



Preliminary Flood Risk Assessment

Flood Vulnerability Assessment of Natura 2000 Sites
Volume I: Method Statement

July 2011

The Office of Public Works



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The Office of Public Works, Trim, County Meath

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We also wish to thank Mr. Jim Ryan of the National Parks and Wildlife Services for his time in providing expert opinion on the vulnerability classification assigned to habitats and species (excluding birds) in the Republic of Ireland.

1. Introduction

1.1 Brief Overview of the Project

Articles 4 and 5 of the European Floods Directive (2007/60/EC) require Member States to undertake a Preliminary Flood Risk Assessment (PFRA). This initial flood assessment for each Member State is designed to identify those areas where there is potentially significant flood risk. The Office of Public Works (OPW) is carrying out the PFRA in Ireland, as lead agency for flood risk management. Mott MacDonald is assisting the OPW in carrying out some aspects of this assessment. In order to carry out a preliminary analysis on the potential risk to the natural environment from flooding it has been necessary to carry out an initial assessment on the vulnerability of European conservation designated sites to flooding. The methods used in this assessment are based on 'available or readily derivable' information, which is in keeping with the principles relating to the PFRA set out in the Floods Directive.

This initial, high level ecological assessment has been designed to determine the potential for damage of, or adverse consequences on, European designated sites (Natura 2000 sites) that could arise from flooding. The Natura 2000 network of sites comprises Special Areas of Conservation (SACs) and Special Protection Areas (SPAs). The Natura 2000 network is the centrepiece of EU nature and biodiversity policy. It is an EU-wide network of nature protection areas established under the Habitats Directive. The aim of the network is to assure the long-term survival of Europe's most valuable and threatened species and habitats.

At the outset of the project, the scope of works included conducting vulnerability assessments of Natural Heritage Areas (NHAs) and proposed Natural Heritage Areas (pNHAs), in addition to the Natura 2000 sites. NHAs are the basic Irish national designation for the protection of habitats, flora and fauna. NHAs are given legal protection under the Irish Wildlife Acts (1976-2000) from the date that they are proposed for designation. There are over 140 designated NHAs in Ireland. In addition, there are over 800 pNHAs which were published on a non-statutory basis in 1995. Despite the fact that the pNHA sites have not been statutorily proposed or designated, their significance in terms of their flora, fauna and habitats has been identified. Although spatial data on the locations and extents of the NHAs and pNHAs is available, it is not supported by available or readily-derivable data on the designated species and ecology for these areas. Given the absence of this type of data and the number of sites involved, it has not been possible to extend the vulnerability analysis for these areas.

The objective of this document is to define the 'vulnerability' of the important ecological assets of Ireland to flooding. This report does not cover the subsequent stage of defining 'flood risk' where the vulnerability of the designated area is spatially evaluated against 'flood hazard' areas (areas of predicted inundation from flood events of a specific magnitude). The results of the flood risk assessment for the ecological areas are detailed in the accompanying report for the full PFRA process¹.

¹ Preliminary Flood Risk Assessment, The Predictive Assessment of Potentially Significant Risk (Mott MacDonald, 2011)

1.2 Special Areas of Conservation

Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora, commonly known as the Habitats Directive, requires the designation of SACs for the protection and restoration of habitats and species considered to be of European importance. The Habitats Directive was transposed into Irish law through the European Communities (Natural Habitats) Regulations, 1997-2010.

Habitats of European Community interest whose conservation requires the designation of a SAC are listed in 'Annex I' of the Directive. These are habitats which:

- are in danger of disappearance in their natural range; or
- have a small natural range following their regression or by reason of their intrinsically restricted area; or
- present outstanding examples of typical characteristics of one or more of the nine following biogeographical regions: Alpine, Atlantic, Black Sea, Boreal, Continental, Macaronesian, Mediterranean, Pannonian and Steppic.

Annex I habitats which are in danger of disappearance are further classified as 'priority natural habitat types'.

Species (animals and plants) of European Community interest are listed in 'Annex II', 'Annex IV' or 'Annex V' of the Habitats Directive. Those species of European Community interest for which SACs must be designated are listed in Annex II of the Habitats Directive. These are species which are:

- endangered; or
- vulnerable, i.e. believed likely to move into the endangered category in the near future if the causal factors continue operating; or
- rare, i.e. with small populations that are not at present endangered or vulnerable, but are at risk. These species are located within restricted geographical areas or are thinly scattered over a more extensive range; or
- endemic and are requiring particular attention by reason of the specific nature of their habitat and/or the potential impact of their exploitation on their habitat and/or the potential impact of their exploitation on their conservation status.

1.3 Special Protection Areas

Council Directive 79/409/EEC on the conservation of wild birds, commonly referred to as the Birds Directive, requires designation of Special Protection Areas (SPAs) for bird species. The Birds Directive is implemented in Ireland under the Wildlife Acts (1976 – 2000).

SPAs are designated for the following reasons:

- Rare and vulnerable bird species (listed in Annex I of the Directive);
- Regularly occurring migratory species, such as ducks, geese and waders; and
- Wetlands, especially those of international importance, which attract large numbers of migratory birds each year. (Internationally important means that 1% of the population of a species uses the site or more than 20,000 birds regularly use the site.)

2. Method Statement

2.1 Introduction

The following sections outline the method that has been applied for the initial vulnerability assessment of European Designated Sites, as presented in the Appendices to this report.

The overview of the method has been split between the determination of vulnerability to flooding for specific species and habitats in a designated area (Section 2.2) and combining these to approximate the vulnerability of the overall designated area (Section 2.3). These sections are followed by more detailed discussions of the approach that has been used to define flood vulnerabilities for the individual components of SACs and SPAs (Sections 2.4 and 2.5).

2.2 Overview of Approach – Vulnerability of Individual Species and Habitats

Site synopses for all SACs and SPAs were obtained from the National Parks and Wildlife Service (NPWS). It should be noted that synopses were not available for a small number of designated sites (approximately 13 sites in the country), when compared to the list of sites in the NPWS Site Designation Database that has been received from NPWS for a separate project. This difference in the number of designated sites since 2007 may be due to some sites being combined into larger designated areas or due to changes to the designation status for specific sites.

A comprehensive assessment of the spatial distribution of key species and habitats is not available in GIS (Geographical Information System) format at a higher resolution than the European Community designated areas. Therefore for the PFRA, the ecological impact of flooding has been assessed at the level of the overall SAC and SPA areas.

Specific criteria were set to achieve a systematic and consistent method of assigning vulnerability classifications for the different species and habitats at each of the sites. These criteria are set out in Tables 2.1-2.3 in Sections 2.3 and 2.4. The assessment of the vulnerability of a designated area to flooding is complex, in view of the different types of habitats and species concerned, and will also be site specific. In addition, considering the level, frequency and type of each specific flood event, the degree of impact on different species and habitats across each designated areas will also vary.

However, the detailed variations in the number of species and distribution of habitats represented within each SPA or SAC could not be taken into account during this assessment due to the preliminary nature of the study and lack of current or readily-derivable data on species numbers. Ideally, this level of local, site specific information would be important in ensuring a more accurate assessment of the vulnerability of flooding for each habitat and site and therefore the vulnerability of the overall SACs and SPAs.

In addition, SPAs, whilst designated for particular species or numbers of species, are also designated for the habitat that supports these species. During this assessment, account was only taken of the potential impact of flooding on feeding areas inside these habitats in the short-term; i.e. restriction of the availability of, and potential damage to, important feeding and breeding areas. However, in reality the level, frequency and type of flood may also have additional impacts on the habitat. Therefore a specific flood event could

result indirectly in a change in species composition or degradation of the habitat, potentially causing fewer species or numbers of each species using the site in the future.

The discussion in the preceding sections illustrates the significant absence of readily-derivable detailed spatial data on the local distribution of specific species and habitats. Therefore the results of this preliminary assessment of ecological vulnerability to flooding should be viewed in terms of certain key assumptions and limitations. The assumptions include the following points:

- All habitats or species designated for each SAC / SPA are assumed to be at equal probability of flooding (even though it is unlikely some habitats will be impacted eg. steep cliffs, uplands);
- The occurrence of a flood is equally likely during winter and summer months;
- The flood event may potentially impact the reproductive success for the entire population of each species (flora and fauna) which is identified as potentially being impacted;
- The flood event will only impact the environment in terms of inundation of floodwater and also increased sedimentation and potentially nutrients (even though the impacts would be locally complex and include for example, potential decreased water quality, changes in hydrodynamics and flow, erosion and deposition, increased disturbance of flora and fauna);
- For SPAs, impacts were only considered in terms of feeding and breeding areas.

2.3 Overview of Approach – Vulnerability of Overall SACs and SPAs

In order to complete the PFRA, the vulnerability assessment for the individual species and habitats has had to be converted into overall vulnerability levels for the designated areas. The assumptions of the method and the limitations of the available data sets (including local habitat locations, species counts and their proximity to watercourses during nesting, feeding etc.) indicate that a precautionary approach should be taken.

Therefore, the highest flood vulnerability classification of the constituent designated species or habitats has been taken as the overall vulnerability of that area. However, for some sites which have, for example, six species with 'high' vulnerability, the overall site vulnerability may be higher. It is very clear that this method to estimate overall vulnerability to flooding could be improved by the use of more detailed spatial data of individual species and habitat distribution within the designated areas, information that was not available for the PFRA.

It should also be noted that the number of types of habitats or species per site does not reflect the importance of the SPA or SAC, which, in some cases, are designated for only one species. Therefore, as an example, despite significant differences in the number of types of species and habitats included in the designation lists for two different areas, both could be judged to be equally important in terms of ecological 'value'.

2.4 Vulnerability Assessment - Special Areas of Conservation

Data on the species and habitats present in each designated SAC was obtained from the NPWS through their website: <http://www.npws.ie>

The dataset obtained identifies each SAC and the associated qualifying interests or conservation features. A ‘qualifying interest’ is one of the listed species or habitats that is present in the site and for which the site merits designation.

Vulnerability classification for each species and habitat was based on the assessment of their susceptibility to damage (intrinsic vulnerability). Where the likely damage is none/not significant, the vulnerability classification is low. Habitats that are water-dependent were given the lowest vulnerability classification. The assessment of vulnerability also took account of whether the habitat was an ‘Annex I habitat’ or an ‘Annex I priority type habitat’. While the intrinsic vulnerability may be low, where the habitat is identified as ‘priority’ in the Directive, a higher vulnerability class was assigned (where they are not water-dependent) in recognition of its priority status. Similarly, rarity was considered. Where a species (or habitat) is rare, the vulnerability classification was raised by one level from its intrinsic value on the basis that where a non-negligible impact was identified there would be greater impact than for other species on the national stock. If flooding has no or negligible impact on a rare species / habitat then there would be no change in the vulnerability classification that has been assigned.

