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Éimer Godsil
Office of Climate, Licensing & Resource Use
Environmental Protection Agency
Inniscarra
Co. Cork.

19th May 2015

IW-ER-LT0252

RE: Milltown Waste Water Discharge Licence Application D0331-01

Dear Éimer Godsil,

In response to the Regulation 18(3)(b)-5 request for further information notice dated the 29th January 2015, please see below relevant information.

You are thereby required to submit a Natura Impact Statement as defined in Regulation 2(1) of the European Communities (Birds and Natural Habitats) Regulations (S.I. No. 477 of 2011).

Please see attached the Appropriate Assessment (Natura Impact Statement) Report for the Milltown agglomeration as requested. The report concluded that the Milltown discharge, alone or in-combination with other plans and/or projects will not give rise to significant effects on the integrity of the Castlemaine Harbour SAC and the Castlemaine Harbour SPA, as long as the recommended mitigation measures are implemented in full.

The recommended mitigation measures in support of the ongoing operation of the Milltown WwTP are:

- Monitoring of the effluent discharge and both upstream and downstream of the discharge point on a regular basis;
- Monitoring of TN and TP concentration of the effluent discharge to assess nutrient inputs to the receiving waterbody;
- The effluent quality must meet the requirements as set out in Urban Waste Water Treatment Regulations, 2001. This will serve to protect the SAC and SPA;

Stiúrthóiri / Directors: M. McNicholas (Chairman), Brendan Murphy, Michael O'Sullivan, John Tierney
Oifig Chláraithe / Registered Office: Teach Colvill, 24-26 Sráid Thalbóid, Baile Átha Cliath 1 / Colvill House, 24-26 Talbot Street, Dublin 1
Is cuideachta phríobháideach í Uisce Éireann faoi theorainn scaireanna / Irish Water is a private company limited by shares
Uimhir Chláraithe in Éirinn / Registered in Ireland No.: 530363

- With regard to the cumulative impacts of the discharge as a whole and the operational impacts, the waste water discharge effluent standards must be in line with the Urban Waste Water Treatment Regulations, 2001.

Best Regards,

Gerry Galvin
Chief Technical Advisor

Irish Water Report

Natura Impact Statement as part of the Milltown Waste Water Discharge Licence Application – D0331-01

Contents

Introduction

This Natura Impact Statement provides an Appropriate Assessment (AA) of the existing wastewater discharge from the Milltown agglomeration, located in County Kerry. This Report assesses whether the current discharge from the agglomeration, alone or in combination with other plans and projects, is likely to have significant effects on a European Site(s) in view of best scientific knowledge and the conservation objectives of the site(s). European Sites are those identified as sites of European Community importance designated as Special Areas of Conservation under the Habitats Directive or as Special Protection Areas under the Birds Directive.

This report follows the guidance for AA published by the Environmental Protection Agency (EPA) '*Note on Appropriate Assessments for the purposes of the Waste Water Discharge (Authorisation) Regulations, 2007 (S.I. No. 684 of 2007)*' (EPA, 2009); and takes account of the Department of the Environment, Heritage and Local Government guidelines '*Appropriate Assessment of Plans and Projects in Ireland. Guidance for Planning Authorities*' (DoEHLG, 2009) and Circular L8/08 '*Water Services Investment and Rural Water Programmes – Protection of Natural Heritage and National Monuments*' (DoEHLG, 2008).

This Natura Impact Statement was completed by Nicholas O'Dwyer Ltd. on behalf of Irish Water.

Legislative Context

The Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora, better known as "The Habitats Directive", provides legal protection for habitats and species of European importance. Articles 3 to 9 provide the legislative means to protect habitats and species of Community interest through the establishment and conservation of an EU-wide network of sites known as Natura 2000. These are Special Areas of Conservation (SACs) designated under the Habitats Directive and Special Protection Areas (SPAs) designated under the Conservation of Wild Birds Directive (79/409/ECC) as codified by Directive 2009/147/EC.

Articles 6(3) and 6(4) of the Habitats Directive set out the decision-making tests for plans and projects likely to affect Natura 2000 sites (Annex 1.1). Article 6(3) establishes the requirement for Appropriate Assessment (AA):

> *"Any plan or project not directly connected with or necessary to the management of the [Natura 2000] site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subjected to appropriate assessment of its implications for the site in view of the site's conservation objectives. In light of the conclusions of the assessment of the implications for the site and subject to the provisions of paragraph 4, the competent national authorities shall agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the site concerned and, if appropriate, after having obtained the opinion of the general public".*

Article 6(4) states:

"If, in spite of a negative assessment of the implications for the [Natura 2000] site and in the absence of alternative solutions, a plan or project must nevertheless be carried out for imperative reasons of overriding public interest, including those of a social or economic nature, Member States shall take all compensatory measures necessary to ensure that the overall coherence of Natura 2000 is protected. It shall inform the Commission of the compensatory measures adopted".

Methodology

Guidance Followed

Both EU and national guidance exists in relation to Member States fulfilling their requirements under the EU Habitats Directive, with particular reference to Article 6(3) and 6(4) of that Directive. The methodology followed in relation to this AA has had regard to the following guidance:

- Note on Appropriate Assessments for the purposes of the Waste Water Discharge (Authorisation) Regulations, 2007 (S.I. No. 684 of 2007). Environmental Protection Agency, (EPA, 2009).
- Appropriate Assessment of Plans and Projects in Ireland: Guidance for Planning Authorities. Department of Environment, Heritage and Local Government, (DoEHLG, 2010).
- Circular L8/08 – Water Services Investment and Rural Water Programmes – Protection of Natural Heritage and National Monuments. Department of Environment, Heritage and Local Government, (DoEHLG, 2008).
- Communication from the Commission on the Precautionary Principle. Office for Official Publications of the European Communities, Luxembourg, (EC, 2000a).
- Managing Natura 2000 Sites: the provisions of Article 6 of the 'Habitats' Directive 92/43/EEC, Office for Official Publications of the European Communities, Luxembourg, (EC, 2000b).
- Assessment of plans and projects significantly affecting Natura 2000 sites: Methodological guidance on the provisions of Articles 6(3) and (4) of the Habitats Directive 92/43/EEC. Office for Official Publications of the European Communities, Brussels (EC, 2001).
- Guidance document on Article 6(4) of the 'Habitats Directive' 92/43/EEC – Clarification of the concepts of: alternative solutions, imperative reasons of overriding public interest, compensatory measures, overall coherence, opinion of the Commission. Office for Official Publications of the European Communities, Luxembourg, (EC, 2007).
- Nature and biodiversity cases: Ruling of the European Court of Justice. Office for Official Publications of the European Communities, Luxembourg (EC, 2006).
- European Communities (Birds and Natural Habitats) Regulations, 2011 (S.I. No.477 of 2011).
- Interpretation Manual of European Union Habitats. Version EUR 28. European Commission (EC, 2013).

Stages Involved in the Appropriate Assessment Process

Stage 1: Screening/Test of Significance

This process identifies whether the Milltown discharge at Milltown, Co. Kerry is directly connected to or necessary for the management of a European Site(s). This stage identifies whether the discharge is likely to have significant impacts on European Site(s) either alone or in combination with other projects or plans.

The output from this stage is a determination for each European Site of not significant, significant, potentially significant, or uncertain effects. The latter three determinations will cause that site to be brought forward to Stage 2 Appropriate Assessment.

Stage 2: Appropriate Assessment

This stage considers the impact of the current waste water discharge from the agglomeration on the integrity of a European Site(s), either alone or in combination with other projects or plans, with respect to (1) the site's conservation objectives and (2) the site's structure and function and its overall integrity. Where adverse impacts are identified, mitigation measures to negate those impacts are determined.

The output from this stage is a Natura Impact Statement (NIS). This document must include sufficient information for the EPA (Competent Authority) to carry out the Appropriate Assessment. If the assessment is negative, *i.e*. adverse effects on the integrity of a site cannot be excluded then the process must consider alternatives (Stage 3) or proceed to Stage 4.

Stage 3: Assessment of Alternatives

This process examines alternative ways of achieving the objectives of the project or plan that avoid adverse impacts on the integrity of the European Site. This assessment may be carried out concurrently with Stage 2 in order to find the most appropriate solution. If no alternatives exist or all alternatives would result in negative impacts to the integrity of the European sites then the process either moves to Stage 4 or the project is abandoned.

Stage 4: Assessment Where Adverse Impacts Remain

This process is an assessment of compensatory measures where, in the light of an assessment of Imperative Reasons of Overriding Public Interest (IROPI), it is deemed that the project or plan should proceed.

Field Walkover Surveys

A field walkover survey was undertaken by Ecologist Tony Nagle on the 23rd April 2015 to identify the potential for qualifying species and habitats in the surrounding environs of the Milltown discharge location.

Consultation

The EPA, as the competent authority, will seek NPWS advice as may be required in reaching their decision and the NPWS can only communicate with Irish Water on request from the competent authority (*i.e*. the EPA).

Stage 1: Screening

The EPA has been determined that the Milltown WWTP discharge is not directly connected with or necessary to the management of the site as a European site and that it cannot be excluded, on the basis of objective information, that the activity, individually or in combination with other plans or projects will have a significant effect on a European site. Accordingly, it has been determined that an Appropriate Assessment of the activity is required.

This determination is based on the proximity of the discharge to European sites.

Based on the above and in accordance with Article 6(3) of the Habitats Directive, the discharge from the Milltown agglomeration will be brought forward for a Stage 2 Appropriate Assessment.

Stage 2: Appropriate Assessment

The Castlemaine Harbour SAC and the Castlemaine Harbour SPA have been determined as requiring Appropriate Assessment and are described in the following sections below. All the potential impacts resulting from the Milltown WWTP discharge are detailed in relation to the conservation objectives of these designated sites.

Description of the Project

Milltown Wastewater Treatment Plant (WWTP) is located in Milltown, Co. Kerry between Tralee and Killarney. The WWTP upgrade was completed in May 2011. The plant was designed to cater for 3,500 population equivalent (PE). The current estimated PE at Milltown is approximately 1,510. The projected PE for 2021 is 1,524.

