SWRBD CFRAM Study

Flood Risk Review Report

February 2012
Office of Public Works

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NATIONAL
CFRAM
PROGRAMME
CATCHMENT FLOOD RISK
ASSESSMENT AND MANAGEMENT

Mott MacDonald

SWRBD CFRAM Study

Flood Risk Review Report

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Office of Public Works

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Issue and Revision Record

Revision	Date	Originator	Checker	Approver	Description
A	December 2011	T. Donovan	B. O'Connor	F. McGivern	Initial Issue
B	February 2012	T. Donovan	B. O'Connor	F. McGivern	Revised following Stakeholder Consultation

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Content

Glossary

AEP	Annual Exceedence Probability – this represents the probability of an event being exceeded in any one year and is an alternative method of defining flood probability to 'return periods'. The 10%, 1% and 0.1% AEP events are equivalent to 10-year, 100-year and 1000-year return period events respectively.
AFA	Areas for Further Assessment – Areas where, based on the Preliminary Flood Risk Assessment and the CFRAMS Flood Risk Review, the risks associated with flooding are potentially significant, and where further, more detailed assessment is required to determine the degree of flood risk, and develop measures to manage and reduce the flood risk.
ARR	Area for Flood Risk Review – an appraisal of the output from the PFRA involving on site verification of the predictive flood extent mapping, the receptors and historic information.
CAR	Community at Risk
CFRAM	Catchment Flood Risk Assessment and Management – The 'CFRAM' Studies will develop more detailed flood mapping and measures to manage and reduce the flood risk for the AFAs.
FRI	Flood Risk Index – a metric that allows the risk to different types of assets (e.g., home, business, monument, utility asset, etc.) to be expressed numerically, but without attempting to assign monetary values to all types of damage.
FRR	Flood Risk Review – an appraisal of the output from the PFRA involving on site verification of the predictive flood extent mapping, the receptors and historic information.
HA	Hydrometric Area
PFRA	Preliminary Flood Risk Assessment – A national screening exercise, based on available and readily-derivable information, to identify areas where there may be a significant risk associated with flooding.

1. Introduction

1.1 General

Mott MacDonald Ireland Ltd. have been appointed by the Office of Public Works (OPW) to undertake the Catchment Flood Risk Assessment and Management (CFRAM) Study for the South Western River Basin District. As part of this study, Mott MacDonald Ireland Ltd. are required to review the outputs of the initial national Preliminary Flood Risk Assessment (PFRA).

This process involves carrying out Flood Risk Review's (FRR) of areas designated as Areas for Further Assessment (AFA) under the PFRA. This report lists the AFA's within the South Western CFRAM, details the FRR process and provides recommendations on the designation of each of the AFA's.

Sections 2.0 and 3.0 detail the process / methodology adopted for carrying the Flood Risk Reviews. Section 4.0 outlines the findings and recommendations from the Flood Risk Reviews. Site Inspection Reports and revised preliminary flood extent maps for each of the AFA's are included in Appendix A.

A brief background to the PFRA and CFRAM Study is provided in the following section.

1.2 Background

1.2.1 Preliminary Flood Risk Assessment

The Office of Public Works (OPW) has undertaken a Preliminary Flood Risk Assessment (PFRA), a national screening exercise, based on available and readily-derivable information, to identify areas where there may be a significant risk associated with flooding.

These areas identified as part of the PFRA, referred to as Areas for Further Assessment (AFA's), are where more detailed assessment may be undertaken to more accurately assess the extent and degree of flood risk, and where the risk is significant, to develop where possible, measures to manage and reduce the risk.

The more detailed assessment that will focus on the AFA's will be undertaken through Catchment Flood Risk Assessment and Management (CFRAM) Studies.

1.2.2 PFRA Approach

As mentioned above, the PFRA identified areas where the risk due to flooding might be potentially significant and designated these areas AFA's. The PFRA approach to designating an area an AFA was carried out under the following guiding principles:

1. Historic Analysis: The historic flood risk assessment indicates that a location has a historic hazard or risk category of 4

2. Predictive Analysis: The predictive flood risk assessment indicates that a location has a community Flood Risk Index in excess of 250, or where an individual receptor has an Index in excess of 250 and is deemed to be of strategic, national importance or be critical in the event of a major regional emergency (such as a power station, international airport or hospital)

3. Consultation: Information has been provided through consultation that clearly indicates that an area is subject to severe flood risk that is beyond the capacity or responsibility of the Local Authority or other responsible body to manage locally.

1.2.3 Probable and Possible AFA's

The PFRA defined AFA's as probable or possible. This reflects the preliminary nature of the PFRA, and the need to take into account the outcomes of the consultation. All of the provisional AFA's are subject to validation (Flood Risk Review) during site-visits. Subject to the outcomes of the validation and consultation it was foreseen that:

- **Probable AFA's** are intended to be designated as AFA's, and hence subject to further assessment through the CFRAM Studies, unless information arises to indicate that this should not be the case.

- **Possible AFA's** would not be designated as AFA's, unless information arises to indicate that this should not be the case. These are areas where the degree of risk does not indicate that the area should be designated as an AFA, but where there is some degree of risk and where sites visits and consultation are required to validate the risk. It is also important to note that if an area is not designated as an AFA, then that area is not excluded from any further action to address flood risk, and works to reduce or manage the flood risk could still be considered through channels other than the CFRAM Programme.

1.3 Flood Risk Review

As part of the South Western RBD CFRAM Study, Flood Risk Reviews were required for 68 Nr.[1] AFA's (23 Nr. Probable AFA's and 45 Nr. Possible AFA's). In the Project Brief for the South Western RBD CFRAM Study the Probable AFA's are referred to as Communities at Risk (CAR) and the Possible AFA's are referred to as Areas for Flood Risk Review (ARR). It should be noted that the PFRA identified additional AFA's within the South Western RBD. However, these are covered by separate studies. Details of the AFA's are provided on the following tables:

[1] Ballingeary was not included in the brief, added as Probable AFA during the Flood Risk Review.