An initial (intrinsic) vulnerability classification is therefore provided together with a final classification.

Tables 2.1 and 2.2 detail the vulnerability classifications for SAC habitats and species respectively.

Table 2.1: SAC Habitat Vulnerability Classifications

Habitat Vulnerability Classification	Reasoning
Low	<ul style="list-style-type: none"> Water dependent habitat (Annex I and Priority Habitats) where flooding is likely to have minimal / low impacts.
Moderate	<ul style="list-style-type: none"> Annex I Habitat where flooding is likely to have a moderate / high impact. Annex I Priority Habitats where flooding is likely to have a low impact.
High	<ul style="list-style-type: none"> Annex I Habitat and Annex I Priority Habitat where flooding is likely to have a moderate / high impact.
Extreme	<ul style="list-style-type: none"> Annex I Habitat and Annex I Priority Habitat where the nature of the habitat a flood event would have the potential to cause a very significant impact.
Critical	<ul style="list-style-type: none"> Annex I Habitat and Annex I Priority Habitat where, because of the nature of the habitat, a flood event would have the potential to cause a profound impact.

The dataset obtained from the NPWS also contained information on the ‘representivity’ and ‘percentage cover’ of each habitat type. This data was not used in the current flood vulnerability assessment as there was no comprehensive data set available or easily derivable showing the local distribution of particular species and habitats within the SACs (which range in total size from less than one square kilometre to over 750km²). Without a spatial aspect to this data it would be difficult to use the ‘representivity’ and ‘percentage cover’ information in evaluating the impact of flooding of specific parts of SACs (and SPAs) to define flood risk. However, it is recommended that consideration be given to representivity and percentage cover of each habitat type in future revisions of the PFRA and for the more detailed Catchment-Based Flood Risk Assessment and Management (CFRAM) studies, if the local data within SACs (SPAs) can be improved (see Section 3.2).

The reader should also note that it was assumed that all habitats were equally susceptible to flooding, even if it is highly unlikely that this would occur, e.g. upland habitats. The objective of the analysis was to use a systematic method to assign flood vulnerability levels to important species and habitats. This assessment does not include any reference to the evaluation of flood hazard combined with the vulnerability levels to define flood risk. This latter exercise was completed in GIS in a subsequent step of the PFRA method².

Table 2.2: SAC Species Vulnerability Classifications

Species Vulnerability Classification	Reasoning
Low	<ul style="list-style-type: none"> ■ Annex II species unlikely to be impacted by flooding.
Moderate	<ul style="list-style-type: none"> ■ Annex II species found in wetland habitats and are tolerant to periodic flooding. However flooding has the potential to impact during extreme / prolonged events.
High	<ul style="list-style-type: none"> ■ Annex II species where, due to the nature of the species, a flood event would cause a large impact.
Extreme	<ul style="list-style-type: none"> ■ Annex II species where, due to the nature of the species, a flood event would cause a profound impact.
Critical	<ul style="list-style-type: none"> ■ Annex II species where, due to the nature of the species, a flood event would cause a complete loss.

2.5 Vulnerability Assessment - Special Protection Areas

Data on the Special Conservation Interests (SCI), the selection bird species present in each SPA (i.e., those which occur in significant numbers at a given SPA and which are thereby listed in the designation citation), were obtained from each site synopsis and were included in a spreadsheet. The details of each site were available in pdf format from NPWS and were supplemented by information held by Bird Watch Ireland. Other common bird species not cited as SCIs but mentioned in the site synopses (e.g. the Hooded Crow), were not included in the assessment.

A classification was assigned to each SCI species in each SPA which is reflective of their potential vulnerability during flood events. Breeding sites were generally considered more vulnerable than sites designated for non-breeding species (such as wintering waterbirds). Nesting birds are highly reliant on specific sites and / or habitats, especially as the season and thereby the degree of investment by the birds in the nesting process progresses (i.e. time spent incubating, producing and incubating clutches, and brooding chicks). Ground-nesting species were generally considered to be the highest risk group. SPAs supporting highly scarce ground-nesters and those for which Ireland supports a significant proportion of the biogeographical population were assigned the most vulnerable classifications of ‘Critical’ or ‘Extreme’. An additional category termed ‘Low (unlikely)’ was assigned to those species which would be affected by a flood event, but whose nesting habitat is unlikely to flood (such as uplands and some of the offshore SPA islands such as Great Blasket).

Additional (non-SCI) species included in this assessment include the Marsh Harrier (*Circus aeruginosus*). This species was formerly bred in Ireland but is not included on the BoCCI list. While this species is not known to be breeding yet in Ireland, increasing numbers have been visiting in recent years.

² See reference in Footnote 1 on Page 1.

As discussed for the SACs in Section 2.4, the vulnerability classification is only based on the potential impact of flooding on the breeding and feeding habitats required by each species in each SPA. The process has not included an assessment of the probability of flood occurrence in each area. The analysis of the spatial distribution of the flood hazard areas and the vulnerability classifications for each of the designated areas has been completed as part of a separate stage of the PFRA method.

Table 2.3 details the criteria that have been applied in evaluating the vulnerability of SPAs to flooding.

Table 2.3: SPA Species Vulnerability Classifications

Species Vulnerability Classification	Reasoning
Low	<ul style="list-style-type: none"> ■ Selection Species unlikely to be impacted by flooding.
Low (unlikely)	<ul style="list-style-type: none"> ■ Species considered extremely vulnerable to flooding (as they are ground nesters), but the susceptibility of their nesting habitats to flooding is very low (e.g. uplands and seabird islands).
Moderate	<ul style="list-style-type: none"> ■ Selection Species where, due to the nature of the species, a flood would cause a moderate detrimental impact.
High	<ul style="list-style-type: none"> ■ Selection Species where, due to the nature of the species, a flood event would cause a large impact.
Extreme	<ul style="list-style-type: none"> ■ Selection Species where, due to the nature of the species, a flood event would cause a profound impact and would impact at national (all-Ireland) level.
Critical	<ul style="list-style-type: none"> ■ Selection Species where, due to the nature of the species, a flood event would cause a complete loss. Includes species that would be impacted at a population scale from flood events.

3. Overview of SAC and SPA Vulnerability to Flooding

3.1 Vulnerability Classifications for Habitats, Species and Natura 2000 Sites

An overview of the results of the vulnerability classification process is presented in the Appendices to this document.

Appendix A provides a breakdown of the vulnerability class assigned to each species or habitat, with reasoning in each case.

Appendix B provides a summary list of the overall vulnerability class assigned to each SAC and SPA site. Full details of the vulnerability classifications of the sites are contained in a separate volume of this report.³

Table 3.1 provides a summary overview of the overall Natura 2000 site vulnerability and lists the number of SAC and SPA sites per vulnerability classification category.

Table 3.1: Overview of Overall Natura 2000 Site Vulnerability Classifications

Vulnerability Classification	No. of SAC Sites	No. of SPA Sites
Low	58	47
Moderate	154	64
High	117	28
Extreme	94	13
Critical	0	2

³ Preliminary Flood Risk Assessment, Flood Vulnerability Assessment of Natura 2000 Sites, Volume II – Detailed Assessment of Specific SAC and SPA Sites (Mott MacDonald, 2011)

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Appendix A. Vulnerability Assessments by Species / Habitat

A.1. Vulnerability Assessments by Species - SACs

Code	Species / Habitat Name	Latin Name	Vulnerability	Reasoning for Vulnerability
7110	Active raised bogs		Moderate	Waterlogged systems therefore minimal impact if flooded. Fluvial flooding may however deposit sediment that can cause habitat alteration. However a high level of sedimentation would be necessary for this problem to occur. Note that these systems are identified as priority habitats in Annex I of the Directive.
7230	Alkaline fens		Moderate	Permanently waterlogged systems. However fluvial flooding may result in deposition that could alter the habitat. Final classification therefore elevated to Moderate.
91	Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno-Padion, Alnion incanae, Salicion albae)		Low	Riparian habitat in alluvial areas (wet woodland) with periodical flooding. Habitat is tolerant to flooding. Note these systems are identified as priority habitats in Annex I of the Directive Note: threats to this ecosystem include flood prevention measures, river control and channelisation, which impacts on the natural disturbance-succession balance.
4060	Alpine and Boreal heaths		Moderate	Occurs on ridges and summits of upland areas (also present in areas of the Burren). Unlikely to be located near areas of flooding therefore initially characterised as low vulnerability. If flooding was to occur, habitat would be impacted and therefore final classification is moderate.
1210	Annual vegetation of drift lines		Low	Occurs on deposits of shingle lying at or above mean high-water spring tides. These are unstable habitats and species are able to tolerate periodic disturbance by wave action. Prolonged periods of flooding however may not be tolerated. Note: Artificial re-profiling of shingle beaches as a flood risk management measure affects this habitat type as it impacts availability of sediment.
2150	Atlantic decalcified fixed dunes (Calluno-Ulicetea)		High	Occurs on mature, stable, dry sand dunes. These systems are above the high tide mark. Coastal flooding could result in a change in habitat structure. This habitat is listed as a priority habitat in Annex I of the Directive. Note: Construction of sea defence can starve the systems of sediment.
1106	Atlantic salmon	<i>Salmo salar</i>	Low	Flash flooding can result in reed displacement during spawning season and therefore loss of eggs. Regular flooding can cause siltation of river and alteration of river bed which can result in loss of suitable habitat. However aquatic species, because of the nature of the environment in which they live, are adapted to periodic disturbance and can recover from disturbance by flooding as long as the bed isn't scoured out to such an extent to remove the suitable habitat.
1330	Atlantic salt meadows (<i>Glaucopuccinellietalia maritimae</i>)		Low	Saltmarsh is already subject to tidal inundation. However coastal flooding can cause a change in species structure and composition and can cause erosion of the seaward side of the saltmarsh.