Milltown WWTP includes the following treatment processes:

1. Preliminary Treatment (screening and grit removal)
2. Secondary Treatment - SBR

The plant is designed such that the treated effluent will comply with the standards of the Urban Waste Water Treatment Regulations (*i.e*. BOD 25 ml/g, COD 125 mg/l and SS 35 mg/l).

The treated effluent is discharged to the Maine River (NGR E81178, N101423). There are no secondary discharges in the agglomeration. There are two storm water overflow points located at the primary discharge location (NGR E81178, N101423) and on the network (E82044E, N100919) to the Ahsullish Stream.

The mean effluent quality monitoring results for 2014 are detailed below in Table 1.0.

Table 1.0: Mean Milltown WWTP Effluent Monitoring Data (mg/l) (January 2014 – December 2014)

Parameter	Mean Effluent Load (mg/l)
BOD	11.53
COD	37.50
SS	19.32

In 2014, the effluent discharge was compliant with the required UWWTD standard for COD on all sampling occasions. In terms of BOD, the effluent discharge was well below the required standard of 25 mg/l on 10 out of the 12 sampling occasions and in relation to SS, 9 out of the 12 sampling were below the required standard of 35 mg/l.

In 2014 the concentration of Total Phosphorous (TP) in the effluent discharge was measured on one sampling occasion. Total Nitrogen (TN) was not sampled. Therefore, the nutrient input to the receiving waterbody from the Milltown WWTP effluent discharge is unknown for 2014.

Description of the Receiving Environment and Monitoring Results

The receiving water of the effluent from the Milltown agglomeration is the Maine River (transitional at this point). The outfall from the Milltown WWTP discharges directly into the Castlemaine Harbour SAC and is located approximately 3 km upstream of the Castlemaine Harbour SPA.

The Transitional Water Quality (2004 to present), upstream and downstream of the WWTP discharge, is classified as "Unpolluted". The Water Framework Directive (WFD) status 2010-2012 of the Castlemaine Harbour Transitional water (Tidal Water of River Maine) is "Good" (Source: EPA Envision).

The Milltown WWTP is contained within the North Dingle Bay Water Management Unit. The Action Plan notes that the Milltown WWTP is a pressure/risk in the Water Management Unit and notes that it has "Insufficient Existing Capacity". Since the publication of the above Action Plan, the Milltown WWTP has been upgraded (May 2011) and currently has sufficient capacity.

Results from the ambient monitoring upstream (undertaken by IW 2014) and downstream (undertaken by the EPA 2013) of the primary discharge location are shown in Table 2.0 below. The downstream monitoring location is approximately 5.5 km downstream of the Milltown discharge location.

Table 2.0: Average Monitoring Data Upstream and Downstream of Primary Discharge Location (Source: IW and EPA)

Parameter	EQS*	Upstream	Downstream
BOD	≤4.0	1.0	2.0
DO	>80% and <120%	ND	101%
Ortho-P	≤0.06	0.017	0.026

Where, ND is not determined.

*European Communities Environmental Objectives (Surface Waters) Regulations 2009, S.I. No. 272 of 2009 (95%ile standards presented) for Transitional water bodies.

The monitoring results demonstrate that the water quality within the Maine River is in compliance with Schedule 5 of the European Communities Environmental Objectives (Surface Water) Regulations 2009 (S.I. No. 272 of 2009) for all relevant parameters (Transitional waterbody).

It is important to note that this assessment has been carried out on limited monitoring data. The downstream monitoring data is approximately 5.5 km downstream of the current discharge location and therefore the localised impact of the discharge on the receiving waterbody is unknown.

Waste Assimilative Capacity

Table 3.0 summarises the assimilative capacity calculations which are based on the current estimated loading of 1,510 PE (Source: Irish Water), 95%ile river flow (1.15 m^3/s) (Source: Kerry County Council) and water quality standards for Transitional waterbodies in the European Communities Environmental Objectives (Surface Water) Regulations, 2009 (S.I. No. 272 of 2009).

Assimilative capacity calculations have been completed on both the actual background concentrations and the EPA "*notionally clean river"* concentrations.

Table 3.0: Maine River (Transitional Waterbody) assimilative capacity of Milltown wastewater (1,510 PE), using actual background concentrations and notionally clean river concentrations (Source: IW)

Parameter		Background (mg/l)	Predicted downstream quality (mg/l)	EQS (mg/l)
BOD	Actual Background	1.00	1.09	≤4.0
	Notionally Clean	0.26	0.35	
Ortho-P	Actual Background	0.017	0.044	≤0.06 *
	Notionally Clean	0.005	0.032	

*Ortho-P EQS based on EPA salinity data.

The Waste Assimilative Capacity calculations tabled above (Source: IW) indicate that the Maine River does have assimilative capacity for the Milltown WWTP discharge in terms of BOD and Ortho-P.

Field Walkover Survey

A site walkover survey was conducted by Tony Nagle (Ecologist) on the 23rd of April. The walkover was focussed on the Ashullish Stream from Killagh Priory to its confluence with the River Maine (close to the outfall) and along a 650 m stretch of the south bank of the River Maine downstream of the outfall and 350 m upstream of the outfall. In addition, Callanafersy Pier, 5.8 km downstream of the outfall was also visited.

The River Maine is tidal along the surveyed stretch and the land on both sides of the river was formerly saltmarsh and mudflat that was reclaimed during the nineteenth century (McCorry & Ryle 2009). These polders are protected from flooding by berms that follow the contour of the river. The land is dissected by a network of drains that flow into the River Maine through a series of tidally operated sluice gates.

The surrounding landscape is flat and sub-divided by drains and hedges. The agricultural productivity of the polders is likely to have deteriorated in recent times as most of the remaining fields in the area surveyed had substantial growth of Soft Rush (*Juncus effusus*) and large areas have been planted with Sitka Spruce (*Picea sitchensis*) and Alder (*Alnus glutinosa*).

Many of the hedgerows contain interesting mixtures of tree species including Grey Willow (*Salix cinerea*), Oak (*Quercus* spp.), Ash (*Fraxinus excelsior*), Hawthorn (*Crataegus monogyna*), Blackthorn (*Prunus spinosa*) along with occasional Holly (*Ilex aquifolium*). The shrub and ground vegetation is dominated by the following species: Gorse (*Ulex europaeus*), Bramble (*Rubus fruticosus*), Common Nettle (*Urtica dioica*), Bindweed (*Calystegia sepium*), Broad-leaved Dock (*Rumex obtusifolius*) and Dandelion (*Taraxacum agg*.). Yellow Iris (*Iris pseudacorus*) and Reed Canary-grass (*Phalaris arundinacea*) are common along the drains. Common Reed (*Phragmites australis*) grows along the river bank and Common Scurvygrass (*Cochlearia officinalis*) grows close to the water availing of the saline conditions.

Three-spined Sticklebacks (*Gasterosteus aculeatus*) are common in the drains and fish (most likely Brown Trout (*Salmo trutta*) and/or Thick-lipped Grey Mullet (*Chelon labrosus*) were regularly seen leaping in the river.

Waterbirds are generally not found in large numbers in the upper estuaries of rivers but two Teal (*Anas crecca*) and a single Common Sandpiper (*Actitis hypoleucos*) were seen in the river and six Mallard (*Anas platyrhynchos*) were seen in the drains. The estuary widens at Callanafersy and large areas of mudflat are exposed at low tide. Substantial numbers of waterbirds were present in this area even though most visiting waders and wildfowl commence the return migration to their breeding grounds in February and March. The following species were seen: 50 Shelduck (*Tadorna tadorna*), 2 Mallard (*Anas platynchos*), 2 Cormorants (*Phalocroco carbo*), 2 Little Egrets (*Egretta garzetta*), 13 Curlew (*Numenius arquata*), 41 Black-headed Gulls (*Chroicocephalus ridibundus*) and 1 Herring Gull (*Larus argenteus*).

Otter (*Lutra lutra*) footprints were very much in evidence along the riverbanks and an Otter was seen in the river close to where the Ashullish Stream enters the river.

Castlemaine Harbour is one of the main centres of Natterjack Toad (*Bufo calamita*) distribution in Ireland but no evidence of tadpoles or spawn was seen in the drains. Drains are not particularly suitable habitats for this species as they prefer to breed in shallow ponds that dry out during the summer months thereby preventing the establishment of predators such as diving beetles and fish. A number of breeding ponds have recently been created by NPWS around Castlemaine Harbour and many of these have been colonised by toads. No ponds were encountered during the walkover survey. None have been created recently on the south bank of the River Maine even though several have been created at sites along the north bank of the river (Sweeney *et al.* 2013).

Description of the Natura 2000 Sites Affected

Castlemaine Harbour SAC

Castlemaine Harbour SAC is a large site located on the south-east corner of the Dingle Peninsula, Co. Kerry. It consists of the whole inner section of Dingle Bay, *i.e.* Castlemaine Harbour, the spits of Inch and White Strand/Rosbehy and a little of the coastline to the west. The River Maine, almost to Castlemaine, and much of the River Laune catchment, including the Gaddagh, Gweestion, Glanooragh, Cottoner's River and the River Loe, are also included within the site.

(Refer to http://www.npws.ie/sites/default/files/protected-sites/synopsis/SY000343.pdf for the full site synopsis).

