin District
- Raised Bog SAC Sites

Great Soil Groups

- Lithosols
- Podzolics
- Gleys
- Raised Bog
- Blanket Peat
- Cutover Peat
- Fen Peat
- Scree
- Alluvium
- Marine Undifferentiated
- Water
- Made Ground

CLIENT

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SEA for the National Raised Bog SAC Management Plan

TITLE

Soil Mapping per River Basin District **Figure 6.2 (Map 1 of 5)**

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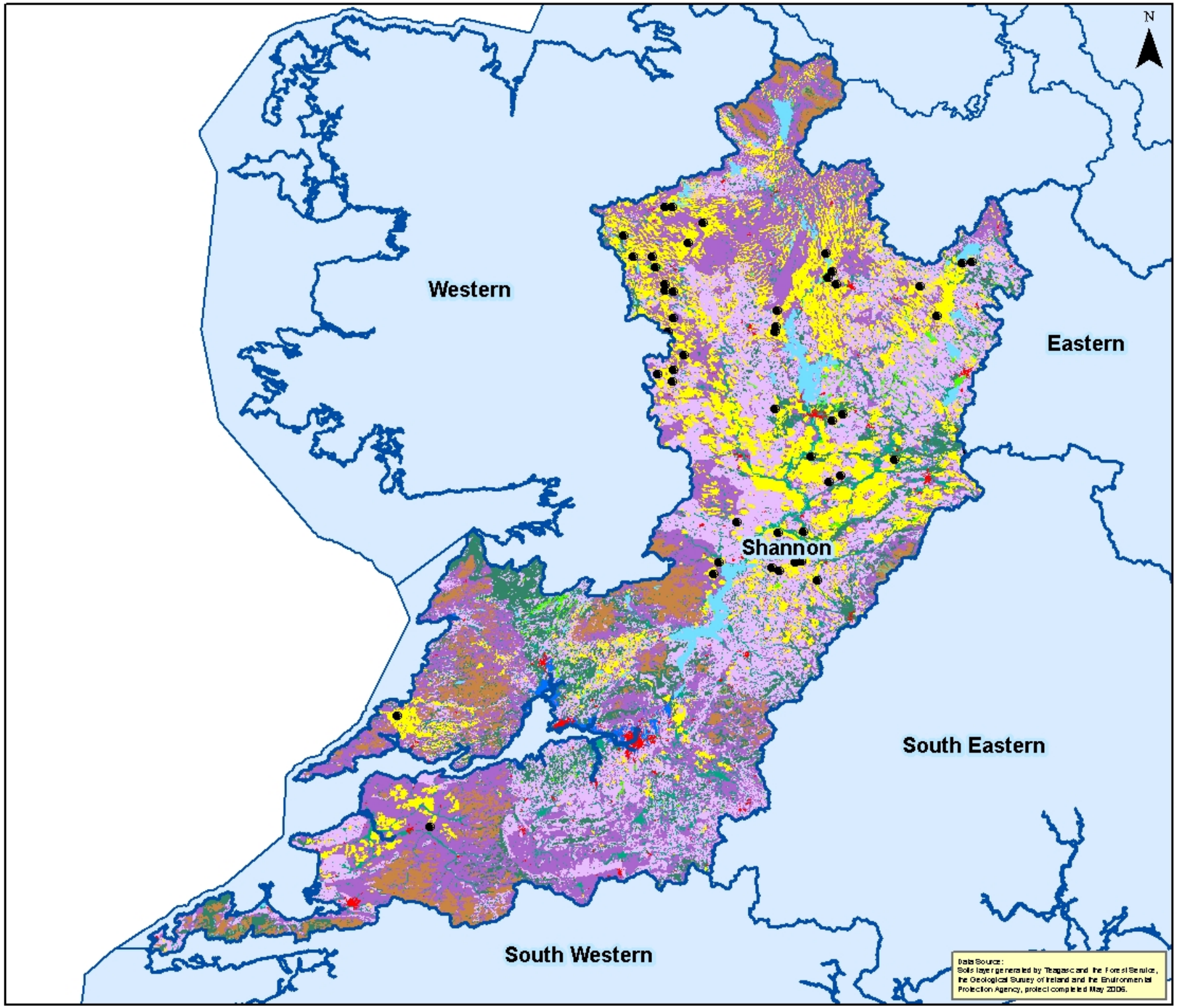

LEGEND

- Raised Bog SAC Sites
- WFD River Basin District

Great Soil Groups

- Lithosols
- Podzolics
- Gleys
- Raised Bog
- Blanket Peat
- Cutover Peat
- Fen Peat
- Scree
- Alluvium
- Marine Undifferentiated
- Water
- Made Ground

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TITLE

Soil Mapping per River Basin District

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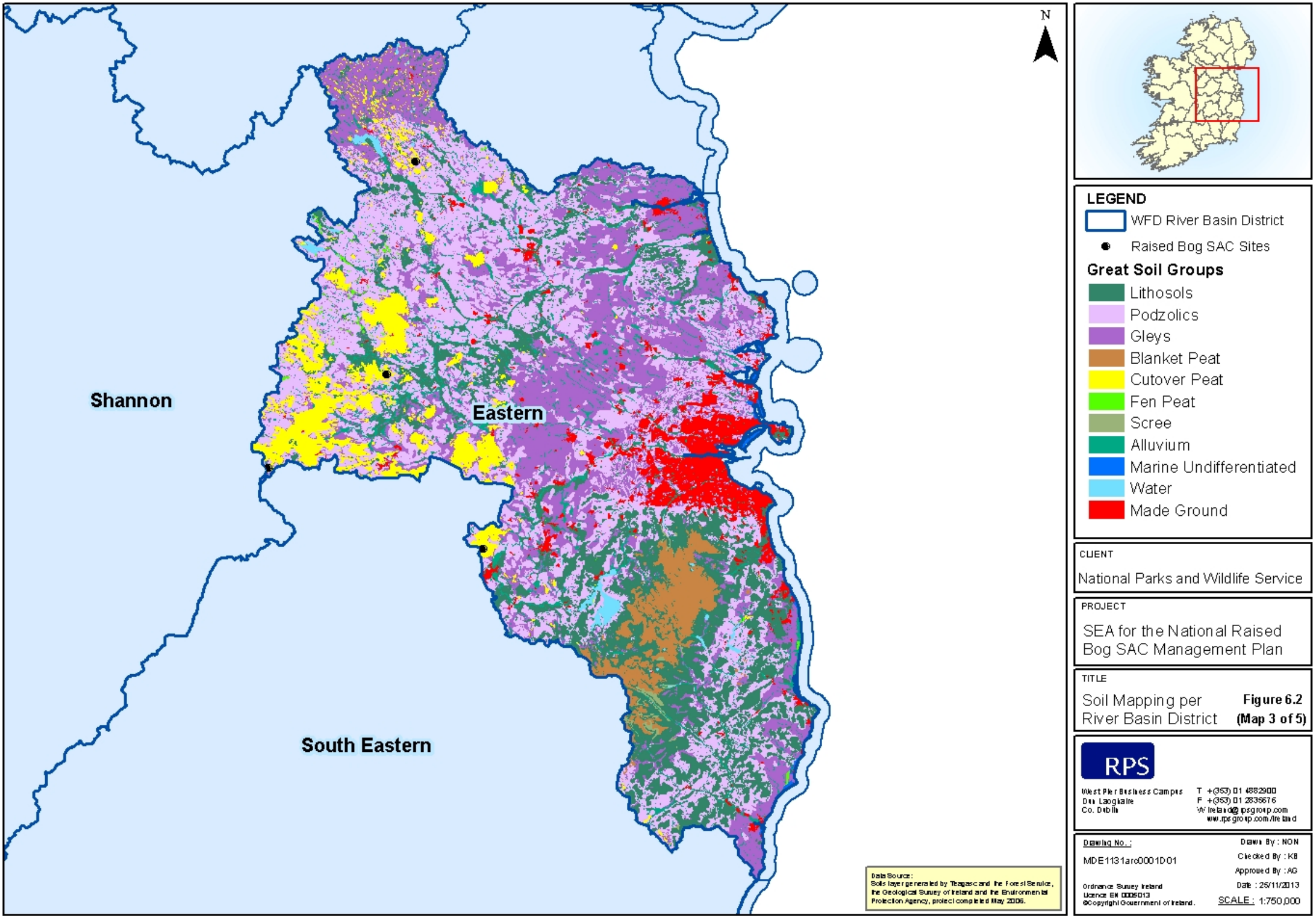

LEGEND

- WFD River Basin District
- Raised Bog SAC Sites

Great Soil Groups

- Lithosols
- Podzolics
- Gleys
- Blanket Peat
- Cutover Peat
- Fen Peat
- Scree
- Alluvium
- Marine Undifferentiated
- Water
- Made Ground

CLIENT

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SEA for the National Raised Bog SAC Management Plan

TITLE

Soil Mapping per River Basin District **Figure 6.2 (Map 3 of 5)**

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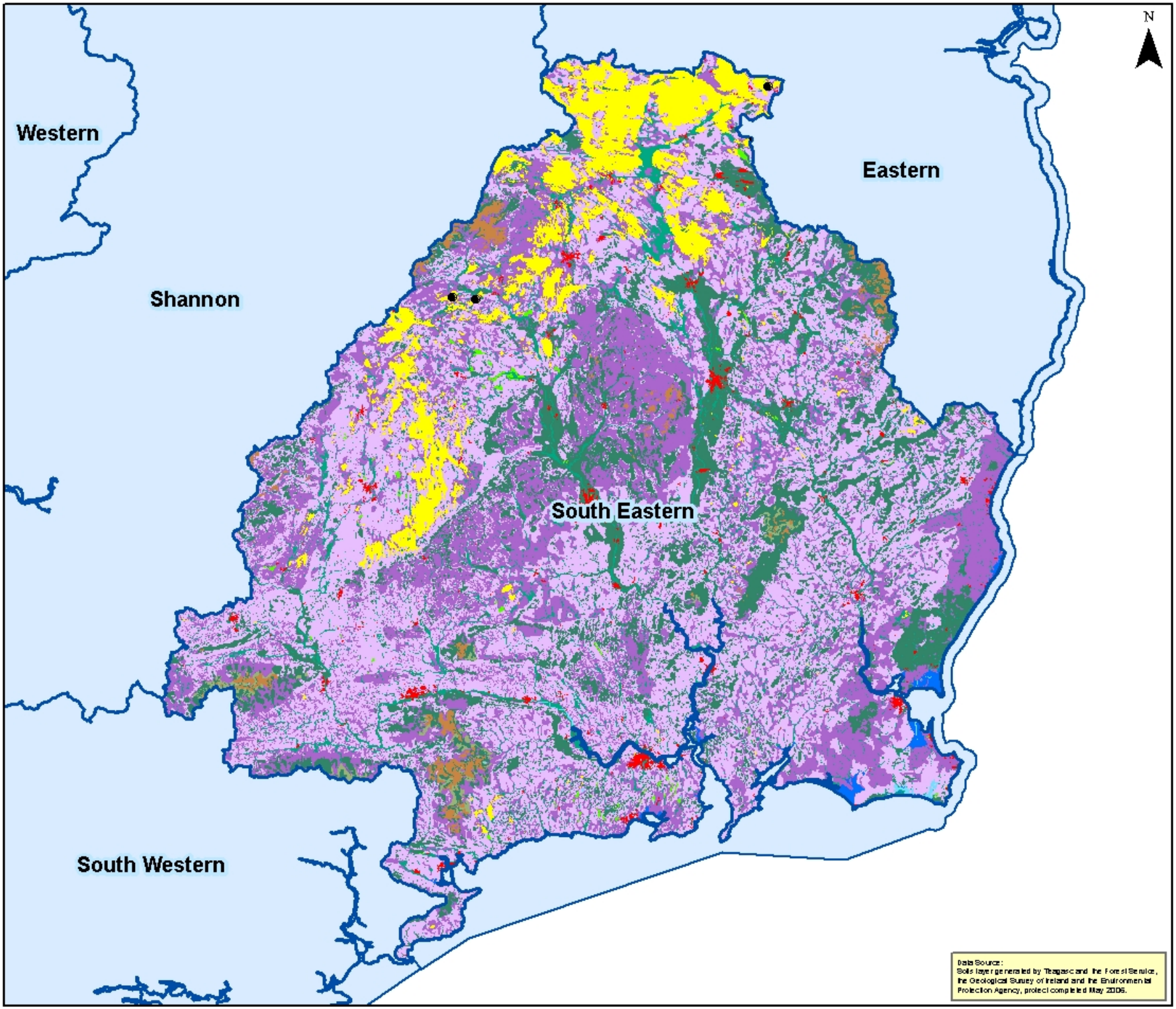

LEGEND

- WFD River Basin District
- Raised Bog SAC Sites

Great Soil Groups

- Lithosols
- Podzolics
- Gleys
- Blanket Peat
- Cutover Peat
- Fen Peat
- Scree
- Alluvium
- Marine Undifferentiated
- Water
- Made Ground

Data Source:
Soils layer generated by Teagasc and the Forest Service, the Geological Survey of Ireland and the Environmental Protection Agency, project completed May 2006.

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Soil Mapping per River Basin District **Figure 6.2 (Map 4 of 5)**

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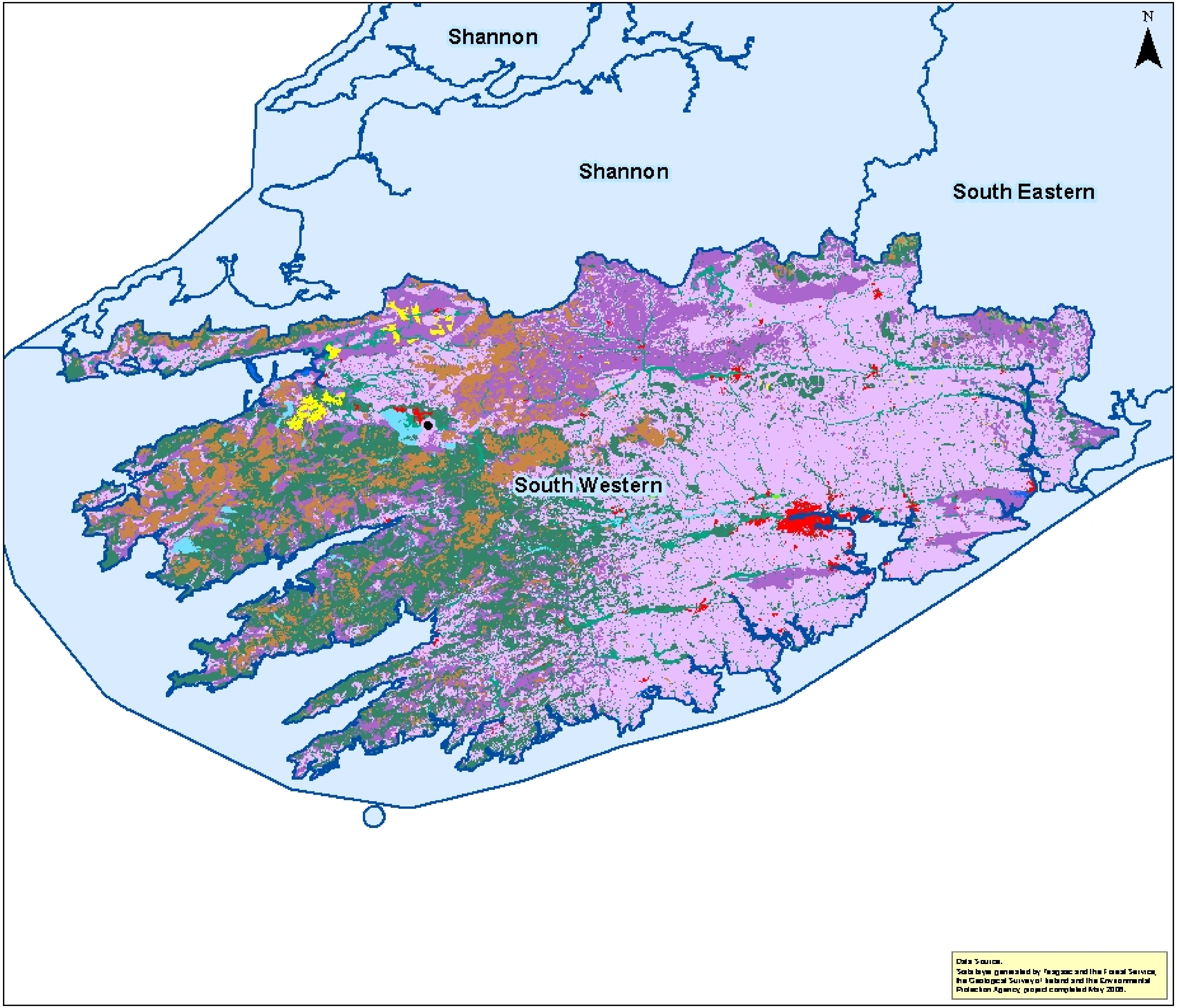

LEGEND

- WFD River Basin District
- ● Raised Bog SAC Sites

Great Soil Groups

- Lithosols
- Podzolics
- Gleys
- Blanket Peat
- Cutover Peat
- Fen Peat
- Scree
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Soil Mapping per River Basin District

Figure 6.2 (Map 5 of 5)

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Existing Environmental Pressures / Problems: Soils

Predictions have been made about the impact of global warming on Ireland, with these predictions indicating a change to wetter winters and drier summers (Sweeney, 1997[3]). In addition there may be an increase in frequency of high intensity rainfall events. Such precipitation changes could have serious implications for slope stability and landslides and their resultant impacts on water management activities.

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

Extraction activities, when mismanaged, are resulting in pressures on water quality. In particular, peat cutting can be damaging to vegetation, hydrology and landscape. Localised cutting has little long-term impact, but commercial extraction removes an irreplaceable resource. Alternately, the extractability of mineral, sand and gravel resources is also being curtailed and/or reduced by the encroachment of residential development into rural areas and the conflicts between people and the impacts associated with these activities, e.g. noise, traffic.

Soil is removed by the action of cutting turf for use as a source of fuel. Turf cutting can also result in subsidence, sediment loss and collapse and failure of the peat bank as it dries out. The use of heavy machinery on bogs, for example for forestry use or industrial cutting of peat can cause compaction of soil.

[3] SWEENEY, J. (1997) Ireland, *In*: Wheeler, D. & Mayes, J. (eds) *Regional Climates of the British Isles*. London: Routledge.

6.1.4 Water

6.1.4.1 Water Quality

A new "water status" assessment approach was introduced in Ireland as part of the WFD implementation by local authorities. The approach incorporated chemical and biological monitoring into a status grade for each water body. **Table 6.5** contains a summary of the water quality information for each raised bog SAC catchment. River water body status maps of each of the 5 RBDs relevant to the Plan are shown in **Figure 6.3,** with groundwater status shown in **Figure 6.4.** As noted earlier intact raised bogs help to filter contaminants and release 'clean' water, and therefore have a function to play in helping to maintain high status water quality.

Table 6.5 Overall Water Quality in Each Raised Bog SAC Catchment

Raised Bog SAC Site	Overall Water Quality: Under *Water Framework Directive Status from the River Basin Management Plans [pink 2006-2008 and white in 2011]*
All Saints Bog and Esker SAC	1 water body with moderate status.
Ardagullion Bog SAC	1 moderate status water body.
Ardgraigue Bog SAC	1 poor status water body.
Ballyduff/Clonfinane Bog SAC	1 water body with moderate status.
Ballynafagh Bog SAC	1 water body with poor status.
Ballynamona Bog and Corkip Lough SAC	1 water body with moderate status.
Barroughter Bog SAC	1 moderate status water body.
Bellanagare Bog SAC	1 water body with good status.
Brown Bog SAC	1 water body with moderate status.
Callow Bog SAC	1 water body with good status.
Camderry Bog SAC	1 water body with good status.
Carn Park Bog SAC	1 poor status water body.
Carrowbehy/Caher Bog SAC	1 water body with moderate status.
Carrownagappul Bog SAC	1 water body with good status.
Clara Bog SAC	1 water body with moderate status.
Cloonchambers Bog SAC	1 water body with moderate status.
Clooneen Bog SAC	1 water body with moderate status.
Cloonmoylan Bog SAC	1 high status water body.
Cloonshanville Bog SAC	1 water body with good status.
Coolrain Bog SAC	1 water body with moderate status.
Corbo Bog SAC	1 water body with good status.
Corliskea/Trien/Cloonfelliv Bog SAC	1 moderate status water body, and 2 good status water bodies.
Crosswood Bog SAC	1 water body with pass status.
Curraghlehanagh Bog SAC	1 water body with good status.

Raised Bog SAC Site	Overall Water Quality: Under *Water Framework Directive Status from the River Basin Management Plans [pink 2006-2008 and white in 2011]*
Derrinea Bog SAC	1 water body with good status.
Drumalough Bog SAC	1 good status water body.
Ferbane Bog SAC	1 water body with moderate status.
Flughany Bog SAC	1 good status water body.
Garriskil Bog SAC	1 water body with good status.
Kilcarren-Firville Bog SAC	2 moderate status water bodies.
Killyconny Bog (Cloghbally) SAC	1 poor status water body.
Kilsallagh Bog SAC	1 good status water body.
Knockacoller Bog SAC	1 water body with moderate status.
Lisnageeragh Bog and Ballinastack Turlough SAC	1 water body with good status.
Lough Corrib SAC	1 water body with pass status
Lough Forbes Complex SAC	2 water bodies with moderate status
Lough Lurgeen Bog/Glenamaddy Turlough SAC	1 water body with moderate status.
Lough Ree SAC	1 water body with poor status, and 1 water body with good status.
Moanveanlagh Bog SAC	1 poor status water body.
Moneybeg and Clareisland Bogs SAC	2 water bodies with moderate status.
Mongan Bog SAC	1 water body with moderate status.
Monivea Bog SAC	1 water body with moderate status.
Mouds Bog SAC	1 water body with good status.
Mount Hevey Bog SAC	1 water body with moderate status.
Moyclare Bog SAC	1 water body with moderate status.
Raheenmore Bog SAC	1 poor status water body.
Redwood Bog SAC	1 water body with good status.
River Moy SAC	1 good status water body, and 4 high status water bodies.
Shankill West Bog SAC	1 water body with good status.
Sharavogue Bog SAC	1 water body with moderate status.
Sheheree (Ardagh) Bog SAC	1 water body with moderate status.
Tullaghanrock Bog SAC	1 water body with good status.
Tullaher Lough and Bog SAC	1 water body with moderate status.