Table 1.1 – Probable Area for Further Assessment

Name	Unique ID	County	Easting	Northing
Ballyduff	180248	Waterford	196500	99500
Castlelyons	180250	Cork	184000	92750
Fermoy	180252	Cork	182750	99500
Freemount	180253	Cork	139500	114250
Kanturk	180254	Cork	138250	102750
Mallow	180262	Cork	155250	98500
Rathcormack	180265	Cork	181750	91000
Tallow	180266	Waterford	199750	93750
Youghal	180267	Cork	210250	78750
Castlemartyr	190277	Cork	196250	73250
Ballingeary*	195499	Cork	115090	67135
Clonakilty	200294	Cork	138000	41250
Dunmanway	200297	Cork	122250	52750
Inishannon	200298	Cork	155000	57000
Schull	200303	Cork	92500	31500
Bantry	210307	Cork	99750	48500
Durrus	210309	Cork	95000	42000
Kenmare	210312	Kerry	90750	70500
Castlemaine	220324	Kerry	83500	103000
Dingle	220327	Kerry	44500	101000
Killarney	220337	Kerry	97000	90500
Killorglin	220338	Kerry	77500	96000
Milltown	220339	Kerry	82500	101000

* Ballingeary was not included in the brief, added as Probable AFA during the Flood Risk Review.

Table 1.2 – Possible Area for Further Assessment

Name	Unique ID	County	Easting	Northing
Aglish	180247	Waterford	212250	91500
Cappoquin	180249	Waterford	210000	99500
Clashmore	180251	Waterford	212500	84250
Killavullen	180256	Cork	164750	99750
Lismore	180260	Waterford	204750	99000
Mitchelstown	180263	Cork	182250	112500
Twopothouse	180264	Cork	153750	103750
Buttevant	182269	Cork	154256	109254
Rathmore	182363	Kerry	116493	93258
Coachford	190273	Cork	145750	73250
Killeagh	190274	Cork	200750	75750
Ladysbridge	190275	Cork	197500	72250
Mogeely	190276	Cork	196500	75750
Carrigtwohill	192399	Cork	182035	73393
Dromanallig	192424	Cork	114315	67100
Dromore School	200295	Cork	106000	45750
Dunderrow	200296	Cork	159250	52750
Ross Carbery	200301	Cork	128750	36750
Ardcahan	202474	Cork	125389	56541
Black Ball Head	210304	Cork	58500	40000
Castletown Bearhaven	210308	Cork	68000	46000
Kealkill	210311	Cork	104500	56250
Kilcrohane	210313	Cork	82250	37750
Templenoe	210315	Kerry	82750	69500
Sneem	212577	Kerry	69075	66940
Innisfallen Abbey	220316	Kerry	93250	89250
Boolteens	220320	Kerry	79000	104000
Castleisland	220323	Kerry	97750	110000
Coolroe Lower	220325	Kerry	65500	89000
Cordal	220326	Kerry	104500	109000
Faha West	220329	Kerry	87750	96500
Farranfore	220330	Kerry	94000	104500
Fieries	220331	Kerry	91500	103250
Glenbeigh	220333	Kerry	66250	91000
Gortnacarriga	220335	Kerry	95750	95500
Kilfarnoge	220336	Kerry	38000	98000
Portmagee	220340	Kerry	36500	73000
Anascaul	222579	Kerry	59397	101791
Ballymalis	222583	Kerry	84222	94958
Cromane	222594	Kerry	69976	96440
Curreal	222595	Kerry	106553	85933
Derreenacullig	222596	Kerry	107739	80874
Rossbehy	222623	Kerry	64828	92434

Name	Unique ID	County	Easting	Northing
Glenflesk	225502	Kerry	106621	85316
Fossa	225503	Kerry	91919	92102

Table 1.3 – Probable AFA's within SW Region Covered by Other Studies

Name	Unique ID	Study	Easting	Northing
Midleton	160279	Lee CFRAM Study	188230	73520
Macroom	190270	Lee CFRAM Study	134100	72900
Tower	190280	Lee CFRAM Study	158250	73750
Little Island	190284	Lee CFRAM Study	175250	72499
Cork City	190286	Lee CFRAM Study	167270	72010
Togher	190288	Lee CFRAM Study	166500	69000
Carrigaline	190289	Lee CFRAM Study	173055	62418
Glanmire / Sallybrook	190290	Lee CFRAM Study	172500	73750
Douglas	190291	Lee CFRAM Study	170750	69500
Ballymakeery	190292	Lee CFRAM Study	120250	77000
Ballyvourney	192389	Lee CFRAM Study	119970	77602
Blarney	192392	Lee CFRAM Study	161111	76180
Cobh	192407	Lee CFRAM Study	179420	66626
Crookstown	192414	Lee CFRAM Study	142597	66085
Bandon	200293	Local Study	149250	54500
Skibbereen	200302	Local Study	112000	33500
Crossbarry	N/A	Lee CFRAM Study	155500	61100
Ballincollig	N/A	Lee CFRAM Study	159740	70620
Kilumney	N/A	Lee CFRAM Study	154830	68710
Crosshaven	N/A	Lee CFRAM Study	179920	61320
Glouthaune	N/A	Lee CFRAM Study	176800	73400
Rostellan / Aghada	N/A	Lee CFRAM Study	185600	64800

2. Flood Risk Review - Methodology

2.1 General

The Flood Risk Review process aims to ensure that the final designation of AFA's, which are taken forward (Probable AFA's) for the more detailed assessment of the CFRAM Study, are verified on site and take full account of local data. The process adopted for the Flood Risk Reviews is outlined below.

2.2 Desktop Study

Prior to any site visits a desktop study for each of the AFA's was carried out. This work included a review of the PFRA outputs, data collection for Historical Flood Events and consultation with relevant stakeholders such as Local Authorities and service providers.

2.2.1 Review of PFRA Outputs

The PFRA identified areas at risk of flooding and designated these areas as AFA's (Probable or Possible). This was achieved using the three approaches highlighted in Section 1.2.2 (Historic, Predictive and Consultation). The predictive approach used to identify AFA's utilised predicted flood outlines overlain with receptor datasets which allowed for flood risk to be measured using a Flood Risk Index.