Description of the Conservation Interests of the SAC

Annex I Habitats

The qualifying habitats of Castlemaine Harbour SAC are listed below:

- [1130] Estuaries
- [1140] Tidal Mudflats and Sandflats
- [1210] Annual Vegetation of Drift Lines
- [1220] Perennial Vegetation of Stony Banks

- [1310] Salicornia Mud
- [1330] Atlantic Salt Meadows
- [1410] Mediterranean Salt Meadows
- [2110] Embryonic Shifting Dunes
- [2120] Marram Dunes (White Dunes)
- [2130] Fixed Dunes (Grey Dunes) (Priority Habitat)
- [2170] Dunes with Creeping Willow
- [2190] Humid Dune Slacks
- [91E0] Alluvial Forests (Priority Habitat)

[1130] Estuaries

Estuaries are coastal inlets where there is a significant freshwater influence. Pollution and fishing/aquaculture related activities affect habitat quality, particularly in some highly sensitive areas. The Overall Status of this habitat is assessed as Inadequate but improving. These improvements and the assessment of Future Prospects as Favourable are due to the fact that these pressures are declining and are not considered to be a threat to habitat quality in the future. Estuaries are surface water and marine water dependent and are considered to be at risk from water pollution; specifically N and P nutrient enrichment (diffuse and point source) and BOD diffuse and point-source organic pollution (Western RBD / ESBI / Eleanor Mayes, 2008).

[1140] Tidal Mudflats and Sandflats

These sediment habitats are found between the low water and mean high water tide marks. The finer silt and clay sediments are dominant in mud flats and the larger sand particles are associated with areas exposed to greater wave forces. A range of physical pressures operate including significant changes in salinity, temperature, and exposure to air. Pollution, fisheries/aquaculture and diverse use of the foreshore are likely to affect habitat quality, particularly eelgrass beds. Therefore, the Overall Status is assessed as Inadequate but improving. These improvements and the assessment of Future Prospects as Favourable are due to the fact that these pressures are declining and are not considered to be a threat to habitat quality in the future. This habitat type is marine water dependent and is considered to be at risk from N nutrient enrichment (diffuse and point-source nutrient pollution) (Western RBD / ESBI / Eleanor Mayes, 2008).

[1210] Annual Vegetation of Drift Lines

This type of vegetation occurs around the high tide mark at the upper part of the strand, where tidal litter accumulates. Tidal litter contains marine organic matter including seaweed, which provides nutrients for strandline vegetation. The Overall Status is assessed as Inadequate due to pressures associated with recreation (notably beach cleaning) and coastal defences, which can interfere with sediment dynamics. The overall conservation status of this habitat is Inadequate due to on-going losses of the habitat primarily due to beach cleaning activities and coastal defences which can interfere with sediment dynamics. This habitat type is a marine water dependent habitat, but is not considered to be at risk from water pollution (Western RBD / ESBI / Eleanor Mayes, 2008).

[1220] Perennial Vegetation of Stony Banks

This habitat occurs along the coast where shingle (cobbles and pebbles) and gravel have accumulated to form elevated ridges or banks above the high tide mark. Most of the rocky

material should be less than 250 mm in diameter to be considered in this habitat category. The Overall Status is assessed as Inadequate due to pressures associated with recreation and coastal defences, which can interfere with sediment dynamics. The assessment was largely based on marginal sites associated with sand dune systems, and did not include large shingle banks. A more comprehensive assessment of shingle systems is required in the future to give a more reliable account of the total national resource and the conservation status of the habitat. This habitat type is a marine water dependent habitat; however, is not considered to be at risk from water pollution (Western RBD / ESBI / Eleanor Mayes, 2008).

[1310] Salicornia Mud

Salicornia and other annuals colonising mud and sand is a pioneer saltmarsh community that may occur on muddy sediment seaward of established saltmarsh, or form patches within other saltmarsh communities where the elevation is suitable and there is regular tidal inundation. As this habitat is dominated by annuals it can be ephemeral or transient in nature and is highly susceptible to erosion. Its distribution can vary considerably from year to year and it can move in response to changing conditions, e.g. in estuaries with shifting river channels. The Overall Status is assessed as Inadequate due to pressures associated with the invasion and on-going spread of Common Cordgrass (*Spartina anglica*). This habitat type is marine water dependent and at risk from nutrient enrichment (N diffuse and point-source nutrient pollution) (Western RBD / ESBI / Eleanor Mayes, 2008) that can promote the growth and spread of Common Cordgrass and Common Reed (McCorry & Ryle 2009).

[1330] Atlantic Salt Meadows

Atlantic salt meadows generally occupy the widest part of the saltmarsh gradient. They also contain a distinctive topography with an intricate network of creeks and salt pans occurring on medium to large sized saltmarshes. Atlantic salt meadows are distributed around most of the coastline of Ireland. The intricate topography of the Irish coastline with many inlets has created an abundance of sites that are sheltered and allow muddy sediments to accumulate, leading to the development of saltmarsh. Although minor losses have been reported for this habitat they are considered negligible at a national level. The Overall Status is assessed as Inadequate due mainly to ecologically unsuitable grazing levels impacting the condition of the habitat. There is unlikely to have been any recent decline in condition. This habitat type is ground water and marine water dependent and at risk from nutrient enrichment (N diffuse and point-source nutrient pollution) (Western RBD / ESBI / Eleanor Mayes, 2008).

[1410] Mediterranean Salt Meadows

Mediterranean salt meadows occupy the upper zone of saltmarshes and usually occur adjacent to the boundary with terrestrial habitats. They are widespread on the Irish coastline; however they are not as extensive as Atlantic salt meadows. The Overall Status is assessed as Inadequate due mainly to ecologically unsuitable grazing levels impacting the condition of the habitat. There is unlikely to have been any recent decline in condition. This habitat type is ground water and marine water dependent and at risk from nutrient enrichment (N diffuse and point-source nutrient pollution) (Western RBD / ESBI / Eleanor Mayes, 2008).

[2110] Embryonic Shifting Dunes

Embryonic shifting dunes are low sand mounds (generally less than a metre high) occurring between the high tide mark and the partially stabilised marram dunes. They are unstable habitats

where wind-blown sand is common and they are still vulnerable to saltwater intrusion. They represent the initial phase of dune formation and typically form where sand gathers around salt-tolerant species. This habitat can be very short-lived, as it is subject to natural erosion processes and susceptible to removal by storms or high tides. Although minor losses have been reported for this habitat they are considered negligible at a national level. The Overall Status is assessed as Inadequate due mainly to recreational pressures and coastal defences, which can interfere with the local sediment and wave dynamics. There is unlikely to have been any recent decline in condition. This habitat type is not considered to be a water dependent habitat (Western RBD / ESBI / Eleanor Mayes, 2008).

[2120] Marram Dunes (White Dunes)

Marram dunes are partly stabilised and are dominated by Marram. They tend to be taller than embryonic shifting dunes and form further inland from these. The dunes are actively created by marram, which traps sand. The dunes can build and erode quickly because of the presence of bare sand, and they are sometimes referred to as mobile dunes. The Overall Status is assessed as Inadequate due to pressures associated with recreation and coastal defences. Change in status since the 2007 EU Habitats Directive Article 17 Report is due to alterations in the methods of assessment and does not represent genuine change on the ground. However for this dynamic habitat, natural losses which occur are not related to human activities, and these are not considered to represent a deterioration in the conservation status. This habitat type is marine water dependent but is not considered to be at risk from water pollution (Western RBD / ESBI / Eleanor Mayes, 2008).

[2130] Fixed Dunes (Grey Dunes)

Fixed dunes are the more stabilised areas of dune systems located inland from mobile dune habitats, where the wind speed and the influence of tidal inundation and salt spray is reduced. As this area is relatively sheltered, sand mobility is greatly reduced, leading to the development of a more or less closed or 'fixed' carpet of vegetation. Only very minor losses in habitat area have been recorded, and these losses have been compensated by larger gains due to accretion. The Overall Status is assessed as Bad due to pressures associated with recreation and ecologically unsuitable grazing. The absence of adequate measures to address undergrazing and the resulting encroachment of scrub and bracken could lead to a further reduction in the conservation value of the habitat in future. This habitat type is marine water dependent but is not considered to be at risk from water pollution (Western RBD / ESBI / Eleanor Mayes, 2008).

[2170] Dunes with Creeping Willow

This habitat is typically found either on sandy hummocks within dune slacks, or on the sides of dune ridges adjacent to slacks. The habitat is beyond the influence of the water table, either through elevation of the surface of the ground or by a lowering of the water table. It is characterised by a dominance of creeping willow (*Salix repens*), which often forms a dense ground cover. Moisture loving plant species typically associated with dune slacks are absent or noticeably reduced. The Overall Status is assessed as Inadequate due to pressures associated with undergrazing, forestry and agricultural intensification. This habitat type is marine and ground water dependent and is considered to be at risk from N and P nutrient enrichment of groundwater (diffuse and point-source pollution) (Western RBD / ESBI / Eleanor Mayes, 2008).

[2190] Humid Dune Slacks

Dune slacks are wet, nutrient-enriched depressions between dune ridges. They are characterised by the occurrence of a water table that is maintained by the combination of an impermeable layer in the soil, or by deeper salt water and precipitation. There have been recent losses of habitat that have affected the Range. However there has been a net increase in the area recorded as some dune slack habitat was undetected in 2007. The Overall Status is assessed as Inadequate and declining due to the on-going losses and pressures from interference in the local hydrology, recreation and agriculture. The range of ecological variation within the habitat is also under threat, with pioneer slacks and very wet slacks being poorly represented in Ireland. Further research is required on hydrological functioning and understanding of natural versus anthropogenic succession. This habitat type is ground water and marine water dependent and at risk from nutrient enrichment of ground water (N and P diffuse and point-source nutrient pollution) (Western RBD / ESBI / Eleanor Mayes, 2008).

[91E0] Alluvial Forests

Riparian forests of Ash (*Fraxinus excelsior*) and Alder (*Alnus glutinosa*) occurs on heavy soils which are periodically inundated by the annual rise of river levels, but which are otherwise well drained and aerated during low water. This habitat has suffered considerable historic losses and is highly fragmented. Non-native and invasive species especially Sycamore (*Acer pseudoplatanus*) and Beech (*Fagus sylvatica*), and problematic native species such as bramble (*Rubus fruticosus*) and Common Nettle (*Urtica dioica*) (a consequence of undergrazing) are regarded as the main pressures impacting this habitat. The Overall Status is assessed as Bad due to these ongoing pressures and highly fragmented nature of this habitat. There have been national efforts to remove non-native and invasive plant species, reinstate correct hydrological regimes and generally to improve the conservation status of alluvial woodlands. Some substantial areas have been rehabilitated, and this is the main reason for the improving trend reported since the 2007 assessment. This habitat type is surface water and ground water dependent and is at risk from nutrient enrichment (Nitrogen and Phosphorous) of surface water and groundwater (diffuse and point-source) (Western RBD / ESBI / Eleanor Mayes, 2008).

