

Administration,  
Environmental Licensing Programme,  
Office of Climate,  
Licensing & Resource Use,  
Environmental Protection Agency,  
P.O.Box 3000,  
Johnstown Castle Estate,  
County Wexford.

25<sup>th</sup> February 2011

**Re: Notice in accordance with Regulation 25(c)(ii) of the Waste Water Discharge  
(Authorisation) Regulations 2007  
Agglomeration of Knockraha, County Cork  
Application Register Number A0352-01**

Dear Sir/Madam,

I refer to the above and to a letter received from the Agency dated 14<sup>th</sup> December 2010 regarding Regulation 24 compliance requirements. I enclose a submission to the Agency in response to the matters raised in the said letter.

I trust that all is now in order and I look forward to a Certificate of Authorisation being granted to Cork County Council for the discharges from the waste water works serving the Knockraha Agglomeration.

Yours faithfully,

---

Patricia Power  
Director of Services

Encl.



**CORK COUNTY COUNCIL**  
**Comhairle Contae Chorcaí**  
**Water Services South**  
**County Hall**  
**Carrigrohane Road**  
**Cork**

**SUBMISSION TO ACHIEVE  
COMPLIANCE WITH  
REGULATION 24  
OF THE  
WASTE WATER DISCHARGE  
(AUTHORISATION)  
REGULATIONS 2007  
FOR  
KNOCKRAHA  
(A0352-01)**

**February 2011**

**QUESTION 1      "ASSESS THE LIKELIHOOD OF SIGNIFICANT EFFECTS OF THE WASTE WATER DISCHARGE ON THE RELEVANT EUROPEAN SITES..."**

**1.0      Background**

Knockraha is located approximately 10km northeast of Cork City and approximately 5km east of Glanmire/Riverstown. Knockraha is located in the Butlerstown River Valley. Cork County Council South is the Water Services Authority serving Knockraha. The agglomeration boundary can be seen at Attachment A.1 of the original application. The population of the Knockraha agglomeration is approximately 230, based on the 2006 Census. Approximately 62 persons are served by the waste water works.

The waste water works serving Knockraha comprises of 2 no. sewerage systems as follows:

1. The Chapelfield Estate sewerage system draining to the primary discharge point;
  2. The septic tank sewerage system draining to the secondary discharge point.
- These are discussed below.

The Chapelfield Estate sewerage system serves 20 dwellings. Waste water is collected by gravity and drains to a pumping station which lifts the sewage to a waste water treatment plant (WWTP). There are no storm overflows from the Chapelfield section of the waste water works. All waste water collected drains to the WWTP.

The Chapelfield WWTP provides primary and secondary treatment. The primary treatment is achieved by settlement. The secondary treatment is achieved by the extended aeration of the settle waste water by means of an air blower. All treated effluent from the waste water treatment plant drains by gravity to a percolation bed where it discharges directly to groundwater at the primary discharge point.

The septic tank sewerage system serves 3 dwellings. Waste water is collected by gravity and drains to a septic tank. There are no pumping stations within the collection system. There are no storm overflows from the septic tank section of the waste water works. All waste water collected drains to a septic tank.

The septic tank provides primary treatment only. The primary treatment is achieved by settlement. All treated effluent from the septic tank drains by gravity to a nearby soak pit where it discharges directly to groundwater at the secondary discharge point.

Both the Chapelfield percolation bed and the septic tank soak pit are located approximately 0.5km from the Butlerstown River. The Butlerstown River flows into the Glashaboy River which, in turn, flows into Cork Harbour approximately 7.5km downstream of Knockraha. Cork Harbour is a Special Protection Area (SPA).