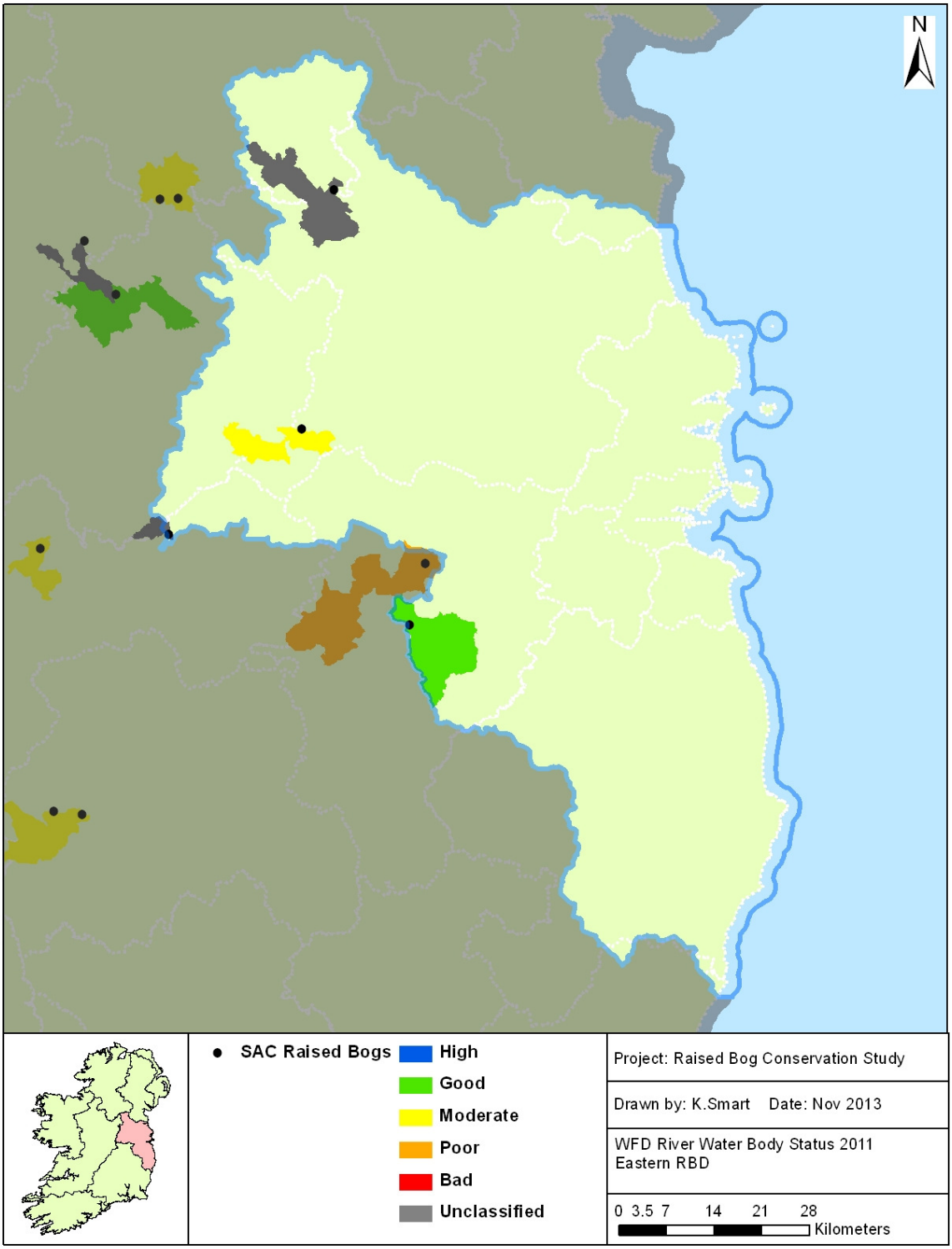
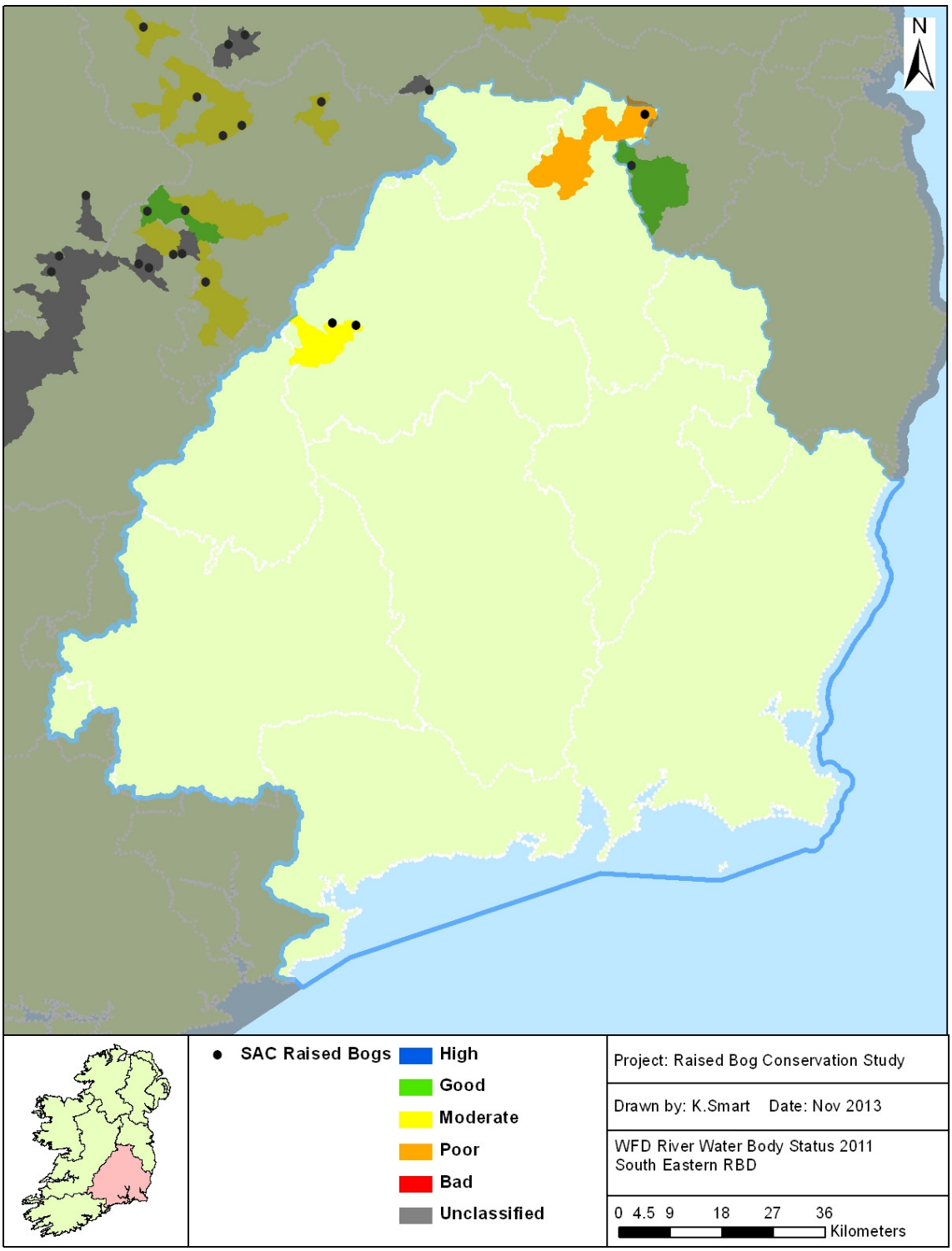
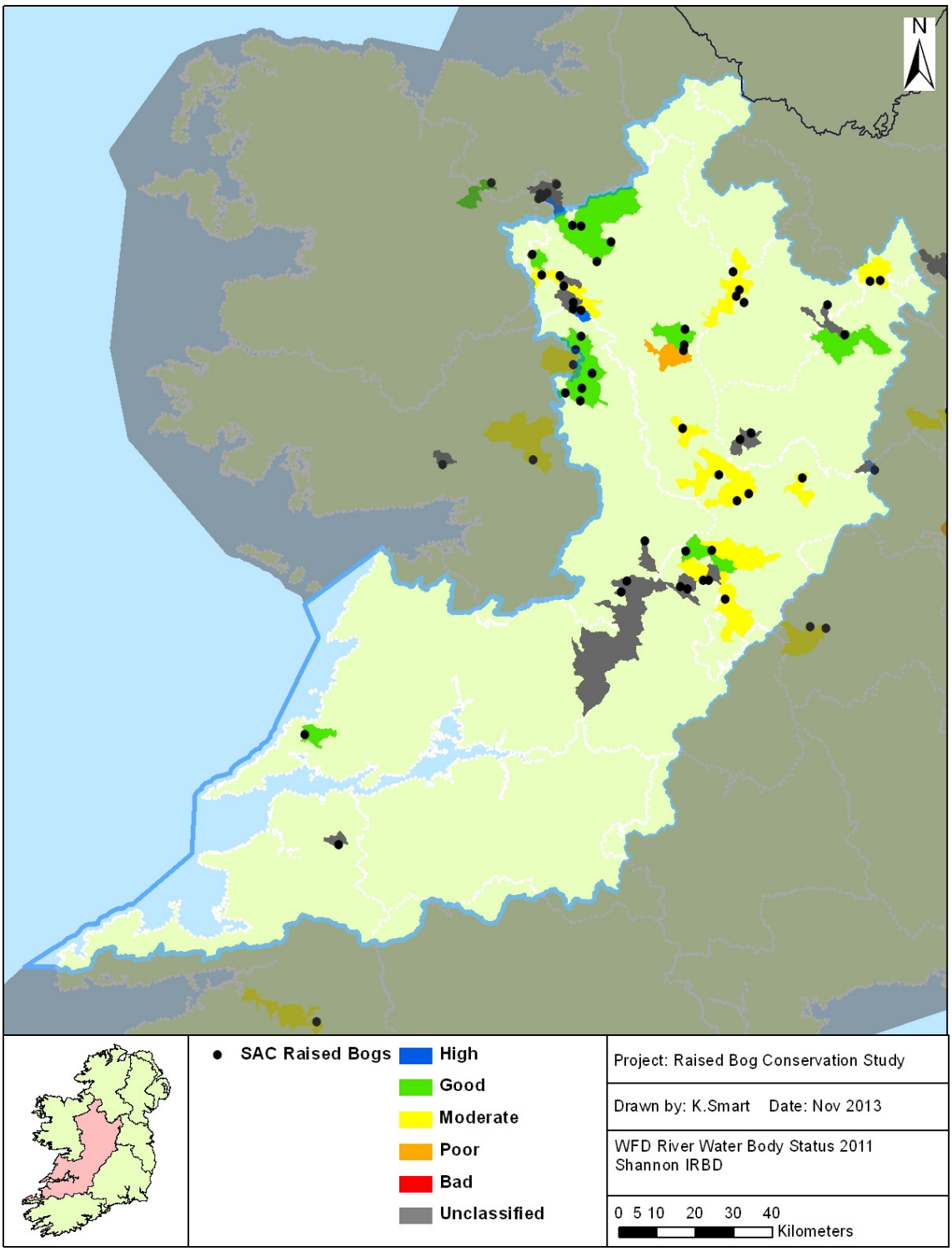
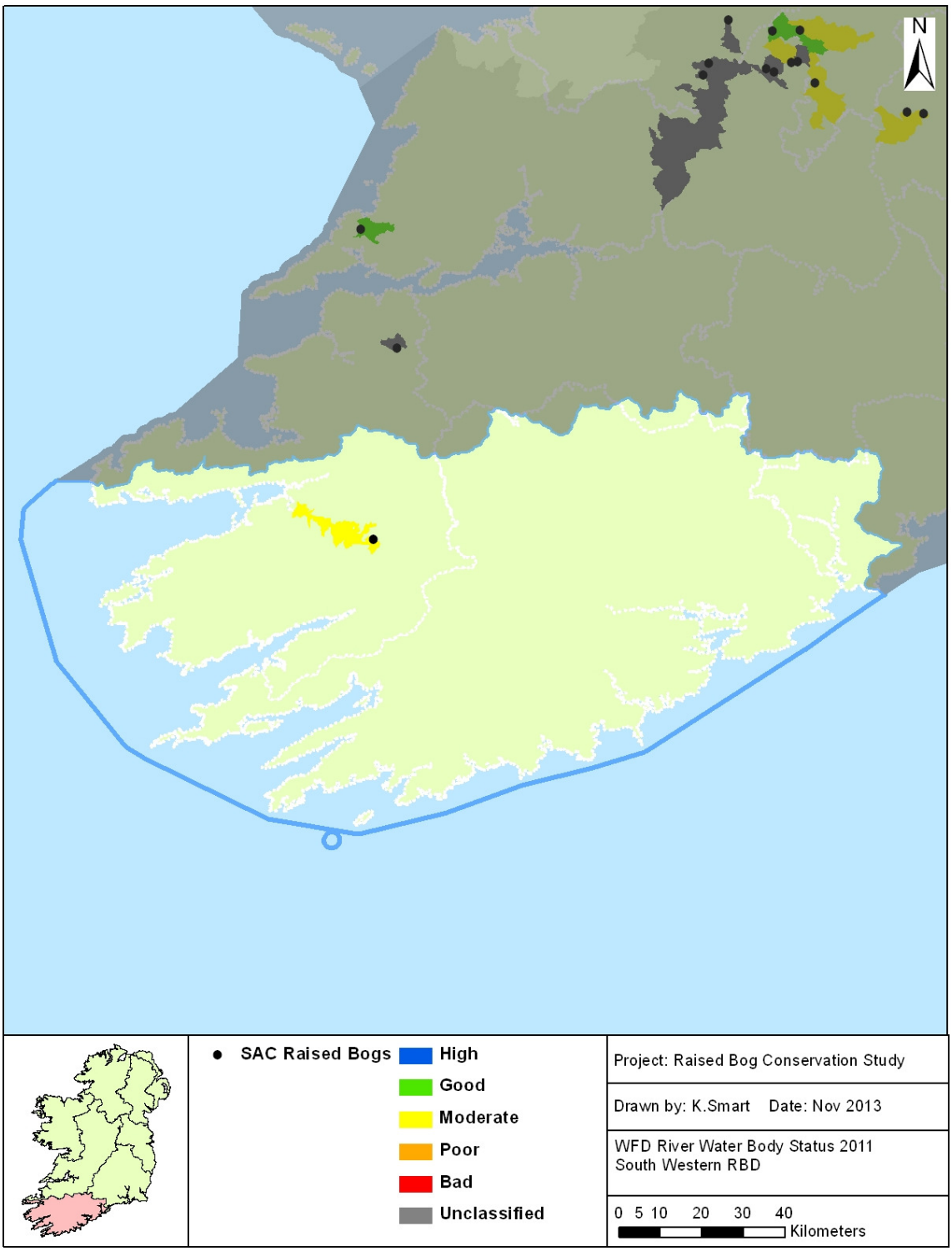
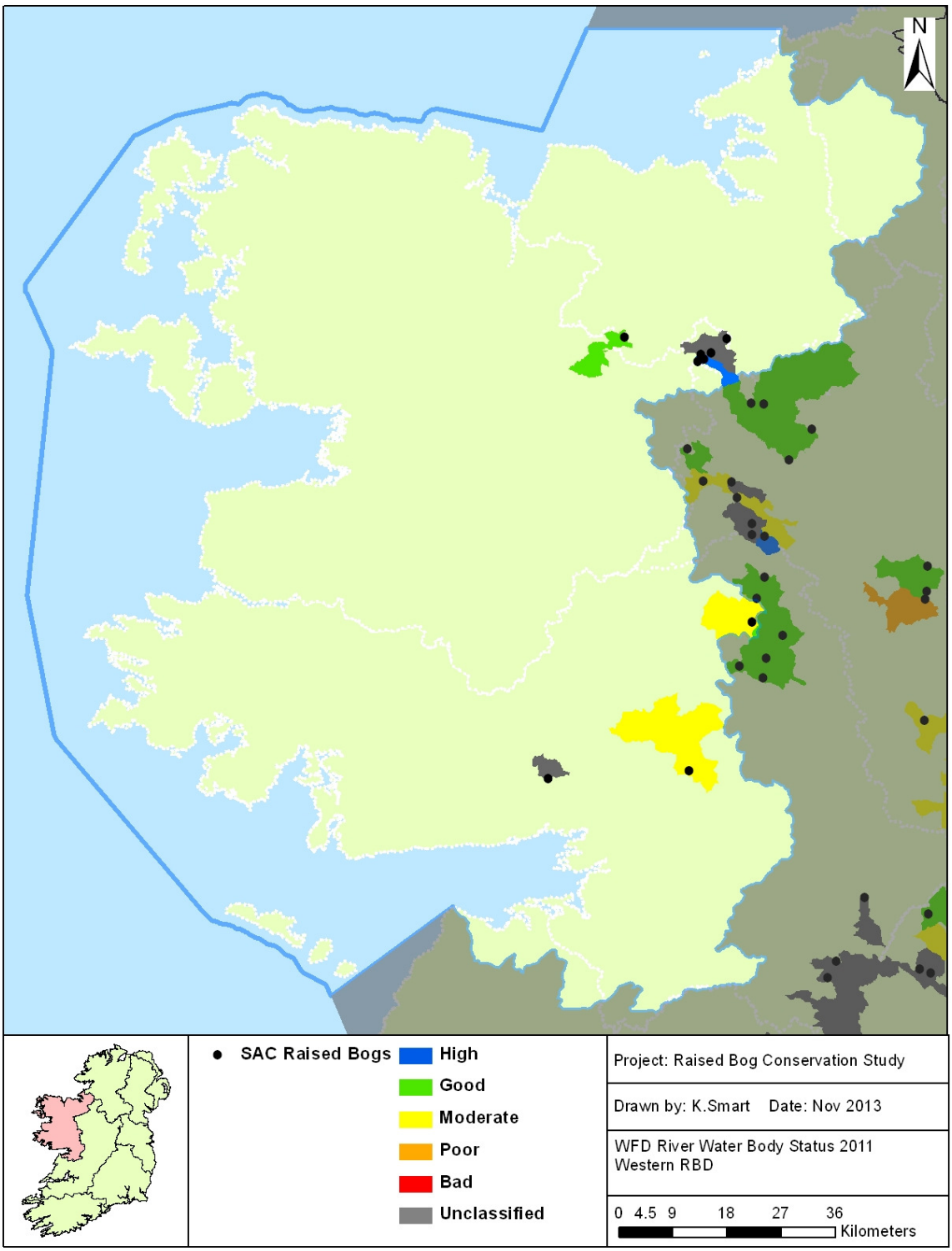


Figure 6.3 (1-5): River Waterbody Status Maps of areas Raised Bog SACs are located (in the Context of River Basin Districts)


N
SAC Raised Bogs
High
Good
Moderate
Poor
Bad
Unclassified
Project: Raised Bog Conservation Study
Drawn by: K.Smart Date: Nov 2013
WFD River Water Body Status 2011
South Eastern RBD
0 4.5 9 18 27 36
Kilometers


N
SAC Raised Bogs
High
Good
Moderate
Poor
Bad
Unclassified
Project: Raised Bog Conservation Study
Drawn by: K.Smart Date: Nov 2013
WFD River Water Body Status 2011
Shannon IRBD
0 5 10 20 30 40
Kilometers


N
SAC Raised Bogs
High
Good
Moderate
Poor
Bad
Unclassified
Project: Raised Bog Conservation Study
Drawn by: K.Smart Date: Nov 2013
WFD River Water Body Status 2011
South Western RBD
0 5 10 20 30 40
Kilometers


N
SAC Raised Bogs
High
Good
Moderate
Poor
Bad
Unclassified
Project: Raised Bog Conservation Study
Drawn by: K.Smart Date: Nov 2013
WFD River Water Body Status 2011
Western RBD
0 4.5 9 18 27 36
Kilometers

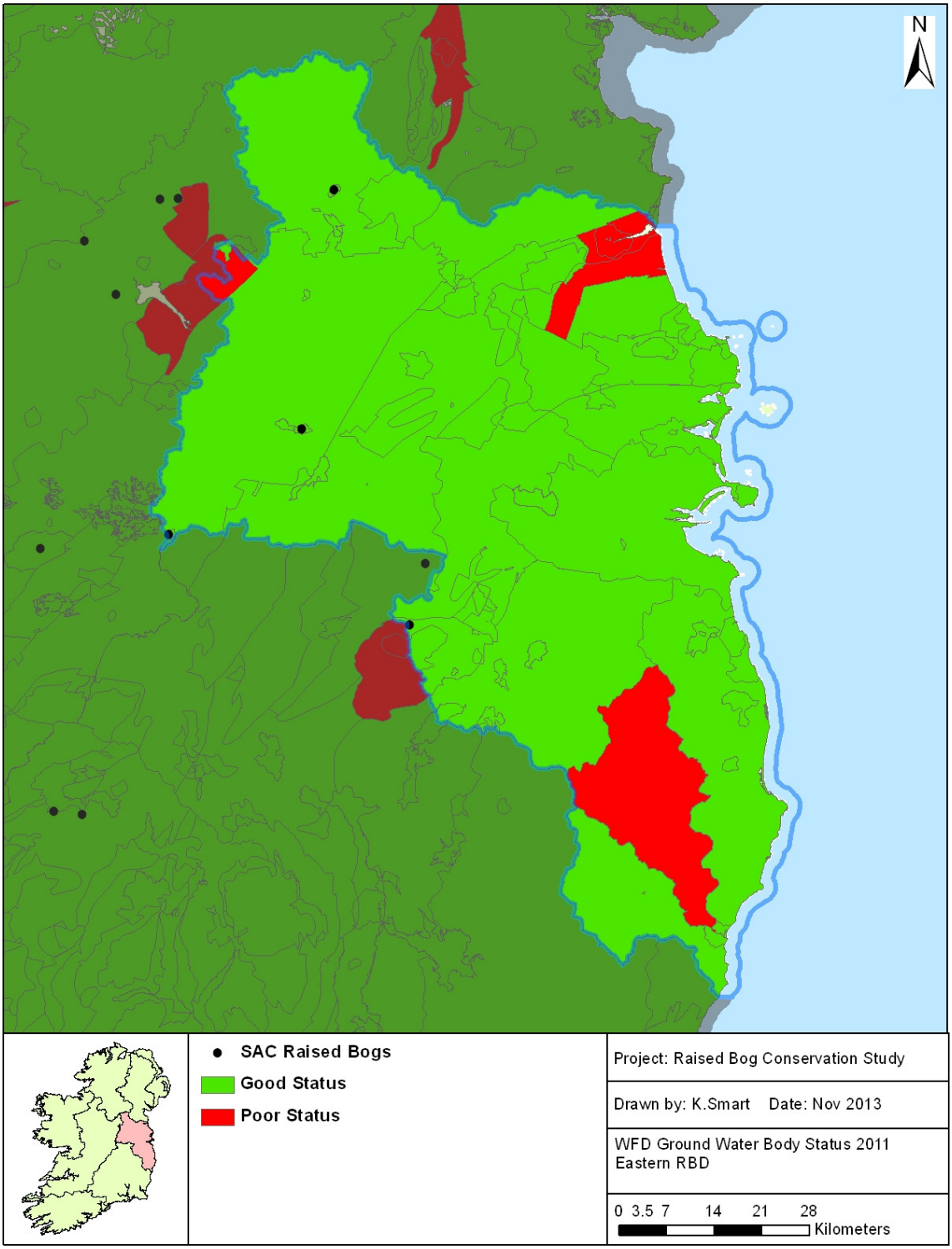
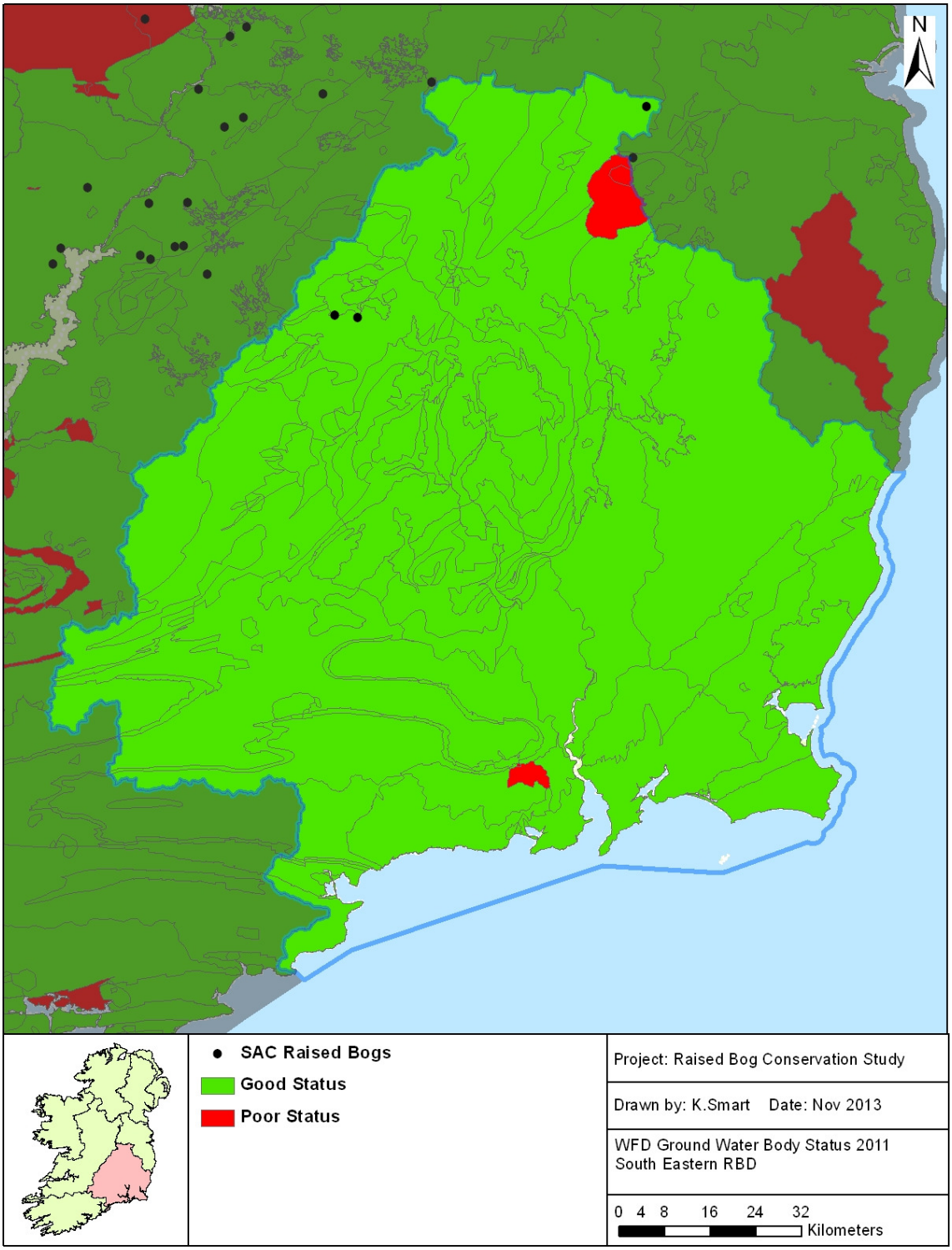
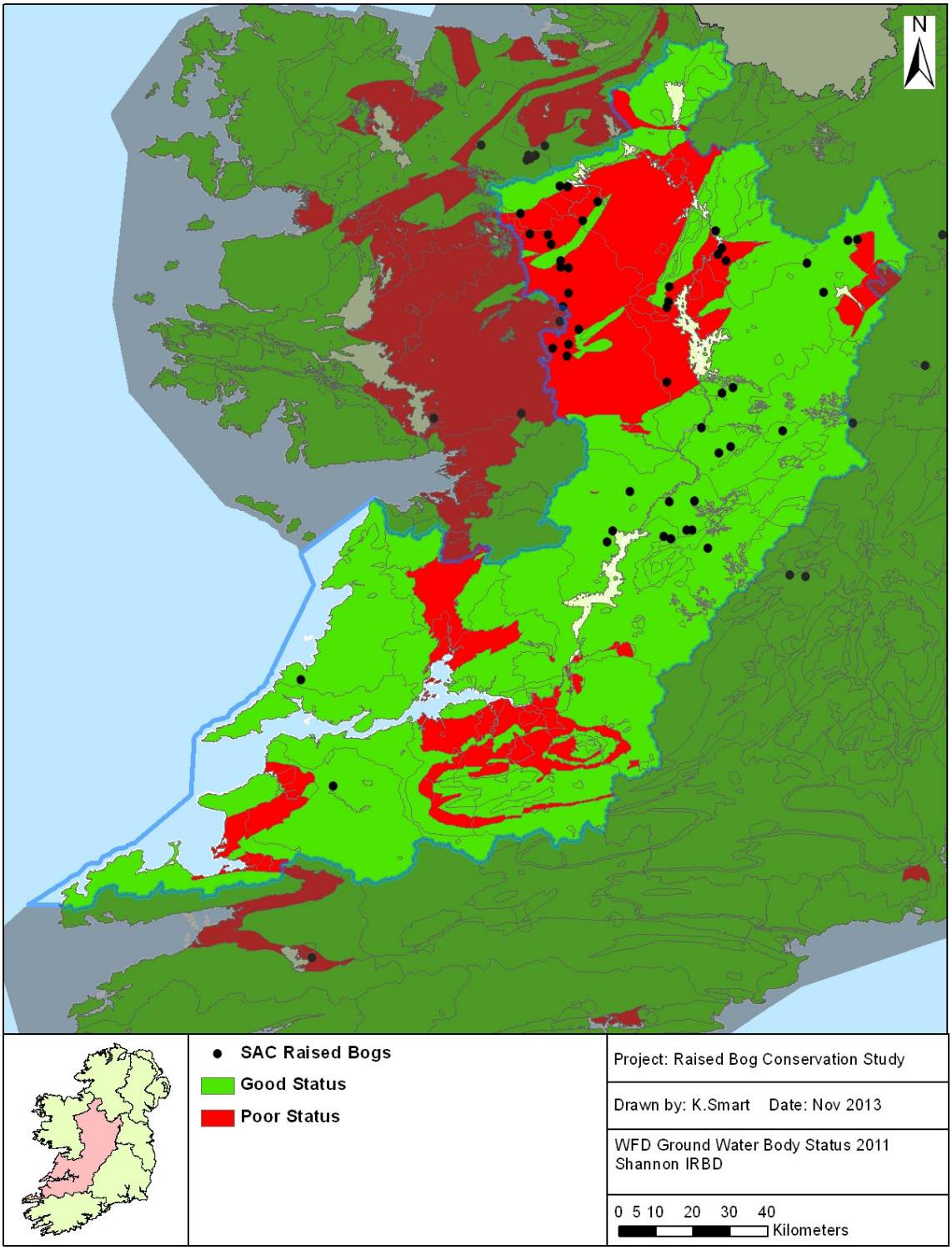
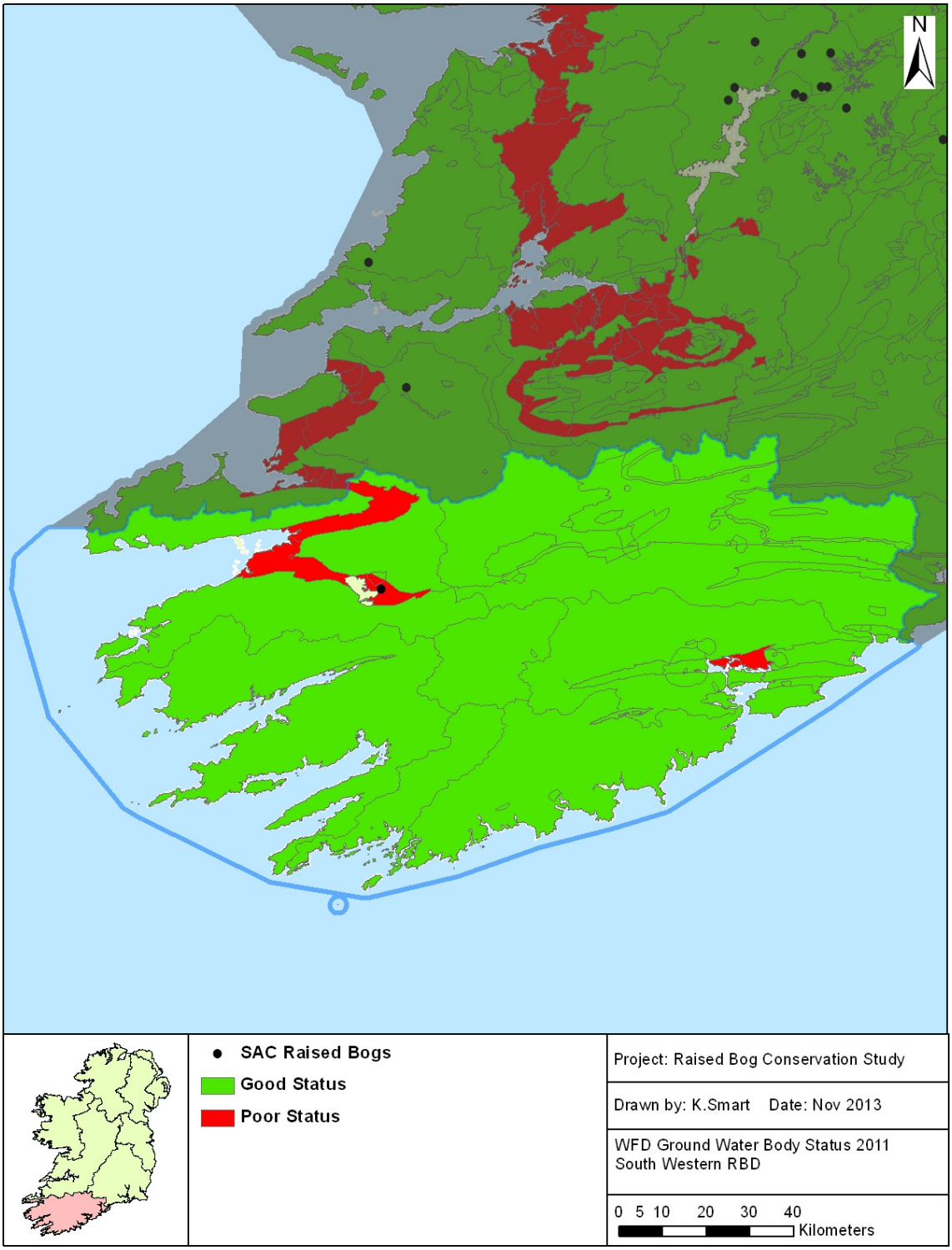
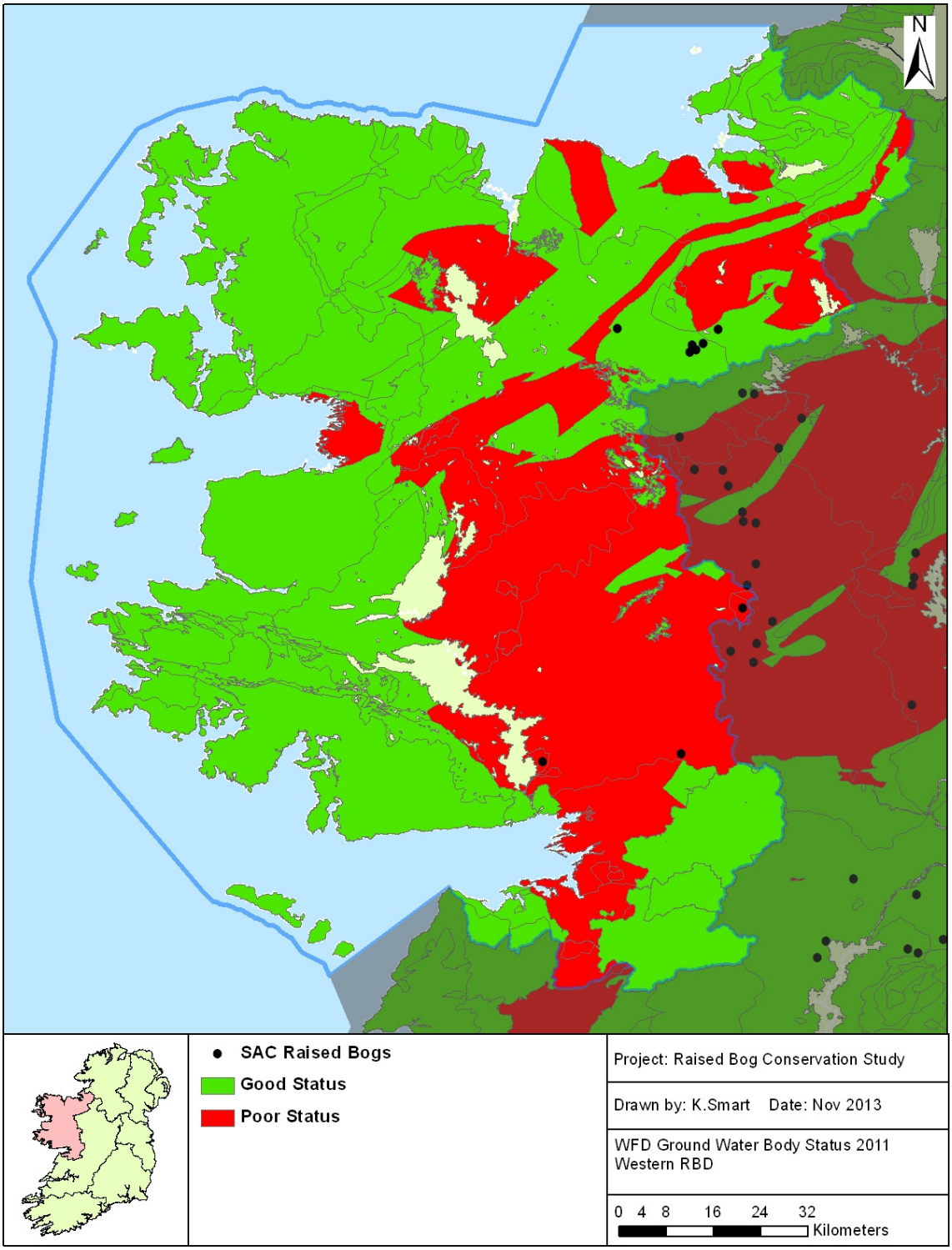


Figure 6.4 (1-5): Groundwater Status Maps of areas Raised Bog SACs are located (in the Context of River Basin Districts)


N
SAC Raised Bogs
Good Status
Poor Status
Project: Raised Bog Conservation Study
Drawn by: K.Smart Date: Nov 2013
WFD Ground Water Body Status 2011
South Eastern RBD
0 4 8 16 24 32
Kilometers


N
SAC Raised Bogs
Good Status
Poor Status
Project: Raised Bog Conservation Study
Drawn by: K.Smart Date: Nov 2013
WFD Ground Water Body Status 2011
Shannon IRBD
0 5 10 20 30 40
Kilometers


N
SAC Raised Bogs
Good Status
Poor Status
Project: Raised Bog Conservation Study
Drawn by: K.Smart Date: Nov 2013
WFD Ground Water Body Status 2011
South Western RBD
0 5 10 20 30 40
Kilometers


N
SAC Raised Bogs
Good Status
Poor Status
Project: Raised Bog Conservation Study
Drawn by: K.Smart Date: Nov 2013
WFD Ground Water Body Status 2011
Western RBD
0 4 8 16 24 32
Kilometers

WFD Protected Areas and Nutrient Content

Article 6 of the WFD requires each Member State to establish a register of protected areas for water bodies or parts of water bodies that must have extra controls on their quality by virtue of how their waters are used by people and wildlife. This register was split into five categories:

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

Table 6.6 summarises the number and types of protected areas within the contributing catchment for each raised bog SAC site. These categories have been adapted slightly for the purposes of this environmental assessment. The adaptations are as follows: category II represents Freshwater Pearl Mussel catchment areas. Category V represents protected water dependent habitats, and category VI represents protected water dependent species, defined as follows:

"Areas designated for the protection of habitats or species where the maintenance or improvement of the status of water is an important factor in their protection, including relevant Natura 2000 sites designated under Directive 92/43/EEC [Habitats Directive] and sites designated under Directive 79/409/EEC [Birds Directive]". (Annex IV 1(v), 2000/60/EC).