Table 4.0: Qualifying Habitats along Surveyed Stretch of the Maine River

Site	Qualifying Habitats	Immediate Present		Potential to be Present downstream of Surveyed Stretch
Castlemaine Harbour SAC	Estuaries	Upstream	Yes	Yes
		Downstream	Yes	
	Tidal Mudflats and Sandflats	Upstream	Yes	Yes
		Downstream	Yes	
	Annual Vegetation of Drift Lines	Upstream	No	Yes
		Downstream	No	
	Perennial Vegetation of Stony Banks	Upstream	No	Yes
		Downstream	No	
	Salicornia Mud	Upstream	No	Yes
		Downstream	No	
	Atlantic Salt	Upstream	No	Yes

Site	Qualifying Habitats	Immediate Present		Potential to be Present downstream of Surveyed Stretch
	Meadows	Downstream	No	
	Mediterranean Salt Meadows	Upstream	No	Yes
		Downstream	No	
	Embryonic Shifting Dunes	Upstream	No	Yes
		Downstream	No	
	Marram Dunes (White Dunes)	Upstream	No	Yes
		Downstream	No	
	Fixed Dunes (Grey Dunes)	Upstream	No	Yes
		Downstream	No	
	Dunes with Creeping Willow	Upstream	No	Yes
		Downstream	No	
	Humid Dune Slacks	Upstream	No	Yes
		Downstream	No	
	Alluvial Forests	Upstream	No	No (Confined to the River Laune)
		Downstream	No	

Annex II Species
Castlemaine Harbour SAC

Castlemaine Harbour SAC has been selected for the following Annex II species:

- [1095] Sea Lamprey (*Petromyzon marinus*)
- [1099] River Lamprey (*Lampetra fluviatilis*)
- [1106] Atlantic Salmon (*Salmo salar*)
- [1355] Otter (*Lutra lutra*)
- [1395] Petalwort (*Petalophyllum ralfsii*)

[1095] Sea Lamprey (Petromyzon marinus)
The life cycle of the sea lamprey (*Petromyzon marinus*) contains both a marine phase and a freshwater phase. Adult sea lamprey, ranging in length from 60 to 100 cm, live at sea as external parasites on host fish. Adult lamprey migrate in spring into freshwater to excavate redds or spawning nests in gravelled areas of large rivers. Egg laying follows and the resulting larvae, called ammocoetes, hatch out within days. These swim or drift downstream to areas of fine sediment into which they can burrow. The ammocoete is a filter feeder and retains its burrowing habit in fine-grained sediment over a period of years. Transformation to the young adult stage occurs in late summer and young adult sea lamprey can be found migrating downriver to estuarine waters and the open sea in late autumn – winter. Records of non-migratory or 'land-locked' sea lamprey have been reported in Lough Derg, on the Shannon, and in L. Conn, L. Corrib and L. Gill. Sea lamprey juveniles are rarely encountered and, when found, numbers are very low. Barriers to upstream migration (e.g. weirs), which limit access to spawning beds and juvenile habitat, are considered to be the major impediment to good conservation status for sea lamprey. The Overall Status of this species is assessed as Bad.

[1099] River Lamprey (Lampetra fluviatilis)

The river lamprey *(Lampetra fluviatilis)* breeds in freshwater rivers and streams. Adults spawn in spring, excavating shallow nests in gravels and stones. After hatching, the larvae called ammocoetes drift or swim downstream to areas of river bed with a fine silt composition. They burrow into this bed material and live as filter feeders over a period of years before transforming into young adult fish. As adults they are parasitic, attaching to and feeding on larger fish in coastal waters. They can grow to 30 cm at maturity at which stage they re-enter freshwater to spawn. The adult fish die after spawning. There are extensive areas of suitable habitat and no significant pressures impacting these species. The Overall Status is therefore assessed as Favourable.

[1106] Atlantic Salmon (Salmo salar)

Salmon use rivers to reproduce and as nursery areas. During the winter eggs are deposited in a depression, called a redd, excavated in river gravels. The eggs develop protected within the substrate and during spring hatch into alevins, which in turn develop into fry. The fry feed for the summer and over the autumn, gradually becoming parr. Fry and parr feed primarily upon invertebrates. The Irish population generally comprises fish that spend two winters (small numbers spend one or three winters) in freshwater before going to sea, in spring, as smolts at around 10-25 cm in length. There has been a recent stabilisation of the numbers of salmon spawning in Ireland and an increasing number of salmon rivers meeting their conservation limits, however low rates of marine survival are of concern. Different units were used to measure population size in 2007; there is no genuine change in the overall population estimate. There are numerous threats to the freshwater habitat and vigilance is required to ensure the maintenance of good quality habitat which salmon require to thrive. The salmon population is still low in comparison to previous decades and so, in the absence of a recovery, the Overall Status is assessed as Inadequate.

[1355] Otter (Lutra lutra)

Dramatic declines, leading in some cases to extinctions, occurred in many European otter *(Lutra lutra)* populations during the latter half of the 20th Century, however, Ireland has remained a stronghold for the species. The main threats to the otter include habitat destruction (including river drainage and the clearance of bank-side vegetation); pollution, particularly organic pollution resulting in fish kills; and accidental deaths (road traffic and fishing gear). Otter are currently widespread throughout Ireland and present in a wide variety of habitat types. Previous concerns about population decline have been allayed and the latest estimate puts the population at approximately 15-20,000 animals. Therefore the Overall Status is assessed as Favourable.

[1395] Petalwort (Petalophyllum ralfsii)

Petalwort (*Petalophyllum ralfsii*) is a pioneering thallose liverwort of bare, moist, stable sand or of short turf mainly on mildly to strongly base-rich dune slacks and machair, where the habitat can be subject to inundation in the winter. The species looks like a miniature lettuce and is often less than 1 cm across. It has erect, almost parallel, lamellae which are perpendicular to the flattened part of the thallus. The above-ground parts can die back during the summer when conditions are drier and the plants survive as underground tubers. There are no significant pressures currently impacting this species. Therefore, the Overall Status is assessed as Favourable.

Table 5.0: Qualifying Species along Surveyed Stretch of Maine River

Natura 2000 Site	Qualifying Species	Observed or Signs of Species Presence along Surveyed Stretch of River		Suitable Habitat Present along Surveyed Stretch of River	
Castlemaine Harbour SAC	Sea Lamprey (*Petromyzon marinus*)	Upstream	No	Upstream	Yes
		Downstream	No	Downstream	Yes
	River Lamprey (*Lampetra fluviatilis*)	Upstream	No	Upstream	Yes
		Downstream	No	Downstream	Yes
	Atlantic Salmon (*Salmo salar*)	Upstream	No	Upstream	Yes
		Downstream	No	Downstream	Yes
	Otter (*Lutra lutra*)	Upstream	Yes	Upstream	Yes
		Downstream	Yes	Downstream	Yes
	Petalwort (*Petalophyllum ralfsii*)	Upstream	No	Upstream	No
		Downstream	No	Downstream	No

Description of the Conservation Interests of the SPA

Annex I and Annex II Birds and Qualifying Species and Habitats

Castlemaine Harbour SPA is very important for the presence of a number of Annex II animal species and has been selected for the following Annex II species:

- [A001] Red-throated Diver (*Gavia stellate*)
- [A017] Cormorant (*Phalacrocorax carbo*)
- [A046] Light-bellied Brent Goose (*Branta bernicla hrota*)
- [A050] Wigeon (*Anas penelope*)
- [A053] Mallard (*Anas platyrhynchos*)
- [A054] Pintail (*Anas acuta*)
- [A062] Scaup (*Aythya marila*)
- [A065] Common Scoter (*Melanitta nigra*)
- [A130] Oystercatcher (*Haematopus ostralegus*)
- [A137] Ringed Plover (*Charadrius hiaticula*)
- [A144] Sanderling (*Calidris alba*)
- [A157] Bar-tailed Godwit (*Limosa lapponica*)
- [A162] Redshank (*Tringa tetanus*)
- [A164] Greenshank (*Tringa nebularia*)
- [A169] Turnstone (*Arenaria interpres*)
- [A346] Chough (*Pyrrhocorax pyrrhocorax*)
- [A999] Wetlands & Waterbirds

[A001] Red-throated Diver (Gavia stellate)

This species is well distributed around the coastline of Ireland and they are typically associated with shallow sandy bays where they feed on flatfish. Ireland hosts a tiny (<7 pairs) breeding population of Red-throated Diver in Co. Donegal. Total numbers wintering around Ireland are difficult to ascertain but a minimum of 920 birds are estimated to winter around Irish coasts. This species is currently Amber-listed in Ireland due to the vulnerable breeding population.

[A017] Cormorant (Phalacrocorax carbo)
Approximately 4,500 pairs of cormorants exist in Ireland. Coastal breeding sites are on cliffs, stacks and rocky inlets. Cormorants feed on fish mainly. Cormorants are Amber-listed in Ireland due to their localised breeding colonies. The European population has been evaluated as Secure. Pollution is a risk to this species as it has the potential to reduce fish stocks.

[A046] Light-bellied Brent Goose (Branta bernicla hrota)
This species is mostly found on coastal estuaries around the country. This population winters almost entirely in Ireland, with small numbers in parts of Britain and France. Amber-listed as the majority winter at less than ten sites. The Irish population is also internationally significant, another Amber listing criterion. The European population has been evaluated as Vulnerable as several important populations declined.

[A050] Wigeon (Anas penelope)
The Wigeon is a common winter visitor to the wetlands of Ireland. They occur on coastal marshes, freshwater and brackish lagoons, estuaries, bays. Many also occur on inland wetlands, lakes, rivers and turloughs. The Icelandic breeding component of this population winters mostly in Ireland and western Britain, though some continue on to parts of continental Europe. They are Amber-listed in Ireland as the majority winter at less than ten sites. The European population is regarded as Secure.