As part of the desktop study, each part of the predictive approach was reviewed. The predicted flood outlines were produced nationally for various return periods for fluvial and coastal flooding. For each AFA these outlines were overlain on OSI maps. This allowed for a preliminary assessment of the outlines against the topography to identify any errors or anomalies. Anomalies such as wedges in the outlines or areas where the 10% AEP exceeded say the 1% AEP were also identified and marked for inspection on site.

Following the review of the predicted flood outlines, the receptors were overlain on OSI maps and locations were verified where possible (i.e. Schools, Hospitals, Fire Stations, Garda Stations etc.).

The FRI score for each AFA was then reviewed and broken down into the contributing receptors. Through the predicted flood outlines, receptor datasets and OSI maps the FRI scores were reviewed. Where any errors or issues were identified, these were noted for specific inspection on site.

2.2.2 Data Collection – Historical Flood Events

As part of the PFRA the OPW gathered historical information in relation to flood events and carried out a historical analysis. For the Flood Risk Reviews, the relevant historical analysis for each AFA was examined. Further to the information made directly available from the OPW, the OPW website www.floodmaps.ie was searched in relation to each AFA. From the website all available information was downloaded and reviewed, including newspaper articles, photographs, correspondence, reports, maps etc.

This information was cross referenced against the predicted flood outlines. Areas identified as being at risk from flooding due to historical information, but not highlighted within the flood outlines were recorded and noted for further examination on site and during consultation.

2.2.3 Consultation

During the desk top study the relevant Local Authorities were contacted to advise of the CFRAM Study, the Flood Risk Reviews and to request contact details of the relevant person to discuss flooding issues with for each of the AFA's. Consultations / discussions were held with Local Authority personnel during the desktop study and/or during the sites visits. The information received from during these consultations / discussions was reviewed and included in the Flood Risk Review.

2.3 Site Inspection

2.3.1 Site Inspection Training

To ensure the adequacy and consistency of the site inspections, each of the Surveyors underwent specific Site Inspection Training. This training was carried out over 2 days and detailed the process of the PFRA including the approach adopted in the Flood Risk Index scoring and the designation of the AFA's. The training included information on the CFRAM Study outlining the information required for the detailed assessment of the AFA's taken forward.

The Site Inspection Training also involved the Surveyors shadowing during two Site Inspections. In addition, each Surveyor was accompanied on at least one site visit and their inspection was reviewed and assessed. If additional training was required it was provided.

2.3.2 Quality Assurance & Consistency of Reporting

To ensure the quality and consistency of the Site Inspection Reports, each Surveyor was provided with a camera, laptop computer and mobile internet connection. Following the completion of the site inspection, the Surveyors completed the Site Inspection Report and emailed the report along with photographs back to the office for review. This ensured consistency between the reports and that any errors or issues could be addressed while the Surveyor was still on site.

2.3.3 Site Inspections

A Site Inspection of an AFA was only carried out after the desktop survey was completed. This ensured that the Surveyor was aware of any historical flood events, key receptors and any other issues with the site.

The first priority of the site inspection was to verify the predicted flood outlines for the AFA. This involved the Surveyor walking the site and identifying any errors or anomalies in the flood outlines. The extents of the flood outlines were reviewed based on the topography of the site. Where modifications were required to the predicted flood outlines, the outlines were modified on a hardcopy on site. The changes were later recorded digitally. Where receptors were included or removed from the flood outlines as a result of any on site modifications, these were recorded so the appropriate adjustments could be made to the FRI score at the reporting stage.

Following the predicted flood outlines, the receptors and FRI score were reviewed. The location of the receptors were verified and inspected to determine if the receptors are at risk. In some cases receptors within the flood outlines were found to be raised well above the flood level.

Where key receptors such as schools, hospitals, fire stations etc. were identified during the desktop study, the location of these were verified on site. Key receptors were also inspected for the presence of any flood

defences. Where possible, discussions were held with persons responsible for key receptors and this information was recorded in the Site Inspection Report.

In addition to identifying and reviewing known receptors, any unknown receptors identified within the flood outlines (i.e. new housing estates, health centres, flood defences, etc.) were recorded and photographed. From the FRI and the vulnerability classification, scores for the additional receptors were determined and included in the overall FRI score for the AFA.

On site, discussions were held with landowners, business owners, persons responsible for key receptors etc. Any anecdotal evidence was recorded and included in the Site Inspection Reports. Also, any evidence of flooding such as sand bags, barriers, high water marks etc. were recorded.

Following completion of the Site Inspection, the Site Inspection Report was prepared. The preparation of the report involved the recalculation of the FRI score for the AFA including any adjustment. Based on the revised FRI score the town was designated an AFA or Non-AFA.

Copies of the Site Inspection Reports are included in Appendix A.