Salmonid waters, Special Areas of Conservation (SACs, cSACs, pcSACs) and Special Protection Areas (SPAs and pSPAs) are included within the Register as areas protected for water dependent species and habitats.

The protected areas for Salmonid species are comprised of the 34 Salmonid rivers, tributaries and lakes designated under Directive 78/659/EEC (Freshwater Fish) and listed in the Salmonid Regulations (S.I. 293 / 1988) as main channels and tributaries. Where the main channel of a river was thought to extend into a transitional water, this section of transitional water was also included.

Morphological Pressures

Designated raised bog SAC waters come under pressure from morphological pressures; some of these pressures include, but are not limited to: drainage of bog for agricultural land reclamation, heavily modified and artificial water bodies, flood protection works, etc.

A review of morphological pressures within the contributing catchment for each raised bog SAC site was undertaken. Only two of the 53 sites have such pressures identified: the first is Brown bog SAC which is within the catchment which includes reinstatement of the navigation channel on the Camlin River: and Lough Forbes Complex SAC which also includes reinstatement of the navigation channel on the

Camlin River. Further details of these morphological pressures within each catchment will be reviewed in the relevant Site Specific Management plans.

Abstractions

Abstractions within the catchment areas of the designated raised bog SAC waters are taken from a variety of sources and are used for both public and private water supplies. **Table 6.6** identifies whether a catchment is at risk or not at risk from known public and private abstractions within the contributing catchment for each designated raised bog SAC.

Table 6.6: Water Resources within the Catchment of Raised Bog SAC Sites

Raised Bog SAC Site	Presence of WFD Protected Areas within the Catchment*						At Risk from Abstraction**
	I	II	III	IV	V	VI	
All Saints Bog and Esker SAC	No	No	No	No	Yes	Yes	Not at risk
Ardagullion Bog SAC	Yes	No	No	No	Yes	Yes	Not at risk
Ardgraigue Bog SAC	No	No	No	No	Yes	Yes	Not at risk
Ballyduff/Clonfinane Bog SAC	No	No	No	No	Yes	No	Not at risk
Ballynafagh Bog SAC	No	No	No	No	Yes	No	Not at risk
Ballynamona Bog and Corkip Lough SAC	No	No	No	No	Yes	No	Not at risk
Barroughter Bog SAC	Yes	No	Yes	Yes	Yes	Yes	No data
Bellanagare Bog SAC	No	No	No	No	Yes	Yes	Not at risk
Brown Bog SAC	Yes	No	No	No	Yes	Yes	Not at risk
Callow Bog SAC	Yes	No	No	No	Yes	Yes	Probably not at risk
Camderry Bog SAC	No	No	No	No	Yes	No	Not at risk
Carn Park Bog SAC	No	No	No	No	Yes	No	Not at risk
Carrowbehy/Caher Bog SAC	No	No	No	No	Yes	No	Not at risk
Carrownagappul Bog SAC	No	No	No	No	Yes	No	Not at risk
Clara Bog SAC	No	No	No	Yes	Yes	No	Not at risk
Cloonchambers Bog SAC	No	No	No	No	Yes	No	No data

Raised Bog SAC Site	Presence of WFD Protected Areas within the Catchment*						At Risk from Abstraction**
	I	II	III	IV	V	VI	
Clooneen Bog SAC	No	No	No	No	Yes	Yes	Not at risk
Cloonmoylan Bog SAC	No	No	Yes	No	Yes	Yes	Not at risk
Cloonshanville Bog SAC	No	No	No	No	Yes	Yes	Not at risk
Coolrain Bog SAC	No	Yes	No	No	Yes	No	Not at risk
Corbo Bog SAC	No	No	No	No	Yes	Yes	Not at risk
Corliskea/Trien/Cloonfelliv Bog SAC	No	No	No	No	Yes	No	Not at risk
Crosswood Bog SAC	No	No	No	No	Yes	Yes	Not at risk
Curraghlehanagh Bog SAC	No	No	No	No	Yes	No	Not at risk
Derrinea Bog SAC	No	No	No	No	Yes	No	Not at risk
Drumalough Bog SAC	No	No	No	No	Yes	No	Not at risk
Ferbane Bog SAC	No	No	No	No	Yes	No	Not at risk
Flughany Bog SAC	No	No	No	No	Yes	No	Not at risk
Garriskil Bog SAC	Yes	No	No	No	Yes	Yes	Probably not at risk
Kilcarren-Firville Bog SAC	No	No	No	No	Yes	No	Not at risk
Killyconny Bog (Cloghbally) SAC	No	No	No	No	Yes	No	No data
Kilsallagh Bog SAC	No	No	No	No	Yes	No	Not at risk
Knockacoller Bog SAC	No	Yes	No	No	Yes	No	Not at risk
Lisnageeragh Bog and Ballinastack Turlough SAC	No	No	No	No	Yes	No	Not at risk
Lough Corrib SAC	Yes	No	No	No	Yes	Yes	Not at risk
Lough Forbes Complex SAC	Yes	No	No	Yes	Yes	Yes	Part of SAC probably at risk, part of SAC not at risk
Lough Lurgeen Bog/Glenamaddy Turlough SAC	Yes	No	No	No	Yes	No	Not at risk
Lough Ree SAC	No	No	No	Yes	Yes	Yes	Not at risk

Raised Bog SAC Site	Presence of WFD Protected Areas within the Catchment*						At Risk from Abstraction**
	I	II	III	IV	V	VI	
Moanveanlagh Bog SAC	No	No	No	No	Yes	No	Not at risk
Moneybeg and Clareisland Bogs SAC	No	No	No	No	Yes	Yes	Probably not at risk
Mongan Bog SAC	No	No	No	No	Yes	Yes	No data
Monivea Bog SAC	Yes	No	No	No	Yes	No	Not at risk
Mouds Bog SAC	No	No	No	Yes	Yes	No	Not at risk
Mount Hevey Bog SAC	No	No	No	No	Yes	No	Not at risk
Moyclare Bog SAC	No	No	No	No	Yes	Yes	Not at risk
Raheenmore Bog SAC	No	No	No	No	Yes	No	Not at risk
Redwood Bog SAC	Yes	No	No	No	Yes	Yes	Not at risk
River Moy SAC	Yes	No	No	No	Yes	No	Not at risk
Shankill West Bog SAC	No	No	No	No	Yes	No	Not at risk
Sharavogue Bog SAC	No	No	No	Yes	Yes	No	Not at risk
Sheheree (Ardagh) Bog SAC	Yes	No	No	No	Yes	Yes	Not at risk
Tullaghanrock Bog SAC	No	No	No	No	Yes	Yes	No data
Tullaher Lough and Bog SAC	Yes	No	No	No	Yes	Yes	Not at risk

***Note: Categories for Protected Areas:** I. Drinking Waters; II. Freshwater Pearl Mussel Catchment Areas; III. Recreational and Bathing Waters; IV. Nutrient Sensitive Waters; V. Protected Water Dependent Habitats; VI. Protected Water Dependent Species.*

****: Based on WFD POMs Standards Study.** This was a general study relating to impacts to water quality. Where additional information from field work has identified localised issues, this will be recorded in the individual site restoration plans.*

6.1.4.2 Hydrogeology

The natural state of raised bog habitat includes a water table which is usually less than 10cm from the surface. An active raised bog essentially constitutes a rainwater reservoir.

Peatlands are dependent on certain hydrogeological characteristics. In active peat-forming bogs, the water table must be within 10cm of the surface and a gently sloping topography is necessary to maintain a suitable hydrology. Steep slopes have a drying effect on the margins of bogs and this will be dependent on the underlying substrate (whether subsoil or bedrock). Artificial drainage which involves cutting into the bog surface can change the hydrology of the underlying substrate by causing water to be lost at the margins with a subsequent drop in the water table. The locations of springs, source protection areas, wells and groundwater monitoring points in the vicinity of the raised bog SAC sites will be important to help understand the hydrogeological status of the sites, see **Table 6.7**. Hydrogeological characteristics are also influenced by the subsoil profile (thickness of subsoil and its permeability), the degree of subsoil saturation as well as the nature of underlying aquifers (through the ability to accept percolating waters). A map of wells and source protection areas is shown in **Figure 6.5,** soils are shown in **Figure 6.2.**

Table 6.7: Number of Source Protection Areas, Groundwater Wells and Historical Groundwater Sampling Points in the vicinity of Raised Bog SAC

Raised Bog SAC Site	No. of Source Protection Areas	Groundwater Wells (those located with an accuracy between 10-50m)
All Saints Bog and Esker SAC	0	0
Ardagullion Bog SAC	0	0
Ardgraigue Bog SAC	0	0
Ballyduff/Clonfinane Bog SAC	0	0
Ballynafagh Bog SAC	0	13
Ballynamona Bog and Corkip Lough SAC	1	5
Barroughter Bog SAC	0	0
Bellanagare Bog SAC	0	20
Brown Bog SAC	0	1
Callow Bog SAC	0	3

Raised Bog SAC Site	No. of Source Protection Areas	Groundwater Wells (those located with an accuracy between 10-50m)
Camderry Bog SAC	0	1
Carn Park Bog SAC	0	7
Carrowbehy/Caher Bog SAC	0	3
Carrownagappul Bog SAC	0	1
Clara Bog SAC	0	10
Cloonchambers Bog SAC	0	2
Clooneen Bog SAC	0	0
Cloonmoylan Bog SAC	0	0
Cloonshanville Bog SAC	0	6
Coolrain Bog SAC	0	4
Corbo Bog SAC	0	7
Corliskea/Trien/Cloonfelliv Bog SAC	0	6
Crosswood Bog SAC	0	0
Curraghlehanagh Bog SAC	0	0
Derrinea Bog SAC	0	0
Drumalough Bog SAC	0	1
Ferbane Bog SAC	0	0
Flughany Bog SAC	0	0
Garriskil Bog SAC	0	0
Kilcarren-Firville Bog SAC	0	3
Killyconny Bog (Cloghbally) SAC	0	0
Kilsallagh Bog SAC	0	1

Raised Bog SAC Site	No. of Source Protection Areas	Groundwater Wells (those located with an accuracy between 10-50m)
Knockacoller Bog SAC	0	11
Lisnageeragh Bog and Ballinastack Turlough SAC	0	0
Lough Corrib SAC	0	105
Lough Forbes Complex SAC	0	2
Lough Lurgeen Bog/Glenamaddy Turlough SAC	0	1
Lough Ree SAC	0	34
Moanveanlagh Bog SAC	0	0
Moneybeg and Clareisland Bogs SAC	0	1
Mongan Bog SAC	0	0
Monivea Bog SAC	0	0
Mouds Bog SAC	0	9
Mount Hevey Bog SAC	0	3
Moyclare Bog SAC	0	3
Raheenmore Bog SAC	0	4
Redwood Bog SAC	0	1
River Moy SAC	0	16
Shankill West Bog SAC	0	0
Sharavogue Bog SAC	0	0
Sheheree (Ardagh) Bog SAC	0	0
Tullaghanrock Bog SAC	1	9
Tullaher Lough and Bog SAC	0	0

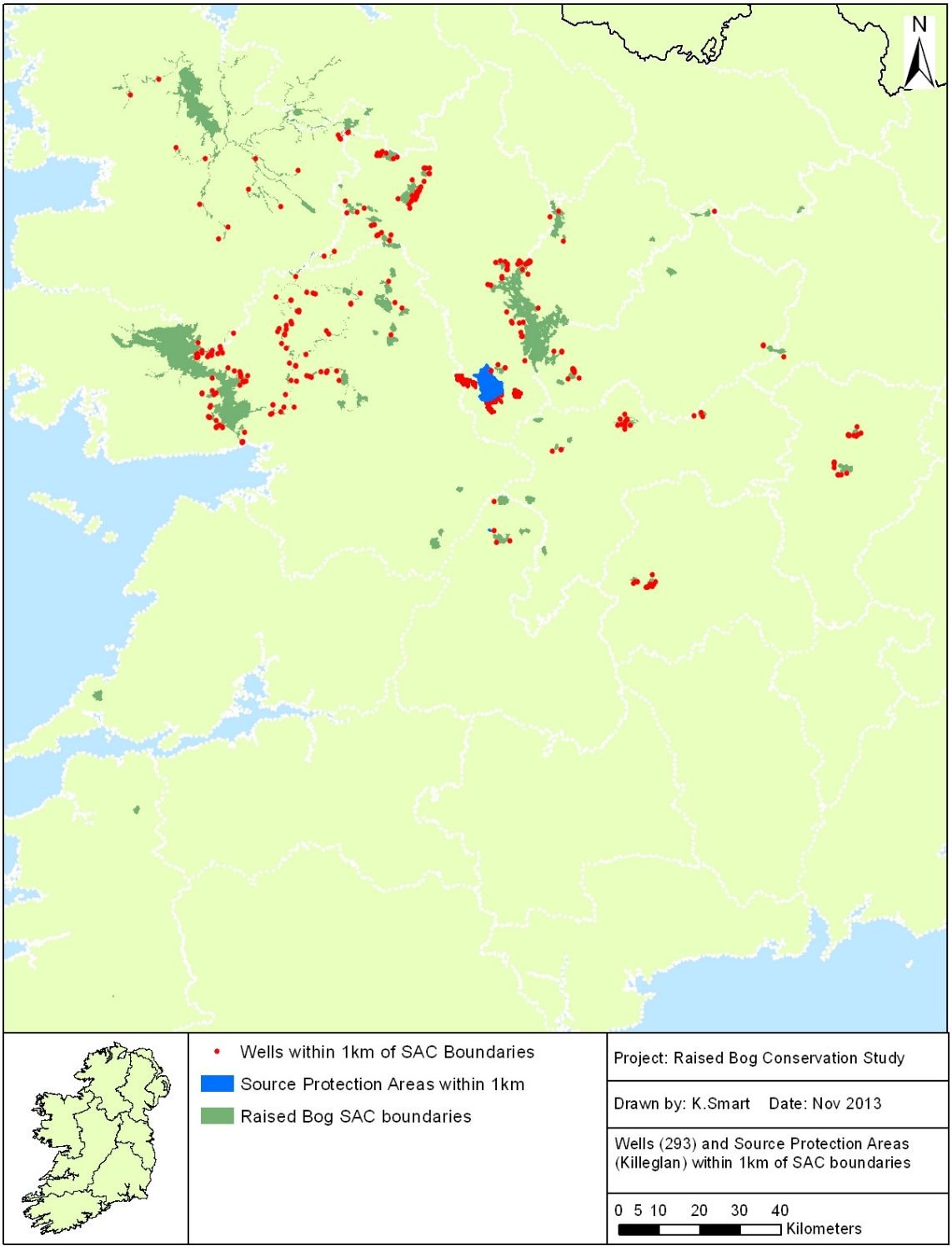


Figure 6.5: River Waterbody Status Maps of Areas Raised Bog SACs are Located (in the Context of River Basin Districts)

Existing Environmental Pressures / Problems: Water

The WFD has been implemented in Ireland at the River Basin District level through a series of River Basin Management Plans and Programmes of Measures. These have provided a coordinated approach to water management throughout Ireland and across Europe. The plans address many of the pressure on water however it will take time to fully resolve issues and residual pressures will remain. The main pressures on surface and groundwater quality relevant to this draft Plan can be summarised into the following categories.

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

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

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

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

Flooding: Flooding is a natural phenomenon however, changes in the occurrence of severe rainfall events as a result of climate change over the next 50 to 100 years would be likely to increase the frequency and severity of flooding events and inundation, which could result in damage and loss to houses and infrastructure. These risks could be further exacerbated by: urban development increasing the speed and volume of run-off; and changes to geomorphological processes such as sediment transport, siltation and erosion.

6.1.5 Climatic Factors

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

Active raised bog acts as a carbon store and serves an important function in carbon sequestration. In contrast to most other ecosystems, which rapidly recycle biomass releasing carbon dioxide, water and nutrients, bog biomass does not decay completely and builds up as peat due to the very wet and acid environment. A healthy, un-drained bog can store carbon indefinitely as long as the bog is wet. Healthy bogs continually take more carbon from the atmosphere by the vegetation which, upon dying will form new peat. Since the last ice age in Ireland 10,000 years ago, raised bogs have formed and grown, building up peat and a carbon store within. By taking the carbon dioxide from the atmosphere over long periods and by emitting other greenhouse gases such as methane, natural bogs affect and help to regulate the global climate. When a raised bog is either drained or cut at the edges causing the bog to become drier, decomposition of the peat increases, the bog no longer accumulates carbon and starts to release CO_2 to the atmosphere, thereby contributing to climate warming. With restoration and conservation, bogs have the potential to contribute to Ireland's national targets to reduce GHG emissions as mandated by EU and international legislation (e.g. the Kyoto Protocol). Further, any surplus carbon credits generated through carbon sequestration may be converted into other revenue streams.

Existing Environmental Pressures / Problems: Climate

Under the Kyoto Protocol, Ireland's total emissions were limited to an average of 62.8 million tonnes of CO_2 equivalents per annum (13 per cent above the baseline estimate) in the period 2008-2012 (www.eea.europa.eu). New commitments under the Kyoto Protocol for the post 2012 period are still in discussions however the focus is likely to remain on emission reduction targets. The key drivers of greenhouse gas emissions in Ireland relate to agriculture; energy industries, transport sector and the industrial / commercial sector. The drainage or cutting of bogs releases carbon dioxide into the atmosphere, adding to the carbon dioxide emissions produced on the island as a whole.

The potential changes in climate predicted as a result of anthropogenic greenhouse gas emissions are expected to result in further pressures on water quantity and precipitation

regimes giving rise to water quality issues and flooding as discussed in the previous section.

Climate change is also likely to result in increased competition and an alternation of species and populations dynamics. Changes in rainfall may also affect the hydrology of raised bogs and could have an impact on habitats.

6.1.6 Material Assets

The following is a summary of the baseline environment within the raised bog SAC sites in relation to material assets. The summary below includes both water-related material assets, such as land flooding, and non-water related material assets, such as agriculture. The purpose of including both water and non-water related material assets is to characterise those facilities/activities whose operations may potentially be affected, either positively or negatively, by measures included in the Plan.

Commercial activities in proximity to the raised bog SAC sites are also considered to be material assets in the context of this SEA. The commercial activities relevant to the National Raised Bog SAC Management Plan include agriculture, forestry, and industry (such as turf cutting), as these may all be affected by implementation of the site-specific raised bog restoration plans. Information on forestry, agriculture and other activities, if present, for each raised bog SAC is presented in **Table 6.8**.

Bord na Móna is the semi-state company in Ireland in charge of the commercial cutting of peat. The total land-holding of Bord na Móna amounts to approximately 80,000 hectares, most of which is located in the midlands. Commercial peat production takes place on approximately 65,000 hectares of bog.

Table 6.8 shows the most common landuse type in each raised bog SAC site as identified in CORINE. It should be noted however, that the CORINE dataset gives a good indication of large scale landuse, but is not designed to provide fine scale, site specific data. Therefore, more site specific information will be gathered for the Site Specific Management Plans completed for each SAC in 2014/2015.

Turf cutting has historically been, and continues to be, an important source of fuel for rural communities. Peat is routinely extracted for domestic use by individuals who have a legal right to do so (turbary). In addition to this activity, tracts of bog fall within landowner parcels, and individuals may exercise their legal property rights over the peat resource. The number of turf cutters associated with each raised bog SAC is shown in **Table 6.9**.

In May 2010, the Government of Ireland announced the cessation of the derogation granted in 1999, which allowed the cutting of turf by landowners and turbary rights owners. Of those bogs designated

as SAC, turf cutting was to be immediately halted on 32 raised bog sites. By the end of 2011, turf cutting was to cease on a further 24 raised bogs. By the end of 2013, 75 NHA sites will also see their derogations end.

Table 6.8: Most Common Corine Land Use in Each Raised Bog SAC Site

Raised Bog SAC Site	Main Corine Landuse Categories (% cover)	Forestry Coverage (% cover)
All Saints Bog and Esker SAC	Peat bogs (84%) Agriculture (4%)	-
Ardagullion Bog SAC	Peat bogs (75%) Pasture (3.3%)	21.4%
Ardgraigue Bog SAC	Peat bogs (90%) Pasture (7.8%)	3%
Ballyduff/Clonfinane Bog SAC	Peat bogs (69%) Pasture (22.7%)	8%
Ballynafagh Bog SAC	Peat bogs (80%) Agriculture (2%) Pasture (0.9%)	17%
Ballynamona Bog and Corkip Lough SAC	Peat bogs (55%) Marshes (11.5%) Pasture (30.3%)	3%
Barroughter Bog SAC	Peat bogs (71.4%) Pasture (8.8%)	20%
Bellanagare Bog SAC	Peat bogs (88.4%) Pasture (1.1%)	10.5%
Brown Bog SAC	Peat bogs (91.8%) Pasture (7%)	1.3%
Callow Bog SAC	Water bodies (0.2%) Peat bogs (95.6%) Agriculture (2.2%) Pasture (1.6%)	0.4%
Camderry Bog SAC	Peat bogs (82%) Pasture (3.5%)	14.2%
Carn Park Bog SAC	Peat bogs (64.4%) Pasture (2.1%)	33.5%
Carrowbehy/Caher Bog SAC	Pasture (1%) Peat Bog (96.5%) Agriculture (2.1%)	0.4%
Carrownagappul Bog SAC	Agriculture (3.5%) Peat bogs (90%) Pasture (0.3%)	6.5%
Clara Bog SAC	Peat bogs (64%) Agriculture (2.4%) Pasture (14.2%)	19.3%
Cloonchambers Bog SAC	Peat bogs (97.7%) Pasture (2.3%)	-

Raised Bog SAC Site	Main Corine Landuse Categories (% cover)	Forestry Coverage (% cover)
Clooneen Bog SAC	Peat bogs (80%) Pasture (20%)	-
Cloonmoylan Bog SAC	Peat bogs (96.7%) Pasture (2.9%)	0.4%
Cloonshanville Bog SAC	Peat bogs (84%) Pasture (12.6%)	3.3%
Coolrain Bog SAC	Peat bogs (45.5%) Agriculture (3.4%) Pasture (1.6%)	49.7%
Corbo Bog SAC	Peat bogs (97.8%) Pasture (2.2%)	-
Corliskea/Trien/Cloonfelliv Bog SAC	Peat bogs (94.1%) Pasture (5.9%)	-
Crosswood Bog SAC	Peat bogs (73.1%) Pasture (3.9%)	22.9%
Curraghlehanagh Bog SAC	Peat bogs (71.3%) Agriculture (0.2%) Pasture (3.8%)	24.8%
Derrinea Bog SAC	Peat bogs (97.5%)	2.5%
Drumalough Bog SAC	Pasture (2.2%) Peat bogs (82.1%)	15.6%
Ferbane Bog SAC	Peat bogs (90.7%) Pasture (5.7%)	3.6%
Flughany Bog SAC	Peat bogs (95.6%) Pasture (4.4%)	-
Garriskil Bog SAC	Peat bogs (69%) Pasture (1.6%)	29.6%
Kilcarren-Firville Bog SAC	Peat bogs (65.3%) Agriculture (1%) Pasture (20%)	13.7%
Killyconny Bog (Cloghbally) SAC	Peat bogs (89.6%) Pasture (10.3%)	-
Kilsallagh Bog SAC	Peat bogs (97.4%) Agriculture (1%) Pasture (1%)	0.6%
Knockacoller Bog SAC	Peat bogs (95.5%) Pasture (3.8%)	0.7%
Lisnageeragh Bog and Ballinastack Turlough SAC	Peat bogs (90%) Pasture (6.3%)	3.7%

Raised Bog SAC Site	Main Corine Landuse Categories (% cover)	Forestry Coverage (% cover)
Lough Corrib SAC	Peat bogs (11.5%) Marshes (1.7%) Agriculture (6.4%) Pasture (9.6%) Waters (67.4%) Artificial surfaces (0.1%)	3.3%
Lough Forbes Complex SAC	Peat bogs (35.7%) Marshes (0.1%) Water (26%) Agriculture (1.9%) Pasture (13.9%)	22.5%
Lough Lurgeen Bog/Glenamaddy Turlough SAC	Peat bogs (72.3%) Marshes (2.3%) Pasture (7.9%)	17.4%
Lough Ree SAC	Peat bogs (7.7%) Marshes (1.94%) Waters (75.4%) Agriculture (1.8%) Artificial surfaces (0.1%) Pasture (8.1%)	4.9%
Moanveanlagh Bog SAC	Peat bogs (95%) Agriculture (0.5%) Pasture (4.5%)	-
Moneybeg and Clareisland Bogs SAC	Peat bogs (70.5%) Waters (2.2%) Marshes (8.7%) Agriculture (2%) Pasture (1.5%)	15%
Mongan Bog SAC	Peat bogs (57.7%) Pasture (28.2%)	14.1%
Monivea Bog SAC	Peat bogs (94.1%) Pasture (1.7%)	4.2%
Mouds Bog SAC	Peat bogs (98.9%) Pasture (0.7%)	-
Mount Hevey Bog SAC	Peat bogs (67.6%) Pasture (7.6%)	24.7%
Moyclare Bog SAC	Peat bogs (85.7%) Pasture (14.3%)	-
Raheenmore Bog SAC	Peat bogs (76.9%) Arable (0.9%)	-

Raised Bog SAC Site	Main Corine Landuse Categories (% cover)	Forestry Coverage (% cover)
	Pasture (22.1%)	
Redwood Bog SAC	Peat bogs (79%) Agriculture (6.6%) Pasture (3.5%)	10.8%
River Moy SAC	Peat bogs (19.1%) Marshes (4%) Waters (37.2%) Agriculture (13.7%) Pasture (20.6%)	5.2%
Shankill West Bog SAC	Peat bogs (62.4%) Pasture (15.6%)	22%
Sharavogue Bog SAC	Peat bogs (77%) Agriculture (1%) Pasture (21.7%)	0.3%
Sheheree (Ardagh) Bog SAC	Pasture (8.2%) Arable (22.4%) Agriculture (69.4%)	
Tullaghanrock Bog SAC	Pasture (5.6%) Peat bogs (94.4%)	
Tullaher Lough and Bog SAC	Peat bogs (60.6%) Agriculture (13.4%) Pasture (11.6%)	14.4%