[A053] Mallard (Anas platyrhynchos)
This is a widespread resident species in Ireland present all year winter migrants also occur here. Green-listed in Ireland. They are present in almost all wetland habitats in Ireland. Breeding sites can vary but are in ground hidden by vegetation. The European population is regarded as Secure by BirdLife International.

[A054] Pintail (Anas acuta)
This is a winter visitor to Ireland. They form flocks on brackish coastal lagoons, in estuaries and on large inland lakes. Red-listed in Ireland, due to a significant decrease in the numbers wintering in Ireland. The European population has been assessed as Declining, due to a moderate ongoing decline.

[A062] Scaup (Aythya marila)
This is a wintering visitor from Iceland, northern Europe and Siberia. Scaup occur mostly in small parties and occasionally larger flocks around coastal estuaries and bays, on brackish lagoons and in shallow marine waters, usually less than 10 m in depth. They are Amber-listed in Ireland for their small breeding population and their localised wintering range. The European population has been evaluated as Endangered due to several key populations undergoing significant declines.

[A065] Common Scoter (Melanitta nigra)
In Ireland this species is found on a few inland waters during the breeding season. There has been a decline in breeding numbers since the 1970s - 96 pairs were estimated in 1995 and 80 in 1999. Eutrophication of the waters has reduced the species' food supply which has resulted in poor productivity and juvenile survival. Mink predation has also had a considerable impact during the breeding season, and incubating females have been most vulnerable. However, in recent

decades, it has been suggested that birds may be redistributing to other large lakes in western and central Ireland. They are Red-listed due to their declining breeding population. The European population has been evaluated as Secure. Much larger numbers of Common Scoter arrive in the autumn to spend the winter months at several locations around the coast of Ireland.

[A130] Oystercatcher (Haematopus ostralegus)
This is a resident and wintering species found around the Irish coasts. This species breed and nest on shingle beaches, dunes, salt marshes and rocky shores around the coast. During the winter period this species utilises all coastal habitats, and particularly favour open sandy coasts. Amber-listed as Ireland hosts internationally important numbers of Oystercatchers in winter. The European population is considered to be Secure.

[A137] Ringed Plover (Charadrius hiaticula)
This species can be found around the coast of Ireland all year. This species traditionally prefers sandy and shingle beaches. They are Amber-listed as internationally important numbers winter in Ireland. The European population is considered to be Secure.

[A144] Sanderling (Calidris alba)
This species is a winter visitor in Ireland confined to coastal areas, in particular non-estuarine sandy coastlines. They are Green-listed in Ireland. The European population is considered to be Secure.

[A157] Bar-tailed Godwit (Limosa lapponica)
This is a coastal species which spends most of its time feeding in the intertidal zone or the high-tide roost close to the coast. This species is a long distance migrator heavily dependent on a few coastal wetlands. These sites are at risk of land-claim, construction of marinas and barges and commercial exploitation. Amber-listed in Ireland as the majority of the population winter at less than ten sites. The European population is considered to be Secure.

[A162] Redshank (Tringa tetanus)
This is a resident and also a winter visitor from Iceland and a passage migrant (birds on passage from Scandinavia/the Baltic breeding areas to West African wintering areas). Highest numbers occur during the early autumn, when there is an overlap of the populations. They nest on the ground in grassy tussock, in wet, marshy areas and occasionally heather. They winter all around the coasts of Ireland, Britain and many European countries. This species favours mudflats, large estuaries and inlets. There are smaller numbers at inland lakes and large rivers. This species is Red-listed in Ireland, due to its small and declining breeding population. The European population has been evaluated as Declining, due to a moderate continuing decline.

[A164] Greenshank (Tringa nebularia)
The Greenshank is a medium-sized wader that winters in Ireland and is also a passage migrant from north-eastern Europe in the autumn. It is thought that a substantial proportion of the Scottish breeding population (1,000 pairs) winter in Ireland. Greenshanks are largely coastal birds and the great majority are found on estuaries where they feed mainly on shrimps, crabs and small fish. The species is currently Green-listed although there has been a slight decline in wintering numbers in recent years. The All-Ireland wintering population is estimated to be 1,040 birds. The European population is considered to be Secure.

[A169] Turnstone (Arenaria interpres)
This is a coastal wintering species to Ireland. A small wader found along the rocky shorelines, headlands, islands and piers. This species is Green-listed in Ireland. The European population is considered to be Secure.

[A346] Chough (Pyrrhocorax pyrrhocorax)
Chough distribution in Ireland is confined mainly to the rocky coasts of Munster, as well as parts of Connaught and Ulster. Their breeding sites can be located in caves or rock face crevices along the Irish south and west coasts. They feed mainly on insects and their larvae, worms and other subterranean invertebrates, using their curved bills to dig them out of the soil. They will also feed on berries, grain, small mammals and birds. This species is Amber-listed in Ireland. The European population has been evaluated as declining by BirdLife International, due to an ongoing moderate decline across much of its range.

[A999] Wetlands & Waterbirds
Large numbers of a wide variety of wildfowl and waders spend the winter in the harbour. The site includes the estuaries of the Maine and Laune Rivers and the associated shallow intertidal area that are comprised of mudflats, sandbanks and saltmarshes. Two large dune formations (Inch on the north and Rossbehy on the south) protect the site from the open sea. The fourth largest *Zostera* (Eel-grass) bed in Ireland is found in the harbour especially on the eastern side of the Inch sand dune system.

Table 6.0: Qualifying Habitats along Surveyed Stretch of the Maine River

Site	Qualifying Habitat	Observed or Signs of Habitat Presence		Potential to be Present Outside of Surveyed Stretch
Castlemaine Harbour SPA	Wetlands	Upstream	Yes	Yes
		Downstream	Yes	

Table 7.0: Qualifying Species along Surveyed Stretch of the Maine River

Site	Qualifying Species	Observed or Signs of Species Presence		Suitable Habitat Present	
Castlemaine Harbour SPA	Red-throated Diver (*Gavia stellate*)	Upstream	No	Upstream	No
		Downstream	No	Downstream	Yes
	Cormorant (*Phalacrocorax carbo*)	Upstream	No	Upstream	Yes
		Downstream	Yes	Downstream	Yes
	Light-bellied Brent Goose (*Branta bernicla hrota*)	Upstream	No	Upstream	No
		Downstream	No	Downstream	Yes
	Wigeon (*Anas penelope*)	Upstream	No	Upstream	Yes
		Downstream	No	Downstream	Yes
	Mallard (*Anas platyrhynchos*)	Upstream	Yes	Upstream	Yes
		Downstream	Yes	Downstream	Yes
	Pintail (*Anas acuta*)	Upstream	No	Upstream	No
		Downstream	No	Downstream	Yes
	Scaup (*Aythya*	Upstream	No	Upstream	No

Site	Qualifying Species	Observed or Signs of Species Presence		Suitable Habitat Present	
	marila)	Downstream	No	Downstream	Yes
	Common Scoter (*Melanitta nigra*)	Upstream	No	Upstream	No
		Downstream	No	Downstream	Yes
	Oystercatcher (*Haematopus ostralegus*)	Upstream	No	Upstream	No
		Downstream	No	Downstream	Yes
	Ringed Plover (*Charadrius hiaticula*)	Upstream	No	Upstream	No
		Downstream	No	Downstream	Yes
	Sanderling (*Calidris alba*)	Upstream	No	Upstream	No
		Downstream	No	Downstream	Yes
	Bar-tailed Godwit (*Limosa lapponica*)	Upstream	No	Upstream	No
		Downstream	No	Downstream	Yes
	Redshank (*Tringa tetanus*)	Upstream	No	Upstream	Yes
		Downstream	No	Downstream	Yes
	Greenshank (*Tringa nebularia*)	Upstream	No	Upstream	Yes
		Downstream	No	Downstream	Yes
	Turnstone (*Arenaria interpres*)	Upstream	No	Upstream	No
		Downstream	No	Downstream	Yes
	Chough (*Pyrrhocorax pyrrhocorax*)	Upstream	No	Upstream	No
		Downstream	No	Downstream	Yes
	Wetlands & Waterbirds	Upstream	Yes	Upstream	Yes
		Downstream	Yes	Downstream	Yes

Conservation Objectives of the Natura 2000 sites

Article 6 of the Habitats Directive states that:

> *Any plan or project not directly connected with or necessary to the management of the site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subject to appropriate assessment of its implications for the site in view of the site's conservation objectives.*

The importance of a site designated under the Habitats Directive is defined by its qualifying features or interests. Qualifying interests for any Natura 2000 site are listed on a *pro forma*, called the Natura 2000 standard data form, which forms the basis of the rationale behind designation, and informs the Conservation Management Plan for targeted management and monitoring of key species and habitats.