7130	Blanket bog (*active only)		Moderate	These systems have naturally high water retention and there is therefore a minimal impact if flooded. They are also typically associated with high water table levels. Irish Lowland Atlantic Blanket Bogs are of very particular importance in a European context. Also where the blanket bog is active it is classified as a priority habitat under the Directive. Note however that deposition of sediment through fluvial flooding could alter the habitat.
91D0	Bog woodland		Low	This habitat consists of woodland on wet peaty ground and therefore there would be minimal impact if flooded, i.e. low vulnerability. These systems are identified as priority habitats in Annex I of the Directive and are therefore elevated to a final classification of moderate.
1349	Bottle-nosed dolphin	<i>Tursiops truncatus</i>	Low	Occurs in marine habitat.
1096	Brook lamprey	<i>Lampetra planeri</i>	Low	Brook lamprey spawn in spring in freshwater gravel areas. Flooding can result in disturbance to the gravel areas and can result in the washing out of the eggs. Sediment may also be disturbed resulting in the loss of juvenile lamprey. However aquatic species, because of the nature of the environment in which they live, are adapted to periodic disturbance and can recover from disturbance by flooding.
6130	Calaminarian grasslands of the <i>Violetalia calaminariae</i>		High	Grasslands associated with soils with high heavy metals content - typically associated with mines. Need dampness but not inundation.
8120	Calcareous and calcshist screes of the montane to alpine levels (<i>Thlaspietea rotundifolii</i>)		High	Upland habitat type, unlikely to be located near areas of flooding. Flooding would impact habitat.
7210	Calcareous fens with <i>Cladium mariscus</i> and species of the <i>Caricion davallianae</i>		Moderate	These habitats are fed by groundwater and by drainage from the surrounding area. They are waterlogged systems and therefore flooding has a negligible effect. Sediment deposition could, however, alter the habitat therefore final vulnerability is moderate. Note the habitat is classified as a priority habitat under the Directive.
8210	Calcareous rocky slopes with chasmophytic vegetation		High	Upland habitat type, unlikely to be located near areas of flooding therefore initially classified as low. In the event of the habitat being subjected to flooding, it would be highly impacted.
8310	Caves not open to the public		Low	This habitat type is important to support lesser horseshoe bat populations. Flooding however would have negligible impact on the habitat itself.
1150	Coastal lagoons		Moderate	Lagoons are subject to natural salinity fluctuations caused by freshwater and sea water influence, evaporation and precipitation. Large flood event would however generate and impact; coastal lagoons are a priority habitat and are therefore considered to be moderately vulnerable.
1365	Common seal	<i>Phoca vitulina</i>	Low	Coastal flooding has the potential to cause disturbance to terrestrial breeding grounds during breeding season. Seals are readily adaptable to such disturbance.

2140	Decalcified fixed dunes with <i>Empetrum nigrum</i>		High	Occurs on mature, stable, acidic, sand dunes. These systems are above the high tide mark. Coastal flooding could cause a change in habitat structure. This habitat is listed as a priority habitat in Annex I of the Directive and is therefore deemed to have high vulnerability. Note: Construction of a sea defence can starve the systems of sediment.
7120	Degraded raised bogs still capable of natural regeneration		Low	Waterlogged systems therefore minimal impact if flooded with the exception of where sediment deposition could alter habitat.
7150	Depressions on peat substrates of the Rhynchosporion		Low	Waterlogged systems therefore minimal impact if flooded.
1016	Desmoulin's Whorl Snail	<i>Vertigo moulinsiana</i>	High	Require damp/wet habitats. Flooding can disturb habitat and species - very sensitive to hydrological changes.
2170	Dunes with <i>Salix repens</i> ssp. <i>argentea</i> (<i>Salix arenariae</i>)		Moderate	This system requires a high water table. Temporary flooding is a natural feature of these systems. Fluvial flooding while unlikely to occur would cause impact - therefore moderate vulnerability.
2110	Embryonic shifting dunes		Low	Unstable systems subject to erosion by wave action. Unlikely to be subject to fluvial flooding.
1130	Estuaries		Low	Subject to tidal influence and natural flooding.
4030	European dry heaths		Moderate	Occurs on slopes/hills/mountains. Unlikely to be located near areas of flooding. Fluvial flooding while unlikely to occur would cause impact - therefore moderate vulnerability.
2130	Fixed coastal dunes with herbaceous vegetation (grey dunes)		High	Stable sand dunes. These systems are above the high tide mark. Coastal flooding of the system could cause a change in habitat structure. Classified as a priority habitat under the Directive.
1029	Freshwater pearl mussel	<i>Margaritifera margaritifera</i>	High	The glochidia (larval stage) are released in the summer and young mussels bury into gravel in summer. A flood at this time could result in loss of species however a high level of scouring would be required. Siltation caused by flood can cause death of adult mussels. Where high siltation occurs, the species have a higher vulnerability.
1013	Geyer's whorl snail	<i>Vertigo geyeri</i>	Extreme	<i>Vertigo geyeri</i> require damp/wet habitats. Has a very niche habitat. Flooding can destroy habitat and can disturb species - very sensitive to hydrological changes.
1364	Grey seal	<i>Halichoerus grypus</i>	Low	Found distributed along the Irish coastline. Coastal flooding has the potential to cause disturbance to terrestrial breeding grounds during breeding season (autumn and winter). However seal are readily adaptable and can remove young to safer areas.
1351	Harbour porpoise	<i>Phocoena phocoena</i>	Low	Occurs in marine habitat.
3140	Hard oligo-mesotrophic waters with benthic vegetation of <i>Chara</i> spp.		Moderate	These habitats are typically confined to limestone areas which are free-draining therefore have a lower flood potential. Nutrient enrichment of these lakes may occur following a flood event where the surrounding land-use includes intensive agriculture - therefore moderate vulnerability.

2190	Humid dune slacks		Moderate	This system requires a high, but often fluctuating water table. Temporary flooding is a natural feature of these systems. Fluvial flooding is unlikely but would impact habitat if it occurred - moderate vulnerability.
6430	Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels		Low	Found along water courses and woodland borders. Tolerant to periodic flooding.
5130	Juniperus communis formations on heaths or calcareous grasslands		High	Found in free-draining soil. <i>Juniperus communis</i> are not tolerant of flooding.
1024	Kerry slug	<i>Geomalacus maculosus</i>	High	Eggs are deposited between July and October. Prolonged flooding could result in loss of habitat/disturbance to food source.
1421	Killarney fern	<i>Trichomanes speciosum</i>	Moderate	Found in shaded wet habitats e.g. near waterfall. Requires wet habitat, however delicate species and increased water velocity during flood conditions may impact.
1160	Large shallow inlets and bays		Low	These systems are not subject to freshwater input and are subject to periodic coastal inundation.
1303	Lesser horseshoe bat	<i>Rhinolophus hipposideros</i>	Extreme	Would not expect flooding to be a factor in the loss of roosting/foraging habitat with the exception of where the entrances to cave hibernation sites are blocked by flooding. In such cases the species are extremely vulnerable.
8240	Limestone pavements		High	Flooding may cause loss of flora in grykes. Note that these systems are identified as priority habitats in Annex I of the Directive.
6510	Lowland hay meadows (<i>Alopecurus pratensis</i> , <i>Sanguisorba officinalis</i>)		Low	Habitat typically found in lowland floodplains and is tolerant of seasonal flooding.
21A0	Machairs (* in Ireland)		Moderate	Machair is mosaic of wet and dry areas, some degree of flooding is normal, exceptional fluvial flooding could however cause some damage - therefore moderate vulnerability. Note that these systems, where they occur in Ireland, are identified as priority habitats in Annex I of the Directive.
1065	Marsh fritillary	<i>Euphydryas aurinia</i>	Extreme	Typically occurs in wetland habitat; potential for loss of larvae and webs to be impacted if inundated.
1528	Marsh saxifrage	<i>Saxifraga hirculus</i>	Moderate	Flowering begins in mid July and continues until early October. Flooding during this period could inhibit pollination & seed dispersal. Also reproduce asexually.
1420	Mediterranean and thermo-Atlantic halophilous scrubs (<i>Sarcocornetea fruticosi</i>)		Low	Perennial Glasswort is restricted to the south-east of Ireland in areas of waterlogged saltmarsh.
1410	Mediterranean salt meadows (<i>Juncetalia maritimi</i>)		Moderate	This habitat is typically located in the upper zone of the salt marsh and is therefore not under diurnal tidal inundation. Prolonged fluvial flooding will cause a negative impact - therefore moderate vulnerability.

6410	Molinia meadows on calcareous, peaty or clayey-silt-laden soils (<i>Molinion caeruleae</i>)		Low	This habitat occurs in naturally wet substrate, often with fluctuating water table.
1140	Mudflats and sandflats not covered by seawater at low tide		Low	This habitat is an important feeding ground for wading birds and wildfowl. The habitat is subject to regular tidal inundation.
1014	Narrow-mouthed whorl snail	<i>Vertigo angustior</i>	Extreme	Require damp/wet habitats. Suitable habitat includes floodplains. Also found in coastal areas. Flash flooding can disturb habitat and species - very sensitive to hydrological changes.
3160	Natural dystrophic lakes and ponds		Low	Found in peaty/bog areas - naturally waterlogged. Fluvial flooding can alter naturally acidic pH of the lake.
3150	Natural eutrophic lakes with Magnopotamion or Hydrocharition-type vegetation		Low	Eutrophic lakes in Ireland are typically as a result of the surrounding geology. Deposition of sediment through flooding can impact on the habitat.
1990	Nore freshwater pearl mussel	<i>Margaritifera durrovensis</i>	High	The glochidia (larval stage) are released in the summer and young mussels bury into gravel in summer. A flood at this time could result in loss of species, although a high level of scouring would be required. Siltation caused by flood can cause death of adult mussels. Where high siltation occurs, the species have a higher vulnerability.
4010	Northern Atlantic wet heaths with <i>Erica tetralix</i>		Low	Found in upland shallow peaty areas with fluctuating water table. Substrate is moist rather than waterlogged. Tolerant to periodical flooding. Fluvial flooding may disturb habitat.
91A0	Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in British Isles		High	Tend to occur in upland areas away from areas of flooding. However if subjected to frequent flood events, waterlogging of substrate may result in habitat loss.
3130	Oligotrophic to mesotrophic standing waters with vegetation of the <i>Littorelletea uniflorae</i> and/or of the <i>Isoëto-Nanojuncetea</i>		Moderate	Nutrient enrichment of these lakes may occur following a flood event where the surrounding landuse includes intensive agriculture - therefore Moderate vulnerability.
3110	Oligotrophic waters containing very few minerals of sandy plains (<i>Littorelletalia uniflorae</i>)		Moderate	Nutrient enrichment of these lakes may occur following a flood event where the surrounding landuse includes intensive agriculture.
1355	Otter	<i>Lutra lutra</i>	Moderate	Accustomed to periodic disturbance. However flooding of holts in breeding season i.e. when there is a possibility of young cubs being present in the holt can result in loss of young.
1220	Perennial vegetation of stony banks		Low	This habitat is tolerant to periodic disturbance. Coastal flooding may cause the shingle to become unstable. This is particularly a risk at the pioneer stage where the flora is in the early stages of establishment and the shingle is unstable.
1395	Petalwort	<i>Petalophyllum ralfsii</i>	Extreme	Present in damp, calcareous dunes. Cannot tolerate flood inundation.