Table 6.9: Number of Active Turf Cutters on Each Raised Bog SAC Site

Raised Bog SAC Name	Bog Name	No of Active turf-cutters
All Saints Bog and Esker SAC	All Saints Bog	13
Ardagullion Bog SAC	Ardagullion Bog	15
Ardgraigue Bog SAC	Ardgraigue Bog	48
Ballyduff/Clonfinane Bog SAC	Ballyduff Bog	2
Ballyduff/Clonfinane Bog SAC	Clonfinane Bog	0
Ballynafagh Bog SAC	Ballynafagh Bog	25
Ballynamona Bog and Corkip Lough SAC	Ballynamona Bog	50
Barroughter Bog SAC	Barroughter Bog	78
Bellanagare Bog SAC	Bellanagare Bog	110
Brown Bog SAC	Brown Bog	0

Raised Bog SAC Name	Bog Name	No of Active turf-cutters
Callow Bog SAC	Callow Bog South	55
Callow Bog SAC	Callow Bog North	0
Camderry Bog SAC	Camderry Bog	17
Carn Park Bog SAC	Carn Park Bog	32
Carrowbehy/Caher Bog SAC	Carrowbehy/Caher Bog	0
Carrownagappul Bog SAC	Carrownagappul Bog	51
Clara Bog SAC	Clara Bog	41
Cloonchambers Bog SAC	Cloonchambers Bog	36
Clooneen Bog SAC	Clooneen Bog	14
Cloonmoylan Bog SAC	Cloonmoylan Bog	72
Cloonshanville Bog SAC	Cloonshanville Bog	1
Coolrain Bog SAC	Coolrain Bog	49
Corbo Bog SAC	Corbo Bog	56
Corliskea/Trien/Cloonfelliv Bog SAC	Corliskea Bog	42
Corliskea/Trien/Cloonfelliv Bog SAC	Trien Bog	4
Corliskea/Trien/Cloonfelliv Bog SAC	Cloonfelliv Bog	3
Crosswood Bog SAC	Crosswood Bog	46
Curraghlehanagh Bog SAC	Curraghlehanagh Bog	38
Derrinea Bog SAC	Derrinea Bog	0
Drumalough Bog SAC	Drumalough Bog West	7
Drumalough Bog SAC	Drumalough Bog East	0
Ferbane Bog SAC	Ferbane Bog	0
Flughany Bog SAC	Flughany Bog	1
Garriskil Bog SAC	Garriskil Bog	0
Kilcarren-Firville Bog SAC	Kilcarren Bog	2
Kilcarren-Firville Bog SAC	Firville Bog	0
Killyconny Bog (Cloghbally) SAC	Killyconny Bog	0
Kilsallagh Bog SAC	Kilsallagh Bog	35

Raised Bog SAC Name	Bog Name	No of Active turf-cutters
Knockacoller Bog SAC	Knockacoller Bog	9
Lisnageeragh Bog and Ballinastack Turlough SAC	Lisnageeragh Bog	14
Lough Corrib SAC	Knockkillaree Bog	29
Lough Forbes Complex SAC	Ballykenny Bog	0
Lough Forbes Complex SAC	Fisherstown Bog	0
Lough Lurgeen Bog/Glenamaddy Turlough SAC	Lough Lurgeen Bog East	14
Lough Lurgeen Bog/Glenamaddy Turlough SAC	Lough Lurgeen Bog West	6
Lough Ree SAC	Clooncraff and Cloonlarge Bogs	150
Moanveanlagh Bog SAC	Moanveanlagh Bog	29
Moneybeg and Clareisland Bogs SAC	Moneybeg Bog	53
Moneybeg and Clareisland Bogs SAC	Clareisland Bog	12
Mongan Bog SAC	Mongan Bog	0
Monivea Bog SAC	Monivea Bog	90
Mouds Bog SAC	Mouds Bog	115
Mount Hevey Bog SAC	Mount Hevey Bog	27

Existing Environmental Pressures / Problems: Material Assets

Increased development and intensification of agricultural continues to put pressure on habitats such as raised bogs. Bogs have been drained and reclaimed for the purpose of agriculture and forestry in particular leading to loss and / or damage to these habitats. Turf cutting and more intensive peat extraction has also put significant pressure on these habitats. Industrial turf cutting and the individual right to cut turf remains a highly sensitive issue. Despite the turf cutting prohibition on all designated raised bog sites, the practice continues on some bogs and raised bog habitat continues to deteriorate

6.1.7 Cultural, Architectural and Archaeological Heritage

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

- Record of Monuments and Places (RMP), which is the statutory list of all known archaeological monuments in Ireland and is compiled by the Archaeological Survey of Ireland;

- National Inventory of Architectural Heritage (NIAH), which identifies, records and evaluates the post-1700 architectural heritage of Ireland, uniformly and consistently as an aid in the protection and conservation of the built heritage. NIAH surveys provide the basis for the recommendations of the Minister for the Environment, Heritage and Local Government to the planning authorities for the inclusion of particular structures in their Record of Protected Structures; and

- United Nations Educational, Scientific and Cultural Organisation (UNESCO) World Heritage List, which includes cultural and natural heritage sites around the world considered to be of outstanding value to humanity.

Table 6.10 presents the number of features listed on each of these within the contributing catchments of the 53 raised bog SAC. These are in addition to previously unknown archaeological sites and features.

Table 6.10: Number of Listed/Designated Cultural Heritage Resources in Each Raised Bog SAC Site

Designated Area	RMP	NIAH*
All Saints Bog and Esker	13	1
Ardagullion Bog	2	8
Ardgraigue Bog	56	0
Ballyduff/Clonfinane Bog	9	1
Ballynafagh Bog	13	10
Ballynamona Bog and Corkip Lough	45	0
Barroughter Bog	24	0
Bellanagare Bog	64	0
Brown Bog	8	1
Callow Bog	31	5
Camderry Bog	8	0
Carn Park Bog	14	10
Carrowbehy/Caher Bog	5	0
Carrownagappul Bog	18	0
Clara Bog	19	70
Cloonchambers Bog	23	0
Clooneen Bog	51	0
Cloonmoylan Bog	30	0

Designated Area	RMP	NIAH*
Cloonshanville Bog	19	2
Coolrain Bog	1	1
Corbo Bog	9	0
Corliskea/Trien/Cloonfelliv Bog	18	0
Crosswood Bog	7	7
Curraghlehanagh Bog	4	0
Derrinea Bog	5	0
Drumalough Bog	6	0
Ferbane Bog	12	23
Flughany Bog	25	0
Garriskil Bog	11	0
Kilcarren-Firville Bog	31	8
Killyconny Bog (Cloghbally)	8	0
Kilsallagh Bog	68	0
Knockacoller Bog	7	0
Lisnageeragh Bog and Ballinastack Turlough	52	0
Lough Corrib	2650	0
Lough Forbes Complex	53	71
Lough Lurgeen Bog/Glenamaddy Turlough	38	0
Lough Ree	294	165
Moanveanlagh Bog	7	0
Moneybeg and Clareisland Bogs	19	18
Mongan Bog	93	2
Monivea Bog	26	0
Mouds Bog	5	0
Mount Hevey Bog	5	5
Moyclare Bog	9	2
Raheenmore Bog	16	3
Redwood Bog	9	4

Designated Area	RMP	NIAH*
River Moy	1854	24
Shankill West Bog	2	0
Sharavogue Bog	3	5
Sheheree (Ardagh) Bog	63	4
Tullaghanrock Bog	15	3
Tullaher Lough and Bog	11	1

** NIAH data is currently in the process of being digitised for some Counties and parts of Counties, therefore these figures do not include the raised bog SAC sites or parts of raised bog SAC sites in Counties Mayo and Galway.*

Raised bog serves as a repository for archaeological heritage as the waterlogged soil in a bog can preserve archaeological artefacts (bog butter and bog bodies) as well as information in the un-decomposed plants, animals, seeds or pollen which represent the past biodiversity (what used to grow in Ireland) and that can tell us more about our past climates. In addition bogs provide opportunities for the development of knowledge and understanding through palaeo-archaeology and palaeo-climatology as well as general research, education and training. Intact peat is a repository of information about the wider environment, not only about past climate but about regional vegetation, human settlement and even cosmic radiation. With new techniques constantly being developed, the depth and breadth of information we can obtain are increasing. All this information is destroyed as peat is removed and burned and when decomposition is accelerated because the remainder of the bog is drying out.

Historically, turf cutting has and continues to be an important component of the local cultural heritage where such activity takes place. Peat has been extracted in Ireland for domestic use by individuals since the fifteenth century, a traditional activity which is seen as a right for individuals to do so (turbary).

Existing Environmental Pressures / Problems: Cultural Heritage

Development resulting from economic growth and increasing population is placing pressure on sites or features of archaeological, architectural or cultural heritage interest. Bogs in Ireland are a particularly important to the historical record in terms of both artefacts of human origin and our knowledge of past climatic, landuse and habitat cover in Ireland. Development pressures on bogs relate to impacts on groundwater through abstractions for drinking water purposes, and also direct physical impacts on the bog surface associated with drainage, reclamation and disturbance from turf cutting, peat extraction, farming, fires, trampling etc. Such activities cam impact directly through disturbance of archaeological material preserved in the bog and also indirectly through changes in hydrology of the bog leading to drainage out of peat and possible exposure of artefacts.

Cumulatively, this results in impacts on the overall cultural heritage resource.

6.1.8 Landscape

Currently there is no agreed national landscape strategy. As a result, the protection of national landscape types such as peatlands, which are characteristic of an Irish landscape, is not available. Instead local authorities conserve and protect scenic value as areas of high amenity, high sensitivity, areas of outstanding natural beauty, protected views and similar designations. Each local authority is responsible for the designation of these within their individual jurisdictions, with each development plan providing objectives to protect such views. In many cases there will be overlap of SAC designations and landscape value in a county and where this is not the case the legal protection afforded SAC and SPA will confer indirect protection from a landscape perspective on these areas.

Existing Environmental Pressures / Problems: Landscape

Peatlands generally (and raised bogs) are a unique national habitat. Pressures related to drainage of raised bog habitat or surrounding wetland habitats through harvesting and turf cutting, forestry, fires etc may change the character of the landscape in these areas significantly. *At a national level, existing pressures on landscape as a result of activities on SAC raised bogs relate to loss of the habitat type and its associated characteristics together with changes to character as a result of competing land uses such as forestry. The absence of a cohesive national landscape strategy which seeks to preserve and /or protect such historical and cultural landscape places much of the emphasis on local authorities however the approaches taken are often not consistent.* The gradual altering of these peatland habitats may have a cumulative effect on the national landscape.

6.2 EVOLUTION OF THE ENVIRONMENT IN THE ABSENCE OF THE PLAN

The National Raised Bog SAC Management Plan is aimed setting out Ireland's strategic approach to the protection, restoration compensation and future conservation of raised bog habitats designated as SAC sites, in order to meet the legal requirements contained in the Habitats, Birds and EIA Directives. In the absence of the National Raised Bog SAC Management Plan, the pressures identified in the Plan would continue to impact on raised bog status.

In the absence of the Plan it is anticipated that the current deterioration in status of raised bogs in Ireland would continue with further damage caused by drainage, peat extraction, turf cutting, forestry, fires and other activities such as water abstraction from groundwater and quarrying which can have a significant impact on the raised bogs by lowering the regional groundwater level. It is noted that

damaging activities such as those mentioned are illegal and as such even without the Plan would have to cease, however, this would be done in an uncoordinated manner without recognised processes of compensation of turf cutters and others with interests on these SAC bogs. Without the Plan, it is also noted that the raised bog habitat that has been lost since the designation of the bogs as SAC would not be replaced either through the restoration measures or location of compensatory habitat by relocation measures. The Plan contains a number of key initiatives including education and awareness which would otherwise not be implemented in relation to raised bogs and as such an opportunity would be lost to raise the benefits such ecosystems bring to the wider community through the services they provide.

Water quality in the absence of the Plan is likely to continue to improve under the River Basin Management Plans which incorporate the requirements of a number of European directives and measures to reduce water pollution. The RBMP provide for the coordination of these controls to reduce impacts to the water environment across Ireland and examine how damaging activities are impacting the water environment in a holistic fashion. The implementation of these RBMP will ensure water management across Ireland is carried out in a coordinated manner with both direct and indirect positive benefits to aquatic ecology. Without the Plan run-off from the damaged SAC bogs has the potential to present water quality problems within the various catchments, reducing the likelihood that affected rivers can achieve their WFD objectives. Bogs have the potential to mitigate against flooding. However, bog which has been affected by turf cutting or the implementation of non-natural drainage may release excess water and contribute to flooding.

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

It is predicted that evolution of the climatic environment is likely to be heavier winter rainstorms causing more flash flooding, resulting in an increase in diffuse pollution loads from soil run-off and increasing demand for flood controls. These types of flood events would continue to pose a risk to soils as a result of erosion and release of contaminants, thus potentially leading to water quality problems downstream of Raised Bog SAC.

Bogs are considered important repositories of archaeological material. Activities which cause changes to the hydrology of a bog have the potential to expose such materials and may lead to drying out, damage or complete obliteration of such material. In the absence of the Plan, such drainage can be expected to continue at least in the short-term with a potential for loss of archaeological material.

It is noted that there is considerable legislation in place for the protection of our archaeological resource however, unknown archaeology may be inadvertently damaged through physical disturbance by machinery or indirectly through exposure.

In the absence of the Plan the heritage tradition of turf cutting would continue on the SAC bogs however it is noted that these activities are illegal on the SAC bogs and as such would have to be stopped in the short term regardless of the Plan. This would be done in the absence of any agreed compensation for turf cutters in particular. This is a direct result of infringement proceedings commenced against the State for its failure to protect these SACs. A continued failure to address this issue and provide the protections required will lead to fines against the Irish State (and indirectly by the tax-payer). Being fined would not remove the obligation to protect these sites and would not change the requirement to cease turf cutting.

7 ENVIRONMENTAL OBJECTIVES, TARGETS AND INDICATORS

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

In order to streamline the assessment process, this report has used broad themes, based on the environmental topics listed in the SEA Directive, to group large environmental data sets, e.g., human health, cultural heritage and climate. Assigned to each of these themes is at least one high-level Strategic Environmental Objective that specifies a desired direction for change, e.g. reduce CO2 emissions, against which the future impacts of the Plans can be measured. These high-level Strategic Environmental Objectives are then paired with specific targets. The progress towards achieving these specific targets is monitored using Indicators, which are measures of identified variables over time.

The selection of the environmental objectives had regard to the environmental protection objectives outlined in Chapter 5 (and related Appendix) Other Relevant Plans and Policies. Selection was also based on consultation with statutory consultees and stakeholders during the scoping stage. Section 7.2 describes the Strategic Environmental Objectives, Targets and Indicators used in assessing the National Raised Bog SAC Management Plan.

7.1 DEVELOPMENT OF STRATEGIC ENVIRONMENTAL OBJECTIVES, TARGETS AND INDICATORS

7.1.1 Strategic Environmental Objectives

There are essentially three types of Objectives considered as part of this SEA. The first relates to the Objectives of the plan. The second relates to wider Environmental Objectives, i.e. environmental protection objectives at a national, European and international level (see Chapter 5), and finally there are the Strategic Environmental Objectives, which were devised to test the effects of the national raised bog SAC Management Plan on the wider environment.

The selected Strategic Environmental Objectives for this SEA are set out in **Table 7.1**. These environmental objectives are based on the current understanding of the key environmental issues identified. In addition, the selection of the environmental objectives had regard to the indicative list of environmental protection objectives outlined in the documents Implementation of SEA Directive 2001/42/EC (DoEHLG, 2004). Selection was also based on discussions between the SEA Team and

the team preparing the management plan as well as comments received from the Steering Group and from consultees during the scoping process.

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

Table 7.1: Strategic Environmental Objectives

Objective	Detailed Assessment Criteria* – To what extent will the National Raised Bog SAC Management Plan	Related to SEA Topic(s)
Objective_1 To restore the favourable conservation status of active raised bog in Ireland.	• Sustain, enhance or where relevant prevent the loss of ecological networks or parts thereof which provide significant connectivity between areas of biodiversity? • Contribute to the restoration, rehabilitation enhancement and management of these EU designated sites	Biodiversity, Flora and Fauna (BFF)
Objective_2 To preserve, protect and maintain the terrestrial, aquatic and soil biodiversity, particularly EU designated sites and protected species.	• Provide protection of European and nationally designated biodiversity sites and species? • Avoid loss of relevant habitats, species or their sustaining resources in national and European designated ecological sites? • Support delivery of Habitats and Birds Directives, Birds and the Water Framework Directive objectives?	Biodiversity, Flora and Fauna (BFF)
Objective_3 To provide ecosystem services for communities and contribute to sustainable management of the natural resource.	• Protect drinking water areas (including private abstractions), bathing waters, economic shellfish waters and fisheries? • Contribute to flood risk management planning by retention of water? • Provide amenity / recreational areas for enjoyment and wellbeing? • Encourage eco-tourism? • Guide land use planning? • Improve water quality / quantity?	Population / Human Health (PHH)
Objective_4 Avoid damage to the function and quality of the soil resource.	• Accelerate or reduce erosion? • Result in impacts on the productivity of agricultural land? • Safeguard soil quality, quantity and function?	Soil (S)

Objective	Detailed Assessment Criteria* – To what extent will the National Raised Bog SAC Management Plan	Related to SEA Topic(s)
Objective_5 Ensure that the status of water bodies is protected, maintained and improved.	• Prevent deterioration of the status of designated water bodies with regard to quality, quantity • Improve water body status to at least good status, as appropriate to the WFD. • Impact on physical modifications to habitat and on fish passage? • Contribute to effective protection of "protected areas" on the WFD Register of Protected Areas? • Contribute to the enhancement of "protected areas" on the WFD Register of Protected Areas? • Contribute toward achieving the basic ("good / high status") objectives of the WFD?	Water (W)
Objective_6 Minimise contribution to climate change by reducing emissions of greenhouse gasses associated with Plan implementation.	• Contribute to reducing GHG emission from landuse management activities? • Provide for measures that are vulnerable to climate change? • Reduce the risk of flooding?	Climatic Factors (CF)
Objective_7 Support economic activities such as eco-tourism without conflicting with the objectives of the Habitats Directive.	• Result in a loss of land available for economic activities? • Result in significant changes to an existing economic activity, which would render it unviable? • Encourage new or enhance existing economic activity e.g. ecotourism? • Support recreation?	Material Assets (MA)
Objective_8 Protect and maintain cultural heritage resources.	• Interfere with archaeological, architectural or cultural heritage features? • Interfere with the landscape setting of archaeological, architectural or cultural heritage features? • Result in the loss of traditional practices?	Cultural Heritage (CH)
Objective_9 Protect and maintain the national landscape character.	• Contribute to maintaining the national landscape character? • Result in changes to the historic or cultural landscape? • Recognise the diversity and complexity of inherited landscapes?	Landscape (L)

7.1.2 Internal Compatibility of Strategic Environmental Objectives

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

	Objective 1 BFF	Objective 2 BFF	Objective 3 PHH	Objective 4 S	Objective 5 W	Objective 6 CF	Objective 7 MA	Objective 8 CH	Objective 9 BFF
Objective 1 BFF	Y								
Objective 2 BFF	Y	Y							
Objective 3 PHH	Y	Y	Y						
Objective 4 S	Y	Y	Y	Y					
Objective 5W	Y	Y	Y	Y					
Objective 6 CF	Y	Y	Y	Y	Y	Y			
Objective 7 MA	Y/N	Y/N	Y	Y	Y	Y/N	Y		
Objective 8 CH	Y/N	Y/N	Y	Y	Y	Y/N	Y/N	Y	
Objective 9 L	Y	Y	Y	Y	Y	Y	Y	Y	Y

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

Figure 7.1: Inter-relationship of SEA Topics

7.1.3 Strategic Environmental Indicators and Targets

The overall purpose of environmental indicators in the SEA is to provide a way of measuring the environmental effect of implementing the Plan. Environmental indicators are also used to track the progress in achieving the targets set in the SEA as well as the Plan itself. Targets were considered over the duration of the baseline data collection and assessment, and throughout the consultation process, in order to meet the Strategic Environmental Objectives (SEO) as well as the objectives of the Plan.

The proposed targets and indicators have been selected bearing in mind the availability of data and the feasibility of making direct links between any changes in the environment and the implementation of the Plan. For this reason, where possible targets and indicators have been based on existing published targets such as Irelands Action Plan for Biodiversity 2011-2016, which set national objectives, targets and indicators to measure Ireland's progress in protecting biodiversity, in line with our commitments under the Convention on Biological Diversity (CBD).

The targets and indicators associated with each SEO are presented in **Table 7.2**.

Table 7.2: Strategic Environmental Objectives, Targets and Indicators

SEA Topic and Objective	SEA Target	SEA Indicators
Biodiversity Flora and Fauna_1: Objective_1 To restore the favourable conservation status of active raised bog in Ireland	See Targets in Table 8.1	The status of raised bogs as reported to the EU (report due every 6 years, first report in 2007). Note: Site level indicators may be added once site specific plans have been developed in 2014 / 2015.
Biodiversity Flora and Fauna_2: Objective_2 To preserve, protect and maintain the terrestrial, aquatic and soil biodiversity, particularly EU designated sites and protected species.	No protected habitats or species associated with raised bog habitat in Ireland in worsening conservation status by 2016; majority of habitats or species in, or moving towards, favourable conservation status by 2020 [Based on national Target 17 of Ireland Actions for Biodiversity 2011-2016].	The status of raised bogs as reported to the EU (report due every 6 years, first report in 2007).
Population and Human Health: Objective_3 To provide ecosystem services for communities and contribute to sustainable management of the natural resource	A greater shared responsibility for the conservation of raised bogs and the sustainable use of its components to be full recognised, and acted upon, by all stakeholders [Based on national Target 1 of Ireland Actions for Biodiversity 2011-2016]. Enhance appreciation of the value of biodiversity and ecosystem services amongst policy makers, stakeholders and the general public [Based on national Target 4 of Ireland Actions for Biodiversity 2011-2016].	Percentage of site specific restoration and management plans created and extent of implementation. Level of public awareness of biodiversity and surrounding issues increased compared with previous years. Number of hits on Notice Nature website.
Soil: Objective_4 Avoid damage to the function and quality of the soil resource.	Achieve risk reduction targets as detailed in the Soil Directive for areas identified as at risk.	Monitoring programme as established under the requirements for the Soil Directive

SEA Topic and Objective	SEA Target	SEA Indicators
Water: Objective_5 Ensure that the status of water bodies is protected, maintained and improved.	No deterioration in water body status in the catchment of an SAC bog or downstream as a result of the plan in line with the objectives of the Water Framework Directive.	Status of water bodies as reported by the EPA
Climatic Factors: Objective_6 Minimise contribution to climate change by reducing emissions of greenhouse gasses associated with Plan implementation.	No net loss of CO_2 sequestering vegetation over the plan period.	Calculated CO_2 sequestering potential of raised bog vegetation. Volume of peat lost to cutting.
Material Assets: Objective_7 Support economic activities such as eco-tourism without conflicting with the objectives of the Habitats Directive .	Minimise impacts to economic activity due to Plan implementation without conflicting with the objectives of the Habitats Directive. Provision of alternative sources of fuel or compensation to all those affected by protection of raised bog SAC.	Percent change in ecotope types due to Plan implementation. Percentage of turf-cutters applying for compensation / relocation schemes.
Cultural Heritage: Objective_8 Protect and maintain cultural heritage resources.	Provision of alternative sites for turf cutting which will allow traditional turf cutting practices to be continued without damage to EU or national designated sites.	Percentage of turf-cutters applying for relocation schemes.
Landscape: Objective_9 Protect and maintain the national landscape character.	Halt the decline of peatland landscapes contained within raised bog SAC [Based on content of draft National Landscape Strategy 2011].	Protection afforded to peatland landscapes in relevant CDP.

7.1.4 Plan Objectives and SEA Objectives

The draft Plan outlines the conservation objective and targets for raised bog nationally. The compatibility of these against the SEO was explored using a compatibility matrix to highlight possible areas of conflict between the Plan and the SEA. Conservation objectives can be set at different scales, from site-specific (e.g. SAC) to national. The Raised Bog SAC Management Plan does not define detailed conservation objectives for each of the 53 SACs, as these will be developed on a site-by-site basis. However, it quantifies the overall area, distribution and the general conditions required to restore the SAC network. To put this in context, the National Conservation Objective for active raised bog is also defined. The restoration of raised bog habitats within SACs to favourable conservation condition will contribute to the overall restoration of favourable conservation status of those habitats at a national level.

The setting of a conservation objective is a scientific process that aims to define favourable conservation status for a particular habitat. Having regard to the definition of favourable conservation status in the Habitats Directive, Article 1, and given that the current conservation status of active raised bog in Ireland is bad, the national conservation objective has been identified as:

To restore the favourable conservation status of active raised bog in Ireland.

Targets for range, area and a series of attributes relating to "structure and functions" have been set to support this national objective. These are reviewed in the context of the SEA Environmental Objectives in **Table 7.3**.

The Plan objectives are broadly compatible with the environmental objectives. However, it is recognised that some Plan objectives / targets have potential to be in conflict with the SEA objectives, particularly with reference to population, cultural heritage and material assets. These targets may only be compatible with the SEA objectives depending on how they are implemented, e.g. impacts to material assets where turf cutting must cease on certain bogs. The needs of affected turf-cutters' are being addressed through compensation or relocation. The concerns and interests of land-owners within and around these sites will also be addressed through the putting in place of site-specific management and restoration plans for each raised bog SAC, in consultation with them and in keeping with the requirements of the Plan. The Site Specific Plans can also be used to explore how the restoration and management of these sites can benefit local communities through their use as amenity areas, for education, and as a focus for conservation.

While the plan addresses a number of these issues some potential for residual conflict between the Plan and SEA Objectives remains. It is therefore recommended that consideration be given to revising the text of the national objective to state: To restore the favourable conservation status of active raised bog in Ireland in accordance with the Habitats Directive and having regard to sustainability.

Table 7.3: Compatibility of SEA Objectives with Plan Objective and Associated Targets

	SEA Environmental Objective ⇨	Bio 1	Bio 2	PHH	S	W	CF	MA	CH	L
	Plan Targets ⇩									
National Objective	***To restore the favourable conservation status of active raised bog in Ireland***	**Y**	**Y**	**Y/N**	**Y**	**Y**	**Y**	**Y/N**	**Y/N**	**Y**
Range	Range increasing from current situation. (National)	**Y**	**Y**	**Y/N**	**Y**	**Y**	**Y**	**Y/N**	**Y/N**	**Y**
	Not less than current range subject to natural processes. (SACs)	**Y**	**Y**	**Y/N**	**Y**	**Y**	**Y**	**Y/N**	**Y/N**	**Y**
Area	Area increasing and not less than 3,600 ha National	**Y**	**Y/N**	**Y/N**	**Y**	**Y**	**Y**	**Y/N**	**Y/N**	**Y**
	Area increasing and not less than 2,590 ha SACs	**Y**	**Y/N**	**Y/N**	**Y**	**Y**	**Y**	**Y/N**	**Y/N**	**Y**
Hydrological Regimes	Maintain/restore appropriate water levels and flow directions on each bog	**Y**	**Y/N**	**Y**	**Y**	**Y**	**Y**	**Y/N**	**Y/N**	**Y**
Supporting High Bog Habitat	Maintain/restore adequate high bog to support development and maintenance of active raised bog	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y/N**	**Y/N**	**Y**
Transitional areas between high bog and adjacent	Maintain/restore semi-natural habitats with high water levels around as much of the bog margins	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y/N**	**Y/N**	**Y**

	SEA Environmental Objective ⇨	Bio 1	Bio 2	PHH	S	W	CF	MA	CH	L
	Plan Targets ⇩									
mineral soils	as necessary									
Vegetation quality	Maintain/restore sufficient high quality vegetation (i.e. central ecotope and/or soaks). At least 50% of active raised bog habitat should be central ecotope and/or soaks	**Y**	**Y/N**	**Y**	**Y**	**Y**	**Y**	**Y/N**	**Y**	**Y**
Micro-topographical features	Maintain/restore adequate cover of high quality micro-topographical features	**Y**	**Y/N**	**Y**	**Y**	**Y**	**Y**	**Y/N**	**Y**	**Y**
Cover of bog moss species	Maintain/restore adequate cover of bog-moss (Sphagnum) species to ensure peat-forming capacity	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**0**	**0**	**Y**
Typical bog flora	Maintain/restore typical raised bog flora	**Y**	**Y**	**0**	**Y**	**Y**	**0**	**0**	**0**	**Y**
Elements of local distinctiveness	Maintain/restore indicators of local distinctiveness	**Y**	**Y**	**0**	**Y**	**Y**	**0**	**0**	**0**	**Y**
Negative physical indicators	Bare peat and other indicators of degradation including algae-dominated pools and hollows and tear patterns are absent or insignificant	**Y**	**Y**	**0**	**Y**	**Y**	**Y**	**0**	**0**	**Y**

	SEA Environmental Objective ⇨	Bio 1	Bio 2	PHH	S	W	CF	MA	CH	L
	Plan Targets ⇩									
Negative indicator species	Native negative indicators and non-native species are absent or under control	**Y**	**Y**	**0**	**Y**	**Y**	**Y**	**0**	**0**	**Y**

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

8 CONSIDERATION OF ALTERNATIVES

The SEA focuses on two main aspects of the draft Plan:

1. A national toolkit of the protection, restoration and replacement options to achieve the plans conservation objectives; and

2. A national strategy to achieve the plans conservation objectives [programme of measures].

8.1 NATIONAL TOOLKIT OF MEASURES

Chapter 7 outlines the National Conservation Objectives and associated targets set for raised bogs in Ireland in the draft Plan. Following on from this, a toolkit of measures have been developed to achieve these Conservation Objectives. The measures proposed have been categorised as Protection, Restoration and Replacement. The protection measures relate principally to cessation of damaging activities currently in place on the 53 raised bog SACs. The restoration options are focussed on active intervention through engineered solutions, while the replacement options are focussed on identifying NHA and other non-designated bogs which could be used as compensatory habitat for raised bog SACs which has been lost / damaged beyond repair.