Castlemaine Harbour SAC

Objective: To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected:

- [1130] Estuaries
- [1140] Tidal Mudflats and Sandflats
- [1210] Annual Vegetation of Drift Lines
- [1220] Perennial Vegetation of Stony Banks
- [1310] Salicornia Mud
- [1330] Atlantic Salt Meadows
- [1410] Mediterranean Salt Meadows
- [2110] Embryonic Shifting Dunes
- [2120] Marram Dunes (White Dunes)
- [2130] Fixed Dunes (Grey Dunes)
- [2170] Dunes with Creeping Willow
- [2190] Humid Dune Slacks
- [91E0] Alluvial Forests
- [1095] Sea Lamprey
- [1099] River Lamprey
- [1106] Atlantic Salmon
- [1355] Otter
- [1395] Petalwort

Castlemaine Harbour SPA

Objective: To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SPA has been selected:

- [A001] Red-throated Diver (*Gavia stellate*)
- [A017] Cormorant (*Phalacrocorax carbo*)
- [A046] Light-bellied Brent Goose (*Branta bernicla hrota*)
- [A050] Wigeon (*Anas penelope*)
- [A053] Mallard (*Anas platyrhynchos*)
- [A054] Pintail (*Anas acuta*)

- [A062] Scaup (*Aythya marila*)
- [A065] Common Scoter (*Melanitta nigra*)
- [A130] Oystercatcher (*Haematopus ostralegus*)
- [A137] Ringed Plover (*Charadrius hiaticula*)
- [A144] Sanderling (*Calidris alba*)
- [A157] Bar-tailed Godwit (*Limosa lapponica*)
- [A162] Redshank (*Tringa tetanus*)
- [A164] Greenshank (*Tringa nebularia*)
- [A169] Turnstone (*Arenaria interpres*)
- [A346] Chough (*Pyrrhocorax pyrrhocorax*)
- [A999] Wetlands & Waterbirds

The favourable conservation condition of the above species and habitats are defined by a number of species and habitats site specific attributes and targets which are detailed in the following documents:

NPWS (2011) Conservation Objectives: Castlemaine Harbour SAC 000343 and Castlemaine Harbour SPA 004029. Version 2.0. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

Impact Prediction

Impacts on Water Quality

The aquatic conservation interests of Castlemaine Harbour SAC and Castlemaine Harbour SPA are directly dependent on the aquatic environment. As the WWTP discharges treated effluent into the River Maine (Castlemaine Harbour transitional waters) and directly into Castlemaine Harbour SAC, and then flows approximately 3 km downstream into Castlemaine Harbour SPA, there is a connection between this discharge and the ecological receptors in the receiving SAC and downstream SPA.

The Transitional Water Quality (2004 to present), upstream and downstream of the WWTP discharge, is classified as “Unpolluted”. The Water Framework Directive (WFD) 2010-2012 status of the Maine River (Castlemaine Harbour Transitional Waters) is “Good”.

The 2014 ambient monitoring results demonstrate that the water quality within the River Maine and Castlemaine Harbour are in compliance with Schedule 5 of the European Communities Environmental Objectives (Surface Water) Regulations 2009 (S.I. No. 272 of 2009) for all Transitional waterbody parameters. However, the ambient monitoring point in the Castlemaine Harbour is approximately 5.5 km downstream of the current discharge location and as such it is not possible to determine if there is a localised impact from the Milltown discharge.

Cumulative water quality impacts, which may impact the Castlemaine Harbour SAC and Castlemaine Harbour SPA and hence the water dependent qualifying habitats and species, may result from the following:

- Chemical fertiliser application to agricultural lands (the main fertilisers in use supply nitrogen, phosphorus, potassium and sulphur)
- Agricultural practices such as ploughing leads to greater mineralisation and nitrification, and in the case of old grassland, it can result in an increase in the release of nitrogen over a number of years (OECD, 1986)
- Artificial drainage increases nitrate leaching and reduce the morphological qualities of watercourses, thereby reducing the quality of habitat for flora and fauna
- Forestry may alter water quality indirectly through increased evaporation losses and hence an increase in solute concentrations
- On-site wastewater treatment systems, poorly performing septic tank units and other small effluent systems can be significant sources of nutrients to rivers.
- Point pressures including Section 4 licenced facilities and IPPC licenced facilities
- Peat siltation due to peat harvesting, over-grazing by sheep leading to erosion and forestry practices in the hills during planting and harvesting operations

In summary, the discharge does not appear to be impacting on the overall status of the waterbody. However, based on the lack of proximate downstream monitoring data, the pre-cautionary principle has been applied and it is therefore considered that the effluent from the agglomeration may be having a localised impact on the water quality of the River Maine (Castlemaine Harbour) and therefore the Castlemaine Harbour SAC and SPA water dependent species and habitats.

Impacts on Annex I Habitats

[1130] Estuaries

Estuaries tend to accumulate emissions from a variety of sources along a river course including nutrients and pollutants. Sediments from both the river and the sea are deposited and accumulate to form mudflats and sand banks. Adverse impacts arising from aquaculture, fishing, coastal development and water pollution are considered the principal threats (NPWS 2011). Effluent with a high nutrient content from Milltown WWTP in combination with other pollution sources could potentially lead to an eventual accumulation of nutrients in Castlemaine Harbour. High nutrient levels can enhance the growth of algae such as Sea Lettuce *Ulva lactua* and continued high nitrogen levels in Castlemaine Harbour could eventually lead to the establishment of eutrophic conditions resulting in an ecological imbalance caused by excessive algal growth. This phenomenon has already occurred in several estuaries along the south coast (e.g. Clonakilty Bay and Courtmacsherry Bay in County Cork) and also in Dublin Bay where excessive growth of Sea Lettuce is jeopardizing environmental conditions for important invertebrate species with likely negative consequences for some wetland bird species at these sites (Sea Lettuce Task Force Report, 2010). The TN and TP input to the receiving water body from the effluent Milltown discharge is unknown and therefore there is the potential for nutrient enrichment of the waterbody which in turn could potentially result in excessive algal growth which could lead to eutrophic conditions in the estuary in time.

[1140] Tidal Mudflats and Sandflats

Mudflats and sandflats are important habitats for a variety of waders and wildfowl attracted by the high biomass of invertebrates feeding on organic matter deposited in the sediments. An increase in nutrient levels (TP and TN) could eventually lead to eutrophication and this in turn could have a detrimental impact on the biodiversity of mudflats. (See *Estuaries* above).

[1210] Annual Vegetation of Drift Lines

This habitat exists in a state of instability and the main threats are related to human activities such as beach-cleaning and coastal defence work. The habitat thrives on the accumulation of organic litter and consequently Milltown WWTP discharge may be contributing positively to this habitat type.

[1220] Perennial Vegetation of Stony Banks

The main threats to this habitat type include sea defence and coastal protection works and removal of beach materials. Milltown WWTP discharge is unlikely to be negatively impacting on this habitat type.

[1310] Salicornia Mud

The main threat to this habitat in Ireland is the spread of Common Cordgrass (*Spartina anglica)* an invasive species of saltmarsh and mudflats. Eutrophication from sewage discharges has been recorded as having negative impacts on this habitat at two locations in Ireland (NPWS, 2013) and the favourable conservation condition of this habitat may be threatened by the current lack of nutrient removal facilities at Milltown WWTP, a situation that is likely to be contributing to increased nutrient levels in Castlemaine Harbour. Sewage effluent is known to cause dieback of saltmarsh vegetation and it can promote the growth and spread of Common Cordgrass and Common Reed (McCorry & Ryle 2009). Based on the above the Milltown WWTP discharge has the potential to negatively impact on this habitat type.

[1330] Atlantic Salt Meadows
Grazing and infilling are seen as the major threats to this habitat along with climate change resulting in increasing sea-levels and an increase in the severity of coastal storms. Sewage effluent is known to cause dieback of saltmarsh vegetation and it can promote the growth and spread of Common Cordgrass and Common Reed (McCorry & Ryle 2009). The Milltown WWTP discharge has the potential therefore to negatively impact on this habitat type.

[1410] Mediterranean Salt Meadows
Grazing, infilling and the effects of climate change are recognised to be the greatest threats to this habitat in Ireland. Sewage effluent is known to cause dieback of saltmarsh vegetation and it can promote the growth and spread of Common Cordgrass and Common Reed (McCorry & Ryle 2009). The Milltown WWTP discharge has the potential therefore to negatively impact on this habitat type.

[2110] Embryonic Shifting Dunes
This is a terrestrial habitat and it is not water dependent so therefore Milltown WWTP discharge is not considered to be impacting on this habitat.

[2120] Marram Dunes (White Dunes)
This habitat type is marine water dependent but is not considered to be at risk from water pollution so therefore Milltown WWTP discharge is not considered to be impacting on this habitat.

[2130] Fixed Dunes (Grey Dunes)
This habitat type is marine and ground water dependent and is considered to be at risk from N and P nutrient enrichment of groundwater (diffuse and point-source pollution). However, given the distance (approximately 15 km) between Milltown WWTP discharge and the closest dune systems at Inch, the WWTP discharge is not considered to be impacting on this habitat.

[2170] Dunes with Creeping Willow
This habitat type is marine and ground water dependent and is considered to be at risk from N and P nutrient enrichment of groundwater (diffuse and point-source pollution). However, given the distance (approximately 15 km) between Milltown WWTP discharge and the closest dune systems at Inch, the WWTP discharge is not considered to be impacting on this habitat.

[2190] Humid Dune Slacks
This habitat type is ground water and marine water dependent and at risk from nutrient enrichment of ground water (N and P diffuse and point-source nutrient pollution). However, given the distance (approximately 15 km) between the Milltown WWTP discharge and the closest dune systems at Inch, the WWTP discharge is not considered to be impacting on this habitat.

[91E0] Alluvial Forests
This habitat type is surface water and ground water dependent and is at risk from nutrient enrichment (Nitrogen and Phosphorous) of surface water and groundwater (diffuse and point-source). However, all of the alluvial woodland identified to date within the Castlemaine Harbour SAC has been confined to the River Laune, a river that has escaped the habitat alteration wrought by drainage and embankment unlike the River Maine which has been heavily altered by

such practices. As such, the Milltown WWTP discharge is not considered to be impacting on this habitat.