7220	Petrifying springs with tufa formation (Cratoneurion)		Moderate	Springs typically fed by groundwater associated with bog/fen habitats. The springs require an almost constant flow of water. These systems are identified as priority habitats in Annex I of the Directive. Potential impact from fluvial flood due to change in pH.
1170	Reefs		Low	Areas are typically permanently flooded.
1099	River lamprey	<i>Lampetra fluviatilis</i>	Low	River lamprey spawn in April in freshwater gravel areas. Flooding can result in disturbance to the gravel areas and can result in the washing out of the eggs. Sediment may also be disturbed resulting in the loss of juvenile lamprey. However aquatic species, because of the nature of the environment in which they live, are adapted to periodic disturbance and can recover from disturbance by flooding.
3270	Rivers with muddy banks with <i>Chenopodium rubri</i> p.p. and <i>Bidention</i> p.p. vegetation		Low	Habitat is subject to natural flooding. Occurs in only a few sites nationally.
1310	Salicornia and other annuals colonizing mud and sand		Low	Saltmarsh habitat. Not subject to fluvial impact. Tolerant of tidal influence, however large flood event could cause habitat disturbance.
1110	Sandbanks which are slightly covered by sea water all the time		Low	Permanently submerged coastal habitat.
1095	Sea lamprey	<i>Petromyzon marinus</i>	Low	Sea lamprey spawn between May and August in freshwater gravel areas. Flooding can result in disturbance to the gravel areas and can result in the washing out of the eggs. Sediment may also be disturbed resulting in the loss of juvenile lamprey. However aquatic species, because of the nature of the environment in which they live, are adapted to periodic disturbance and can recover from disturbance by flooding.
6210	Semi-natural dry grasslands and scrubland facies on calcareous substrates (<i>Festuco Brometalia</i>)(*important orchid sites)		High	Occurs in shallow well-drained soils unlikely to be subject to flooding therefore initially low vulnerability. If flooding were to occur it would have a high impact and would cause habitat degradation. Important orchid sites within this classification are priority habitats.
2120	Shifting dunes along the shoreline with <i>Ammophila arenaria</i> (white dunes)		Moderate	Habitat is dynamic in nature and tolerant to periodical disturbance. Large flood may be destructive - therefore moderate vulnerability.
1393	Shining sickle moss	<i>Drepanocladus vernicosus</i>	Moderate	Associated with wetland habitat, tolerant to periodic flooding, however prolonged inundation with silt and nutrients may impact.
8220	Siliceous rocky slopes with chasmophytic vegetation		High	Upland habitat type, unlikely to be located near areas of flooding - low initial vulnerability. In the unlikely event of flooding flora may be impacted - therefore high vulnerability.
8110	Siliceous scree of the montane to snow levels (<i>Androsacetalia alpinae</i> and <i>Galeopsietalia ladani</i>)		High	Upland habitat type, unlikely to be located near areas of flooding - low initial vulnerability. In the unlikely event of flooding flora may be impacted - therefore high vulnerability.

1833	Slender naiad	<i>Najas flexilis</i>	Moderate	Submerged aquatic plant found in lakes. Flooding may cause change in trophic condition of lake due to nutrient input causing moderate vulnerability.
1320	Spartina swards (<i>Spartinion maritimae</i>)		Low	Saltmarsh habitat. Not subject to fluvial impact. Tolerant of tidal influence.
6230	Species-rich <i>Nardus</i> grasslands, on siliceous substrates in mountain areas (and submountain areas, in Continental Europe)		High	Occurs in upland sloping areas unlikely to be subject to flooding. These systems are identified as priority habitats in Annex I of the Directive. In the unlikely event of flooding there is potential for habitat disturbance.
8330	Submerged or partly submerged sea caves		Low	Marine habitat subject to regular tidal influence.
91J0	<i>Taxus baccata</i> woods of the British Isles		Extreme	This habitat is classified as a priority habitat under the Directive. This habitat is present on karst substrate with shallow dry soils, which are well drained. This habitat type is concentrated to only a few areas in Ireland. Prolonged flooding, e.g. by groundwater, would result in unfavourable conditions for the yew wood.
7140	Transition mires and quaking bogs		Moderate	Wet substrate, typically waterlogged. Flooding would have only slight impact. However moderate impact if a significant of nutrients and sediment entered the system - therefore moderate vulnerability.
3180	Turloughs		Low	This habitat is periodically flooded by groundwater. These systems are identified as priority habitats in Annex I of the Directive. Extreme prolonged flooding may affect zonation.
1103	Twait shad	<i>Alosa fallax</i>	Low	Adult life spent in sea/estuaries. Spawn in freshwater at tidal limits in summer. Flooding has the potential to disturb spawning grounds (gravel pools), damage eggs and inhibit shad movement to appropriate spawning areas and can cause silting up of the interstitial spaces in the gravel which then become unsuitable spawning areas. However aquatic species, because of the nature of the environment in which they live, are adapted to periodic disturbance and can recover from disturbance by flooding.
1230	Vegetated sea cliffs of the Atlantic and Baltic coasts		Moderate	This habitat occurs on steep sea cliffs. Not under tidal influence but affected by sea spray. In the unlikely event of flooding, a shift in habitat floral composition may occur.
3260	Water courses of plain to montane levels with the <i>Ranunculon fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation		Low	Flooding may result in loss of in-stream flora.
1092	White-clawed crayfish	<i>Austropotamobius pallipes</i>	Moderate	Brooding females require undisturbed shelter over a prolonged winter-spring period. Flooding may disturb habitat however a strong flood would be required to cause such disturbance.

A.2. Vulnerability Assessments by Species - SPAs

Important Note: The table below provides the typical vulnerability assessment for each species. The vulnerability of a species for each particular site also takes into account the particular context or importance of that site, such as:

- whether or not it is a breeding site;
- whether the site is of particularly importance for that species;
- whether the site is cited for the species.

The assigned vulnerability of a site related to a species may hence vary from the vulnerability given below. The full set of vulnerabilities per species for each site is given in Volume II of this report.

Species Name	Species Name (Latin)	Conservation concern	Annex 1	Vulnerability	Reasoning for Vulnerability Classification
Arctic Tern	<i>Sterna paradisaea</i>	Amber	1	High	Most breeding colonies on west coast, yet some important colonies located on the east coast (Rockabill Island) and south (Lady's Island Lake). With the exception of key sites, a flood event at any one site at inappropriate time would impact on the colony but probably not on the population.
Barnacle Goose	<i>Branta leucopsis</i>	Amber	1	Low	Roosts on water, feeds on grasslands (mostly on islands) and intertidal areas - would not be affected by short-term flooding event.
Bar-tailed Godwit	<i>Limosa lapponica</i>	Amber	1	Moderate	Requires intertidal for feeding and secure roosting area (e.g. saltmarsh). Energetic constraints on this small migratory waterbird may be caused by frequent movement of flocks or a shift in distribution some distance away in response to a flood event.
Bewick's Swan	<i>Cygnus bewickii</i>	Red (winter)	1	Low	Roosts on water, feeds in fields (mostly).
Black Guillemot	<i>Cephus grylle</i>	Amber		Low (unlikely)	Nests usually high up in cliff crevices, some nests may be affected by storm surges.
Black-headed Gull	<i>Chroicocephalus ridibundus</i>	Red (breeding)		High	Widely occurring in variety of terrestrial/ aquatic habitats. Non-breeders unlikely to be affected by short-term flood events. Breeding birds nest on islands (including offshore and lake islands) - ground nesters would be affected by flooding, especially at key sites such as Lady's Island Lake and Lough Corrib.
Black-tailed Godwit	<i>Limosa limosa</i>	Amber		Moderate	Requires intertidal for feeding and secure roosting area (e.g. saltmarsh). Energetic constraints on this small migratory waterbird may be caused by frequent movement of flocks or a shift in distribution some distance away in response to a flood event.
Black-throated Diver	<i>Gavia arctica</i>	Amber	1	Low	Wintering species with offshore distribution.
Chough	<i>Pyrrhocorax pyrrhocorax</i>	Amber	1	Low (unlikely)	Nests usually high up in cliff crevices, some nests may be affected by storm surges.
Common Gull	<i>Larus canus</i>	Amber		High	Non-breeding birds are widely occurring in variety of terrestrial/ aquatic habitats. Non-breeders unlikely to be affected by short-term flood events. Breeding distribution predominantly along the west coast. Some inland colonies on lakes such as Lough Corrib, Lough Mask, Lough Conn and Carrowmore Lake – they would be highly susceptible to flood events.

Common sandpiper	<i>Actitus hypoleucos</i>	Amber		Low	Occurrence on SPAs is outside breeding period. No impact of flooding expected.
Common Scoter	<i>Malanitta nigra</i>	Red (breeding)		Extreme	Wintering birds occur offshore distribution. Breeding population declining and currently restricted to a selection of sites (extreme vulnerability for breeding sites where species is listed)
Common Tern	<i>Sterna hirundo</i>	Amber	1	High	Most breeding colonies on west coast, yet some important colonies located on the east coast (Rockabill Island) and south (Lady's Island Lake). With the exception of key sites, a flood event at any one site at inappropriate time would impact on the colony but probably not on the population.
Coot	<i>Fulica atra</i>	Amber		Low	Wintering species, remains on waterbody
Cormorant	<i>Phalacrocorax carbo</i>	Amber		High	Wintering birds remain on water. However, breeding birds are either tree or ground-nesters – those nesting on the ground are highly vulnerable.
Corncrake	<i>Crex crex</i>	Red (breeding)	1	Extreme	Corncrake population now highly restricted in Ireland to few sites. Importance of maintaining breeding range
Curlew	<i>Numenius arquata</i>	Red (breeding)		High	Requires intertidal/ coastal grasslands for feeding and secure roosting area (e.g. saltmarsh). Energetic constraints on this small migratory waterbird may be caused by frequent movement of flocks or a shift in distribution some distance away in response to a flood event. Vulnerability classification higher for birds breeding in Ireland – the breeding population in Ireland is undergoing a significant decline.
Curlew Sandpiper	<i>Calidris ferruginea</i>			Low	Passage migrant.
Dunlin	<i>Calidris alpina</i>	Amber		High	Non-breeding birds require intertidal zone for feeding and secure roosting area (e.g. saltmarsh). Energetic constraints on this small migratory waterbird may be caused by frequent movement of flocks or a shift in distribution some distance away in response to a flood event. . The vulnerability classification is high for breeding birds – ground nesters at a variety of locations which are possibly susceptible to flooding.
Eider	<i>Somateria mollissima</i>	Amber		High	Breeding birds nest on ground and would be affected (hence High vulnerability classification). Wintering birds remain on the sea.
Fulmar	<i>Fulmarus glacialis</i>			Low	Cliff nester. Occasional nest may suffer from storm surge
Gadwall	<i>Anas strepera</i>	Amber		Low	Wintering birds remain mostly on waterbody