These measures provide a national toolkit of measures designed to address the specific pressures impacting on the raised bogs in the 53 designated SACs. It is intended that the measures in this toolkit will be implemented alone, or in combination, if and where required in the various SACs, and at those sites where investigations and risk assessment show that specific pressures need to be remediated to maintain and restore raised bog to favourable conservation status.

A review of the ecological and eco-hydrological condition of the Raised Bog SACs (Chapter 3 and Appendix A), has revealed that, in the absence of intervention measures aimed at limiting the detrimental impacts of human activities, the area under Active Raised Bog (ARB) has followed a declining trend from the mid 1990s to the present. In other words natural feedback processes arising from peat cutting and associated activities are incapable of maintaining the eco-hydrological conditions necessary to support ARB. Further intervention is therefore necessary if the current trend is to be halted and ultimately reversed. The National Toolkit of Measures for the Raised Bog SACs are presented under Protection, Restoration and Relocation headings.

Protection Options

Preventative measures including cessation of the following activities:

- Drainage of raised bog habitat or surrounding wetland habitats;

- Peat harvesting and turf cutting;
- Planting of commercial forestry;
- Burning; and
- Other damaging activities such as water abstraction from groundwater and quarrying which can have a significant impact on the raised bogs by lowering the regional groundwater level.

Restoration Options

Engineered (active intervention) measures including:

- Drain blockage on high bog;
- Drain blockage in marginal areas;
- Removal of forest plantations;
- Marginal dams;
- Bunding on high bogs; and
- High bog and cut-over bog excavation/re-profiling.

Replacement Options

Replacement measures including the following:

- Re-designation of appropriate NHAs
- Designation of appropriate non-designated sites

As such, the following options have been assessed in **Chapter 9** of this SEA:

- Protection Options to achieve the Conservation Objectives;
- Restoration Options to achieve the Conservation Objectives;
- Replacement Options to achieve the Conservation Objectives

8.2 NATIONAL STRATEGY [PROGRAMME OF MEASURES]

The following scenarios have been assessed in this SEA:

(i) Business as Usual;

(ii) Individual Measures as part of a National Programme of Measures.

In certain cases a 'do nothing' option is one of the alternatives considered as part of the strategic environmental assessment process. However, in this case the 'do nothing' option, i.e. no Plan, is not considered a realistic alternative as the Habitats Directive and EC judgements against Ireland require that action be taken with regard to the status of this protected habitat. Therefore, a 'do nothing' option has not been assessed. Instead a '*do minimum'* is considered wherein those activities identified as damaging to the Raised Bog SAC are ceased with immediate effect and no restoration or relocation options are considered to address the historical loss of area / range and no compensation is provided for turf-cutters. This would equate to the Protection options outlined in Section 8.1 and is assessed in **Table 9.2.**

Following on from the toolkit discussed above, a *programme of measures* to achieve the Conservation Objectives and targets in the draft Plan has been developed (**Table 8.1).** The measures represent the preferred alternative derived from the national toolkit of measures and has been assessed in **Chapter 9, Table 9.3.**

Table 8.1: Summary of Proposed Programme of Conservation Measures

Measure	Where	When	Who
1. Protection and Restoration of current SAC network entailing • Preventative measures (cessation of damaging activities including drainage, peat harvesting and turf cutting, planting of commercial forestry, fires etc.) and • Restoration measures (drain blockage in both open and overgrown drains, coupled with forestry plantation clearance) • Note: Detailed restoration and management plans for each SAC will be developed during 2014 /	Current SAC bogs	2014-2020	DAHG (NPWS)

Measure	Where	When	Who
2015.			
2. Additional Raised Bog Selection and Restoration to fulfil SAC Area Objectives	Compensatory sites	2014-2020	DAHG (NPWS)
3. Demonstration Project – Rewetting of Cut-over Bog to restore to high bog and to evaluate the rewetting of a proportion of the cutover bog	Clara Bog	2014-2017	DAHG (NPWS)
4. EU LIFE Proposal and Project implementation	Selected SACs	2014-2020	DAHG (NPWS)
5. Support for other conservation works – making funding available to individuals and organisations to carry out approved restoration works.	Selected sites	2014-2020	DAHG (NPWS)
6. Mid-cycle Review of the National Raised Bogs SAC Plan	National	2017	DAHG (NPWS)
7. Preparation of Second National Raised Bogs SAC Plan	National	2020	DAHG (NPWS)
8. Review of the NHA Network Designation Status (additional NHAs and de-designation of sites of low conservation value)	Current and new NHA Networks	2014	DAHG (NPWS)
9. Preparation of a national Raised Bog NHA Management Plan and site specific NHA Restoration and Implementation Plans affording protection and restoration measures akin to those in the SAC Network with supporting Code of Practice and Guidance Documents	New NHA Network	2014-2016	DAHG (NPWS)
10. Raised Bogs Education and Awareness Programme and engagement and consultation with local communities.	National	2014-2020	DAHG (NPWS)
11. Raised Bogs Monitoring	National	2014-2020	DAHG (NPWS)

Measure	Where	When	Who
Programme			
12. Habitats Regulations implementation to prevent damaging activities	National	Ongoing	DAHG (NPWS)
13. Environmental Impact Assessment Regulations implementation to prevent damaging activities	National	Ongoing	DAHG (NPWS)
14. Ensure legislative and policy linkage to other plans and programmes including River Basin Management Plans and Catchment Flood Risk Management Plans	National	Ongoing	DAHG (NPWS)

In particular the programme includes monitoring, review and further plan iteration measures to assess the progress and effectiveness of the long term strategies put in place under the first National Raised Bog SAC Management Plan and the supporting suite of NHA network reviews and plans. The programme also includes demonstration projects to support this plan's implementation, which includes a demonstration of cut over rewetting for evaluation prior to possible incorporation into subsequent planning cycles. Further educational and awareness programmes are also incorporated as are legislative measures.

9 ASSESSMENT

9.1 ASSESSMENT APPROACH

The approach used for assessing the alternatives under consideration for the draft National Raised Bog SAC Management Plan is an objectives led assessment. To assess the toolkit of measures a detailed high-level objectives led assessment was carried out, which was primarily qualitative in nature, with some assessment based on expert judgement. This qualitative assessment compares the likely impacts of each alternative against the strategic environmental objectives to see if the alternative meets the strategic environmental objectives or if it contradicts these. The alternative is then allotted an assessment rating for the purposes of comparison. For the purposes of this assessment, plus (+) indicates a potential positive impact, minus (-) indicates a potential negative impact, plus/minus (+/-) indicates that both positive and negative impacts are likely or that in the absence of further detail the impact is unclear, and a neutral or no impact is indicated by 0.

For the assessment of the Programme of Measures a similar objective led assessment has been undertaken. This approach is reflective of the very strategic nature of the plan and in recognition that at this time, detailed assessments for each raised bog SAC have not been undertaken as the site specific measures have not been developed. It is anticipated that in 2014 / 2015, the most appropriate measures or combination of measures from the toolkit and strategy presented in this SEA and the National Plan will be developed further for each raised bog SAC. At that time project level appropriate assessment and environmental assessment will be undertaken which addresses local issues.

9.2 ASSESSMENT PARAMETERS

In line with the SEA Directive, *short, medium and long-term impacts* must be considered during the assessment. However, it is recognised that short-term assessment may be confined to considerations around construction of intervention measures such as drain blocking. As implementation of actual measures may take significant time to show effect, consideration of short term impacts beyond this are not likely to be constructive. It is noted however, that under Article 17 of the Habitat's Directive, each member state must report to the EU on the status of each habitat and species protected under Annex I and Annex II of the Habitat's Directive. The last report was published in 2013. In 2019, the next set of Article 17 reports will be sent to the EU. This will include an update on the size and status of the various raised bog SACs, the measures that are in place and the improvements or deteriorations (as applicable) and will provide an interim check on implementation if not effect. For the purposes of this SEA, assessments have been made for 2019 (as a medium-term horizon) and 2025 (as a long-term horizon) in keeping with the Article 17 reporting

timeline. Medium and long-term impacts are addressed in **Tables 9.1, 9.2 and 9.3**. Short-term construction effects are raised where relevant.

Cumulative effects arise for instance where several activities may each have an insignificant effect but together have a significant effect or where effects viewed at a local scale may in combination give rise to a regional or national effect. *Synergistic effects* interact to produce a total effect greater than the sum of the individual effects so that the nature of the final impact is different to the nature of the individual impact. Cumulative and synergistic effects are highlighted through the sections.

The primary aim of the Management Plan is to protect or improve habitat quality in designated SACs in order to support the growth of active raised bog. Many of the alternatives under consideration will have *direct impacts* on water and aquatic biodiversity as a result. However, a number of alternatives also have the potential to directly and indirectly impact on other environmental receptors as a consequence of the alternatives in the Management Plan. These are also addressed in **Tables 9.1, 9.2 and 9.3.**

9.3 TOOLKIT OF MEASURES

Table 9.1: Assessment of Toolkit of Measures

Measure	Biodiversity Flora and Fauna_1 (BFF)	Biodiversity Flora and Fauna_2 (BFF)	Population Human Health (PHH)	Soil (S)	Water (W)	Climatic Factors (CF)	Material Assets (MA)	Cultural Heritage (CH)	Landscape (L)
Protection_1: Cessation of drainage of raised bog habitat or surrounding wetland habitats	+	+/-	+	+/-	+	+	+/-	+/-	+
Protection_2: Cessation of peat harvesting and turf cutting	+	+/-	+	+/-	+	+	+/-	+/-	+
Protection_3: Cessation of planting of commercial forestry	+	+/-	+	+/-	+	+	+/-	+/-	+
Protection_4: Cessation of spread of fires	+	+/-	+	+/-	+	+	+	+	+
Protection_5: Cessation of other human activities such as water abstraction from groundwater and quarrying which can have a significant impact on the raised bogs by lowering the regional groundwater level	+	+/-	+	+/-	+	+	+/-	+/-	+
Restoration_1: Drain blockage on high bog	+	+/-	+/-	+/-	+/-	+	+/-	+/-	+

Measure	Biodiversity Flora and Fauna_1 (BFF)	Biodiversity Flora and Fauna_2 (BFF)	Population Human Health (PHH)	Soil (S)	Water (W)	Climatic Factors (CF)	Material Assets (MA)	Cultural Heritage (CH)	Landscape (L)
Restoration_2: Drain blockage in marginal areas	+	+/-	+/-	+/-	+/-	++	+/-	+/-	+
Restoration_3: Removal of forest plantations	+	+/-	+/-	+/-	+-	+/-	+/-	+/-	+
Restoration_4: Marginal dams	+	+/-	+/-	+/-	+/-	+	+/-	+/-	+
Restoration_5: Bunding on high bogs	+	+/-	+/-	+/-	+/-	+	+/-	+/-	+
Restoration_6: High bog and cut-over bog excavation/re-profiling.	+	+/-	+/-	+/-	+/-	+	+/-	+/-	+
Replacement_1: Re-designation of appropriate NHAs	+	+/-	+/-	+	+	+	-	+/-	+
Replacement_2: Designation of appropriate non-designated sites	+	+/-	+/-	+	+	+	-	+/-	+

9.3.1 Discussion

Measures **Protection_1 to Protection_5** deal with the cessation of individual activities associated with pressures on conservation of raised bog habitat, which include drainage, peat harvesting / turf cutting, forestry, fires and activities affecting the water table.

Drainage is a critical issue in relation to bog habitats as the direct drainage of bogs and / or surrounding wetlands, together with activities such as peat harvesting / turf cutting, afforestation and abstractions, can have implications for the water table and associated ecology (BFF and W). The hydrology and ecology of bogs are very closely interlinked, and therefore drainage and other related activities can cause significant negative changes to the hydrological regime of bogs. This can result in a lowering of the water table causing large areas of the High Bog to dry out for extended periods of time. Lowering the water table can also permit colonisation by vegetation not typically associated with bogs which can further lower the water table over the longer term to levels that result in acrotelm degradation or loss. This can also lead to the introduction of invasive species. Drainage is also associated with subsidence in peat which may lead to topographic gradients that prevent acrotelm re-growth. Peat harvesting and turf cutting for example compromise the hydrological integrity of a raised bog leading to the lowering of the water table which can cause shrinkage cracking, deformation, collapse or bursts. Such actions can result in peat being exposed to air as the water levels drop and the dead plants in the peat start to decompose, releasing carbon dioxide and other gases into the atmosphere. These changes to the structure of the raised bog result in the loss of the raised bog ecology. Afforestation also has had negative impacts on raised bogs both through habitat loss and changes to the hydrological regime as a result of construction of forestry drains.

Similarly drainage and loss of vegetation associated with the activities mentioned can increase the amount and speed of water leaving the bog resulting in loss of particulate matter into adjacent watercourses in the catchment area leading to negative impacts on aquatic flora and fauna. In addition, this drained water contains higher amounts of dissolved organic carbon and particulate organic carbon (brown water) than natural bog water and leads to leaching of nutrients from the decomposing peat (Holden *et al.* 2004[4]). In cases where this brown water is used as a source for drinking water, the treatment required to remove the colour becomes very expensive. Furthermore, the waterborne carbon which is lost via drainage leads to further off-site CO_2 emissions.

In addition to being nationally and internationally important for biodiversity, Ireland's peatlands are a defining landscape feature, particularly in the midlands, both in their natural state and their degraded

[4] Holden *et al.,*: Artificial drainage of peatlands: hydrological and hydrochemical process and wetland restoration. Progress in Physical Geography, 2004.

anthropogenic form. Cessation of damaging activities will preserve some of the diversity and complexity of this inherited landscape for future generations.

By preventing further drainage and associated activities on these SAC raised bogs, these protection measures will have significant positive benefits for BFF, W and CF. Positive impacts are also anticipated for PHH and L. Cessation of these activities is expected to result in medium and long term positive direct impacts on raised bog conservation status.

Both positive and negative effects are anticipated for MA, S and CH in relation to these protection measures. The negative effects are principally related to the socio-economic nature of some of the activities e.g. agriculture, turf cutting etc. Practices of drainage and extraction have been ongoing on some bogs for generations and deep cultural traditions have developed around these practices. Cessation of the activities could lead to a loss of cultural heritage in addition to the negative impact on the material asset value of the bogs. This draft National Raised Bog SAC Management Plan proposes that the cultural and production services of raised bogs in the form of turf cutting are not lost but are maintained through a programme of re-location to other less fragile and ecologically important sites (or through compensation where relocation is either not possible or not wanted by the land owner). The cessation of turf cutting on natural protected raised bogs means that other benefits (including cultural and traditional benefits) of the national resource can be harnessed for the wider community and society. There are also positive implications such as protection of drinking water supplies for the wider community within the catchment, management of flood risk on adjacent lands and provision of amenity / eco-tourism opportunities which are also anticipated with this measure.

Negative impact has been recorded for BFF in relation to the potential to impact on other flora, fauna and habitats associated with the raised bogs. The AA has identified that the draft Raised Bog SAC Plan has the potential for significant adverse effects to the integrity of Natura 2000 sites through:

- Changes to hydrology (in particular to water levels) which in turn indirectly impact on habitat requirements for other Qualifying Interests and Qualifying Features of some of the 53 Raised Bog SAC sites, e.g. Vertigo, Marsh Fritillary and Red Grouse.

- Disturbance and habitat loss for bird species of SPAs in / adjacent to the Raised Bog SACs that use the raised bog habitat as feeding / breeding grounds. Five of the 53 designated SAC raised bogs are also designated SPAs for birds. These are: All Saints Bog; Ballykenny-Fisherstown Bog; Bellanagare Bog; Garriskil Bog; and Mongan Bog.

Measures **Restoration_1 to Restoration_6** deal with restoration of existing degraded bog to achieve active raised bog status in the SAC bogs. In most cases these measures relate to changes to topography and drainage patterns to mimic natural conditions and encourage active raised bog

formation. Similar to the protection measures, these restoration measures are anticipated to have significant positive benefits for BFF, S, W, CF and L in the medium and long term.

Generally these measures will address deficiencies in the hydrological regime resulting from drainage patterns which are having negative implications for the ecology of the bog. Potential negative impacts have been identified in relation to PHH, MA and CH with regard to impact on existing land uses such as agriculture, peat extraction and turf cutting. It is proposed that these practices will be implemented in line with the protection measures discussed above. The impacts on traditional practices and socio-economics activities discussed above will therefore permeate these restoration measures also.

The restored bogs will be able to accumulate peat again and sequester carbon. The restoration measures therefore, directly supports Ireland's aim to reduce its national greenhouse gas emissions by firstly conserving those bogs that are currently sequestering carbon and secondly, by providing measures to reduce the carbon emissions from currently drained/cut bogs. New accounting changes in the next Kyoto Protocol commitment period (2013-2017) permit the inclusion of rewetted peatlands and their associated greenhouse gas fluxes. Removal of carbon by rewetted bogs can be reported and used against our national emissions.

Rewetting the bogs will also lead to a decrease in waterborne carbon leaching to levels comparable with undrained/uncut bogs. Restoration also re-creates the natural heterogeneity of habitats which is critical for the diversity of flora and fauna. Once the pre-disturbance vegetation cover is re-established, the site can be deemed fully restored and therefore all the benefits including carbon sequestration can be enjoyed again.

Negative impacts have been identified in relation to restoration measures and BFF. There is a delicate ecological balance within the raised bog wetland between the habitat and the species living within. The AA has identified that increasing water levels may impact on the requirements for ling heather (*Calluna vulgaris*) for example and indirectly on Red Grouse species as they feed almost exclusively on this heather. Similarly changes to hydrology or land use/land management practice may impact on requirements for Devil's-bit Scabious (*Succisa pratensis)*. This plant is an essential habitat component for the Marsh Fritillary butterfly and any alteration to land management of the Raised Bog SAC may ultimately impact on populations of Marsh Fritillary. Any alteration to hydrology can also impact on the micro-habitat structure that supports the Vertigo snail. Minor topographical changes and small changes in subsurface layers and interaction with the groundwater can have substantial impacts on the habitat.

Furthermore potential short-term negative impacts have been identified in relation to S and W as a result of construction related impacts associated with these engineered (active intervention) measures. Of particular concern is the loss of suspended solids to the catchment during bund formation, re-profiling and deforestation leading to negative impacts on aquatic flora and fauna and

loss of soils. Deforestation in particular could lead to negative impacts in relation to acidification of local watercourses, increased organic matter loss and changes to the water chemistry.

The final set of measures **Replacement_1 and Replacement_2** relate to the creation of additional SAC habitat to compensate for irretrievable losses through re-designation of some existing NHA and designation of other bog habitats not currently designated.

These measures will be broadly positive for BFF in particular as they will address the short-fall in available SAC raised bog habitat which has arisen since Irelands 53 raised bogs were designated. The extension of the network will benefit the biological and genetic diversity of typical flora and fauna associated with this habitat type in Ireland. Positive medium to long-term impacts are also anticipated for soils, water and landscape as this designation of lands as SAC will elevate and / or confer protection to the newly designated sites, protecting their ecology and hydrology from damaging activities such as drainage and peat extraction.

Undoubtedly the most significant negative impact will be to material assets in relation to activities currently ongoing on any of the appropriate NHA bogs and un-designated bogs. Particularly with regard to the un-designated bog sites, there is likely to be significant restrictions on land use practices following the confirmation of an SAC designation. Those extracting peat from existing NHA sites are already subject to regulations made under the Local Government (Planning and Development) (Amendment) Regulations, 2001 (S.I. No. 539 of 2001), which introduced a planning threshold for peat extraction of 10 hectares. In addition, these regulations introduced amendments to the Wildlife (Amendment) Act, 2000 and the European Communities (Natural Habitats) Regulations, 1997 to allow for the possibility of EIA for peat extraction in NHAs and SACs, respectively, below the 10 hectare planning threshold, where a project is likely to have significant effects on the environment. This currently applies to NHA raised bogs.

It is noted that the replacement measures only address the designation issues and do not mention relocation of existing turf cutting rights by way of compensation.

Mitigation Measure Proposed by the SEA:

National Toolkit

- It is noted that the replacement measures in the national toolkit only address the designation issues and do not mention relocation of existing turf cutting rights by way of compensation. It is therefore recommended that a new measure be added under Replacement to expressly address the relocation of turf cutting rights.
- A specific national toolkit measure should be added to develop Site Specific Management Plans for the 53 raised bog SACs.

- Site Specific Plans should undergo an environmental assessment taking in to account at a minimum, BFF, W, MA, PHH, CH, L and S.
- Site Specific Plans should include a Construction Environmental Management Plans (CEMP) where restoration measures are required, which clearly sets out the protocols for working within the SAC with a view to minimising the potential for contamination of ground water and / or surface water as a result on engineered activities, protection of cultural heritage and protection of qualifying features other than raised bog which may also be in / adjacent to the designated sites.

National Conservation Objective

- The national conservation objective for raised bogs should include a reference to sustainability (National Conservation Objective)

9.4 DO MINIMUM SCENARIO

Table 9.2: Assessment of Do Minimum Scenario.

Measure	Biodiversity Flora and Fauna_1	Biodiversity Flora and Fauna_2	Population /Human Health	Soil	Water	Climatic Factors	Material Assets	Cultural Heritage	Landscape
Do Minimum: Cessation of all damaging activities on the existing 53 raised bogs with no further actions.	+	+/-	+	+/-	+	+	+/-	+/-	+

9.5 PROGRAMME OF MEASURES [PREFERRED STRATEGY]

Table 9.3: Assessment of Programme of Measures

Measure	Biodiversity Flora and Fauna_1	Biodiversity Flora and Fauna_2	Population /Human Health	Soil	Water	Climatic Factors	Material Assets	Cultural Heritage	Landscape
POM_1 Protection and Restoration of current SAC network entailing: • Preventative measures (cessation of damaging activities including drainage, peat harvesting and turf cutting, planting of	+ / -	+/-	+	+/-	+	+	+/-	+/-	+

Measure	Biodiversity Flora and Fauna_1	Biodiversity Flora and Fauna_2	Population /Human Health	Soil	Water	Climatic Factors	Material Assets	Cultural Heritage	Landscape
commercial forestry, fires etc); and • Restoration measures (drain blockage in both open and overgrown drains, coupled with forestry plantation clearance). Note: Detailed restoration and management plans for each SAC will be developed during 2014-15.									
POM_2 Additional Raised Bog Selection and Restoration to Fulfil SAC Area Objectives	**+**	**+**	**+/-**	**+**	**+**	**+**	**+/-**	**+/-**	**+**
POM_3 Demonstration Project – Rewetting of Cutover Bog to restore the high bog and to evaluate the rewetting of a proportion of the cutover bog.	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
POM_4 EU LIFE Proposal and	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Measure	Biodiversity Flora and Fauna_1	Biodiversity Flora and Fauna_2	Population /Human Health	Soil	Water	Climatic Factors	Material Assets	Cultural Heritage	Landscape
Project implementation									
POM_5 Support for other conservation works – making funding available to individuals and organisations to carry out approved restoration works	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
POM_6 Mid-cycle Review of the National Raised Bogs SAC Plan	**+**	**+**	**+**	**+**	**+**	**0**	**+**	**0**	**0**
POM_7 Preparation of Second National Raised Bogs SAC Plan	**+**	**+**	**+**	**+**	**+**	**+**	**+**	**+**	**+**
POM_8 Review of the NHA Network Designation Status (additional NHAs and de-designation of sites of low conservation value)	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
POM_9 Preparation of a national Raised Bog NHA Management Plan and site specific NHA Restoration and Implementation Plans affording	**+**	**+**	**+/-**	**+**	**+**	**+**	**+/-**	**+/-**	**+**

Measure	Biodiversity Flora and Fauna_1	Biodiversity Flora and Fauna_2	Population /Human Health	Soil	Water	Climatic Factors	Material Assets	Cultural Heritage	Landscape
protection and restoration measures akin to those in the SAC Network with supporting Code of Practice and Guidance Documents									
POM_10 Raised Bogs Education and Awareness Programme	**+**	**+**	**+**	**+**	**+**	**+**	**+**	**+**	**+**
POM_11 Raised Bogs Monitoring Programme	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
POM_12 Habitats Regulations implementation to prevent damaging activities	**+**	**+**	**+/-**	**+**	**+**	**+**	**+/-**	**+**	**+**
POM_13 Environmental Impact Assessment Regulations and Environmental Liabilities implementation to prevent damaging activities.	**+**	**+**	**+/-**	**+**	**+**	**+**	**+/-**	**+**	**+**

Measure	Biodiversity Flora and Fauna_1	Biodiversity Flora and Fauna_2	Population /Human Health	Soil	Water	Climatic Factors	Material Assets	Cultural Heritage	Landscape
POM_14 Ensure legislative and policy linkage to other plans and programmes including River Basin Management Plans and Catchment Flood Risk Management Plans	+	+	0	+	+	+	0	+	+

9.5.1 Discussion

The **do minimum** deals with cessation of damaging activities on the 53 raised bog SAC in line with the requirements of the Habitats Directive to protect the Natura 2000 network, without any attempt to restore or replace damaged or lost raised bog habitat. Under the Habitats Directive, Member States must show the steps taken to achieve the Directives objectives as well as avoiding deterioration in those natural habitats and habitats of species for which an area has been designated. Already the European commission has commenced infringement proceedings against Ireland for alleged failures to adhere to the Habitats Directive and the Environmental Impact Assessment Directives as they adhere to SAC and NHA designated raised bogs. While such a focused and targeted alternative would result in positive medium term effects in regard for BFF, it would not fully address the short comings in application of the Habitats Directive that have been identified and would not in any way go to restoring the full area and range of raised bog habitat which was originally designated. As such the positive effects in the long-term would be somewhat diluted. The principal area of negative effect with regard to this alternative would be the complete dislocation of cultural and economic interests which have used the bogs over decades for the purposes of extraction of turf. This is likely to result in significant short, medium and long term impacts to MA and CH in particular, and would require consideration of significant mitigation to offset these losses. Negative impacts associated with this scenario would also be expected for BFF where changes to hydrology (in particular to water levels) indirectly impact on habitat requirements for other Qualifying Interests and Qualifying Features of some of the 53 Raised Bog SAC sites, e.g. *Vertigo*, Marsh Fritillary and Red Grouse. Disturbance and habitat loss for bird species of SPAs in / adjacent to the Raised Bog SAC that use the raised bog habitat as feeding / breeding grounds could also result in negative impacts for BFF. Five of the 53 designated SAC raised bogs are also designated SPAs for birds. These are: All Saints Bog; Ballykenny-Fisherstown Bog; Bellanagare Bog; Garriskil Bog; and Mongan Bog.

POM 1 and **POM 2** provide the greatest direct implications for stakeholders in relation to sustainable management of the SAC raised bog resource. Natural bogs (those with little human impact) are considered one of the most important ecosystems of the world, because of their key value for biodiversity, regulation of climate, water filtration and supply, and important support for human welfare (e.g. source of well-being and knowledge). The bogs specifically provide services in the form of:

1. Carbon storage and carbon sequestration;
2. Support for habitats and species biodiversity;
3. Water filtration, contaminant removal and nutrient cycling;
4. Soil formation, massif landscape and support for nature;

5. Preservation of information in un-decomposed biota and artefacts; and

6. Production of peat/turf.

The protection and restoration of the raised bog SACs within a robust national network of raised bogs as proposed through POM 1 and POM 2 will have direct long-term positive impacts for BFF, S, W, CH, L and CF through provision of these ecosystem services listed in 1-5 above. POM 1 and POM 2 will have a direct negative impact in relation to MA as it pertains to production of peat, turf cutting, forestry etc. These activities have been identified as damaging and as such the measures seek to prevent them. Where turf cutting and other damaging activities were allowed to continue, the bog resource would continue to degrade and therefore would not provide the other benefits associated with healthy natural wet bogs as mentioned above (Functions 1 to 5). This is because when a bog is drained and peat is cut, critical functions are affected and associated services cease to exist.

POM 1 relates to the protection and restoration of the existing bog resource with a focus on the 53 SAC raised bogs currently in Ireland. The preventative measures offer direct positive impacts for BFF, S, W, CF and CH, L and PHH in so far as they support the ecosystem services mentioned above. Cessation of damaging activities including drainage, peat harvesting and turf cutting, planting of commercial forestry, fires, and other damaging activities will have direct medium to long term positive impacts for these environmental receptors. They will however have direct negative impacts on some aspects of BFF, CH and MA. The BFF impacts are principally related to changes in water levels etc.

As identified in the AA for the Plan, there is the possibility that qualifying features (bird species) of SPAs adjacent to the raised bog SACs will use the raised bog habitat as feeding ground or breeding grounds and any change or disturbance to the raised bog SAC might disturb this use. It is also possible that such changes may impact on habitat requirements for other qualifying interests and qualifying features of the 53 Raised Bog SAC sites. Five SPAs overlap with the 53 raised bog SAC designations as follows: All Saints Bog; Ballykenny-Fisherstown Bog; Bellanagare Bog; Garriskil Bog; and Mongan Bog.