3. Environmental Flood Risk Review

3.1 General

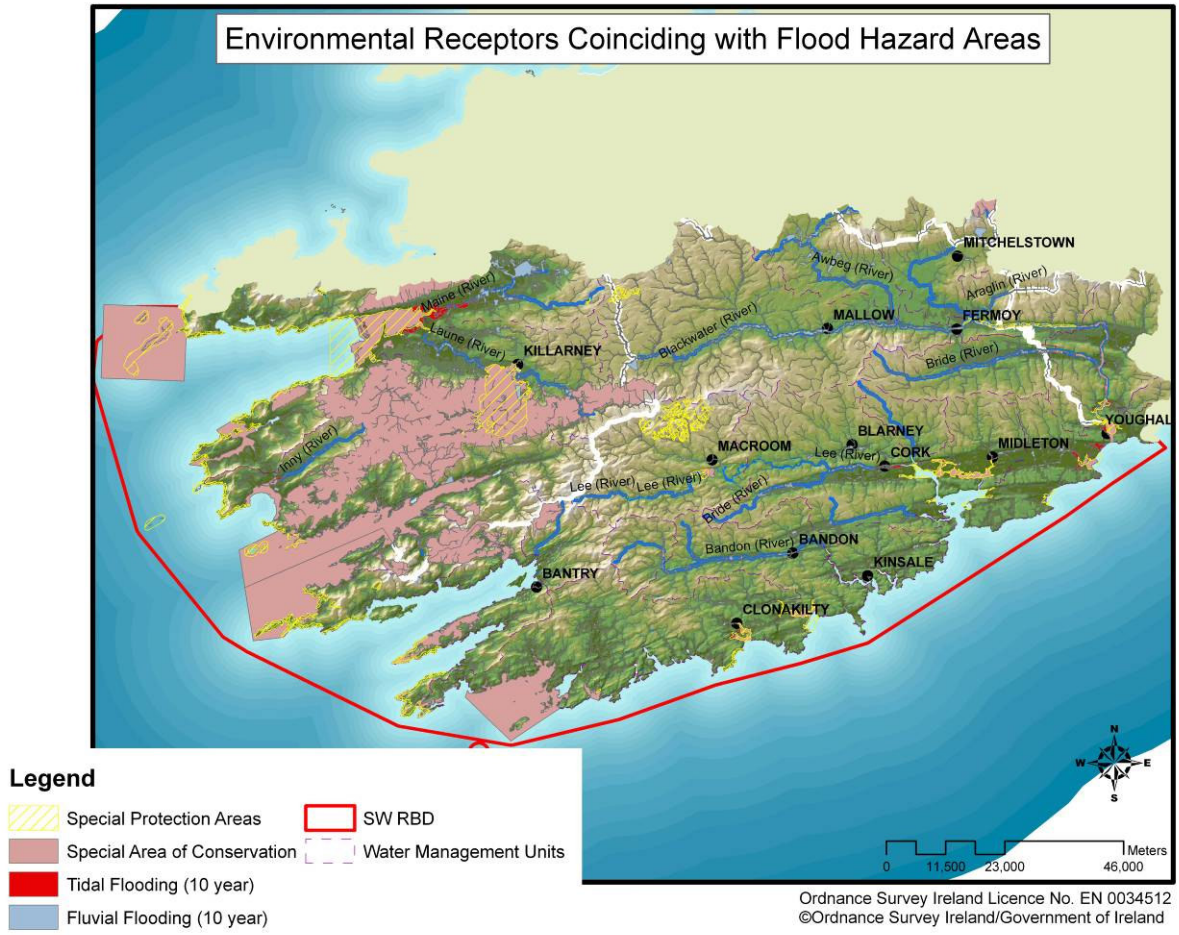
Flood risk levels for environmental receptors may be estimated by examining the vulnerability of the environmental receptor (i.e. Special Protection Areas - SPA and Special Areas of Conservation - SAC) against the probability of a flood event.

The methods used for defining the environment receptor vulnerability are contained in the OPW Report *Flood Vulnerability Assessment of Natura 2000 Sites Volume I: Method Statement* (July 2011). The environmental receptors were assigned to one of 5 vulnerability classifications (low, moderate, high, extreme and critical) on the basis of their susceptibility to damage by inundation. In the case of SACs, consideration was not given to the likelihood of inundation occurring (i.e. flood hazard). The method of vulnerability classification for SPAs did however consider to a degree the potential for inundation i.e. a lower risk classification was allocated to SPAs where the qualifying interests were bird species that breed and nest in areas of high ground unlikely to flood. A direct comparison between flood event data and the environmental receptors was not however carried out at the time of vulnerability classification.

In order to determine flood risk levels for environmental receptors, Geographical Information System (GIS) computer software was used to map the SPAs and SACs located within the South West against the PFRA flood event outlines sourced from the OPW.

Automated procedures in the GIS facilitated the identification of environmental receptors that are located in areas subject to flooding. While some receptors were identified as being 'vulnerable' to flooding in the OPW report, they are not regarded as being at flood risk due to their location outside of the flood hazard boundaries. The environmental receptors located in fluvial flood hazard areas and tidal flood hazard areas are shown in Figure 3.1.

Figure 3.1 – Environmental Receptors Coinciding with Flood Hazard Areas



The environmental receptors located in flood hazard areas were allocated a flood risk index score in accordance with the matrix provided in Table 3.1. Those environmental receptors identified as having a Flood Risk Index (FRI) score which is in excess of 250 (as derived through the assessment of vulnerability against flood hazard) are classified as Area for Further Assessment (AFA's).

Table 3.1 – Matrix for Determining Flood Risk Index

Vulnerability Class	Vulnerability Class Factor	Probability of Flood Event (Annual Exceedance Probability)		
		10% - High	1% - Medium	0.1% - Low
Critical Vulnerability	2500	25000	2500	250
Extreme Vulnerability	250	2500	250	25
High Vulnerability	25	250	25	2.5
Moderate Vulnerability	2.5	25	2.5	0.25
Low Vulnerability	1	10	1	0.1

Of the Special Protection Areas identified as being subject to fluvial and tidal flood hazard, none had a vulnerability classification of greater than 'high' (i.e. a FRI >250) and are therefore are not included for further assessment.

Of the Special Areas of Conservation identified as being subject to fluvial and tidal flood hazard, the following where allocated a FRI score of greater than 250:

Table 3.2 – SAC with FRI Score > 250

Site Code	Site Name	Fluvial	Tidal
000090	Glengarriff Harbour And Woodland	Yes	Yes
000335	Ballinskelligs Bay And Inny Estuary	Yes	Yes
000343	Castlemaine Harbour	Yes	Yes
000353	Old Domestic Building, Dromore Wood	Yes	Yes
000364	Kilgarvan Ice House	Yes	No
000365	Killarney National Park, Macgillycuddy'S Reeks And Caragh River Catchment	Yes	Yes
001342	Cloonee And Inchiquin Loughs, Uragh Wood	Yes	Yes
002158	Kenmare River	Yes	Yes
002170	Blackwater River (Cork/Waterford)	Yes	Yes
002173	Blackwater River (Kerry)	Yes	No
002315	Glanlough Woods	Yes	No

The vulnerability classification for environmental receptors assumed equal probability of flooding across the full extent of all designated areas. In order to further validate the Flood Risk Index for the above-listed SACs, Mott MacDonald conducted a further examination of the SAC vulnerability classification dataset in order to determine the rationale for the 'Extreme' classification and to compared this against the flood extents while having regard to available data from the NPWS and Biodiversity mapping website (www.maps.biodiversityireland.ie) on species and habitat locations. The Flood Risk Index was subsequently amended to reflect the examination and to account for the expert opinion sought.