Gannet	<i>Morus bassana</i>	Amber		Low (unlikely)	Few breeding colonies in Ireland – these are steep offshore islands which would not flood.
Garganey	<i>Anas querquedula</i>	Amber		High	Scarce breeding bird in Ireland. Nests would be vulnerable to flooding.
Golden Plover	<i>Pluvialis apricaria</i>	Red (breeding)	1	Moderate	Feeds in intertidal/ grasslands and roosts in secure areas near wetlands/ intertidal zone). Energetic constraints on this small migratory waterbird may be caused by frequent movement of flocks or a shift in distribution some distance away in response to a flood event.
Goldeneye	<i>Bucephala clangula</i>	Amber		Low	Wintering species, remains on waterbody.
Goosander	<i>Mergus merganser</i>	Amber		Low	Nests in trees, and otherwise remains on water.
Grasshopper Warbler	<i>Locustella naevia</i>	Amber		Low	
Great Black-backed Gull	<i>Larus marinus</i>	Amber		Low	Wintering birds occur in a variety of coastal habitats, unlikely to be affected by short-term inundation. Breeding birds are ground-nesting. Most of their main colonies are on cliffs or offshore islands that do not flood.
Great Crested Grebe	<i>Podiceps cristatus</i>	Amber		Low	Wintering birds remain on water.
Great Northern Diver	<i>Gavia immer</i>		1	Low	No breeding birds in Ireland, non-breeders occur in offshore waters.
Green Sandpiper	<i>Tringa ochropus</i>			Low	
Greenland White-fronted Goose	<i>Anser albifrons flavirostris</i>	Amber	1	Moderate	Roosts on water, feeds in fields (mostly) - higher fidelity to feeding areas than other geese/ swans.
Greenshank	<i>Tringa nebularia</i>	Amber		Moderate	Requires intertidal for feeding and secure roosting area (e.g. saltmarsh). Energetic constraints on this small migratory waterbird may be caused by frequent movement of flocks or a shift in distribution some distance away in response to a flood event.
Grey Heron	<i>Ardea cinerea</i>			Low	Nests in trees, wintering birds not affected by inundation.
Grey Plover	<i>Pluvialis squatarola</i>	Amber		Moderate	Requires intertidal for feeding and secure roosting area (e.g. saltmarsh). Energetic constraints on this small migratory waterbird may be caused by frequent movement of flocks or a shift in distribution some distance away in response to a flood event.
Greylag Goose	<i>Anser anser</i>	Amber		Low	Roost on water and feed in fields (mostly). Birds of Icelandic origin (wild birds) occur at most sites.
Guillemot	<i>Uria aalge</i>	Amber		Low (unlikely)	Cliff nester. Occasional nest may suffer from storm surge.

Hen Harrier	<i>Circus cyaneus</i>	Amber	1	Low (unlikely)	Scarce breeding bird in Ireland. Ground nester in uplands. Flooding would impact, but highly unlikely to occur.
Herring Gull	<i>Larus argentatus</i>	Red (breeding)		Extreme	Colonial nester, undergone massive decline in past decade and is red listed. Lambay Island is the biggest colony in Ireland and a flood event would impact significantly on the national population. There are many other sites that support significant numbers and a flood event would impact certainly at colony level, hence High vulnerability classification.
Kestrel	<i>Falco tinnunculus</i>	Amber		Low	
Kingfisher	<i>Alcedo atthis</i>		1	High	Nests can be flooded by high water levels in summer caused by floods/ heavy rainfall. Species widespread in Ireland so flood event on particular river system may result in loss of many nests.
Kittiwake	<i>Rissa tridactyla</i>	Amber		Low (unlikely)	Nests on cliffs - often affected by storm surges, will nest again in season if lost.
Knot	<i>Calidris canutus</i>	Red (winter)		Moderate	Requires intertidal for feeding and secure roosting area (e.g. saltmarsh). Energetic constraints on this small migratory waterbird may be caused by frequent movement of flocks or a shift in distribution some distance away in response to a flood event.
Lapwing	<i>Vanellus vanellus</i>	Red (breeding)		High	Requires intertidal/ coastal grasslands for feeding and secure roosting area (e.g. saltmarsh).. Energetic constraints on this small migratory waterbird may be caused by frequent movement of flocks or a shift in distribution some distance away in response to a flood event. Small & declining breeding population in Ireland at low-lying sites that would be susceptible to flooding, hence High vulnerability classification.
Leach's Petrel	<i>Oceanodroma leucorhoa</i>	Amber	1	Low (unlikely)	Unknown breeding status. Few breeding sites in the Republic of Ireland, and these are offshore islands that would not be expected to flood.
Lesser Black-backed Gull	<i>Larus fuscus</i>	Amber		High	Wintering birds occur in a variety of coastal habitats, unlikely to be affected by short-term inundation. During the breeding season, this species is a ground nester and some sites are susceptible to flooding (e.g. lake islands).
Light-bellied Brent Goose	<i>Branta bernicla hrota</i>	Amber		Low	Roosts on water, feeds on grasslands and intertidal areas - would not be affected by short-term flooding event
Little Egret	<i>Egretta garzetta</i>		1	Low	nests in trees, wintering birds not affected by inundation
Little Grebe	<i>Tachybaptus ruficollis</i>	Amber		Low	Wintering sites designated for this species – they remain on waterbody

Little Stint	<i>Calidris minuta</i>			Low	Passage migrant
Little Tern	<i>Sterna albifrons</i>	Amber	1	High	Breeds in colonies on low-lying coastline. There are 4-5 key colonies, which are very susceptible to tidal inundation, hence vulnerability classification is High.
Long-tailed Duck	<i>Clangula hyemalis</i>			Low	Wintering species with offshore distribution
Mallard	<i>Anas platyrhynchos</i>			Low	Wintering species, remains mostly on waterbody
Manx Shearwater	<i>Puffinus puffinus</i>	Amber		Low (unlikely)	Burrow nester. Highly vulnerable to flooding, but regular nesting areas are offshore islands which are not likely to flood.
Marsh Harrier	<i>Circus aeruginosus</i>			Low	Not proven as nesting in Republic of Ireland yet - flooding would be big risk if they do
Meadow Pipit	<i>Anthus pratensis</i>			Low	
Mediterranean Gull	<i>Larus melanocephalus</i>	Amber	1	Critical	Few breeding pairs in Ireland (<20), most on Lady's Island Lake. A flood event would possibly result in the loss of this species as a breeding species in Ireland. Low vulnerability for non-breeding sites - birds able to use a variety of coastal habitats.
Merlin	<i>Falco columbarius</i>	Amber	1	Low	
Mute Swan	<i>Cygnus olor</i>	Amber		Moderate	Nests adjacent to waterbodies/ waterways. Flooding expected to impact on nests. But distribution is widespread, and it is not likely that many nests would be affected during a particular single event.
Oystercatcher	<i>Haematopus ostralegus</i>	Amber		Moderate	Requires intertidal/ coastal grasslands for feeding and secure roosting area (e.g. saltmarsh). Energetic constraints on this small migratory waterbird may be caused by frequent movement of flocks or a shift in distribution some distance away in response to a flood event.
Pectoral Sandpiper	<i>Calidris melanotos</i>			Low	Passage migrant
Peregrine	<i>Falco peregrinus</i>		1	Low (unlikely)	Nests usually high up in cavities, mostly in quarries and sea-cliffs), sparse distribution so not likely that more than one nest would be affected during a given storm surge event.
Pink-footed Goose	<i>Anser brachyrhynchus</i>			Low	Roosts on waterbody, feeds in fields (mostly). Scarce in Ireland.
Pintail	<i>Anas acuta</i>	Red (winter)		Low	Wintering species, remains on waterbody.
Pochard	<i>Aythya ferina</i>	Amber		Low	Wintering species, remains on waterbody.
Puffin	<i>Fratercula arctica</i>	Amber		Low (unlikely)	Burrow nester. Highly vulnerable to flooding, but regular nesting areas are offshore islands which are not likely to flood.

Purple Sandpiper	<i>Calidris maritima</i>			Moderate	Requires intertidal for feeding and secure roosting area (e.g. saltmarsh). Energetic constraints on this small migratory waterbird may be caused by frequent movement of flocks or a shift in distribution some distance away in response to a flood event
Quail	<i>Coturnix coturnix</i>	Red (breeding)		High	Highly scarce breeding bird in Ireland. Shannon Callows a regular site. Likely to be affected by flood event.
Razorbill	<i>Alca torda</i>	Amber		Low (unlikely)	Cliff nester. Occasional nest may suffer from storm surge.
Red Grouse	<i>Lagopus lagopus</i>	Red (breeding)		Low (unlikely)	Nests mostly in uplands. Flood event would be catastrophic. But very unlikely.
Red-breasted Merganser	<i>Mergus serrator</i>			Low	Wintering species, remains on water.
Red-necked Phalarope	<i>Phalaropus lobatus</i>	Red (breeding)	1	Low	Species has not bred in Ireland in more than 20 years.
Redshank	<i>Tringa totanus</i>	Red (breeding)		Moderate	Requires intertidal for feeding and secure roosting area (e.g. saltmarsh). Energetic constraints on this small migratory waterbird may be caused by frequent movement of flocks or a shift in distribution some distance away in response to a flood event Higher vulnerability classification for breeding sites - ground-nester.
Red-throated Diver	<i>Gavia stellata</i>	Amber	1	Low	Outside the breeding season, this species occurs in offshore waters. There are very few breeding in Ireland (<20 pairs) (edge of their breeding range). Breeding birds occur in upland lakes in Donegal which carries a critical vulnerability classification.
Reed Bunting	<i>Emberiza schoeniclus</i>			Low	Widespread breeding passerine. Occasional nest may be affected by a flood.
Reed Warbler	<i>Acrocephalus scirpaceus</i>	Amber		Low	Widespread breeding passerine. Occasional nest may be affected by a flood.
Ring Ouzel	<i>Turdus torquatus</i>	Red (breeding)		Low (unlikely)	Nests mostly in uplands. Flood event would be catastrophic on this highly scarce species. But the likelihood of a flood event occurring in their preferred upland breeding habitat is very minimal.
Ringed Plover	<i>Charadrius hiaticula</i>	Amber		High	Requires intertidal for feeding and secure roosting area (e.g. saltmarsh). Energetic constraints on this small migratory waterbird may be caused by frequent movement of flocks or a shift in distribution some distance away in response to a flood event. Species also breeds in Ireland, largely on coastal shingle banks which are very susceptible to tidal inundation, hence vulnerability classification increased to High.