Table 8.0: Qualifying Habitats Potentially Impacted by the Milltown Discharge

Qualifying Habitats	Potential Impacts	Brief Explanation	Mitigation required
[1130] Estuaries	Yes	Nutrient enrichment could potentially result in excessive algal growth and could lead to eutrophic conditions in the estuary.	Yes
[1140] Tidal Mudflats and Sandflats	Yes	Nutrient enrichment could potentially result in excessive algal growth and could lead to eutrophic conditions in the estuary.	Yes
[1210] Annual Vegetation of Drift Lines	No	The habitat thrives on the accumulation of organic litter.	No
[1220] Perennial Vegetation of Stony Banks	No	Nutrient enrichment is not perceived as a threat to this habitat type.	No
[1310] Salicornia Mud	Yes	Nutrient enrichment may alter the structure of the habitat	Yes
[1330] Atlantic Salt Meadows	Yes	Nutrient enrichment may alter the structure of the habitat.	Yes
[1410] Mediterranean Salt Meadows	Yes	Nutrient enrichment may alter the structure of the habitat.	Yes
[2110] Embryonic Shifting Dunes	No	Nutrient enrichment is not perceived as a threat to this habitat type.	No
[2120] Marram Dunes (White Dunes)	No	Nutrient enrichment is not perceived as a threat to this habitat type.	No
*[2130] Fixed Dunes (Grey Dunes)**	No	Nutrient enrichment is not perceived as a threat to this habitat type.	No
[2170] Dunes with Creeping Willow	No	Nutrient enrichment is not perceived as a threat to this habitat type.	No
[2190] Humid Dune Slacks	No	Nutrient enrichment is not perceived as a threat to this habitat type.	No
*[91E0] Alluvial Forests**	No	This habitat has not been recorded in the vicinity of Milltown WWTP discharge.	No

Impacts on Annex II Species

[1095] Sea Lamprey (*Petromyzon marinus*)

Various studies have shown that both low and high density values for ammocoetes were found in a wide range of water quality types which would appear to suggest that water quality does not seem to have deleterious impacts on Brook and River Lamprey survival (NPWS, 2008). Nevertheless, Lampreys are likely to be affected by serious pollution to waterways and substantial increases in Sea Lamprey numbers have been recorded in restored tributaries of Lake Michigan that were formerly polluted (Ferreri *et al.* 1995). The Milltown WWTP discharge is unlikely to be having a serious negative impact on this species. However, due to lack of proximate downstream monitoring data a pre-cautionary approach has been taken and it is considered that there is the potential for localised impacts on this species.

[1099] River Lamprey (*Lampetra fluviatilis*)
Water quality and eutrophication are not considered to be highly significant in impacting on lamprey status, in general and recent studies have found lampreys in rivers with Q values as low as 2 and O'Connor (2007) suggested that lampreys seem to favour waters with slightly elevated levels of organic material and filamentous algae. In fact, O'Connor (2006) recorded large numbers of lampreys (River and Brook) in stretches of the Boyne downstream of Navan where the river was considered to be in an advanced state of eutrophication with excessive amounts of live and decaying filamentous algae and other sections were overgrown with aquatic macrophytes. Other studies have shown that both low and high density values for ammocoetes were found in a wide range of water quality types which would appear to suggest that water quality does not seem to have deleterious impacts on lamprey survival (NPWS, 2008). However, no juvenile lamprey or redds were found at any sites with a categorisation of less than Q3-4, *i.e.* at any moderately or seriously polluted sites in the Lamprey survey of the Rivers Slaney and Blackwater (King & Linnane 2004). Lampreys are likely to be affected by serious pollution to waterways and substantial increases in Sea Lamprey numbers have been recorded in restored tributaries of Lake Michigan that were formerly polluted (Ferreri *et al.* 1995). The Milltown WWTP discharge is unlikely to be having a serious negative impact on this species. However, due to lack of proximate downstream monitoring data a pre-cautionary approach has been taken and it is considered that there is the potential for localised impacts on this species.

[1106] Atlantic Salmon (*Salmo salar*)
A fish survey of the tidal River Maine undertaken by staff of Inland Fisheries Ireland in 2011 found relatively small numbers of Salmon in the lower reaches of the river (Kelly *et al*. 2012). An earlier survey of a non-tidal stretch in 2008 5 km east of Castlemaine found Salmon to be the most abundant species in that part of the river with good numbers of Brown Trout and smaller numbers of Lamprey (unidentified) also present (Kelly 2009). Milltown WWTP discharge may be contributing to increased nutrient levels in the River Maine and could potentially be having a negative impact on clean water conditions necessary for the survival of the river's Salmon population.

[1355] Otter (*Lutra lutra*)
Water pollution represents one of the principal threats to Otter survival in Ireland (Reid *et al.*, 2013). Otters can tolerate significant levels of pollution (Chanin, 2003; Bailey & Rochford, 2005; Romanowski *et al.* 2012) but poor water quality tends to result in reduced numbers and variety of fish species which in turn will have a negative impact on Otter presence in polluted waterways. Milltown WWTP discharge, alone and in combination with other point sources, could potentially be having indirect negative effects on Otters (as a result of reduced food supply).

[1395] Petalwort (*Petalophyllum ralfsii*)
Petalwort typically grows on damp ground in dune slacks and in short, sandy turf, usually close to the sea. Milltown WWTP discharge is not considered to be impacting on this habitat.

Table 9.0: Qualifying Species Potentially Impacted by the Milltown Discharge

Qualifying Habitats	Potential Impacts	Brief Explanation	Mitigation required
[1095] Sea Lamprey	Yes	Lampreys seem to favour waters with slightly elevated levels of organic material but they will not tolerate heavily polluted waters. Due to lack of proximate downstream monitoring data a pre-cautionary approach has been taken and it is considered that there is the potential for localised impacts on this species.	Yes
[1099] River Lamprey	Yes	Lampreys seem to favour waters with slightly elevated levels of organic material but they will not tolerate heavily polluted waters. Due to lack of proximate downstream monitoring data a pre-cautionary approach has been taken and it is considered that there is the potential for localised impacts on this species.	Yes
[1106] Atlantic Salmon	Yes	The Atlantic Salmon is a clean water dependent species and is highly sensitive to pollution.	Yes
[1355] Otter	Yes	This species is dependent on fish stocks which are ultimately dependent on water quality.	Yes
[1395] Petalwort	No	This species is not likely to be impacted by Milltown WWTP.	No

Impacts on Annex I and Annex II Bird Species

It is possible that nutrient delivery via the WWTP discharge (and other sources such as agriculture) may be leading to increased nutrient levels accumulating in the sediments of Castlemaine Harbour that in turn may lead to increases in certain invertebrate populations which attract large numbers of wetland birds to feed on the abundant food source. Sewage outfalls are widely known to provide significant food sources for a variety of bird species either directly as a source of edible matter or indirectly by artificially enhancing nutrient availability (Burton *et al.* 2002).

Improved sewage treatment usually results in a reduction of organic matter and nutrients entering the sea and this in turn can lead to a decline in invertebrate numbers followed by declines in bird numbers at the outfall site (Pearce, 1998).

Excessive discharge of nutrients may have short-term positive impacts on some bird populations but in the long-term, excessive accumulation of nutrients is likely to be detrimental to habitats within the SPA and could well threaten the survival of important invertebrate populations which will have serious negative implications for several of the designated bird species within the SPA. Sediments close to sources of nutrient and organic enrichment eventually become anaerobic due to the high biological oxygen demand (BOD) and may in extreme cases become unsuitable for invertebrate life and this can result in a loss of foraging habitat for wintering water birds (Burton *et al.* 2002). High nutrient loading can also result in excessive algal growth which can lead to oxygen depletion and reductions in the availability of vital invertebrate food. Cleaner wastewater treatment is likely to result in lower nutrient levels with consequent reductions in the abundance of certain invertebrate species and this may impact on bird populations in the immediate area. A decline in bird numbers at certain locations close to the nutrient emission source may lead to a more even re-distribution of waterbirds to other favoured foraging sites around Castlemaine Harbour SPA. Castlemaine Harbour contains large areas of suitable foraging habitat and should

be able to accommodate birds that may have to disperse due to reduced invertebrate availability in once-favoured feeding areas.

Failure to assess the potential problem of excessive nutrients entering Castlemaine Harbour could eventually lead to a change in the status of this waterbody, (i.e to a eutrophic status), in the future resulting in an ecological imbalance due to excessive algae growth. This phenomenon has already occurred in several estuaries along the south coast (e.g. Clonakilty Bay and Courtmacsherry Bay in County Cork) and in Dublin Bay where excessive growth of Sea Lettuce (*Enteromorpha* spp.) is jeopardizing environmental conditions for important invertebrate species with likely negative consequences for large numbers of wetland birds at these sites (Sea Lettuce Task Force Report, 2010). It is worth noting however that presently the Castlemaine harbour is currently "Unpolluted".

[A001] Red-throated Diver (*Gavia stellate*)
Red-throated Divers are winter visitors to Castlemaine Harbour and they tend to be concentrated on the seaward side of the Inch and Rossbehy peninsulas (Dempsey & O'Clery 2007) and as such, they are unlikely to be impacted by Milltown WWTP discharge.

[A017] Cormorant (Phalacrocorax carbo)
Cormorants feed largely on fish and often move to inland sites in winter when wind can lead to difficult fishing conditions (Crowe 2005). Cormorants are likely to benefit from increases in fish numbers as a result of increased nutrient inputs.

[A046] Light-bellied Brent Goose (Branta bernicla hrota)
The north shore east of Inch is particularly favoured during the early part of the wintering season when Eelgrass is abundant (Crowe 2005). Eelgrass is sensitive to nutrient enrichment and declines in water quality (OSPAR Commission 2009) and Milltown WWTP discharge could potentially be contributing to increased nutrient levels within Castlemaine Harbour.

[A050] Wigeon (Anas penelope)
Wigeon are largely vegetarian and feed chiefly on land or exposed mud (Prater 1981) so they are unlikely to be impacted by Milltown WWTP discharge.

[A053] Mallard (Anas platyrhynchos)
Mallard feed on seeds and invertebrates and any reduction in nutrient levels is likely to reduce the abundance of these invertebrates resulting in less food availability for Mallard and this may lead to local declines. This species does not occur in large numbers in the vicinity of Milltown WWTP discharge but it is possible that the WWTP effluent is currently benefitting Mallard.

[A054] Pintail (Anas acuta)
Pintail feed extensively on the marine snail *Hydrobia ulvae* and increased nutrient levels benefit this species (Lewis & Kelly 2001). This species does not occur in large numbers in the vicinity of Milltown WWTP discharge but it is possible that WWTP effluent is currently benefitting Pintail.

[A062] Scaup (Aythya marila)
Scaup are known to congregate at WWTP outfalls in estuaries (Burton *et al.* 2002) so Milltown WWTP discharge is unlikely to be impacting negatively on this species and recent declines in

numbers visiting Castlemaine Harbour SPA are related to changes in wintering distribution as a result of milder winters.