The Cloonee And Inchiquin Loughs, Uragh Wood (site code: 001342) was deemed not to require further assessment on the basis that the site was allocated an 'Extreme' vulnerability classification due to the presence of Lesser Horseshoe Bat (Rhinolophus hipposideros). This SAC is subject only to fluvial flooding in a minor section of the designated area which is not likely to impact on bat roosting.

Probable Areas for Further Environmental Assessment (AFEA's) have been identified as follows and are shown in Figure 3.3 below:

Table 3.3 – Probable Areas for Further Environmental Assessment

Site Code	Site Name	Reason for Extreme Classification	Rational for FRI
000343	Castlemaine Harbour	Petalwort (Petalophyllum ralfsii)	This species cannot tolerate prolonged periods of inundation. The Biodiversity maps online show Petalwort to be present at Castlemaine Harbour. There is a coincidence of flood hazard areas with the known species locations.
000365	Killarney National Park, Macgillycuddy'S Reeks And Caragh River Catchment	Taxus baccata woods of the British Isles.	Species are located in areas of fluvial flooding.
		Lesser horseshoe bat (Rhinolophus hipposideros)	Taxus baccata and Marsh Fritillary larvae are recorded near Muckross Lake in areas identified as flood hazard. Marsh fritillary also occurs at Waterville however flooding
		Marsh fritillary (Euphydryas	

Site Code	Site Name	Reason for Extreme Classification	Rational for FRI
		aurinia)	only occurs in small areas therefore impact is not significant here. Locations of Lesser horseshoe bat roosting and breeding sites need to be confirmed with NPWS before a determination of flood risk can be made.
002158	Kenmare River	Narrow-mouthed whorl snail (Vertigo angustior) Lesser horseshoe bat (Rhinolophus hipposideros)	Narrow-mouthed whorl snail has been recorded in areas subject to both fluvial and tidal flooding within the Kenmare River. Locations of Lesser horseshoe bat roosting and breeding sites need to be confirmed with NPWS before a determination of flood risk can be made.
002170	Blackwater River (Cork/Waterford)	Taxus baccata woods of the British Isles	The principle area within the Blackwater where this species occurs is at Lismore in County Waterford. The area is subject to fluvial flooding.

Figure 3.3 – Probable Areas for Further Environmental Assessment

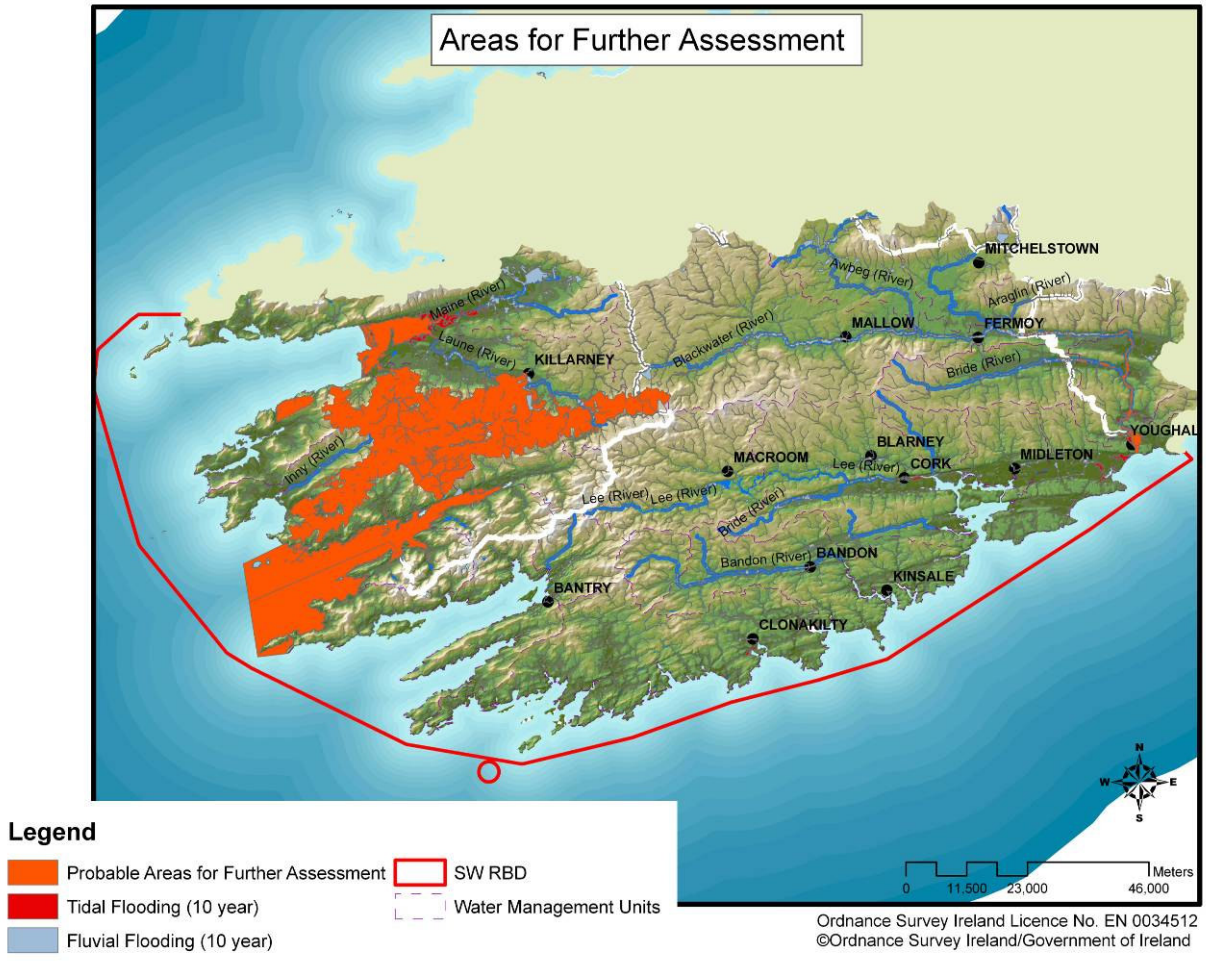


Plate 1 - Petalwort (Petalophyllum ralfsii) at Castlemaine Harbour
(Source: www.maps.biodiversityireland.ie)