Rock Pipit	<i>Anthus petrosus</i>			Low (unlikely)	
Roseate Tern	<i>Sterna dougallii</i>	Amber	1	Extreme	Few breeding colonies in Ireland, yet Ireland supports a significant proportion of the northwest European breeding population – most occur at Rockabill Island which would be very unlikely to flood. A substantial proportion nest at Lady’s Island Lake which would have a higher chance of flooding and which would impact on the biogeographic population.
Ruff	<i>Philomachus pugnax</i>	Amber		Low	Scarce migrant outside the breeding season.
Sanderling	<i>Calidris alba</i>			Moderate	Requires intertidal for feeding and secure roosting area (e.g. saltmarsh). Energetic constraints on this small migratory waterbird may be caused by frequent movement of flocks or a shift in distribution some distance away in response to a flood event.
Sandwich Tern	<i>Sterna sandvicensis</i>	Amber	1	Extreme	Several colonies in Ireland, especially on west coast. A flood event would impact on the colony, and if occurred at key colonies such as Lady’s Island Lake would impact on national population.
Scaup	<i>Aythya marila</i>	Amber		Low	Wintering species, remains on waterbody.
Sedge Warbler	<i>Acrocephalus schoenobaenus</i>			Low	Widespread and non-colonial. Occasional nest may suffer from flooding.
Shag	<i>Phalacrocorax aristotelis</i>			Low (unlikely)	Cliff nester. Occasional nest may suffer from storm surge.
Shelduck	<i>Tadorna tadorna</i>	Amber		Low	Coastal species. Requires intertidal zone for feeding - unlikely to be affected by short-term flood event.
Short-eared Owl	<i>Asio flammeus</i>	Amber	1	Low	
Shoveler	<i>Anas clypeata</i>	Red (winter)		Low	Wintering species, remains mostly on waterbody.
Skylark	<i>Alauda arvensis</i>	Amber		Moderate	Very vulnerable as a ground-nesting species. But relatively widespread in Ireland (although their population is declining), and loss of few sites due to a flood event unlikely to impact significantly on the population. Not colonial.
Slavonian Grebe	<i>Podiceps auritus</i>	Amber		Low	Wintering species, occurs mostly in offshore waters.
Snipe	<i>Gallinago gallinago</i>	Amber		Moderate	Requires intertidal/ grasslands/ marshes for feeding and secure roosting (e.g. saltmarsh). Energetic constraints on this small migratory waterbird may be caused by frequent movement of flocks or a shift in distribution some distance away in response to a flood event .Especially high vulnerability for breeding birds. Snipe are ground-nesters which are highly susceptible to flooding.
Snowy Owl	<i>Nyctea scandiaca</i>	Amber	1	Low	

Spotted Redshank	<i>Tringa erythropus</i>			Moderate	Requires intertidal for feeding and secure roosting area (e.g. saltmarsh). Energetic constraints on this small migratory waterbird may be caused by frequent movement of flocks or a shift in distribution some distance away in response to a flood event.
Storm Petrel	<i>Hydrobates pelagicus</i>	Amber	1	Low (unlikely)	Burrow-nesting. Highly vulnerable to flooding, but regular nesting areas are offshore islands which are not likely to flood.
Teal	<i>Anas crecca</i>	Amber		Low	Wintering species, remains mostly on waterbody.
Tree Sparrow	<i>Passer montanus</i>	Amber		Low (unlikely)	
Tufted Duck	<i>Aythya fuligula</i>	Amber		Low	Wintering species, remains on waterbody.
Turnstone	<i>Arenaria interpres</i>			Moderate	Requires intertidal for feeding and secure roosting area (e.g. saltmarsh). Energetic constraints on this small migratory waterbird may be caused by their shift distribution regularly/ some distance away in response to a flood event.
Water Rail	<i>Rallus aquaticus</i>	Amber		Low	
Wheatear	<i>Oenanthe oenanthe</i>	Amber		Low	
Whimbrel	<i>Numenius phaeopus</i>			Low	Passage migrant, occurring in Ireland for brief periods in the autumn and spring.
Whinchat	<i>Saxicola rubetra</i>	Amber		Low	
Whitethroat	<i>Sylvia communis</i>			Low	
Whooper Swan	<i>Cygnus cygnus</i>	Amber	1	Low	Roosts on waterbody, feeds in fields (mostly).
Wigeon	<i>Anas penelope</i>	Amber		Low	Wintering species, remains on waterbody most of the time, but also grazes on intertidal flats/ in fields.
Wood Sandpiper	<i>Tringa glareola</i>	Amber	1	Low	
Wood Warbler	<i>Phylloscopus sibilatrix</i>	Amber		Low	

Appendix B. Vulnerability Assessments by Site

B.1. Vulnerability Assessments by Site - SACs

SAC Code	SAC Name	Vulnerability
000006	Killyconny Bog (Cloghbally)	Moderate
000007	Lough Oughter and Associated Loughs	Moderate
000014	Ballyallia Lake	Low
000016	Ballycullinan Lake	Moderate
000019	Ballyogan Lough	Moderate
000020	Black Head-Poulsallagh Complex	Extreme
000030	Danes Hole, Poulnalecka	Extreme
000032	Dromore Woods and Loughs	Extreme
000036	Inagh River Estuary	High
000037	Pouladatig Cave	Extreme
000051	Lough Gash Turlough	Low
000054	Moneen Mountain	Extreme
000057	Moyree River System	Extreme
000064	Poulnagordon Cave (Quin)	Extreme
000077	Ballymacoda (Clonpriest and Pillmore)	Low
000090	Glengarriff Harbour and Woodland	Extreme
000091	Clonakilty Bay	High
000093	Caha Mountains	High
000097	Lough Hyne Nature Reserve and Environs	Low
000101	Roaringwater Bay and Islands	Moderate
000102	Sheep's Head	High
000106	St. Gobnet's Wood	High
000108	The Gearagh	High
000109	Three Castle Head to Mizen Head	Moderate
000111	Aran Island (Donegal) Cliffs	High
000115	Ballintra	High
000116	Ballyarr Wood	High
000129	Croaghonagh Bog	Moderate
000133	Donegal Bay (Murvagh)	High
000138	Durnesh Lough	Moderate
000140	Fawnboy Bog/Lough Nacung	High
000142	Gannivegil Bog	Moderate
000147	Horn Head and Rinclevan	Extreme
000154	Inishtrahull	Moderate
000163	Lough Eske and Ardnamona Wood	High
000164	Lough Nagreany Dunes	High
000165	Lough Nillan Bog (Carrickatlieve)	Moderate
000168	Magheradrumman Bog	Moderate

000172	Meenaguse/Ardbane Bog	Moderate
000173	Meentygrannagh Bog	Moderate
000174	Curraghchase Woods	Extreme
000181	Rathlin O'Birne Island	Low
000185	Sessiagh Lough	Moderate
000189	Slieve League	High
000190	Slieve Tooley/Tormore Island/Loughros Beg Bay	Extreme
000191	St. John's Point	High
000194	Tranarossan and Melmore Lough	Extreme
000197	West of Ardara/Maas Road	Extreme
000199	Baldoye Bay	Moderate
000202	Howth Head	Moderate
000204	Lambay Island	Moderate
000205	Malahide Estuary	High
000206	North Dublin Bay	Extreme
000208	Rogerstown Estuary	High
000210	South Dublin Bay	Low
000212	Inishmaan Island	High
000213	Inishmore Island	Extreme
000216	River Shannon Callows	High
000218	Coolcam Turlough	Low
000231	Barroughter Bog	Moderate
000238	Caherglassaun Turlough	Extreme
000242	Castletaylor Complex	High
000248	Cloonmoylan Bog	Moderate
000252	Coole-Garryland Complex	High
000255	Croaghill Turlough	Low
000261	Derrycrag Wood Nature Reserve	High
000268	Galway Bay Complex	High
000278	Inishbofin and Inishshark	Moderate
000285	Kilsallagh Bog	Moderate
000286	Kiltartan Cave (Coole)	Extreme
000295	Levally Lough	Low
000296	Lisnageeragh Bog and Ballinastack Turlough	Moderate
000297	Lough Corrib	Extreme
000299	Lough Cutra	Extreme
000301	Lough Lurteen Bog/Glenamaddy Turlough	Moderate
000304	Lough Rea	Moderate
000308	Loughatorick South Bog	Moderate
000318	Peterswell Turlough	Low
000319	Pollnacknockaun Wood Nature Reserve	High
000322	Rahasane Turlough	Low

000324	Rosroe Bog	Moderate
000326	Shankill West Bog	Moderate
000328	Slyne Head Islands	Low
000330	Tully Mountain	Moderate
000332	Akeragh, Banna and Barrow Harbour	High
000335	Ballinskelligs Bay and Inny Estuary	Extreme
000343	Castlemaine Harbour	Extreme
000353	Old Domestic Building, Dromore Wood	Extreme
000364	Kilgarvan Ice House	Extreme
000365	Killarney National Park, Macgillycuddy's Reeks and Caragh River Catchment	Extreme
000370	Lough Yganavan and Lough Nambrackdarrig	High
000375	Mount Brandon	High
000382	Sheheree (Ardagh) Bog	Moderate
000391	Ballynafagh Bog	Moderate
000396	Pollardstown Fen	Extreme
000397	Red Bog, Kildare	Moderate
000404	Hugginstown Fen	Moderate
000407	The Loughans	Low
000412	Slieve Bloom Mountains	Moderate
000428	Lough Melvin	Moderate
000432	Barrigone	Extreme
000439	Tory Hill	High
000440	Lough Ree	High
000448	Fortwilliam Turlough	Low
000453	Carlingford Mountain	High
000455	Dundalk Bay	Moderate
000458	Killala Bay/Moy Estuary	Extreme
000461	Ardkill Turlough	Low
000463	Balla Turlough	Low
000466	Bellacorick Iron Flush	Moderate
000470	Mullet/Blacksod Bay Complex	Extreme
000471	Brackloon Woods	High
000472	Broadhaven Bay	Low
000474	Ballymaglancy Cave, Cong	Extreme
000475	Carrowkeel Turlough	Low
000476	Carrowmore Lake Complex	Moderate
000479	Cloughmoyne	High
000480	Clyard Kettle-holes	Moderate
000484	Cross Lough (Killadoon)	Moderate
000485	Corraun Plateau	High
000492	Doocastle Turlough	Low
000495	Duvillaun Islands	Moderate