[A065] Common Scoter (Melanitta nigra)
The Common Scoter is a maritime species and the large flocks recorded in Castlemaine Harbour tend to concentrate on the seaward side to the west of the Inch and Rossbehy peninsulas (Crowe, 2005). As such, they are unlikely to be impacted by Milltown WWTP discharge.

[A130] Oystercatcher (Haematopus ostralegus)
Milltown WWTP discharge may be contributing to an increase of nutrient levels in Castlemaine Harbour and this in turn could be providing a source of nutrients for a variety of invertebrates such as *Capitella capitata, Corophium, Eteone longa, Macoma balthica, Scolelepsis fuliginosa* and *Mytilus edulis* (Burton *et al.* 2002) some of which are important food sources for waders such as Oystercatcher. However, increased nutrient levels in Castlemaine Harbour SPA have the potential to alter the invertebrate composition of the SPA and this situation could eventually lead to a deterioration of certain parts of the SPA with consequent negative impacts for species such as Oystercatcher.

[A137] Ringed Plover (Charadrius hiaticula)
Ringed Plover feed on a wide variety of food items, mainly those found in the surface centimetre of the sand due to their relatively short bill size. Ringed Plover are likely to benefit from increased nutrient levels but could decline if parts of the SPA were to become eutrophic.

[A144] Sanderling (Calidris alba)
Sanderling show a distinct preference for sandy coasts. They feed on a wide variety of prey including polychaetes, bivalves, crustacea, anemones and especially prey stranded in the surf (Vanerman 2009). They are opportunistic foragers adapted for life on relatively low nutrient beaches and they are not likely to be significantly impacted by Milltown WWTP discharge.

[A157] Bar-tailed Godwit (Limosa lapponica)
Milltown WWTP discharge may be contributing to an increase of nutrient levels in Castlemaine Harbour and this in turn could be providing a source of nutrients for a variety of invertebrates such as *Capitella capitata, Corophium, Eteone longa, Macoma balthica, Scolelepsis fuliginosa* and *Mytilus edulis* (Burton *et al.* 2002) some of which are important food sources for waders such as Bar-tailed Godwit. However, increased nutrient levels in Castlemaine Harbour have the potential to alter the invertebrate composition of the SPA and this situation could eventually lead to a deterioration of certain parts of the SPA with consequent negative impacts for species such as Bar-tailed Godwit.

[A162] Redshank (Tringa tetanus)
Milltown WWTP discharge may be contributing to an increase of nutrient levels in Castlemaine Harbour and this in turn could be providing a source of nutrients for a variety of invertebrates such as *Capitella capitata, Corophium, Eteone longa, Macoma balthica, Scolelepsis fuliginosa* and *Mytilus edulis* (Burton *et al.* 2002) some of which are important food sources for waders such as Redshank. However, increased nutrient levels in Castlemaine Harbour have the potential to alter the invertebrate composition of the SPA and this situation could eventually lead to a

deterioration of certain parts of the SPA with consequent negative impacts for species such as Redshank.

[A164] Greenshank (Tringa nebularia)
Greenshank feed mainly on shrimps, crabs and small fish along channels in the mudflats and Milltown WWTP discharge may be contributing to an increase of nutrient levels in Castlemaine Harbour and this in turn could be providing a source of nutrients for these prey species. However, increased nutrient levels in Castlemaine Harbour have the potential to alter the species composition of the SPA and this situation could eventually lead to a deterioration of certain parts of the SPA with consequent negative impacts for species such as Greenshank.

[A169] Turnstone (Arenaria interpres)
Milltown WWTP discharge may be contributing to an increase of nutrient levels in Castlemaine Harbour and this in turn could be providing a source of nutrients for a variety of invertebrates such as *Capitella capitata, Corophium, Eteone longa, Macoma balthica, Scolelepsis fuliginosa* and *Mytilus edulis* (Burton *et al.* 2002) some of which are important food sources for waders such as Turnstone. However, increased nutrient levels in Castlemaine Harbour SPA have the potential to alter the invertebrate composition of the SPA and this situation could eventually lead to a deterioration of certain parts of the SPA with consequent negative impacts for species such as Turnstone.

[A346] Chough (Pyrrhocorax pyrrhocorax)
Choughs feed mainly on soil invertebrates and their foraging habitat consists of improved pasture, unimproved grassland and coastal grass (Gray *et al.* 2003) and as such, they are unlikely to be impacted by Milltown WWTP discharge.

[A999] Wetlands & Waterbirds
Castlemaine Harbour is a relatively large coastal complex comprised of a variety of wetland sites including the open sea, the estuaries of the Maine and Laune Rivers, mudflats, sandbanks and salt marshes. Large numbers of waders and wildfowl visit the site each autumn and winter. Increases in nutrient levels from Milltown WWTP discharge (and other sources) could potentially alter many of these habitats and over time, could potentially result in a deterioration of some of these habitats with potentially negative consequences for many of the qualifying interests of the SPA.

Table 10.0: Qualifying Species Potentially Impacted by the Milltown Discharge

Qualifying Species	Potential Impact	Brief Explanation	Mitigation Required
Red-throated Diver (*Gavia stellate*)	No	This species feeds mainly on the seaward side of the Inch and Rossbehy peninsulas.	No
Cormorant (*Phalacrocorax carbo*)	No	Cormorants could benefit from an increase in fish numbers as a result of increased nutrient levels.	No
Light-bellied Brent Goose (*Branta bernicla hrota*)	Yes	An increase in nutrient levels could have negative impacts on the *Zostera* beds east of Inch, an important food source for this species.	Yes
Wigeon (*Anas penelope*)	No	Wigeon feed almost entirely on vegetable matter (seagrass and *enteromorpha sp.* but they also feed on grassland and cereals (Crowe, 2005).	No
Mallard (*Anas platyrhynchos*)	No	Mallard diet is highly variable and they feed on a range of plant and animal material and they also feed on human waste (Crowe, 2005).	No
Pintail (*Anas acuta*).	No	Increased nutrient levels could artificially boost *Hydrobia* numbers.	No
Scaup (*Aythya marila*)	No	This species often feeds at WWTP outfalls.	No
Common Scoter (*Melanitta nigra*)	No	This species feeds mainly on the seaward side of the Inch and Rossbehy peninsulas.	No
Oystercatcher (*Haematopus ostralegus*)	Yes	This species benefits from increased invertebrate numbers due to increased nutrient levels but could decline if parts of the SPA become eutrophic.	Yes
Ringed Plover (*Charadrius hiaticula*)	Yes	This species benefits from increased invertebrate numbers due to increased nutrient levels but could decline if parts of the SPA become eutrophic	Yes
Sanderling (*Calidris alba*)	No	This species is adapted to foraging on beaches.	No
Bar-tailed Godwit (*Limosa lapponica*)	Yes	This species benefits from increased invertebrate numbers due to increased nutrient levels but could decline if parts of the SPA become eutrophic.	Yes
Redshank (*Tringa tetanus*)	Yes	This species benefits from increased invertebrate numbers due to increased nutrient levels but could decline if parts of the SPA become eutrophic.	Yes
Greenshank (*Tringa nebularia*)	Yes	This species benefits from increased prey numbers due to increased nutrient levels but could decline if parts of the SPA become eutrophic.	Yes
Turnstone (*Arenaria interpres*)	Yes	This species benefits from increased invertebrate numbers due to increased nutrient levels but could decline if parts of the SPA become eutrophic.	Yes
Chough (*Pyrrhocorax*)	No	This species feeds largely on terrestrial invertebrates.	No
Wetlands & Waterbirds	Yes	Many wetland habitats could be altered as a result of increased nutrient levels with negative consequences for many waterbird species.	Yes

Mitigation Measures

The plant is likely contributing to nutrient enrichment within the receiving waterbody, in particular at a local level. It is not possible to determine a localised impact due to the lack of relevant downstream monitoring and effluent TN and TP data. The Castlemaine Harbour SAC and the Castlemaine Harbour SPA contain a wide range of designated habitats and species which may be impacted by the WWTP effluent discharge.

Mitigation Measures recommended for the ongoing operation of the existing discharge are as follows:

- Monitoring of the effluent discharge and both upstream and downstream of the discharge point on a regular basis.
- Monitoring of TN and TP concentration of the effluent discharge to assess nutrient inputs to the receiving waterbody.
- The effluent quality must meet the requirements as set out in Urban Waste Water Treatment Regulations, 2001. This will serve to protect the SAC and SPA.
- With regard to the cumulative impacts of the discharge as a whole and the operational impacts, the waste water discharge effluent standards must be in line with the Urban Waste Water Treatment Regulations, 2001.

Stage 2 Appropriate Assessment Conclusion Statement

The current assessment for the Waste Water Discharge Licence Application investigates the potential adverse effects on the aquatic qualifying interests of the Natura 2000 network, specifically the Castlemaine Harbour SAC and the Castlemaine Harbour SPA, arising from the Milltown discharge, in combination with other plans/projects affecting the aquatic environment.

The assessment considers whether the discharge, alone or in combination with other projects or plans, will have adverse effects on the integrity of the Castlemaine Harbour SAC and the Castlemaine Harbour SPA, and includes any mitigation measures necessary to avoid, reduce or offset negative effects.

When the above mitigation measures are implemented in full, it is envisaged that there will be no significant adverse effects on the integrity of the Castlemaine Harbour SAC and the Castlemaine Harbour SPA, in view of the conservation objectives of the sites and that the conservation status of the Annex I and II species and Annex I Habitats will not be compromised by the discharge either directly, indirectly or cumulatively.

It is concluded that the Milltown discharge, alone or in-combination with other plans and/or projects will not give rise to significant effects on the integrity of the Castlemaine Harbour SAC and the Castlemaine Harbour SPA, as long as the mitigation measures as listed above are implemented in full. This Stage 2 assessment concludes the Appropriate Assessment process and further assessment is not considered necessary.

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