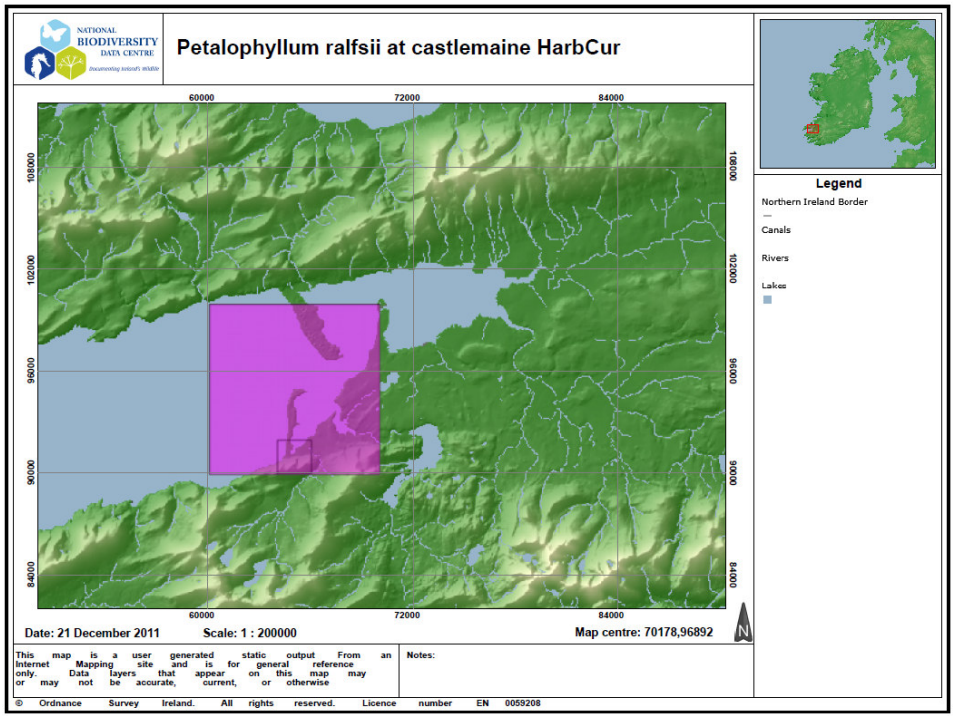


Plate 2 - Taxus baccata woods of the British Isles and Marsh fritillary (Euphydryas aurinia) at Muckross
(Source: www.maps.biodiversityireland.ie)

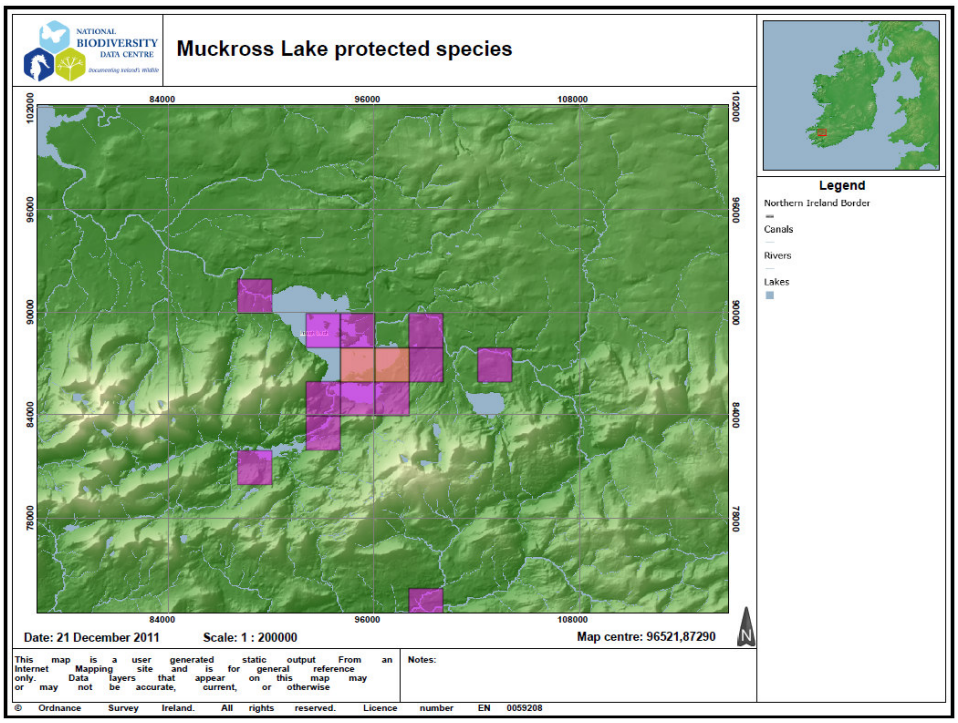


Plate 3 - Narrow-mouthed whorl snail (Vertigo angustior) at Kenmare River
(Source: www.maps.biodiversityireland.ie)