000497	Flughany Bog	Moderate
000500	Glenamoy Bog Complex	Extreme
000503	Greaghans Turlough	Low
000504	Kilglassan/Caheravoostia Turlough Complex	Low
000507	Inishkea Islands	Extreme
000516	Lackan Saltmarsh and Kilcummin Head	High
000522	Lough Gall Bog	Moderate
000525	Shrule Turlough	Low
000527	Moore Hall (Lough Carra)	Extreme
000532	Oldhead Wood	High
000534	Owenduff/Nephin Complex	High
000541	Skealaghan Turlough	Low
000542	Slieve Fyagh Bog	Moderate
000566	All Saints Bog and Esker	High
000571	Charleville Wood	High
000572	Clara Bog	Extreme
000575	Ferbane Bog	Moderate
000576	Fin Lough (Offaly)	Extreme
000580	Mongan Bog	Moderate
000581	Moyclare Bog	Moderate
000582	Raheenmore Bog	Moderate
000584	Cuilcagh - Anierin Uplands	High
000585	Sharavogue Bog	Moderate
000588	Ballinturly Turlough	Low
000592	Bellanagare Bog	Extreme
000595	Callow Bog	Extreme
000597	Carrowbehy/Caher Bog	Extreme
000600	Cloonchambers Bog	Extreme
000604	Derrinea Bog	Moderate
000606	Lough Fingall Complex	Extreme
000607	Errit Lough	Moderate
000609	Lisduff Turlough	Low
000610	Lough Croan Turlough	Low
000611	Lough Funshinagh	Low
000612	Mullygollan Turlough	Low
000614	Cloonshanville Bog	Moderate
000622	Ballysadare Bay	Extreme
000623	Ben Bulbin, Gleniff and Glenade Complex	Extreme
000625	Bunduff Lough and Machair/Trawalua/Mullaghmore	Extreme
000627	Cummeen Strand/Drumcliff Bay (Sligo Bay)	Extreme
000633	Lough Hoe Bog	Extreme
000634	Lough Nabrickkeagh Bog	Moderate

000636	Templehouse and Cloonacleigha Loughs	Moderate
000637	Turloughmore (Sligo)	Low
000638	Union Wood	High
000641	Ballyduff/Clonfinane Bog	Moderate
000646	Galtee Mountains	High
000647	Kilcarren-Firville Bog	Moderate
000665	Helvick Head	Moderate
000668	Nier Valley Woodlands	High
000671	Tramore Dunes and Backstrand	High
000679	Garriskil Bog	Moderate
000685	Lough Ennell	Moderate
000688	Lough Owel	Moderate
000692	Scragh Bog	Extreme
000696	Ballyteige Burrow	High
000697	Bannow Bay	High
000700	Cahore Polders and Dunes	High
000704	Lady's Island Lake	Moderate
000707	Saltee Islands	Moderate
000708	Screen Hills	Moderate
000709	Tacumshin Lake	Moderate
000710	Raven Point Nature Reserve	High
000713	Ballyman Glen	Moderate
000714	Bray Head	High
000716	Carriggower Bog	Moderate
000717	Deputy's Pass Nature Reserve	High
000719	Glen of the Downs	High
000725	Knocksink Wood	Moderate
000729	Buckronev-Brittis Dunes and Fen	High
000733	Vale of Clara (Rathdrum Wood)	High
000764	Hook Head	Moderate
000770	Blackstairs Mountains	Moderate
000781	Slaney River Valley	High
000831	Cullahill Mountain	High
000849	Spahill and Clomantagh Hill	High
000859	Clonaslee Eskers and Derry Bog	Extreme
000869	Lisbigney Bog	High
000919	Ridge Road, SW of Rapemills	High
000925	The Long Derries, Edenderry	High
000930	Clare Glen	High
000934	Kilduff, Devilsbit Mountain	High
000939	Silvermine Mountains	High
000979	Corratirrim	High

000994	Ballyteige (Clare)	Low
000996	Ballyvaughan Turlough	Low
001013	Glenomra Wood	High
001021	Carrowmore Point to Spanish Point and Islands	Moderate
001040	Barley Cove to Ballyrisode Point	High
001043	Cleanderry Wood	High
001058	Great Island Channel	Low
001061	Kilkeran Lake and Castlefreke Dunes	High
001070	Myross Wood	Moderate
001090	Ballyness Bay	Extreme
001107	Coolvoy Bog	Moderate
001125	Dunragh Loughs/Pettigo Plateau	Moderate
001141	Gweedore Bay and Islands	Extreme
001151	Kindrum Lough	Moderate
001179	Muckish Mountain	High
001190	Sheephaven	High
001195	Termon Strand	Moderate
001197	Keeper Hill	High
001209	Glenasmole Valley	High
001228	Aughrusbeg Machair and Lake	Moderate
001230	Courtmacsherry Estuary	High
001242	Carrownagappul Bog	Moderate
001251	Cregduff Lough	Moderate
001257	Dog's Bay	High
001271	Gortnandarragh Limestone Pavement	High
001275	Inisheer Island	High
001285	Kiltiernan Turlough	Low
001309	Omey Island Machair	Extreme
001311	Rusheenduff Lough	Moderate
001312	Ross Lake and Woods	Extreme
001313	Rosturra Wood	High
001321	Termon Lough	Low
001342	Cloonee and Inchiquin Loughs, Uragh Wood	Extreme
001371	Mucksna Wood	High
001387	Ballynafagh Lake	Extreme
001398	Rye Water Valley/Cartron	Extreme
001403	Arroo Mountain	High
001430	Glen Bog	Low
001432	Glenstal Wood	High
001459	Clogher Head	Moderate
001482	Clew Bay Complex	Extreme
001497	Doogort Machair/Lough Doo	Extreme

001501	Erris Head	Moderate
001513	Keel Machair/Menaun Cliffs	Extreme
001529	Lough Cahasy, Lough Baun and Roonah Lough	Moderate
001536	Mocorha Lough	Moderate
001547	Castletownshend	Moderate
001571	Urlaur Lakes	High
001625	Castlesampson Esker	High
001626	Annaghmore Lough (Roscommon)	Extreme
001637	Four Roads Turlough	Low
001656	Bricklieve Mountains & Keishcorran	Extreme
001669	Knockalongy and Knockachree Cliffs	High
001673	Lough Arrow	Moderate
001680	Streedagh Point Dunes	Extreme
001683	Liskeenan Fen	Moderate
001741	Kilmuckridge-Tinnaberna Sandhills	High
001742	Kilpatrick Sandhills	High
001757	Holdenstown Bog	Moderate
001766	Magherabeg Dunes	High
001774	Lough Carra/Mask Complex	Extreme
001776	Pilgrim's Road Esker	High
001786	Kilroosky Lough Cluster	Moderate
001810	White Lough, Ben Loughs and Lough Doo	Moderate
001818	Lough Forbes Complex	High
001831	Split Hills and Long Hill Esker	High
001847	Philipston Marsh	Moderate
001858	Galmoy Fen	Moderate
001873	Derryclogher (Knockboy) Bog	Moderate
001879	Glanmore Bog	High
001880	Meenaguse Scragh	Low
001881	Maulagowna Bog	Moderate
001890	Mullaghanish Bog	Moderate
001898	Unshin River	Moderate
001899	Cloonakillina Lough	Moderate
001912	Glendree Bog	Moderate
001913	Sonnagh Bog	Moderate
001919	Glenade Lough	Moderate
001922	Bellacorick Bog Complex	Extreme
001926	East Burren Complex	Extreme
001932	Mweelrea/Sheeffry/Erriff Complex	Extreme
001952	Comeragh Mountains	High
001955	Croaghaun/Slievemore	Moderate
001957	Boyne Coast and Estuary	High

001975	Ballyhoorisky Point to Fanad Head	Extreme
001976	Lough Gill	High
001992	Tamur Bog	Moderate
002005	Bellacragher Saltmarsh	Moderate
002006	Ox Mountains Bogs	Extreme
002008	Maumturk Mountains	High
002010	Old Domestic Building (Keevagh)	Extreme
002012	North Inishowen Coast	Extreme
002031	The Twelve Bens/Garraun Complex	High
002032	Boleybrack Mountain	Moderate
002034	Connemara Bog Complex	Extreme
002036	Ballyhoura Mountains	Moderate
002037	Carrigeenamronety Hill	Moderate
002041	Old Domestic Building, Curraglass Wood	Extreme
002047	Cloghernagore Bog and Glenveagh National Park	High
002070	Tralee Bay and Magharees Peninsula, West to Cloghane	Extreme
002074	Slyne Head Peninsula	Extreme
002081	Ballinafad	Extreme
002091	Newhall and Edenvale Complex	Extreme
002098	Old Domestic Building, Askive Wood	Extreme
002110	Corliskea/Trien/Cloonfelliv Bog	Moderate
002111	Kilkieran Bay and Islands	Moderate
002112	Ballyseedy Wood	Low
002117	Lough Coy	Low
002118	Barnahallia Lough	Moderate
002119	Lough Nageeron	Moderate
002120	Lough Bane and Lough Glass	Moderate
002121	Lough Lene	Moderate
002122	Wicklow Mountains	High
002123	Ardmore Head	Moderate
002124	Bolingbrook Hill	High
002125	Anglesey Road	High
002126	Pollagoona Bog	Moderate
002129	Murvey Machair	Extreme
002130	Tully Lough	Moderate
002135	Lough Nageage	Moderate
002137	Lower River Suir	Extreme
002141	Mountmellick	High
002144	Newport River	High
002147	Lisduff Fen	Extreme
002157	Newgrove House	Extreme
002158	Kenmare River	Extreme

002159	Mulroy Bay	Moderate
002161	Long Bank	Low
002162	River Barrow and River Nore	High
002164	Lough Golagh and Breesy Hill	Moderate
002165	Lower River Shannon	High
002170	Blackwater River (Cork/Waterford)	Extreme
002171	Bandon River	High
002172	Blasket Islands	Moderate
002173	Blackwater River (Kerry)	Extreme
002176	Leannan River	High
002177	Lough Dahybaun	Moderate
002179	Towerhill House	Extreme
002180	Gortacarnaun Wood	High
002181	Drummin Wood	High
002185	Slieve Mish Mountains	High
002187	Drongawn Lough	Moderate
002189	Farranamanagh Lough	Moderate
002193	Ireland's Eye	Moderate
002213	Glenloughaun Esker	High
002214	Killeglan Grassland	High
002236	Island Fen	High
002241	Lough Derg, North-East Shore	Extreme
002243	Clare Island Cliffs	High
002244	Ardrahan Grassland	High
002245	Old Farm Buildings, Ballymacrogan	Extreme
002246	Ballycullinan, Old Domestic Building	Extreme
002247	Toonagh Estate	Extreme
002249	The Murrough Wetlands	Moderate
002250	Carrowmore Dunes	Extreme
002252	Thomastown Quarry	Moderate
002256	Ballyprior Grassland	High
002257	Moanour Mountain	High
002258	Silvermines Mountains West	High
002259	Tory Island Coast	Moderate
002261	Magharee Islands	Low
002262	Valencia Harbour/Portmagee Channel	Low
002263	Kerry Head Shoal	Low
002264	Kilkee Reefs	Low
002265	Kingstown Bay	Low
002268	Achill Head	Low
002269	Carnsore Point	Low
002274	Wicklow Reef	Low