There is a delicate ecological balance within the raised bog wetland between the habitat and the species living within. The AA has identified that increasing water levels may impact on requirements for ling heather (*Calluna vulgaris*) for example and indirectly on Red Grouse species as they feed almost exclusively on this heather. Similarly changes to hydrology or land use/land management practice may impact on requirements for Devil's-bit Scabious, (*Succisa pratensis)*. This plant is an essential habitat component for Marsh Fritillary butterfly and any alteration to land management of the Raised Bog SAC may ultimately impact on populations of Marsh Fritillary. Any alteration to hydrology can impact on the micro-habitat structure that supports the Vertigo snail. Minor topographical

changes and small changes in subsurface layers and interaction with the groundwater can substantial impact on the habitat.

The remaining negative impacts are focussed on cessation of activities such as drainage, peat harvesting, turf cutting and planting of commercial forestry and the negative implications that will have on MA and CH. The plan specifically addresses relocation and compensation of turf cutters, however; compensation in relation to commercial activities is not addressed in the plan. It is anticipated that this will be addressed in Site Specific Plans as necessary. The measure will result in direct negative impact to MA (including over 1,584 active turf cutters on the existing raised bog SAC network) in the short term until such time as compensation and / or relocation can be achieved. It is noted that the draft Plan does not include a specific measure in relation to compensation / relocation of groups such as the turf cutters. It is therefore recommended that such a measure be included to address concerns raised by various interest groups during the scoping stage of the process. Similarly negative impacts are anticipated in the medium to long term in relation to CH as family and community traditions are curtailed and traditional practices are possibly lost. Consideration should therefore be given to provision of information signage at the 53 bogs which broadly outlines the ecological values of the site and provides historical context, which includes the traditions which have shaped the evolution of the bog. Relocation of turf cutters to alternate sites will also address longer term impacts to CH by preserving the traditional practices.

The restoration measures proposed under POM 1 (drain blockage in both open and overgrown drains, coupled with forestry plantation clearance will broadly give rise to positive impacts in the medium to long-term for BFF, W, S, L once the measures have had sufficient time to take effect which may be over 10+ years. Short-term indirect negative impacts are anticipated in relation to BFF resulting from changes to hydrology (in particular to water levels). Whilst these changes are a requirement for restoration of raised bog habitat, it may impact on habitat requirements for other qualifying interests and qualifying features of some of the 53 Raised Bog SAC sites, e.g. *Vertigo*, Marsh Fritillary and Red Grouse. The restoration of a bog to active raised bog is likely, over time, to lead to ecological changes that may in turn affect species of flora and fauna that use the site in its degraded state. In the process of restoration, these changes should be monitored, and the impacts on habitats and species of conservation interest, both at site level and nationally, should be tracked, so that any significant negative long term impacts at site or national level can be addressed by appropriate mitigation measures in view of site and national conservation objectives

Short-term indirect negative impacts are also anticipated in relation to S, W, CH and L as a result of construction related activities. Any excavation works including backfilling of drains, blockage of drains or removal of forestry has the potential to cause mobilization of soils and other organic matter increasing the risk of pollution to rivers and adjacent lands, and to identify material of archaeological significance within the raised bog area. It is therefore recommended that an environmental assessment be undertaken by a suitable qualified practitioner as part of the development of Site

Specific Plans and a qualified archaeologist be present onsite during implementation of restoration measures to ensure the archaeological resource is protected.

POM 2 relates to the selection of sites to provide additional habitat to replace permanently lost areas in the existing SAC network since they were selected for designation. The Scientific Basis for Raised Bog Conservation in Ireland Study has estimated that 2,590 ha of active raised bog is ultimately required in the SAC network. Of this 1,210 ha are currently active and a further 1,200 ha can be restored within the existing SAC network leaving a shortfall of 180 ha of suitable habitat to achieve the target of 2,590_ha. This is to be achieved by including currently non-SAC areas of active raised bog or degraded raised bog within the SAC network.

A review of raised bog NHAs and other non-designated raised bog habitat was undertaken as part of the Scientific Basis for Raised Bog Conservation in Ireland Study. From the list of suitable sites identified under this review, it was decided to achieve this through the designation of two raised bog sites which are predominantly owned by Bord na Móna.

There will be immediate short-term positive impacts to BFF with regard to the designation of these sites through the protection afforded them by the Habitats Directive. This will continue into the medium and long-term as restoration works are implemented. Specifically it will enhance the Natura 2000 ecological network and provide significant connectivity between areas of biodiversity which has added ecological benefits for more mobile species (Grouse and Curlew for example) and would be in line with Bord na Móna's 1987 policy regarding bogs of significance. It will also contribute to the restoration, rehabilitation enhancement and management of the SAC raised bogs and support the delivery of the Habitats Directive. As noted earlier, negative impacts are also anticipated in relation to habitats and species already using these areas. Changes to the hydrology as a result of restoration are likely to have knock-on indirect negative impacts on species currently in place.

The restoration of Bord na Móna sites offers significant direct and indirect positive impacts with regard to the sustainable management of our raised bog resource for the wider community. Positive impacts are therefore anticipated for PHH with regard to provision of amenity / recreational areas. The designation of these bogs also presents possibilities in relation to eco-tourism in line with other SAC designated bogs such as Clara Bog. It is recommended that such facilities would recognize not only the biodiversity value of the sites but also the industrial archaeology and architectural heritage related to the Bord na Móna activities over the decades and any archaeology which may have been indentified within and adjacent to these bogs over the years. Other positive indirect impacts to PHH include assistance in regulating water within a catchment and in maintaining water quality. However this will be more relevant post restoration of these sites which would be in the long-term as significant lags are expected before active raised bog would be restored and functioning naturally, if this can be achieved. Bord na Móna ownership means that the sites can relatively quickly be brought into the SAC network and restoration work advanced.

Direct long-term positive impacts to soils are anticipated from this measure arising from the restoration of bog at the Bord na Móna sites. Restoration of active bog will safeguard the soil quality, quantity and functioning of these habitats and maintain soil biodiversity as a result. Active raised bog will also introduce mosses and other vegetation which will secure soils and reduce erosion in these habitats. As above these will be long-term positive impacts as it will take considerable time to see the benefits of these restoration measures.

Raised bogs have a role to play in a number of other aspects of the environment including regulating water within a catchment and in maintaining water quality. As such positive impacts are anticipated for W, generally through the contribution of these restoration measures and the designation of these bogs will have on toward achieving the principle objectives of the WFD. Similarly the bogs have a role to play in water retention and flow regulation and restoration and designation of these bogs will have positive impacts in relation to flooding.

The principle negative impact of POM 2 relates to material assets and cultural heritage. Although the majority of the lands are within Bord na Móna ownership, they have not been commercially harvested and any potential to do so would be removed with such a designation. Those areas of bog in the land bank that are not Bord na Móna sites may also experience loss of economic potential and significant changes to existing economic activity, which would render them unviable in any extractive sense.

There are a total of 72 known cutters on the two sites: some own the land, others have turbary rights and others have permission from Bord na Móna's to cut. As such the designation of these bogs will have immediate short to medium term negative impacts on those currently using the bogs. Negative impacts to CH as a result of these newly designated bogs is primarily related to restoration activities such as drain blocking etc which could encounter previously unrecorded archaeology. It is acknowledged that peatlands are unrivalled repositories of archaeological material, both artifactual and in terms of structures. Given the potential sensitivities around archaeology in particular, it is recommended that the Site Specific Plans developed for each of the 53 raised bog SAC are extended to include these newly designated sites. These Site Specific Plans must include a full environmental assessment of the implications of the Site Specific Plans once know and shall include an archaeological assessment with regard to each site. Site specific mitigations measures can then be proposed.

POM 3; POM 4; and POM 5 relate to demonstration projects and funding sources to assist in the protection of the raised bog SAC network. These measures are considered neutral overall at this scale however specific impacts associated with the demonstration project will be addressed at the site specific scale when the location and methods are known. A demonstration of cut over rewetting for evaluation prior to possible incorporation into subsequent planning cycles will add to the evidence base of the wider Raised Bog Scientific Study and will help inform decisions at the site specific level. It will also provide further clarity on issues such as bog bursts which were mentioned in a number of submissions during consultation on the SEA scope.

EU Life funding is to be sought for some of the individual bogs to assist in implementation of measures. This measure is considered to have a neutral impact on the environment.

POM 6 and POM 7 deal with development of plans and reviews of plans for both the SAC and NHA networks in relation to raised bogs. Broadly speaking the mid-cycle review of the National Raised Bog SAC Management Plan proposed in POM 6 will have positive medium term impacts for BFF, W, S, PHH, and MA as it will provide a monitoring tool for progress on implementation of the measures identified in the Plan and it will facilitate monitoring of speed of implementation of mitigation measures recommended by the SEA and AA. Where short-comings are identified, strategies should be implemented to deal with these in a proactive manner. It is recommended that a timeline for roll out of the individual measures and proposed mitigation is included in the Plan to allow a proper audit in the mid-term review. Neutral impacts are anticipated for the remaining environmental topics. A thorough

and robust mid-term review will also inform changes needed in the development of a second National SAC Management Plan proposed in POM 7. This second Plan is also anticipated to result in broadly positive medium and long-term impacts for all environmental topics as it maintains a structured, focussed and managed approach to the SAC raised bog resource. It is anticipated that negative impacts relating to MA, CH and PHH identified for the first Plan would be significantly reduced for the second Plan if progress is made in relation to compensation of turf-cutters and others in the intervening 6 year period. It is recommended that if the mid-term review identifies short-comings in this regard, a specific strategy should be developed in consultation with the Peatland Council and mediation / arbitration options should be explored.

POM 8 and **POM 9** relate to the NHA network. POM 8 relates to a review process and it anticipated that this will have a neutral impact on all environmental topics as it is based on a fact finding exercise to inform the development of a national Raised Bog NHA Management Plan and site specific NHA Restoration and Implementation Plans as outlined in POM 9. The details of the NHA Plan, site specific plans, guidance documents and codes of practice are not yet available; therefore, it is not possible to fully assess the impacts associated with these at this time. However, POM 9 is likely to result in similar positive impacts to the SAC Management Plan as it is a structured management approach to the NHA network. Positive impact in the medium to long-term would be anticipated for BFF, W, S, CF but as with the SAC Management Plan, PHH, MA and CH are all likely to experience negative impacts in the medium term as new regimes are implemented and compensation packages are discussed and agreed with landowners and bog users. However, it is strongly recommended that at the time the details of these are known that they are subject to an environmental assessment under the SEA and Appropriate Assessment processes in order to identify any potential impacts other than those related to water, e.g. material assets, biodiversity, population, etc. The purpose of this would be to identify focussed mitigation measures aimed at offsetting or reducing any identified negative impacts.

POM 10 is perhaps the most important of all the measures suggested and has been recommended for inclusion in the draft Plan through both the SEA process and the stakeholder engagement process. These types of initiatives and programmes are expected to result in increased stakeholder awareness of the value of raised bogs and the range of ecosystem services they provide. Education and awareness programmes are already in place with organisations such as the IPCC, however; additional materials which focus on services provided by these bogs, including quantification of the value at a national, regional and local community scale, will assist in providing a tangible and real world awareness of their value. Similarly the awareness raising with regard to obligations under the Habitats and EIA Directives are also required as this type of relevant information is often more readily available and understood by developers and their agents than by members of the public who may not be aware they apply to the smaller scale activities they are involved in. This measure is expected to give rise to short and medium term direct positive impacts across the range of environmental topics. It is noted that the cumulative effects of awareness campaigns in other high profile environmental

legislation such as the Water Framework Directive are gradually raising general awareness of environmental issues and also obligations under related directives.

POM 11: This type of monitoring measures continues to build a picture of the baseline environment begun during the Scientific Basis for Raised Bog Conservation in Ireland Study. The measure is concerned with information gathering rather than the taking of any concrete actions and as such is not anticipated to have any negative impacts, but will ensure raised bog management actions at the site specific level are fully informed and based on scientific data.

POM 12, POM 13 and POM 14 are all legislation based measures and relate to implementation of existing legislation in the form of the Habitats Regulations and the Environmental Impact Regulations in particular. Stricter enforcement of legislation was one of the issues raised during scoping consultation.

In the first instance a broader recognition of this legislation is required and should be part of a focussed and targeted response under POM 10. A wider understanding of the existence of the legislation to all relevant stakeholders, coupled with focussed implementation of the requirements of that legislation by relevant planning authorities e.g. local authorities and An Bord Plenála, would have significant positive impacts for BFF, W, S, CF, L and CH. The implementation of the legislation must be conducted in reference to the targets and objectives set for these bogs at a national and local level, and in the case of the EIA Directive and associated regulations, the impact to other environmental receptors such as CH. The positive effects of POM 12 and POM 13 are anticipated to be realised in the short, medium to long term as the regulations are already in place. It is recommended that NPWS provide a targeted information and awareness pack to planning authorities in the first instance to explain the importance of the bogs and their protection, Ireland's obligations under the Habitats and EIA Directives, and corresponding national legislation and the conservation objectives and targets which must be met. This proactive approach in providing planning authorities with the tools to assist in planning decisions could significantly enhance the positive effects of these three measures. A stricter enforcement of the legislation is likely to result in short-term negative impacts to existing bog users such as turf cutters and farmers, as related damaging activity will no longer be permitted. POM 14 specifically looks at linkages with other relevant Directives and legislation such as the Water Framework Directive and the Floods Directive. This will result in direct positive impacts for W, S, BFF, CF, CH and L, in particular, as synergies can be identified and resources pooled where possible. Impacts to other environmental receptors are anticipated to be neutral. It is recommended that consideration is given to adopting a RBD scale of approach in future iterations of the National SAC Management Plan and in the National NHA Management plan in order to align work with existing reporting frameworks such as the RBD. The Floods Directive is already aligned to the RBD scale and this could have merits for the raised bog conservation also.

9.5.2 Summary of Cumulative Impacts

These measures have the potential to give rise to positive cumulative impacts for raised bog SACs both at individual locations and nationally. The primary cumulative/synergistic impacts relate to achievement of the conservation objective now set for raised bog SACs nationally, which relates to area, range and supporting ecological and hydrological functions. Other positive cumulative impacts of the measures include improvements in water quality (which in itself will benefit from the cumulative effects of implementation of the RBMP programme of measures also) and soils quality and diversity. These in turn will have indirect cumulative effects on associated BFF. The protection of our individual SAC raised bogs will contribute cumulatively to preserving a national landscape type, unique to Ireland.

Negative impacts have been anticipated particularly for MA in relation to cessation of existing activities on the 53 designated raised bogs. A total of 1584 known turf cutters will be affected nationally by the measures in the draft Plan. A further 72 will be affected by the proposal to designate currently un-designated bog as SAC as part of relocation / compensation measures. This has indirect impacts for CH in relation to the loss of traditional practices across the county, however it is noted that turf cutting in and of itself can have negative impacts on CH through disturbance and damage. It is further noted that the draft Plan specifically addresses compensation of turf cutters as a result of the proposed measures.

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

9.5.3 Findings of Appropriate Assessment

Appropriate Assessment of the draft Raised Bog SAC Management Plan has been incorporated into the plan-making process and has informed the Plan and SEA at all stages with changes being made as necessary to minimise potential for impacts on Natura 2000 sites. Initial reviews of the proposed programme of conservation measures indicated that there was a risk of adverse effects on the integrity of Natura 2000 sites unless appropriate mitigation was applied. A summary of the findings from the AA is included in Appendix D and this has influenced the assessment under BFF above.

For the purposes of the AA, a precautionary approach has been adopted and therefore it is assumed that each Raised Bog SAC site will be subject to some degree of drain blocking and forest clearance and it is assumed that the impacts could be significant. The exact locations and extent of the measures is not known at this time.

Mitigation measures in the form of specific actions designed to protect the environment have been provided by integrating measures for the protection of Natura 2000 sites into all areas covered by the

Plan to ensure compliance with the Habitats Directive Article 6 requirements. Mitigating policies clearly indicate that where any physical development, hydrological alteration or any other form of disturbance has the potential to significantly impact on a Natura 2000 site, it will be subject to an individual site-specific Appropriate Assessment in 2014 / 2015 in relation to the development of site-specific restoration and management plans, and in full compliance with Article 6(3) and (4) of the Habitats Directive. A summary of the AA mitigation is presented in **Section 9.5.5**.

9.5.4 Mitigation Measure Proposed by the SEA:

Programme of Measures

- It is recommended that a timeline for roll out of the individual measures included in the POM is included in the Plan to allow a proper audit in the mid-term review (General)

- A specific measure committing to the Site Specific Management Plans should be included in the Programme of Measures for transparency. Consideration should be given to preparing the management plans at the scale of multiple connected bog complexes and / or catchment based management plans at the River Basin District level (General)

- It is recommended that an environmental assessment be undertaken by a suitable qualified practitioner as part of the development of Site Specific Plans and a qualified archaeologist be present onsite during implementation of restoration measures to ensure the archaeological resource is protected (POM 1)

- It is recommended that NPWS provide a targeted information and awareness pack to planning authorities in the first instance to explain the importance of the bogs and their protection, Ireland's obligations under the Habitats and EIA Directives, and corresponding national legislation and the conservation objectives and targets which must be met. This proactive approach in providing planning authorities with the tools to assist in planning decisions could significantly enhance the positive effects of POM 12, POM 13 and POM 14.

- It is recommended that eco-tourism facilities related to the SAC designation of sites would recognize not only the biodiversity value of newly designated SAC raised bogs but also the industrial archaeology and architectural heritage related to the Bord na Móna activities over the decades, and any archaeology which may have been indentified within and adjacent to these bogs over the years with particular reference to the evolution of domestic turf cutting over the 20th and 21st century. (POM 1 and POM 2).

- Similarly it is recommended that eco-tourism facilities relating to any of the existing 53 raised bogs would recognize the industrial archaeology and architectural heritage and any

archaeology which may have been indentified within and adjacent to these bogs over the years (POM 2)

- It is recommended that the Site Specific Plans developed for each of the 53 raised bog SAC are extended to include these newly designated sites also. These Site Specific Plans shall include a full environmental assessment of the implications of each Site Specific Plan once known (POM 2)

- Individual Site Specific Plans shall undergo an environmental assessment which will include at a minimum an assessment of the implications of site specific measures once known on: landscape, water, ecology, cultural heritage and community. Site specific mitigations measures can then be proposed (General).

9.5.5 Mitigation Measure Proposed by the AA:

It is noted that site-level appropriate assessment will be carried out in relation to the site-specific restoration and management plans being developed during 2014 / 2015. At this time, it is recommended that:

- Site-specific AA should be undertaken at the compensatory sites as well as the raised bog SACs;

- Site-specific AA be undertaken by a suitably qualified ecologist, supplemented as necessary by additional expertise, using the best scientific evidence and methods;

- Site-specific AA should identify the nature, extent and significance of likely impacts and recommend detailed site-specific mitigation measures to ensure that impacts on qualifying features and interests of Natura 2000 sites are avoided or minimized to the point that they do not affect the integrity of Natura 2000 sites.

- Avoid undertaking works at unsuitable times, for example, during bird nesting or breeding season.

- Avoid impacting on other habitats associated with raised bog.

- Establish appropriate buffer zones around existing Vertigo populations in order to protect factors on which the site depends including the hydrological and ecological environment. The buffers should be established with reference to hydrological data for the site. In the absence of this data, a minimum 50 metre buffer is recommended or as determined with national experts.

- Establish appropriate buffer zones around turloughs or sink holes to ensure that the works do not impact on surface water that can interact with the hydrogeological regime and groundwater quality.

- Ensure that the measures do not impact on other habitats associated with raised bog.

- In the restoration of a bog to active raised bog, there are likely over time to be consequent ecological changes that may affect speices of flora and fauna, including birds, that use the site in its degraded state. In the process of restoration, these changes will require to be monitored, and the impacts on species of conservation interest, both at site level and nationally, tracked, so that any significant negative long term impacts at site or national level can be addressed by appropriate mitigation measures in view of site and national conservation objectives for those species."

10 MITIGATION AND MONITORING

10.1 INTRODUCTION

Article 10 of the SEA Directive requires that monitoring be carried out in order to identify at an early stage any unforeseen adverse effects due to implementation of the Plan, with the view to taking remedial action where adverse effects are identified through monitoring. A monitoring programme is developed based on the indicators selected to track progress towards reaching the targets paired with each strategic environmental objective, thereby enabling positive and negative impacts on the environment to be measured. The environmental indicators have been developed to show changes that would be attributable to implementation of the Management Plan. It is useful to note that the monitoring programme will have substantial overlap with the monitoring required under the WFD and Habitats Directive.

It should be noted that the success of the National Raised Bog SAC Management Plan in achieving the national raised bog conservation objectives and will be related to the speed at which the measures proposed are implemented.

10.2 SOURCES OF INFORMATION FOR MONITORING

Monitoring will focus on aspects of the environment that are likely to be significantly impacted by the Plan. Where possible, indicators have been chosen based on the availability of the necessary information and the degree to which the data will allow the target to be linked directly with the implementation of the NSACRB Management Plan. **Table 10.1** shows the Environmental Monitoring Programme to track progress towards achieving strategic environmental objectives and reaching targets, and includes sources of relevant information. From **Table 10.1**, it can be seen that the majority of information required is already being actively collected (under the WFD, Habitat Directive Monitoring and other programmes), but not all of this is being gathered and reported on at a national level.

10.3 MITIGATION (RECOMMENDATIONS FROM THE SEA TO FEED INTO THE NATIONAL SAC RAISED BOG MANAGEMENT PLAN)

The Environmental Report has highlighted the more significant potential positive and negative environmental impacts from the implementation of the National Management Plan (including cumulative impacts). The following mitigation measures have been identified to reduce the negative impacts identified. It is recommended that the relevant mitigation measure] for any alternative brought forward into the final National Management Plan, also be brought forward into the site specific management plans. Mitigation measures required for alternatives following the outcome of the

Appropriate Assessment for the National Management Plan are noted in red and are required, rather than recommended.

10.3.1 Mitigation Measure Proposed by the SEA (and AA):

National Toolkit

- It is noted that the replacement measures in the national toolkit only address the designation issues and do not mention relocation of existing turf cutting rights by way of compensation. It is therefore recommended that a new measure be added under Replacement to expressly address the relocation of turf cutting rights.
- A specific national toolkit measure should be added to develop Site Specific Management Plans for the 53 raised bogs.
- Site Specific Management Plans should undergo an environmental assessment taking in to account at a minimum, BFF, W, MA, PHH, CH, L and S.
- Site Specific Management Plans should include a Construction Environmental Management Plans (CEMP) which clearly sets out the protocols for working within the SAC with a view to minimising the potential for contamination of ground water and / or surface water as a result on engineered activities, protection of cultural heritage and protection of qualifying features other than raised bog which may also be in / adjacent to the designated sites.

National Conservation Objective

- The national conservation objective for raised bogs should include a reference to sustainability (National Conservation Objective)

Programme of Measures

- It is recommended that a timeline for roll out of the individual measures included in the POM is included in the Plan to allow a proper audit in the mid-term review (General)

- A specific measure committing to the Site Specific Management Plans should be included in the Programme of Measures for transparency. Consideration should be given to preparing the management plans at the scale of multiple connected bog complexes and / or catchment based management plans at the River Basin District level (General)

- It is recommended that an environmental assessment be undertaken by a suitable qualified practitioner as part of the development of Site Specific Plans and a qualified archaeologist be present onsite during implementation of restoration measures to ensure the archaeological resource is protected (POM 1)

- It is recommended that NPWS provide a targeted information and awareness pack to planning authorities in the first instance to explain the importance of the bogs and their protection, Ireland's obligations under the Habitats and EIA Directives and corresponding national legislation and the conservation objectives and targets which must be met. This proactive approach in providing planning authorities with the tools to assist in planning decisions could significantly enhance the positive effects of POM 12, POM 13 and POM 14.

- It is recommended that eco-tourism facilities related to the SAC designation of sites would recognize not only the biodiversity value of newly designated SAC raised bogs but also the industrial archaeology and architectural heritage related to the Bord na Móna activities over the decades and any archaeology which may have been indentified within and adjacent to these bogs over the years with particular reference to the evolution of domestic turf cutting over the 20th and 21st century. (POM 1 and POM 2).

- Similarly it is recommended that eco-tourism facilities relating to any of the existing 53 raised bogs would recognize the industrial archaeology and architectural heritage and any archaeology which may have been indentified within and adjacent to these bogs over the years (POM 2)

- It is recommended that the Site Specific Plans developed for each of the 53 raised bog SAC are extended to include these newly designated sites also. These site specific plans shall include a full environmental assessment of the implications of each Site Specific Plan once know (POM 2)

- Individual Site Specific Plans shall undergo an environmental assessment which will include at a minimum an assessment of the implications of site specific measures once known on: landscape, water, ecology, cultural heritage and community. Site specific mitigations measures can then be proposed (General).

It is noted that site-level appropriate assessment will be carried out in relation to the site-specific restoration and management plans being developed during 2014 / 2015. At this time, it is recommended that:

- Site-specific AA should be undertaken at the compensatory sites as well as the raised bog SACs;

- Site-specific AA should be undertaken by a suitably qualified ecologist, supplemented as necessary by additional expertise, using the best scientific evidence and methods;

- Site-specific AA should identify the nature, extent and significance of likely impacts and recommend detailed site-specific mitigation measures to ensure that impacts on qualifying features and interests of Natura 2000 sites are avoided or minimized to the point that they do not affect the integrity of Natura 2000 sites.

- Avoid undertaking works at unsuitable times, for example, during bird nesting or breeding season.

- Avoid impacting on other habitats associated with raised bog.

- Establish appropriate buffer zones around existing *Vertigo* populations in order to protect factors on which the site depends including the hydrological and ecological environment. The buffers should be established with reference to hydrological data for the site. In the absence of this data, a minimum 50 metre buffer is recommended or as determined with national experts.

- Establish appropriate buffer zones around turloughs or sink holes to ensure that the works do not impact on surface water that can interact with the hydrogeological regime and groundwater quality.

- During the development of the site-specific restoration and management plans, and accompanying site specific AA, the potential for impacts on other habitats and species which are qualifying interests within Natura 2000 sites be further investigated, and, if the need arises, appropriate mitigation be recommended. Tensions may arise between the conservation requirements of individual qualifying interests whereby measures necessary for the conservation of one could adversely impact on the status of another. In such instances, the NPWS will develop a protocol to identify the appropriate response in view of site and national conservation priorities. In addition, the restoration of a bog to active raised bog is likely, over time, to lead to ecological changes that may in turn affect species of flora and fauna that use the site in its degraded state. In the process of restoration these changes will be monitored and the impacts on habitats and species of conservation interest, both at site level and nationally, will be tracked, so that any significant negative long term impacts at site or national level can be addressed by appropriate mitigation measures in view of the site and national conservation priorities.

Table 10.1: Proposed Monitoring Programme for the National Raised Bog SAC Management Plan

SEA Topic and Objective	SEA Target	SEA Indicators	Data Availability, Source and Frequency
Biodiversity Flora and Fauna_1: Objective_1 To restore the favourable conservation status of active raised bog in Ireland	See Targets in Table 8.1	The status of raised bogs as reported to the EU (report due every 6 years, first report in 2007).	The Status of EU Protected Habitats and Species in Ireland report. Published every 6 years.
Biodiversity Flora and Fauna_2: Objective_2 To preserve, protect and maintain the terrestrial, aquatic and soil biodiversity, particularly EU designated sites and protected species.	No protected habitats or species associated with raised bog habitat in Ireland in worsening conservation status by 2016; majority of habitats or species in, or moving towards, favourable conservation status by 2020 [Based on national Target 17 of Ireland Actions for Biodiversity 2011-2016].	The status of raised bogs as reported to the EU (report due every 6 years, first report in 2007).	The Status of EU Protected Habitats and Species in Ireland report. Published every 6 years.
Population and Human Health: Objective_3 To provide ecosystem services for communities and contribute to sustainable management of the natural resource	Shared responsibility for the conservation of raised bogs and the sustainable use of its components to be full recognised, and acted upon, by all stakeholders [Based on national Target 1 of Ireland Actions for Biodiversity 2011-2016]. Enhance appreciation of the value of biodiversity and ecosystem services amongst policy makers, stakeholders and the general public [Based on national Target 4 of Ireland Actions for Biodiversity 2011-2016].	Percentage of site specific restoration and management plans created and extent of implementation. Level of public awareness of biodiversity and surrounding issues increased compared with previous years; Number of hits on Notice Nature website.	Review of National Raised Bog SAC Management Plan and site-specific restoration and management plans [NPWS] Department of the Environment, Community and Local Government]
Soil: Objective_4 Avoid damage to the function and quality of the soil resource.	Achieve risk reduction targets as detailed in the future Soil Framework Directive for areas identified as at risk.	Monitoring programme as established under the requirements for the Soil Framework Directive	Tegasc /EPA / DAFM

SEA Topic and Objective	SEA Target	SEA Indicators	Data Availability, Source and Frequency
Water: Objective_5 Ensure that the status of water bodies is protected, maintained and improved.	No deterioration in water body status in the catchment of an SAC bog or downstream as a result of the plan in line with the objectives of the Water Framework Directive.	Status of water bodies as reported by the EPA	Water Quality in Ireland report. EPA. Published every 1 to 2 years.
Climatic Factors: Objective_6 Minimise contribution to climate change by reducing emissions of greenhouse gasses associated with Plan implementation.	No net loss of CO_2 sequestering vegetation over the plan period.	Calculated CO_2 sequestering potential of raised bog vegetation. Volume of peat lost to cutting.	NPWS
Material Assets: Objective_7 Support economic activities such as eco-tourism without conflicting with the objectives of the Habitats Directive .	Minimise impacts to economic activity due to Plan implementation without conflicting with the objectives of the Habitats Directive. Provision of alternative sources of fuel or compensation to all those affected by protection of raised bog SAC.	Percent change in ecotope types due to Plan implementation. Percentage of turf-cutters applying for compensation / relocation schemes.	NPWS ecotope surveys Cessation of turf cutting compensation scheme statistics (NPWS)
Cultural Heritage: Objective_8 Protect and maintain cultural heritage resources.	Provision of alternative sites for turf cutting which will allow traditional turf cutting practices to be continued without damage to EU or national designated sites.	Percentage of turf-cutters applying for relocation schemes.	The Status of EU Protected Habitats and Species in Ireland report. Published every 6 years. Cessation of turf cutting compensation scheme statistics (NPWS)
Landscape: Objective_9 Protect and maintain the national landscape character.	Halt the decline of peatland landscapes contained within raised bog SAC [Based on content of draft National Landscape Strategy 2011].	Protection afforded to peatland landscapes in relevant CDP.	Relevant Local Authorities

11 NEXT STEPS

There is still some important work to complete before the National Management Plan can be adopted. This will include recording, assessing and, where appropriate, taking on board comments received during consultations on the draft Plan, SEA Environmental Report and Appropriate Assessment. The next step in the SEA and Management Plan process will be a consultation period. During this time comment on the findings of the Environmental Report, the Appropriate Assessment and the content of the draft Management Plan may be submitted for consideration. **Table 11.1** outlines the remaining steps in the National Raised Bog SAC Management Plan and SEA process.