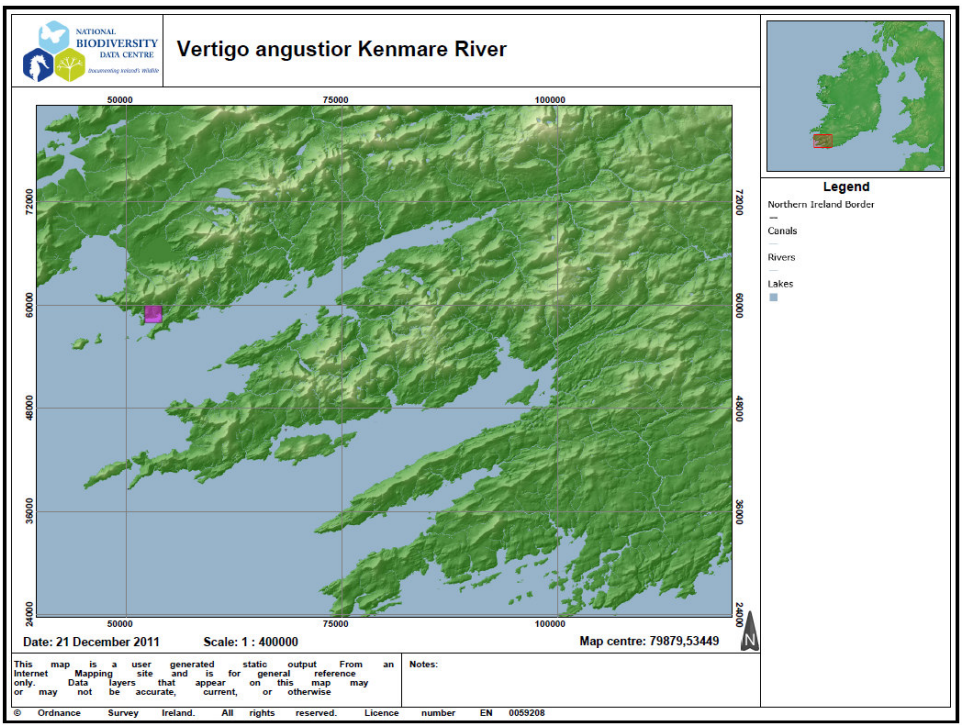
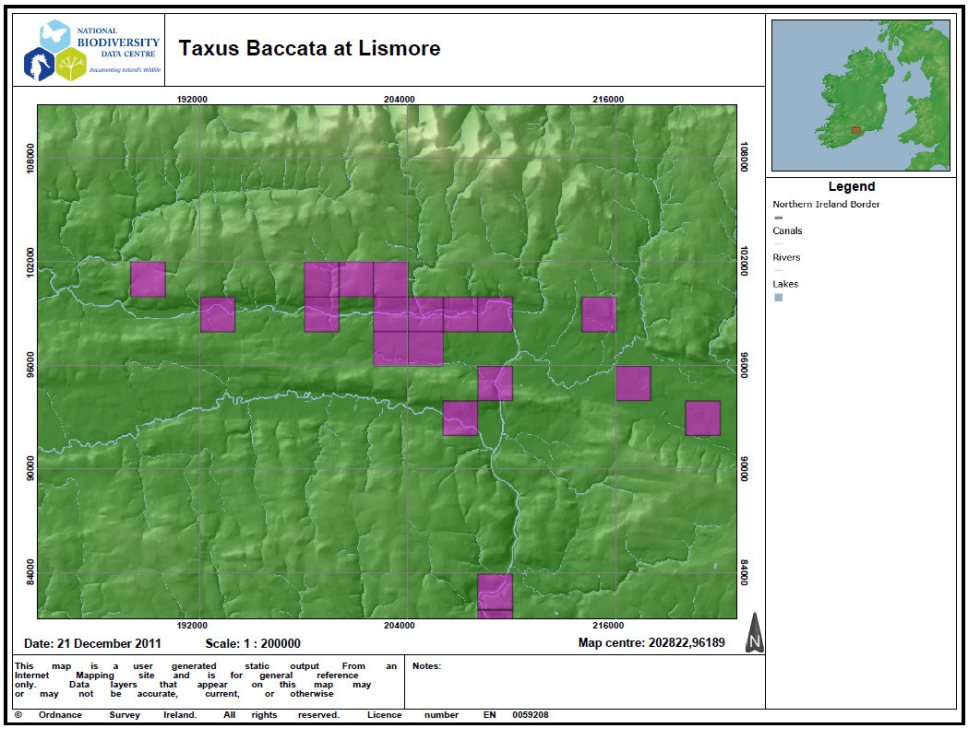


Plate 4 - Taxus baccata woods of the British Isles at Lismore
(Source : www.maps.biodiversityireland.ie)



Possible Areas for Further Environmental Assessment (AFEAs) have been identified as follows:

Note that consultation is underway with the National Parks and Wildlife Services (NPWS) to identify the locations of Lesser horseshoe bat roosting and breeding sites in order that a more accurate determination of flood risk can be made. The SACs identified hereunder may therefore change following NPWS input.

Table 3.4 – Possible Areas for Further Environmental Assessment

Site Code	Site Name	Reason for Extreme Classification	Rational for FRI
000090	Glengarriff Harbour And Woodland	Lesser horseshoe bat (Rhinolophus hipposideros)	Oak Woodland forms foraging and roosting habitat at this site. Need to determine if cave habitat is used where access/egress may be hindered by flooding. If No reduce vulnerability classification.
000335	Ballinskelligs Bay And Inny Estuary	Lesser horseshoe bat (Rhinolophus hipposideros)	The flooding extent is confined primarily to the tidal reaches of the Inny Estuary. Dune type habitat dominates which is unlikely to support lesser horseshoe bat roosting. Propose reducing vulnerability classification. Need confirmation from NPWS.
000353	Old Domestic Building, Dromore Wood	Lesser horseshoe bat (Rhinolophus hipposideros)	Area is subject to fluvial flooding. Habitat is dominated by conifer woodland. The 'Old Domestic Building' is quite large and is unlikely to be fully inundated by fluvial flooding. In addition access to roosting is likely to be in the upper floors of the building. Propose reducing vulnerability classification. Need confirmation from NPWS.
000364	Kilgarvan Ice House	Lesser horseshoe bat (Rhinolophus hipposideros)	Area is subject to fluvial flooding. Habitat is dominated by spruce and bog woodland. Woodland roosting sites are unlikely to be inundated by fluvial flooding. Need to determine if cave habitat is used where access/egress may be hindered by flooding. If No reduce vulnerability classification.
001342	Cloonee And Inchiquin Loughs, Uragh Wood	Lesser horseshoe bat (Rhinolophus hipposideros)	Fluvial flooding occurs in a minor section of the SAC. Propose reducing vulnerability classification. Need confirmation from NPWS regarding absence of bat roosts in flooded areas.
002173	Blackwater River (Kerry)	Lesser horseshoe bat (Rhinolophus hipposideros)	Need to confirm Lesser horseshoe bat with NPWS before assessment of actual vulnerability can be made.
002315	Glanlough Woods	Lesser horseshoe bat (Rhinolophus hipposideros)	Need to confirm Lesser horseshoe bat with NPWS before assessment of actual vulnerability can be made.