002279	Askeaton Fen Complex	Moderate
002280	Dunbeacon Shingle	Moderate
002281	Reen Point Shingle	Moderate
002283	Rutland Island and Sound	High
002287	Lough Swilly	High
002293	Carrowbaun, Newhall and Ballylee Turloughs	Low
002294	Cahermore Turlough	Low
002295	Ballinduff Turlough	Low
002296	Williamstown Turloughs	Low
002298	River Moy	High
002299	River Boyne and River Blackwater	Moderate
002301	River Finn	Moderate
002303	Dunmuckrum Turloughs	Low
002306	Carlingford Shore	Low
002312	Slieve Bernagh Bog	Moderate
002313	Ballymore Fen	Moderate
002314	Old Domestic Buildings, Rylane	Extreme
002315	Glanlough Woods	Extreme
002316	Ratty River Cave	Extreme
002317	Cregg House Stables, Crusheen	Extreme
002318	Knockanira House	Extreme
002319	Kilkishen House	Extreme
002320	Kildun Souterrain	Extreme
002324	Glendine Wood	Moderate
002327	Belgica Mound Province	Low
002328	Hovland Mound Province	Low
002329	South-West Porcupine Bank	Low
002330	North-West Porcupine Bank	Low
002331	Mouds Bog	Moderate
002332	Coolrain Bog	Moderate
002333	Knockacoller Bog	Moderate
002336	Carn Park Bog	Moderate
002337	Crosswood Bog	Moderate
002338	Drumalough Bog	Moderate
002339	Ballynamona Bog and Corkip Lough	Moderate
002340	Moneybeg and Clareisland Bogs	Moderate
002341	Ardagullion Bog	Moderate
002342	Mount Hevey Bog	Moderate
002343	Tullaher Lough and Bog	Moderate
002346	Brown Bog	Moderate
002347	Camderry Bog	Moderate
002348	Clooneen Bog	Moderate

002349	Corbo Bog	Moderate
002350	Curraghlahanagh Bog	Moderate
002351	Moanveanlagh Bog	Moderate
002352	Monivea Bog	Moderate
002353	Redwood Bog	Moderate
002354	Tullaghanrock Bog	Moderate
002356	Ardgraique Bog	Moderate

B.2. Vulnerability Assessments by Site - SPAs

SPA code	Spa Name	Vulnerability
4002	Saltee Islands Spa	Low
4003	Puffin Island Spa	Low
4004	Inishkea Islands Spa	High
4005	Cliffs Of Moher Spa	Low
4006	North Bull Island Spa	Moderate
4007	Skelligs Spa	Low
4008	Blasket Islands Spa	Low
4009	Lady's Island Lake Spa	Critical
4013	Drumcliff Bay Spa	Moderate
4014	Rockabill Spa	Low
4015	Rogerstown Estuary Spa	Moderate
4016	Baldoyle Bay Spa	Moderate
4019	The Raven Spa	Moderate
4020	Ballyteigue Burrow Spa	Moderate
4021	Old Head Of Kinsale Spa	Low
4022	Ballycotton Bay Spa	Moderate
4023	Ballymacoda Bay Spa	Moderate
4024	South Dublin Bay And River Tolka Estuary Spa	High
4025	Malahide Estuary Spa	Moderate
4026	Dundalk Bay Spa	Moderate
4027	Tramore Back Strand Spa	Moderate
4028	Blackwater Estuary Spa	Moderate
4029	Castlemaine Harbour Spa	Moderate
4030	Cork Harbour Spa	High
4031	Inner Galway Bay Spa	High
4032	Dungarvan Harbour Spa	Moderate
4033	Bannow Bay Spa	Moderate
4034	Trawbreaga Bay Spa	Moderate
4035	Cummeen Strand Spa	Moderate
4036	Killala Bay/Moy Estuary Spa	Moderate
4037	Blacksod Bay/Broadhaven Spa	High
4039	Derryveagh And Glendowan Mountains Spa	Critical
4040	Wicklow Mountains Spa	Low
4041	Ballyallia Lake Wildfowl Sanctuary Spa	Moderate
4042	Lough Corrib Spa	Extreme
4043	Lough Derravaragh Spa	Moderate
4044	Lough Ennell Spa	Moderate
4045	Glen Lough Spa	Moderate
4046	Lough Iron Spa	Moderate
4047	Lough Owel Spa	Moderate
4048	Lough Gara Spa	Moderate
4049	Lough Oughter Spa	Moderate

4050	Lough Arrow Spa	High
4051	Lough Carra Spa	Moderate
4052	Carrowmore Lake Spa	High
4056	Lough Cutra Spa	High
4057	Lough Derg (Donegal) Spa	High
4058	Lough Derg (Shannon) Spa	High
4060	Lough Fern Spa	Low
4061	Lough Kinale And Derragh Lough Spa	Moderate
4062	Lough Mask Spa	High
4063	Poulaphouca Reservoir Spa	Moderate
4064	Lough Ree Spa	Extreme
4065	Lough Sheelin Spa	Moderate
4066	The Bull And The Cow Rocks Spa	Low
4068	Inishmurray Spa	Low
4069	Lambay Island Spa	Extreme
4072	Stags Of Broad Haven Spa	Low
4073	Tory Island Spa	Extreme
4074	Illanmaster Spa	Low
4075	Lough Swilly Spa	High
4076	Wexford Harbour And Slobs Spa	High
4077	River Shannon And River Fergus Estuaries Spa	Moderate
4078	Carlingford Lough Spa	Moderate
4080	Boyne Estuary Spa	High
4081	Clonakilty Bay	Moderate
4082	Greers Isle Spa	High
4083	Inishbofin, Inishdoeey And Inishbeg Spa	Extreme
4084	Inishglora And Inishkeeragh Spa	Low
4086	River Little Brosna Callows Spa	High
4087	Lough Foyle Spa	Moderate
4089	Rahasane Turlough Spa	Moderate
4090	Sheskinmore Lough Spa	High
4091	Stabannan-Braganstown Spa	Moderate
4092	Tacumshin Lake Spa	High
4093	Termoncarragh Lake And Annagh Machair Spa	Extreme
4094	Blackwater Callows Spa	Moderate
4095	Kilcolman Bog Spa	Moderate
4096	Middle Shannon Callows Spa	Extreme
4097	River Suck Callows Spa	Moderate
4098	Owenduff/Nephin Complex Spa	Moderate
4100	Inishtrahull Spa	High
4107	Coole-Garryland Spa	Moderate
4110	Lough Nillan Bog Spa	High
4111	Duvillaun Islands Spa	Low
4113	Howth Head Coast Spa	Low
4114	Ilauonearaun Spa	Moderate
4115	Inishduff Spa	Low

4116	Inishkeel Spa	Low
4117	Ireland's Eye Spa	Low
4118	Keeragh Islands Spa	Low
4119	Loop Head Spa	Low
4120	Rathlin O'birne Island Spa	Low
4121	Roaninish Spa	Low
4122	Skerries Islands	High
4123	Slyne Head Islands Spa	Low
4124	Sovereign Islands Spa	Low
4125	Magharee Islands	Low
4129	Ballysadare Bay Spa	Moderate
4132	Illancrone And Inishkeeragh Spa	Low
4134	Lough Rea Spa	Low
4135	Ardboline Island And Horse Island Spa	Low
4136	Clare Island Spa	Low
4137	Dovegrove Callows Spa	Moderate
4139	Lough Croan Turlough Spa	Moderate
4140	Four Roads Turlough Spa	Moderate
4142	Cregganna Marsh Spa	Moderate
4143	Cahore Marshes Spa	Moderate
4144	High Island, Inishark And Davillaun Spa	Low
4145	Durnesh Lough Spa	Moderate
4146	Malin Head Spa	Extreme
4148	Fanad Head Spa	Extreme
4149	Falcarragh To Meenlaragh Spa	Extreme
4150	West Donegal Coast Spa	High
4151	Donegal Bay Spa	Moderate
4152	Inishmore Spa	Low
4153	Dingle Peninsula Spa	Moderate
4154	Iveragh Peninsula Spa	Moderate
4155	Beara Peninsula Spa	Moderate
4156	Sheep's Head To Toe Head Spa	Moderate
4158	River Nanny Estuary And Shore Spa	Moderate
4160	Slieve Bloom Mountains Spa	Low
4161	Stack's To Mullaghareirk Mountains, West Limerick Hills And Mount Eagle Spa	Low
4162	Mullaghanish To Musheramore Mountains Spa	Low
4165	Slievefelim To Silvermines Mountains Spa	Low
4167	Slieve Beagh Spa	Low
4168	Slieve Aughty Mountains Spa	Low
4170	Cruagh Island Spa	Moderate
4172	Dalkey Islands Spa	Low
4175	Deenish Island And Scariff Island Spa	Low
4177	Bills Rocks Spa	Low
4181	Connemara Bog Complex Spa	High
4182	Mid-Clare Coast Spa	Moderate
4186	The Murrough Spa	Moderate

4187	Sligo/Leitrim Uplands Spa	Moderate
4188	Tralee Bay Complex Spa (4011,4018,4079)	Moderate
4189	Kerry Head Spa	Low
4190	Galley Head To Duneen Point Spa	Low
4191	Seven Heads Spa	Low
4192	Helvick Head To Ballyquin Spa	Low
4193	Mid-Waterford Coast Spa	Low
4194	Horn Head To Fanad Head Spa	High
4212	Cross Lough (Killadoon) Spa	Moderate
4219	Courtmacsherry Bay Spa	Moderate
4220	Corofin Wetlands Spa	Moderate
4221	Illannanooon Spa	High
4227	Mullet Peninsula Spa	Extreme
4228	Lough Conn & Lough Cullin Spa	High
4230	West Donegal Islands Spa	Extreme
4231	Inishbofin, Omey Island And Turbot Island Spa	Extreme
4232	River Boyne And Blackwater Spa	High
4233	River Nore Spa	High
4234	Ballintemple And Ballygilgan Spa (New Spa)	Low
4999	Castlegregory Chough (New Spa)	Moderate