Table 11.1 Remaining Steps in the National Raised Bog SAC Management Plan and SEA Process.

Date	Milestone	
	Pollution Reduction Programmes	**Strategic Environmental Assessment**
January 2014	Publication of the draft National Raised Bog SAC Management Plan	Publication of Environmental Report
18th April 2014	End of consultation	End of consultation
April / May 2014	Update of National Raised Bog SAC Management Plan based on consultation	Compilation of SEA Statement
Second half of 2014	Publication of Final National Raised Bog SAC Management Plan	Publication of SEA Statement

Following consultations on the draft National Raised Bog SAC Management Plan, the Appropriate Assessment and SEA Environmental Report, the draft National Raised Bog SAC Management Plan shall be updated, incorporating all relevant comments received. The SEA Statement shall also clearly show how comments received during consultations have been incorporated into and contributed to the Final Plan.

Written submissions or observations are now invited with respect to the draft National Raised Bog SAC Management Plan, associated Environmental Report and Appropriate Assessment.

Please send your comments and views by 18th April 2014 directly to the Department:

Email: peatlandssubmissions@ahg.gov.ie

Web: www.npws.ie; www.ahg.gov.ie

Address: Peatlands Policy Unit, Department of Arts, Heritage and the Gaeltacht, 7 Ely Place, Dublin 2.

or via the Raised Bog Conservation Study:

Email: info@raisedbogconservation.com

Web: www.raisedbogconservation.com

Address: Raised Bog Conservation Study, RPS Consulting Engineers, Unit 33, Innovation Works, National Technology Park, Limerick.

Please send comments and views to one or the other and not both and use either the postal address or the email address.

Acronoyms and Abbreviations

BOD	Biological Oxygen Demand
°C	Degrees Celsius
CO_2	Carbon Dioxide
COD	Chemical Oxygen Demand
CSO	Central Statistics Office
DAFF	Department of Agriculture, Fisheries and Food
DAHG	Department of Arts Heritage and the Gaeltacht
DCENR	Department of Communications, Energy and Natural Resources
DoECLG	Department of Environment, Community and Local Government
EAP	Environment Action Programme
EC	European Community
EIA	Environment Impact Assessment
EPA	Environmental Protection Agency
EU	European Union
GHG	Greenhouse Gas
IPPC	Integrated Pollution Prevention and Control
IRBD	International River Basin District
mg	milligrams
mg/L	milligrams per litre
NHA	Natural Heritage Area
NIAH	National Inventory of Architectural Heritage
NPWS	National Parks and Wildlife Service
OPW	Office of Public Works
POM	Programme of Measures
RBD	River Basin District
RBMP	River Basin Management Plan
RMP	Records of Monuments and Places
SAC	Special Area of Conservation
SEA	Strategic Environmental Assessment
SPA	Special Protection Area
UNESCO	United Nations Educational, Scientific and Cultural Organisation
WFD	Water Framework Directive

Glossary

Alien species	Invasive alien species are non-native plants or animals that successfully establish themselves in aquatic and fringing habitats and damage our natural flora and fauna.
Appropriate Assessment	An assessment of the effects of a plan or project on the Natura 2000 network. The Natura 2000 network comprises Special Protection Areas under the Birds Directive, Special Areas of Conservation under the Habitats Directive and Ramsar sites designated under the Ramsar Convention (collectively referred to as European sites).
Aquifers:	A water bearing rock which readily transmits water to wells and springs.
Artificial water body:	A body of surface water created by human activity. It is known as a heavily modified water body if, as a result of physical alterations by human activity, it is changed substantially in character as designated by an individual Member State and in accordance with the provisions of Annex II of the Water Framework Directive.
Baseline environment**:**	A description of the present state of the environment of the P/P area.
Biodiversity:	Word commonly used for biological diversity and defined as assemblage of living organisms from all habitats including terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part.
Birds Directive (79/409/EEC):	Council Directive of 2nd April 1979 on the conservation of wild birds.
Carbon Dioxide**:**	A naturally occurring gas which is also a by-product of burning fossil fuels and biomass, land-use changes and industrial processes. It is the principal anthropogenic greenhouse gas that affects the earth's radiative balance. It is the reference gas against which other greenhouse gases are measured and therefore has a Global Warming Potential of 1.
Cumulative effects:	Effects on the environment that result from incremental changes caused by the strategic action together with other past, present, and reasonably foreseeable future actions. These effects can result from individually minor but collectively significant actions taking place over time or space.
Ecology:	The study of the relationship among organisms and between those organisms and their non-living environment.
Ecosystem:	A community of interdependent organisms together with the environment they inhabit and with which they interact, and which is distinct from adjacent communities and environments
Ecological status**:**	Is an expression of the structure and functioning of aquatic ecosystems associated with surface waters. Such waters are classified as being of good ecological status when they meet the requirements of the Directive.
Environmental assessment:	The preparation of an environmental report, the carrying out of consultations, the taking into account of the environmental report and the results of the consultations in decision-making and the provision of information on the decision (in accordance with Articles 4 to 9 of the SEA Directive).

Environmental indicator:	An environmental indicator is a measure of an environmental variable over time, used to measure achievements of environmental objectives and targets.
Environmental objective:	Environmental objectives are broad, overarching principles which should specify a desired direction of environmental change.
Environmental receptors:	Include biodiversity, population, human health, fauna, flora, soil, water, air, climatic factors, material assets, cultural heritage (including architectural and archaeological) and landscape as listed in the SEA Directive. This list is not exhaustive, and can include other receptors which may arise for a particular P/P.
Environmental report (ER):	A document required by the SEA Directive as part of a strategic environmental assessment which identifies, describes and evaluates the likely significant effects on the environment of implementing a plan or programme.
Good status	Is a general term meaning the status achieved by a surface water body when both the ecological status and its chemical status are at least good or, for groundwater, and when both its quantitative status and chemical status are at least good.
Groundwater:	All water which is below the surface of the ground in the saturation zone and in direct contact with the ground or subsoil. This zone is commonly referred to as an aquifer which is a subsurface layer or layers of rock or other geological strata of sufficient porosity and permeability to allow a significant flow of groundwater or the abstraction of significant quantities of groundwater.
Greenhouse Gas**:**	Gaseous constituents of the atmosphere that absorb/trap infrared (thermal) radiation which is mainly emitted by the earth's surface and thereby influence the earth's temperature.
Habitats Directive (92/43/EEC):	Council Directive of 21 May 1992 on the conservation of natural habitats and of wild flora and fauna.
Mitigation measures:	Measures to avoid/prevent, minimise/reduce, or as fully as possible, offset/compensate for any significant adverse effects on the environment, as a result of implementing a P/P.
Monitoring:	A continuing assessment of environmental conditions at, and surrounding, the plan or programme. This determines if effects occur as predicted or if operations remain within acceptable limits, and if mitigation measures are as effective as predicted. The primary purpose of monitoring is to identify significant environmental effects which arise during the implementation stage against those predicted during the plan preparation stage
Natural Heritage Area:	An area considered important for the habitats present or which holds species of plants and animals whose habitat needs protection.
Non-technical summary:	A summary of the findings of the ER, summarised under the headings listed in Annex 1 of the SEA Directive that can be readily understood by decision-makers and by the general public. It should accurately reflect the findings of the ER.
Polluter Pays Principle:	An environmental policy principle which requires that the cost of pollution be borne by those who cause it.

Plan or Programme:	Including those co-financed by the European Community as well as any modifications to them: • which are subject to preparation and/or adoption by an authority at national, regional or local level or which are prepared by an authority for adoption, through a legislative procedure by Parliament or Government, and • which are required by legislative, regulatory or administrative provisions. • In accordance with the SEA Directive, P/P that require SEA are those that fulfill the conditions listed in Article 2(a) and Article 3 of the SEA Directive.
Ramsar sites**:**	Sites designated as internationally important wetland habitats under the International Convention on Wetlands of International Importance (1976) (Ramsar Convention).
Reasonable alternatives:	Alternatives should take into account the objectives and geographical scope of the P/P. There can be different ways of fulfilling the P/P objectives, or of dealing with environmental problems. The alternatives should be realistic, capable of implementation and should fall within the legal and geographical competence of the authority concerned.
River Basin**:**	Means the area of land from which all surface water run-off flows, through a sequence of streams, rivers and lakes into the sea at a single river mouth, estuary or delta.
River Basin Districts:	Administrative areas for coordinated water management and are comprised of multiple river basins (or catchments), with cross-border basins (i.e. those covering the territory of more than one Member State) assigned to an international RBD.
Scoping:	The process of deciding the content and level of detail of an SEA, including the key environmental issues, likely significant environmental effects and alternatives which need to be considered, the assessment methods to be employed, and the structure and contents of the Environmental Report
Screening:	The determination of whether implementation of a P/P would be likely to have significant environmental effects on the environment. The process of deciding whether a P/P requires an SEA.
SEA Directive:	Directive 2001/42/EC 'on the assessment of the effects of certain plans and programmes on the environment'.
SEA Statement:	A statement summarising: • how environmental considerations have been integrated into the P/P • how the ER, the opinions of the public, and designated authorities, and the results of transboundary consultations have been taken into account • the reasons for choosing the P/P as adopted in the light of other

	reasonable alternatives.
Significant effects:	Effects on the environment, including on issues such as biodiversity, population, human health, fauna, flora, soil, water, air, climatic factors, material assets, cultural heritage including architectural and archaeological heritage, landscape and the interrelationship between the above factors.
Special Area of Conservation:	Site designated according to the habitats directive.
Special Protection Area:	An area designated under the European Directive on the Conservation of Wild Birds.
Surface water**:**	Means inland waters, except groundwater, which are on the land surface (such as reservoirs, lakes, rivers, transitional waters, coastal waters and, under some circumstances, territorial waters) which occur within a river basin.
Water body:	A discrete and significant element of surface water such as a river, lake or reservoir, or a distinct volume of groundwater within an aquifer.
Water Framework Directive**:**	The WFD is European legislation that promotes a new approach to water management through river basin planning.

APPENDIX A

RESULTS OF ECOLOGICAL AND ECO-HYDROLOGICAL ASSESSMENTS OF THE RAISED BOG SAC

Table A1: Results of Ecological Assessment of the Raised Bog SAC (excluding negative attributes)

Site Code	Bog Name	County	Area	Geographic Range	Habitat Quality	Ecological Diversity
000006	Killyconny Bog	Cavan/Meath	C (moderate-high)	B (high)	D (moderate)	B (high)
000231	Barroughter Bog	Galway	D (moderate)	D (low)	D (moderate)	D (moderate)
000248	Cloonmoylan Bog	Galway	A (excellent)	B (high)	C (moderate-high)	D (moderate)
000285	Kilsallagh Bog	Galway	B (high)	E (low)	C (moderate-high)	D (moderate)
000296	Lisnageeragh Bog and Ballinstack Turlough	Galway	B (high)	E (low)	C (moderate - high)	B (high)
000297	Lough Corrib (Addergoole)	Galway/Mayo	A (excellent)	B (high)	C (moderate - high)	B (high)
000301	Lough Lurgeen Bog East	Galway	B (high)	E (low)	B (high)	B (high)
	Lough Lurgeen Bog West	Galway	D (moderate)	E (low)	D (moderate)	B (high)
000326	Shankill West Bog	Galway	B (high)	E (low)	B (high)	B (high)
000382	Sheheree (Ardagh) Bog	Kerry	B (high)	B (high)	D (moderate)	B (high)
000391	Ballynafagh Bog	Kildare	C (moderate - high)	B (high)	B (high)	D (moderate)
000440	Lough Ree - Clooncraff and Cloonlarge Bogs	Roscommon	C (moderate - high)	E (low)	D (moderate)	B (high)
000497	Flughany Bog	Mayo/Sligo	B (high)	B (high)	C (moderate - high)	D (moderate)
000566	All Saints Bog and Esker	Offaly	A (excellent)	D (moderate)	D (moderate)	B (high)
000572	Clara Bog	Offaly	A (excellent)	E (low)	C (moderate - high)	B (high)
000575	Ferbane Bog	Offaly	B (high)	D (moderate)	C (moderate - high)	D (moderate)
000580	Mongan Bog	Offaly	A (excellent)	E (low)	B (high)	B (high)
000581	Moyclare Bog	Offaly	B (high)	E (low)	B (high)	B (high)
000582	Raheenmore Bog	Offaly	A (excellent)	E (low)	D (moderate)	D (moderate)
000585	Sharavogue Bog	Offaly	B (high)	D (moderate)	D (moderate)	B (high)
000592	Bellanagare Bog	Roscommon	A (excellent)	D (moderate)	D (moderate)	B (high)
000595	Callow Bog South	Roscommon	B (high)	D (moderate)	D (moderate)	D (moderate)
	Callow Bog North	Roscommon	D (moderate)	D (moderate)	D (moderate)	D (moderate)
000597	Carrowbehy/Caher Bog	Roscommon	A (excellent)	D (moderate)	B (high)	B (high)
000600	Cloonchambers Bog	Roscommon	C (moderate - high)	E (low)	D (moderate)	B (high)
000604	Derrinea Bog	Roscommon	B (high)	D (moderate)	B (high)	B (high)
000614	Cloonshanville Bog	Roscommon	B (high)	D (moderate)	C (moderate - high)	B (high)
000641	Clonfinane Bog	Tipperary	D (moderate)	E (low)	D (moderate)	D (moderate)
	Ballyduff Bog	Tipperary	B (high)	D (moderate)	C (moderate - high)	E (low)
000647	Kilcarren Bog	Tipperary	B (high)	E (low)	C (moderate - high)	B (high)
	Firville Bog	Tipperary	B (high)	E (low)	B (high)	D (moderate)
000679	Garriskil Bog	Westmeath	A (excellent)	E (low)	B (high)	D (moderate)
001242	Carrownagappul Bog	Galway	B (high)	D (moderate)	C (moderate - high)	B (high)
001818	Ballykenny Bog	Longford	C (moderate	E (low)	D (moderate)	B (high)

Site Code	Bog Name	County	Area	Geographic Range	Habitat Quality	Ecological Diversity
			- high)			
	Fisherstown Bog	Longford	D (moderate)	E (low)	D (moderate)	D (moderate)
002110	Corliskea Bog	Galway Roscommon	A (excellent)	E (low)	D (moderate)	B (high)
002110	Cloonfelliv Bog	Galway Roscommon	D (moderate)	E (low)	D (moderate)	E (low)
002110	Trien Bog	Roscommon	B (high)	E (low)	D (moderate)	D (moderate)
002298	Kilgarriff Bog	Sligo	B (high)	D (moderate)	C (moderate - high)	D (moderate)
	Gowlaun Bog	Sligo	D (moderate)	D (moderate)	D (moderate)	D (moderate)
	Tawnaghbeg Bog	Sligo	B (high)	D (moderate)	B (high)	D (moderate)
	Derrynabrock Bog	Mayo/Sligo	C (moderate - high)	D (moderate)	B (high)	B (high)
	Cloongoonagh Bog	Sligo	B (high)	B (high)	C (moderate - high)	B (high)
002331	Mouds Bog	Kildare	A (excellent)	B (high)	D (moderate)	D (moderate)
002332	Coolrain Bog	Laois	B (high)	B (high)	D (moderate)	B (high)
002333	Knockacoller Bog	Laois	C (moderate - high)	B (high)	B (high)	E (low)
002336	Carn Park Bog	Westmeath	D (moderate)	E (low)	D (moderate)	D (moderate)
002337	Crosswood Bog	Westmeath	C (moderate - high)	E (low)	D (moderate)	B (high)
002338	Drumalough Bog East	Roscommon	NA	E (low)	NA	D (moderate)
	Drumalough Bog West	Roscommon	C (moderate - high)	D (moderate)	D (moderate)	E (low)
002339	Ballynamona Bog and Corkip Lough	Roscommon	B (high)	D (moderate)	D (moderate)	B (high)
002340	Moneybeg Bog	Meath/ Westmeath	B (high)	D (moderate)	B (high)	D (moderate)
	Clareisland Bog	Westmeath	B (high)	D (moderate)	C (moderate - high)	B (high)
002341	Ardagullion Bog	Longford	B (high)	D (moderate)	C (moderate - high)	E (low)
002342	Mount Hevey Bog	Meath/ Westmeath	B (high)	B (high)	C (moderate - high)	B (high)
002343	Tullaher Lough and Bog	Clare	B (high)	B (high)	D (moderate)	E (low)
002346	Brown Bog	Longford	B (high)	E (low)	B (high)	D (moderate)
002347	Camderry Bog	Galway	C (moderate - high)	E (low)	D (moderate)	B (high)
002348	Clooneen Bog	Longford	B (high)	E (low)	D (moderate)	D (moderate)
002349	Corbo Bog	Roscommon	B (high)	E (low)	C (moderate - high)	D (moderate)
002350	Curraghlehanagh Bog	Galway	B (high)	E (low)	C (moderate - high)	D (moderate)
002351	Moanveanlagh Bog	Kerry	C (moderate - high)	B (high)	D (moderate)	B (high)
002352	Monivea Bog	Galway	C (moderate - high)	D (moderate)	C (moderate - high)	B (high)
002353	Redwood Bog	Tipperary	B (high)	E (low)	D (moderate)	B (high)
002354	Tullaghanrock Bog	Roscommon	B (high)	E (low)	B (high)	B (high)
002356	Ardgraigue Bog	Galway	B (high)	E (low)	D (moderate)	E (low)

Table A2: Results of Eco-hydrological Assessment of the Raised Bog SACs

Site Code	Bog Name	Last ecological survey	Total high bog (ha)	Active raised bog (ha)	Degraded raised bog (ha) (Area restorable)
000006	Killyconny Bog	2011	83.0	3.9	4.8
000231	Barroughter Bog	2005	73.5	2.4	1.6
000248	Cloonmoylan Bog	2005	412.0	52.3	93.3
000285	Kilsallagh Bog	2012	182.1	11.5	18.0
000296	Lisnageeragh Bog	2012	269.5	29.6	38.0
000297	Addergoole Bog	2012	157.4	39.2	16.0
000301	Lough Lurgeen Bog West	2004	113.9	0.5	6.3
	Lough Lurgeen Bog East	1995	499.5	15.8	32.8
000326	Shankill West Bog	2012	67.4	13.3	14.4
000382	Sheheree (Ardagh) Bog	2012	6.4	4.1	<1
000391	Ballynafagh Bog	2011	69.7	6.5	6.9
000440	Clooncraff and Cloonlarge Bogs	2003	474.5	5.9	22.4
000497	Flughany Bog	2012	143.6	11.4	13.1
000566	All Saints Bog	2011	226.8	39.8	21.2
000572	Clara Bog	2009	436.5	111.5	43.8
000575	Ferbane Bog	2012	120.0	32.6	10.9
000580	Mongan Bog	2011	124.4	48.3	14.8
000581	Moyclare Bog	2012	74.3	21.7	8.3
000582	Raheenmore Bog	2011	130.5	52.3	16.4
000585	Sharavogue Bog	2011	137.0	25.8	20.6
000592	Bellanagare Bog	2013	879.1	49.6	73.8
000595	Callow Bog North	2012	42.7	0.4	5.0
	Callow Bog South	2012	309.3	10.9	28.9
000597	Carrowbehy/Caher Bog	2012	204.6	69.9	35.6
000600	Cloonchambers Bog	2012	195.8	7.7	21.1
000604	Derrinea Bog	2012	53.8	17.1	9.8
000614	Cloonshanville Bog	2012	146.3	20.1	22.6
000641	Ballyduff Bog	2011	86.7	15.2	8.5
	Clonfinane Bog	2011	87.2	2.6	18.0
000647	Firville Bog	2011	183.7	16.8	50.1
	Kilcarren Bog	2011	178.6	11.9	36.0
000679	Garriskil Bog	2011	170.3	50.9	31.6
001242	Carrownagappul Bog	2012	323.5	28.1	36.5
001818	Fisherstown Bog	2012	102.4	1.4	8.3
	Ballykenny Bog	2011	180.8	7.6	24.9

Site Code	Bog Name	Last ecological survey	Total high bog (ha)	Active raised bog (ha)	Degraded raised bog (ha) (Area restorable)
002110	Trien Bog	2013	123.3	24.2	11.4
	Cloonfelliv Bog	2013	55.1	0.7	4.0
	Corliskea Bog	2013	274.0	44.3	22.9
002298	Cloongoonagh Bog*	2000	116.8	10.3	22.7
	Derrynabrock Bog	2012	80.5	6.6	16.2
	Tawnaghbeg Bog	2012	71.7	9.9	11.1
	Gowlaun Bog	2003	185.9	1.8	43.1
	Kilgarriff Bog	2000	43.5	13.3	4.5
002331	Mouds Bog*	2003	267.7	47.5	3.7
002332	Coolrain Bog*	2003	51.6	15.7	<1
002333	Knockacoller Bog	2012	53.3	4.8	7.5
002336	Carn Park Bog	2013	160.3	3.2	13.1
002337	Crosswood Bog	2012	96.3	4.6	19.4
002338	Drumalough Bog West	2003	63.4	5.1	10.7
	Drumalough Bog East	NA	90.3	NA	31.3
002339	Ballynamona Bog	2003	60.9	25.1	<1
002340	Clareisland Bog	2003	70.2	21.3	3.1
	Moneybeg Bog	2000	71.3	27.1	1.5
002341	Ardagullion Bog	2003	56.9	21.0	2.7
002342	Mount Hevey Bog*	2000	217.5	32.3	17.2
002343	Tullaher Bog	2000	19.6	6.8	5.6
002346	Brown Bog	2012	50.9	10.8	1.4
002347	Camderry Bog	2012	193.2	6.2	15.7
002348	Clooneen Bog	2003	93.5	11.2	5.4
002349	Corbo Bog	2012	96.5	15.5	10.7
002350	Curraghlehanagh Bog	2012	146.4	9.8	19.8
002351	Moanveanlagh Bog	2012	117.4	4.6	7.3
002352	Monivea Bog	2012	130.6	7.0	18.0
002353	Redwood Bog	2012	366.0	12.1	51.5
002354	Tullaghanrock Bog	2000	62.8	11.0	2.7
002356	Ardgraigue Bog	2003	80.4	10.3	3.7

Note: Bog Name* - Original area of active raised bog amended due to reinterpretation of the survey results. Some surveys are more than 10 years old and the current area of active raised bog is likely to be less than outlined.

APPENDIX B

SUMMARY OF ISSUES RAISED DURING EARLY CONSULTATION

SUMMARY OF KEY ISSUES RAISED – TAKEN FROM CONSULTATION REPORT

Members of the public

The majority of the submissions received from members of the public were from turf-cutters and bog owners.

The majority of turf cutters expressed their wish to continue cutting turf and emphasized that their families have cut turf for generations. Some raised concerns in relation to how they would heat their homes without continuing to cut turf, particularly as the price of others sources of fuel continues to rise. Many stated their intention to continue to cut turf.

The majority of the consultees stated categorically that they are not in favour of the re-wetting of bogs as they fear flooding of their homes and/or lands. Some mentioned the risk of bog bursts.

Some expressed the opinion that Ireland's people are more important than its bogs and that the needs of bogs are being put before the needs and wants of Ireland's people.

The natural heritage, recreational and agricultural value of cutaway peat areas was highlighted by a small number of consultees within this category. One consultee suggested that tours be offered on bogs by local people and the money raised should be passed to the bog owners.

Many reported that their bogs have been drained and maintained by the OPW and/or Local Authorities in the past, including access roads, for the purposes of cutting turf. Turf cutters have received financial grants in the past to cut and deepen drains. In some instances, turf cutters have made financial contributions to the cost of drainage and maintenance schemes. They now question why such bogs are the subject of conservation efforts.

One consultee expressed the opinion that bogs are not a type of habitat, they are more like an abandoned compost heap, and that none of Ireland's raised bogs are active. This consultee suggested that it is not necessary to conserve 53 raised bogs, which was perceived by this individual as a very large number in this context, and that perhaps five to six nationally would adequately represent bogs in Ireland. This consultee stated the belief that it is impossible to reduce the level of water in a bog with drainage etc due to the cohesion principle of water.

Bog-specific comments

<u>Nure Bog [Designated NHA]</u>

It was pointed out that considerable drainage has taken place for decades at this bog, with the involvement of OPW and Westmeath County Council as well as local stakeholders. The consultees believe that, as a result of these works, the bog is now not suitable for conservation. One consultee recommended that a guidance document be issued to each bog plot owner to ensure that minimum damage is inflicted on the bog as a result of harvesting turf for their own use. Adherence to the guidance could be a condition of payment in relation to the Area Aid grant.

Mouds Bog [Designated Raised Bog SAC]

Many people in the area are members of the Kildare Turf Cutters Association, a constituent part of the Turf Cutters and Contractors Association. Strong objections were expressed to the re-wetting of the bog due to the fear of resultant flooding and the risk it poses to farmland, turf banks, cutaway areas, properties and septic tanks located in the natural floodplain. Some expressed their intention to hold the government liable for any damage to their property that may arise if re-wetting were to take place. Many consultees stated that the government has no right to interfere with, or cause impact upon, their private property or rights. Many raised objections to the terms of the legal contract that has been circulated to some local turf bank holders in the area and emphasized that they have not themselves signed any legal agreement with authorities in relation to their property. Some objected to what they describe as an ongoing campaign of harassment, bullying and intimidation to coerce turf bank and turbary right owners into signing a legal agreement. The belief amongst some consultees is that the government will allow some turf cutting to continue on SAC bogs and that Mouds bog will be one such bog. The situation between the government and the locals in relation to this bog was described as being at an impasse that only the continuation of turf cutting could overcome. It was stated that a national agreement charting the way forward is needed before a national plan can be developed. It was stated that only a national agreement will secure the cooperation of the local people. It was further stated that, in the absence of a national agreement, any attempt to enter onto, or impact upon, private property in the area will be regarded as an act of trespass and will receive an appropriate response. Many requested that representatives of the study or the Minister stay away from Mouds Bog until an acceptable solution for all turf bank owners and holders impacted by the SAC designations is in place.

Moanveanlagh Bog [Designated Raised Bog SAC]

Strong objections were expressed in relation to the re-wetting of the bog due to the fear of resultant flooding and bog bursts. In relation to bog bursts in particular, it was pointed out that the natural screen of forest and scrub around the edges of the bog is no longer there to protect the surrounding area against such events.

Cloghan Demesne Raised Bog [bog within River Little Brosna Callows NHA]

It was stated that there is no commercial activity on the bog, just cutting for personal use. People in the area are not aware of any potential suitable relocation sites within a reasonable distance. Concerns were expressed as to whether surrounding farmland would be flooded by the blocking of drains on the bog. The ring road around the bog is of high amenity value to people in the area and concern was expressed that the amenity value could be lessened were turf cutting to cease on the bog as the ring road would deteriorate. Members of the local bog committee are willing and anxious to meet with the study team to discuss their concerns and develop workable solutions.

Local Authorities

A number of additions to the legislation, plans, policies and programmes section of the SEA Scoping Report were highlighted.

It was stated that the conservation of SAC raised bogs must be given priority and should be respected by all members of the community – regulators, national agencies, international developers and farmers.

It was stated that in order to conserve the bogs, appropriate changes must be made to national policies and the way they are interpreted, including policies for the development of wind farms, forestry, mineral exploitation and agricultural intensification.

It was highlighted that development outside the designated areas can have detrimental effects due to the lowering of the water table. It was suggested that the extension of the designated area to include a buffer zone around the bogs be considered. Certain activities should be excluded from the buffer zone and any development allowed would be subject to the requirement to design a drainage system that would have no impact on the level of the water table at the periphery of the bog.

Non-Governmental Organisations

Some additions to the legislation, plans, policies and programmes section of the SEA Scoping Report were highlighted. Some newly published management and action plans were brought to the attention of the study team, for example, a species action plan for Red Grouse in Ireland.

It was suggested that issues such as forestry, the threat of invasive species, agriculture, climate change, illegal dumping, hunting, shooting, tourism, adjacent land reclamation, fire prevention, moss transfer and pollution be considered in the National Raised Bog SAC Management Plan. In short, the plan should seek to address all influences on raised bog biodiversity.