4. Recommendations

4.1 General

The PFRA identified areas where there may be a significant risk associated with flooding. Due to the preliminary nature of the PFRA, these areas were defined as Probable or Possible AFA's and subject to validation (Flood Risk Review) during site visits. Flood Risk Reviews have been carried out for each of the areas listed and the revised designations are provided below:

Table 4.1 – Probable Areas for Further Assessment

HA	Name	Unique ID	Fluvial	Coastal	County	Easting	Northing
18	Aglish	180247	Yes	No	Waterford	212250	91500
18	Ballyduff	180248	Yes	No	Waterford	196500	99500
18	Fermoy	180252	Yes	No	Cork	182750	99500
18	Freemount	180253	Yes	No	Cork	139500	114250
18	Kanturk	180254	Yes	No	Cork	138250	102750
18	Mallow	180262	Yes	No	Cork	155250	98500
18	Rathcormack	180265	Yes	No	Cork	181750	91000
18	Tallow	180266	Yes	No	Waterford	199750	93750
18	Youghal	180267	Yes	Yes	Cork	210250	78750
19	Killeagh	190274	Yes	No	Cork	200750	75750
19	Castlemartyr	190277	Yes	No	Cork	196250	73250
19	Ballingeary*	195499	Yes	No	Cork	115090	67135
20	Clonakilty	200294	Yes	Yes	Cork	138000	41250
20	Dunmanway	200297	Yes	No	Cork	122250	52750
20	Schull	200303	Yes	No	Cork	92500	31500
21	Bantry	210307	Yes	Yes	Cork	99750	48500
21	Castletown Bearhaven	210308	Yes	Yes	Cork	68000	46000
21	Durrus	210309	Yes	No	Cork	95000	42000
21	Kenmare	210312	Yes	Yes	Kerry	90750	70500
22	Castleisland	220323	Yes	No	Kerry	97750	110000
22	Dingle	220327	Yes	Yes	Kerry	44500	101000
22	Killarney	220337	Yes	No	Kerry	97000	90500
22	Milltown	220339	Yes	No	Kerry	82500	101000

Table 4.2 – Probable Areas for Further Environmental Assessment

Probable Areas for further Environmental Assessment (AFEA's)
Castlemaine Harbour
Killarney National Park, Macgillycuddy's Reeks And Caragh River Catchment
Kenmare River
Blackwater River (Cork/Waterford)

Table 4.3 – Possible Areas for Further Assessment

HA	Name	Unique ID	Fluvial	Coastal	County	Easting	Northing
18	Cappoquin	180249	Yes	No	Waterford	210000	99500
18	Castlelyons	180250	Yes	No	Cork	184000	92750
18	Clashmore	180251	Yes	No	Waterford	212500	84250
18	Killavullen	180256	Yes	No	Cork	164750	99750
18	Lismore	180260	Yes	No	Waterford	204750	99000
18	Mitchelstown	180263	Yes	No	Cork	182250	112500
18	Twopothouse	180264	Yes	No	Cork	153750	103750
18	Buttevant	182269	Yes	No	Cork	154256	109254
18	Rathmore	182363	Yes	No	Kerry	116493	93258
19	Coachford	190273	Yes	No	Cork	145750	73250
19	Ladysbridge	190275	Yes	No	Cork	197500	72250
19	Mogeely	190276	Yes	No	Cork	196500	75750
19	Carrigtwohill	192399	Yes	Yes	Cork	182035	73393
19	Dromanallig	192424	Yes	No	Cork	114315	67100
20	Dromore School	200295	Yes	No	Cork	106000	45750
20	Dunderrow	200296	Yes	No	Cork	159250	52750
20	Inishannon	200298	Yes	Yes	Cork	155000	57000
20	Ross Carbery	200301	Yes	Yes	Cork	128750	36750
20	Ardcahan	202474	Yes	Yes	Cork	125389	56541
21	Black Ball Head	210304	No	Yes	Cork	58500	40000
21	Kealkill	210311	Yes	No	Cork	104500	56250
21	Kilcrohane	210313	Yes	No	Cork	82250	37750
21	Templenoe	210315	Yes	Yes	Kerry	82750	69500
21	Sneem	212577	Yes	No	Kerry	69075	66940
22	Innisfallen Abbey	220316	Yes	No	Kerry	93250	89250
22	Boolteens	220320	Yes	No	Kerry	79000	104000
22	Castlemaine	220324	Yes	Yes	Kerry	83500	103000
22	Coolroe Lower	220325	Yes	No	Kerry	65500	89000
22	Cordal	220326	Yes	No	Kerry	104500	109000
22	Faha West	220329	Yes	Yes	Kerry	87750	96500
22	Farranfore	220330	Yes	No	Kerry	94000	104500
22	Fieries	220331	Yes	No	Kerry	91500	103250
22	Glenbeigh	220333	Yes	Yes	Kerry	66250	91000
22	Gortnacarriga	220335	Yes	No	Kerry	95750	95500
22	Kilfarnoge	220336	No	Yes	Kerry	38000	98000
22	Killorglin	220338	Yes	Yes	Kerry	77500	96000
22	Portmagee	220340	Yes	Yes	Kerry	36500	73000
22	Anascaul	222579	Yes	No	Kerry	59397	101791
22	Ballymalis	222583	Yes	No	Kerry	84222	94958
22	Cromane	222594	Yes	No	Kerry	69976	96440
22	Curreal	222595	Yes	No	Kerry	106553	85933
22	Derreenacullig	222596	Yes	No	Kerry	107739	80874
22	Rossbehy	222623	Yes	Yes	Kerry	64828	92434

HA	Name	Unique ID	Fluvial	Coastal	County	Easting	Northing
22	Glenflesk	225502	Yes	No	Kerry	106621	85316
22	Fossa	225503	Yes	No	Kerry	91919	92102

Table 4.4 – Possible Areas for Further Environmental Assessment

Possible Areas for further Environmental Assessment (AFEA's)
Glengarriff Harbour And Woodland
Ballinskelligs Bay And Inny Estuary
Old Domestic Building, Dromore Wood
Kilgarvan Ice House
Cloonee And Inchiquin Loughs, Uragh Wood
Blackwater River (Kerry)
Glanlough Woods

Appendices

Appendix A. Site Inspection Reports

Map Legend for Site Inspection Reports

Blue Line – 10% AEP Flood Extent

Green Dashed Line – 1% AEP Flood Extent

Red Dashed Line – 0.1% AEP Flood Extent

Black Dashed Line – Revised Flood Extent