Concern was raised that there is currently insufficient action to protect and restore raised bog and the provision of necessary protective measures is now urgent. Stricter enforcement and regulation is needed to ensure that illegal turf cutting and drainage activities cease immediately.

It was suggested that it may be time to consider purchasing sites as some bogs are proving so problematic that purchase may be the only viable solution. This would perhaps need to be done by compulsory means.

The importance of raised bogs as breeding habitat and wintering habitat for many protected bird species was raised and it was stated that marked population declines and loss of habitat requirements for birds have been highlighted in ECJ rulings against Ireland.

The importance of raised bogs for butterfly and moth species was also highlighted, some of the species are restricted to bogs and some species that utilise bogs are endangered.

The importance of Natural Heritage Area (NHA) raised bog should be highlighted in the plan. Care should be taken not to raise false hopes with respect to future cutting at these protected sites. These bogs were designated pursuant to a settlement agreement in respect of an EU infringement action brought by the European Commission. It was suggested that the government will need to be very careful that it does not unpick the terms of this settlement in seeking to facilitate cutting on NHAs.

Concern was expressed that meeting the needs of turf cutters may emerge as the key driver in developing the plan rather than the conservation of the raised bog sites. It was categorically stated that the needs of turf cutters are not compatible with conservation requirements and that nature conservation is an ecological necessity to ensure the continued existence of raised bogs and other peatland types in Ireland.

It was stated that not enough reference is being given to habitat removal being the main cause of reduction in bog vegetation.

The exact meaning of a ‘difficult bog’ should be defined and should incorporate factors such as difficulty with ceasing turf cutting, hydrological issues and prohibitive cost issues.

A potential risk was highlighted whereby those engaging in activities that damage the bog to the point that it is considered non-restorable could essentially be rewarded if the activity is allowed to continue on that site. It was suggested that this would be a worrying precedent.

Where restoration of raised bog is not possible, an assessment of the appropriate use of degraded peatlands should be carried out it was suggested.

It was stated that bog margins are frequently extremely rich in biodiversity and that some rare species breed on these areas, for example, the endangered Marsh Fritillary butterfly, and therefore bog margins should be protected and must continue to be part of SAC and NHA designated areas.

Potential risks associated with failure to protect the bogs were highlighted included loss of income from tourism, increased flooding, increased water pollution, loss of biodiversity and loss of cultural identity.

Awareness should be raised amongst the general public in relation to the local and national value of raised bogs other than for turf, for example, flood management, water quality etc.

Walkways and signage should be installed to promote tourism and interest in bogs. Interpretive facilities could be located in public libraries, council offices and NPWS offices.

Clear and comprehensive mapping is recommended for future outputs.

Relocation of turf cutting to non-designated sites will, over time, have a negative effect on those bogs and will cause further wider countryside damage. The possibility for negative carbon impacts associated with potential relocation to NHA bogs or other bogs should be assessed.

Management Agreements should be put in place between the government and turf cutters through agri-environmental schemes in an effort to cease turf cutting and preserve these sites.

Drain-blocking, sphagnum-growing and tree and scrub removal were suggested as potential measures to restore designated sites.

Management of these sites into the future requires comprehensive consultation and engagement with a wide range of stakeholders including environmental NGOs and local communities.

It was suggested that protected sites be monitored with the use of cameras and aerial photography to ensure compliance with legislation.

It was stated that, in the interests of fairness, those whose turbary rights are affected should be compensated. This could include providing employment for affected persons as guides to showcase bogs, or as contractors to block drains or clear trees and scrub. Trees removed could be provided as an alternative source of fuel to those affected by the cessation of turf cutting.

Government Departments and State Agencies

Some additions to the legislation, plans, policies and programmes section of the SEA Scoping Report were highlighted.

It was stated that, of necessity, the first requirement for the management of SAC raised bog sites is the cessation of turf cutting.

It was highlighted that the proposal to relocate turf cutters to other bogs has implications for the receiving bogs which are important habitats in their own right and also wetlands. It was queried whether the process will look at impacts on other wetland sites, and downstream impacts, as a result of relocation.

Consideration should be given to the possible merits of preparing management plans at the scale of multiple connected bog complexes, where relevant, and to the development of catchment-based management plans at the River Basin District level.

The assessment of cumulative effects on bogs of multiple uses and measures should be carefully considered. The assessment of effects should be quantitative where possible.

Convening workshops with relevant stakeholders and statutory authorities should be considered, a workshop for the consideration of alternatives was specifically mentioned. Consultation with relevant stakeholders is of utmost important.

Some very specific comments on the SEA environmental objectives were provided in some of the submissions in Appendix B and are not copied here.

It was proposed that development control be covered in the proposed site-specific raised bog management plans including an assessment of cumulative impact of one-off housing development, arterial drainage, farming practices (slurry spreading) and development of cut-over. An initial assessment of the likely importance of various types of land management/development should be part of the scope of the National Raised Bog SAC Management Plan.

The accuracy and robustness of the figures for the area of SAC bogs lost since designation is extremely important.

APPENDIX C

REVIEW OF ENVIRONMENTAL PROTECTION OBJECTIVES

Table C.1: Review of Environmental Protection Objectives at International Level

Topic	Title	Summary of Objectives
Biodiversity	UN Convention on Biological Diversity (1992)	Objectives include the maintenance and enhancement of Biodiversity. This directly relates to the protection of Irelands raised bog habitats.
	The Ramsar Convention The Convention on Wetlands of International Importance (1971 and amendments)	Objectives include protection and conservation of wetlands, particularly those of importance to waterfowl as Waterfowl Habitat. Raised bogs are valuable wetland habitat.
Climate	UN Kyoto Protocol The United Nations Framework Convention on Climate Change (UNFCCC) Kyoto Protocol 1997	Objectives seek to alleviate the impacts of climate change and reduce global emissions of GHGs. Raised bog habitat provide for carbon storage. Burning of peat releases CO2 which contributes to climate change.
Cultural, Architectural and Archaeological Heritage	The World Heritage Convention United Nations Convention Concerning the Protection of the World Cultural and Natural Heritage (Paris 1972)	Objectives seek to ensure the identification, protection, conservation, presentation and transmission to future generations of the cultural and natural heritage and ensure that effective and active measures are taken for these. Raised bogs are potential repositories of archaeological material. In addition there are traditions associated with bogs such as turf-cutting.

Table C.2: Review of Environmental Protection Objectives at Community Level

Topic	Title	Summary of Objectives
Biodiversity	The EU Biodiversity Strategy Communication on a European Community Biodiversity Strategy	Objectives seek to prevent and eliminate the causes of biodiversity loss and maintain and enhance current levels of biodiversity. The plan seeks to protect and management the 53 raised bog SACs in Ireland.
	The EU Habitats Directive (92/43/EEC)	Objectives seek to prevent and eliminate the causes of habitat loss and maintain and enhance current levels of biodiversity. The Plan is directly related to the management of sites designated under the EU Habitats Directive and which form part of the Natura 2000 network.
	The EU Birds Directive (EC/2009/147)	Objectives seek to prevent and eliminate the causes of bird species loss and maintain and enhance current levels of biodiversity. Original directive was established in 1979 (79/409/EC) but was codified in 2009 including updates to the bird species lists. The Plan is directly related to the management of sites designated under the EU Habitats Directive and which form part of the Natura 2000 network. The sites are also important for birds protected under the Birds Directive.
	The EU Freshwater Fish Directive (78/659/EEC)	Objectives seek to protect those fresh water bodies identified by Member States as waters suitable for sustaining fish populations. For those waters it sets physical and chemical water quality objectives for salmonid waters and cyprinid waters. Turf cutting and other drainage related activities may give rise to release of suspended solids and changes to the hydrology in a catchment.
Climate	Second European Climate Change Programme (ECCP II) 2005.	Objectives seek to develop the necessary elements of a strategy to implement the Kyoto protocol. Raised bog habitat provide for carbon storage. Burning of peat releases CO2 which contributes to climate change.
	Adapting to climate change in Europe – options for EU action [SEC (2007) 849]	Objective is to kick-start a Europe-wide public debate and consultation on how to take forward possible avenues for action in adapting to climate change at EU level. Raised bog habitat provide for carbon storage. Burning of peat releases CO2 which contributes to climate change.
Cultural, Architectural and Archaeological Heritage	Convention for the Protection of the Archaeological Heritage of Europe (revised) (Valletta 1992)	Objective is to protect the archaeological heritage as a source of the European collective memory and as an instrument for historical and scientific study. Raised bogs are potential repositories of archaeological material. In addition there are traditions associated with bogs such as turf-cutting.

Topic	Title	Summary of Objectives
	Convention for the Protection of the Architectural Heritage of Europe (Granada 1985)	Objectives seek to provide a basis for protection of architectural heritage and are a means for proclaiming conservation principles, including a definition of what is meant by architectural heritage, such as monuments, groups of buildings and sites. The Convention also seeks to define a European standard of protection for architectural heritage and to create legal obligations that the signatories undertake to implement. Raised bogs are potential repositories of archaeological material. In addition there are traditions associated with bogs such as turf-cutting.
Sustainable Development	The Gothenburg Strategy (2001) Communication from the Commission on "a Sustainable Europe for a Better World"	Objectives seek to make the future development of the EU more sustainable. Informs the 6th EAP and the Irish sustainable development strategy. The plan is directly related to the sustainable management of Ireland SAC Raised Bogs.
	The 7th Environment Action Programme: 'Living well, within the limits of our planet'	The programme is based on the polluter-pays principle, the precautionary principle and preventive action, and the principle of rectification of pollution at source. The principle objectives include: • to improve environmental integration and policy coherence and to maximise the benefits of the Union's environment legislation; • to improve the evidence base for environment policy; • to protect, conserve and enhance the Union's natural capital.
	Renewed EU Sustainable Development Strategy (2006) and Review (2009)	The renewed EU SDS sets out a single, coherent strategy on how the EU will more effectively live up to its long-standing commitment to meet the challenges of sustainable development. It recognises the need to gradually change our current unsustainable consumption and production patterns and move towards a better integrated approach to policy-making. In 2009 the Commission undertook a review of the 2006 strategy. It underlined that in recent years the EU has mainstreamed sustainable development into a broad range of its policies in the fight against climate change and the promotion of a low-carbon economy. At the same time, unsustainable trends persist in many areas and the efforts need to be intensified. The plan is directly related to the sustainable management of Ireland SAC Raised Bogs.
	The SEA Directive (2001/42/EC)	Objective is to provide for a high level of protection of the environment and to contribute to the integration of environmental considerations into the preparation and adoption of plans and programmes with a view to promoting sustainable development, by ensuring that, in accordance with this Directive, an environmental assessment is carried out of certain plans and programmes which are likely to have significant effects on the environment. Under the SEA Directive, the Plan to identify future areas for development would require an SEA. An SEA is being carried out on the National Raised Bog SAC Management Plan.

Topic	Title	Summary of Objectives
	The EIA Directive (85/337/EEC)	Objective is to require Environmental Impact Assessment of the environmental effects of those public and private projects, which are likely to have significant effects on the environment. Peat extraction falls under the Directive. A threshold of 10ha has been set but this can be lower for NHA and SAC sites.
	Environmental Liabilities Directive (2004/35/CE)	The purpose of this Directive is to establish a framework of environmental liability based on the 'polluter pays' principle, to prevent and remedy environmental damage. The legislation covers damage to protected species and natural habitats.
Water	EU Water Framework Directive (2000/60/EC)	Objectives seek to maintain and enhance the quality of all surface waters in the EU.
	Groundwater Directive (2006/118/EC)	This directive establishes a regime, which sets underground water quality standards and introduces measures to prevent or limit inputs of pollutants into groundwater.
	EU Floods Directive (2007/60/EC)	The Floods Directive applies to river basins and coastal areas at risk of flooding. With trends such as climate change and increased domestic and economic development in flood risk zones, this poses a threat of flooding in coastal and river basin areas. Raised bogs provide a opportunity for storage of water and regulation of water flows within a catchment.
	Bathing Water Directive 2006/7/EC	The overall objective of the revised Directive remains the protection of public health whilst bathing, but it also offers an opportunity to improve management practices at bathing waters and to standardise the information provided to bathers across Europe.
	Drinking Water Directive (DWD) 98/83/EC	The primary objective is to protect the health of the consumers in the European Union and to make sure the water is wholesome and clean.

Table C.3: Review of Environmental Protection Objectives at National Level

Topic	Title	Summary of Objectives
Biodiversity	The National Biodiversity Plan (2011-2016)	Objectives include the enhancement and conservation of biodiversity. It builds upon the achievements of the previous plan and focuses on actions that were not fully completed and addresses emerging issues. It has been developed in line with the EU and International Biodiversity strategies and policies. Although such issues would be dealt with at local or site level, the Plan should have regard to these objectives and promote such objectives where possible.
	The Wildlife Acts 1976. to 2012	The Wildlife Acts, 1976 to 2012 are the principal statutory provisions providing for the protection of Wildlife (both Flora and Fauna) and the control of activities which may impact adversely on the conservation of Wildlife.
	European Communities (Birds and Natural Habitats) Regulations, S.I. No. 477 of 2011	The European Communities (Birds and Natural Habitats) Regulations 2011 meet the requirements of rulings of the European Court of Justice against Ireland which found significant fault with Ireland's previous transposition regulations. They also build on several years' experience of implementation of the Directives and provide more appropriate and effective tools to protect Ireland's endangered wildlife and habitats. The obligations of various public bodies in regard to sites designated for the protection of endangered wildlife have been clarified and strengthened. These sites consist of Special Protection Areas (SPAs), designated for the protection of birds, and Special Areas of Conservation (SACs) designated for the protection of other important habitats such as raised bogs, native woodland and sand dune systems etc. Collectively these sites form part of the EU wide Natura Network. In addition, general obligations are placed on all public authorities to exercise their functions to secure compliance with the Birds and Habitats Directives and to uphold and enforce the requirements of the Regulations. The Regulations contain new powers allowing the Minister to identify "activities requiring consent". These are activities which are likely to harm an SAC or SPA or its species or habitats. Such an activity cannot proceed without first obtaining the consent of the Minister. This can relate to activities within or outside SACs or SPAs
	The Fisheries Acts, 1939 to 2003 (S.I. No. 17 of 1939; S.I. No. 21 of 2003)	These acts provide for the efficient and effective management, conservation, protection, development and improvement of fisheries, hatcheries and fish farms. The bodies responsible for their implementation are the Fisheries Boards. The Fisheries Boards must ensure the suitability of fish habitats, including taking consideration of the conservation of biodiversity in water ecosystems. Fisheries legislation does not allow barriers to migration or the obstruction of the passage of fair or the impairment of the usefulness of the bed and soil of

Topic	Title	Summary of Objectives
		any waters as spawning grounds or their capacity to produce the food of fish. It also requires those involved in aquaculture to obtain a licence.
	Flora Protection Order 1999	Objectives include it being illegal to alter, damage or interfere in any way with their habitats. This protection applies wherever the plants are found and is not confined to sites designated for nature conservation.
	Quality of Salmonid Waters Regulations 1988 (SI 293 of 1988)	Prescribe quality standards for salmonid waters and designate the waters to which they apply, together with the sampling programmes and the methods of analysis and inspection to be used by local authorities to determine compliance with the standards. Also, give effect to Council Directive No. 78/659/EEC on the quality of fresh waters needing protection or improvement in order to support fish life
Climate	National Climate Change Strategy (2000) and National Climate Change Strategy 2007-2012	Objectives include the reduction of national GHG emissions. The Plan should give regard to these objectives and targets for reductions in CO_2 equivalents.
Cultural, Architectural and Archaeological Heritage	National Heritage Plan 2002 - 2006	Core objective is to protect Ireland's heritage. Plan uses the "polluter pays principle" and the "precautionary principle." Sets out archaeological policies and principles that should be applied by all bodies when undertaking a development.
	The National Monuments Acts (1930 to 2004)	Objectives seek to protect all recorded monuments by virtue of the historical, architectural, traditional, artistic or archaeological interest attached to them and includes the site of the monument, the means of access to it and any land required to preserve the monument from injury or to preserve its amenities.
	The Architectural Heritage (National Inventory) and Historic Monuments (Miscellaneous Provisions) Act 1999	Provides for the establishment of a National Inventory of Architectural Heritage (NIAH). The objective of the NIAH is to aid in the protection and conservation of the built heritage, especially by advising planning authorities on the inclusion of particular structures in the Record of Protected Structures (RPS).
	The Planning and Development Act 2000-	Under this Act the County Councils are required to compile and maintain a Record of Protected Structures (RPS) in their Development Plans. Sites included in the RPS are awarded automatic protection and may not be demolished or materially altered without grant of permission under the Planning Acts.
	Framework and Principles for the Protection of the Archaeological Heritage (1999)	Objective is to set out for all concerned parties the basic principles and approaches for the protection of the archaeological heritage.
	Policy and Guidelines on Archaeological Excavation (1999)	Objective is to set down policy on licensing of excavations, and guidelines for licensees on strategies and method statements, reports and publications.
	Architectural Heritage Protection – Guidelines for Planning Authorities	Objective is to provide a practical guide for planning authorities and for all others who must comply with Part IV of the Planning and Development Act 2000 on the protection of the architectural heritage and support the effort of protecting Ireland's architectural heritage.

Topic	Title	Summary of Objectives
Human Health	Quality of Bathing Waters Regulations 1988 (SI 84 of 1988) Bathing Water Quality Regulations 2008 (SI 79 of 2008) Bathing Water Quality (Amendment) Regulations 2011 (SI 351 of 2011)	Prescribe bathing water quality standards and the bathing areas to which they apply, together with the sampling programmes and the methods of analysis and inspection to be used by local authorities to determine compliance with the standards. Give effect to Council Directive No. 76/160/EEC concerning the quality of bathing water and also transpose transposing the EU Bathing Water Directive of 2006 into Irish law.
Planning	National Spatial Strategy 2002-2020 (2002)	Objectives of the NSS are to achieve a better balance of social, economic and physical development across Ireland, supported by more effective planning.
	National Development Plan 2007 to 2013	Objectives of the NDP are to promote more balanced spatial and economic development.
	Planning and Development Acts 2000 to 2011 and associated Regulations	This legislation provides the framework for planning and development within Ireland.
Sustainable Development	European Communities (Environmental Assessment of Certain Plans and Programmes Regulations 2004 as amended in 2011. (S.I. 435 of 2004 as amended by S.I. 200 of 2011).	Objectives include protection of the environment and integration of plan making processes into the sustainable planning of the country as a whole. Amendments changed the list of statutory consultees.
	European Communities (Environmental Assessment of Certain Plans and Programmes Regulations 2004 as amended in 2011. (S.I. 436 of 2004 as amended by S.I. 201 of 2011).	Objectives include protection of the environment and integration of plan making processes into the sustainable planning of the country as a whole. Amendments changed the list of statutory consultees.
	Environmental Liabilities Regulations (SI 547 of 2008)	Regulations implementing the Environmental Liabilities Directive which establishes a framework of environmental liability based on the 'polluter pays' principle, to prevent and remedy environmental damage. The legislation covers damage to protected species and natural habitats.
	Rural Development Programme 2007-2013 [currently being updated]	Ireland's RDP is based on the EU framework for rural development and on the National Rural Development Strategy formulated in line with that framework. Priorities of the RDP relevant to the current Plan include: Improving the environment and the countryside by support for land management: and Improving the quality of life in rural areas and encouraging diversification of economic activity through the implementation of local development strategies.

Topic	Title	Summary of Objectives
	Food Harvest 2020	Has objectives under three pillars – smart green growth. Smart refers to the smart economy, green refers to opportunities to maximise on greening of the sector and growth relates to sustainable growth. The targets proposed would see an intensification of agri-food and fisheries in Ireland.
	Our Sustainable Future, a Framework for Sustainable Development for Ireland, 2012	Our Sustainable Future sets out the challenges facing us and how we might address them in making sure that quality of life and general wellbeing can be improved and sustained in the decades to come. Promotes integrating sustainable development principles into policy making across all sectors. This type of approach is relevant to a suite of EU legislation such as the WFD which seeks to develop sustainable water management across the EU.
	AEO and REPs	The objectives of REPS and AEOS are to meet the challenges of conserving and promoting biodiversity, encouraging water management and water quality measures and combating climate change as part of Irelands Agriculture Sector. In line with the commitments under the UN Convention on Biological Diversity, the EU's Strategy for Halting the Loss of Biodiversity and ongoing work on Ireland's second National Biodiversity Plan, the primary focus of the 2010 Scheme was biodiversity conservation.
Water	Drinking Water Regulations SI 439 of 2000	Prescribe quality standards to be applied in relation to certain supplies of drinking water, including requirements as to sampling frequency, methods of analysis, the provision of information to consumers and related matters. Give effect to provisions of EU Council Directive 98/83/EC on the quality of water intended for human consumption.
	Local Government (Water Pollution) Act, 1977 (Water Quality Standards for Phosphorus) Regulations 1998 (SI 258 of 1998)	Provide for specified improvements in water quality conditions in rivers and lakes based on phosphorus concentrations or related water quality classifications and give effect to certain requirements arising under Council Directive 76/46/EC on pollution caused by certain dangerous substances discharged into the aquatic environment of the Community.
	European Communities (Water Policy) Regulations (SI 722 of 2003)	Provide for the transposition into Irish national law of the provisions of the EU Water Framework Directive.
	European Communities Environmental Objectives (Surface Waters) Regulations, 2009	These regulations apply to all surface waters and are stated to give effect to the Water Framework Directive, the Directive on environmental quality standards in the field of water policy and the Dangerous Substances Directive.
	European Communities (Good Agricultural Practice for protection of Waters) Regulations, 2010	These Regulations, which give effect to Irelands 2nd Nitrates Action Programme, provide statutory support for good agricultural practice to protect waters against pollution from agricultural sources and include measures such as: periods when land application of fertilisers is prohibited; limits on the land application of fertilisers; storage requirements for livestock manure, and; monitoring of the effectiveness of the measures

Topic	Title	Summary of Objectives
		in terms of agricultural practice and impact on water quality.
	European Communities Environmental Objectives (Groundwater) Regulations, 2010	These Regulations establish a new strengthened regime for the protection of groundwater by giving effect to the measures needed to achieve the environmental objectives established for groundwater by Directive 2000/60/EC and by giving effect to the requirements of Directive 2006/118/EC. The Regulations establish clear environmental objectives to be achieved in groundwater bodies within specified timeframes and introduce the legal basis for a more flexible, proportionate and risk-based approach to implementing the legal obligation to prevent or limit inputs of pollutants into groundwater, which already exists under Directive 80/68/EEC.
	Arterial Drainage Acts, 1945 and 1995	Deals with the improvement of lands by drainage and the preventing or sustainably reducing the flooding of lands. Sets up the process of Arterial Drainage Schemes and provides for the maintenance of these works. Also implements a number of drainage and flood reduction related measures such as approval procedures for bridges and weirs, and iterates reporting requirements for Drainage Districts.
	European Communities (Assessment and Management of Flood Risks) Regulations S.I. 122 of 2010	The 'Floods' Directive was transposed into Irish law by the European Communities (Assessment and Management of Flood Risks) Regulations 2010. (SI 122/2010). The Regulations set out the responsibilities of the OPW and other public bodies in the implementation of the Directive, on consultation, and details the process for implementation of the measures set out in the flood risk management plans.
	CFRAM Plans	The national CFRAM Programme is being implemented through a series of Catchment Flood Risk Assessment and Management Studies. These CFRAM Studies are being commissioned on a River Basin District-scale basis. The CFRAM studies deliver on the requirements of the EU Floods Directive. Raised bogs can contribute to flood management by retaining waters and regulating flows within a catchment in the right conditions.
	River Basin Management Plans	The purpose of the WFD is to maintain the "high and good status" of waters where it exists, prevent deterioration in existing status of waters and to achieve or restore at least *"*good status*"* in relation to all waters by 2015. The mechanism to achieve this under the WFD is through the adoption and implementation of River Basin Management Plans (RBMPs) and Programmes of Measures (POMs). Five RBD are represented by the draft National Raised Bog SAC Management Plan.

APPENDIX D

SUMMARY OF IMPACTS FROM AA

For the purposes of the AA, a precautionary approach has been adopted and therefore it is assumed that each Raised Bog SAC site will be subject to some degree of drain blocking and forest clearance and it is assumed that the impacts could be significant. The exact locations and extent of the measures is not known at this time.

Table D1: Summary of Potential Impacts of the Plan on Natura 2000 Sites (from Natura Impact Statement)

Site Name	Direct Impacts (short/long term)	Indirect (short/long term)	Resource Requirements	Emissions	Construction, Operation, Decommissioning	Cumulative
53 Raised Bog SAC sites	Potential effects on other qualifying interests		N	N	Loss and disturbance of habitat	Potential for cumulative effects
All Saints Bog SPA	Potential effects on birds with requirements for raised bog habitat		N	N	N	Potential for cumulative effects
Ballykenny-Fisherstown Bog SPA	Potential effects on birds with requirements for raised bog habitat		N	N	N	Potential for cumulative effects
Ballynafagh Lake SAC	N	Potential effects on sensitive species	N	N	N	Potential for cumulative effects
Bellanagare Bog SPA	Potential effects on birds with requirements for raised bog habitat		N	N	N	Potential for cumulative effects
Castlesampson Esker SAC	N	Potential effects on sensitive habitats	N	N	N	Potential for cumulative effects

Site Name	Direct Impacts (short/long term)	Indirect (short/long term)	Resource Requirements	Emissions	Construction, Operation, Decommissioning	Cumulative
Dovegrove Callows SPA	N	Potential effects on birds with requirements for raised bog habitat	N	N	N	Potential for cumulative effects
Lough Corrib SPA	N	Potential effects on birds with requirements for raised bog habitat	N	N	N	Potential for cumulative effects
Lough Derravaragh SPA	N	Potential effects on birds with requirements for raised bog habitat	N	N	N	Potential for cumulative effects
Lough Gara SPA	N	Potential effects on birds with requirements for raised bog habitat	N	N	N	Potential for cumulative effects
Lough Iron SPA	N	Potential effects on birds with requirements for raised bog habitat	N	N	N	Potential for cumulative effects

Site Name	Direct Impacts (short/long term)	Indirect (short/long term)	Resource Requirements	Emissions	Construction, Operation, Decommissioning	Cumulative
Lough Ree SPA	N	Potential effects on birds with requirements for raised bog habitat	N	N	N	Potential for cumulative effects
Mongan Bog SPA	Potential effects on birds with requirements for raised bog habitat		N	N	N	Potential for cumulative effects
Middle Shannon Callows SPA	N	Potential effects on birds with requirements for raised bog habitat	N	N	N	Potential for cumulative effects
Killarney National Park SPA	N	Potential effects on birds with requirements for raised bog habitat	N	N	N	Potential for cumulative effects
Pilgrim's Road Esker SAC	N	Potential effects on sensitive habitats	N	N	N	Potential for cumulative effects
River Little Brosna Callows SPA	N	Potential effects on birds with requirements for raised bog habitat	N	N	N	Potential for cumulative effects

Site Name	Direct Impacts (short/long term)	Indirect (short/long term)	Resource Requirements	Emissions	Construction, Operation, Decommissioning	Cumulative
River Suck Callows SPA	N	Potential effects on birds with requirements for raised bog habitat	N	N	N	Potential for cumulative effects
Glen Lough SPA	N	Potential effects on birds with requirements for raised bog habitat	N	N	N	Potential for cumulative effects
Lough Croan Turlough SPA	N	Potential effects on birds with requirements for raised bog habitat	N	N	N	Potential for cumulative effects
Four Roads Turlough SPA	N	Potential effects on birds with requirements for raised bog habitat	N	N	N	Potential for cumulative effects
Slieve Bloom Mountains SPA	N	Potential effects on birds with requirements for raised bog habitat	N	N	N	Potential for cumulative effects

Site Name	Direct Impacts (short/long term)	Indirect (short/long term)	Resource Requirements	Emissions	Construction, Operation, Decommissioning	Cumulative
Lough Derravaragh SPA	N	Potential effects on birds with requirements for raised bog habitat	N	N	N	Potential for cumulative effects
Owenduff/Nephin Complex SPA	N	Potential effects on birds with requirements for raised bog habitat	N	N	N	Potential for cumulative effects
Lough Conn and Lough Cullin SPA	N	Potential effects on birds with requirements for raised bog habitat	N	N	N	Potential for cumulative effects
River Shannon and River Fergus Estuaries SPA	N	Potential effects on birds with requirements for raised bog habitat	N	N	N	Potential for cumulative effects
Inner Galway Bay SPA	N	Potential effects on birds with requirements for raised bog habitat	N	N	N	Potential for cumulative effects

Site Name	Direct Impacts (short/long term)	Indirect (short/long term)	Resource Requirements	Emissions	Construction, Operation, Decommissioning	Cumulative
Killala Bay/Moy Estuary SPA	N	Potential effects on birds with requirements for raised bog habitat	N	N	N	Potential for cumulative effects
River Little Brosna Callows SPA	N	Potential effects on birds with requirements for raised bog habitat	N	N	N	Potential for cumulative effects
Slieve Aughty Mountains SPA	N	Potential effects on birds with requirements for raised bog habitat	N	N	N	Potential for cumulative effects
Lower River Shannon SAC	N	Potential effects on sensitive habitats and species	N	N	N	Potential for cumulative effects
Garriskil Bog SPA	Potential effects on birds with requirements for raised bog habitat		N	N	N	Potential for cumulative effects

*Yellow indicates potential for impact.