**1.1      Habitats Directive Assessment**

The Habitats Directive 92/43/EEC is transposed into Irish Law under the European Union (Natural Habitats) Regulations SI 94/1997 (The Regulations). The Regulations require the assessment of all projects or plans that have the potential to impact on nature conservation sites, including SPAs. This assessment is referred to as a Habitats Directive Assessment. The purpose of a Habitats Directive Assessment is to identify potential impacts on nature conservation sites arising from a project or plan and to predict the effect of such impacts on the integrity of the sites.

The European Union has provided guidance on Habitats Directive Assessment which identifies four stages in the assessment process as follows:

1. *Stage One - Screening*  
Screening identifies the likely impacts on a Natura 2000 site of a project or plan, whether alone or in combination with other projects or plans, and considers whether or not these impacts are likely to be significant.
2. *Stage Two – Appropriate Assessment*  
This assessment considers the impact on the integrity of the Natura 2000 site of a project or plan, either alone or in combination with other projects or plans, with respect to the site's structure and function and its conservation objectives. Additionally, where there are adverse impacts, the Appropriate Assessment considers the potential mitigation of those impacts.
3. *Stage Three - Assessment of Alternative Solutions*  
This assessment examines alternative ways of achieving the objectives of the project or plan that avoid adverse impacts on the integrity of the Natura 2000 site.
4. *Stage Four - Assessment Where No Alternative Solutions Exist and Where Adverse Impacts Remain*  
This assessment considers compensatory measures, where in the light of an assessment of imperative reasons of overriding public interest, it is deemed that the project or plan should proceed.

This Submission brings together all of the information necessary to make determination as to whether or not there are likely to be significant impacts arising from the discharges from the Knockraha Agglomeration on the Cork Harbour SPA. A flow diagram in accordance with Appendix 1 of Circular Letter L8/08 is included at Appendix 1 of this Submission.

## **1.2 Stage One - Screening**

Screening identifies the likely impacts on a Natura 2000 site of a project or plan, whether alone or in combination with other projects or plans, and considers whether or not these impacts are likely to be significant. Screening comprises of 5 steps as follows:

1. *Step One – Description of Project or Plan*  
Provide a description of the project or plan and other projects or plans that, alone or in combination, have the potential to have significant effects on Natura 2000 sites within the potential impact zone.
2. *Step Two – Identification of Impacted Natura 2000 Sites*  
Identify Natura 2000 sites which may be impacted by the project or plan, and compile information on their qualifying interests and conservation objectives.
3. *Step Three – Assessment Criteria*  
Determine whether the project or plan needs to be screened for potential impacts on Natura 2000 sites.
4. *Step Four – Assessment of Likely Effects*  
Carry out an assessment of likely effects – direct, indirect and cumulative – undertaken on the basis of available information as a desk study or field survey or primary research as necessary.
5. *Step Five – Significance of Effects*  
Assess the significance of any such effects on the Natura 2000 sites within the impact zone.

Steps 1 to 5 are presented as an Appropriate Assessment Screening Matrix below. This assessment has been prepared in accordance with the following guidance:

- European Commission (2000) Managing Natura 2000 sites: the provisions of Article 6 of the Habitats Directive 92/43/EEC;

- European Commission (2001) 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;
- Appropriate Assessment of Plans and Projects in Ireland. Guidance for Planning Authorities. Environment, Heritage and Local Government, 2009.

<b>Step One - Description of Project or Plan</b>	
Location	Knockraha, Co Cork.
Description of the key components of the project	<p>Knockraha Agglomeration is served by 2 no. sewerage systems:</p> <ol style="list-style-type: none"> <li>1. Chapelfield WWTP &amp; percolation bed;</li> <li>2. Septic tank and soak pit.</li> </ol> <p>The WWTP provides primary and secondary treatment and treated effluent discharges at the primary discharge point to groundwater through a percolation bed.</p> <p>The septic tank provides primary treatment only. Treated effluent discharges at the secondary discharge point to groundwater through a soak pit.</p> <p>Both the percolation bed and the soak pit are located approximately 0.5km from the Butlerstown River.</p>
Distance from designated sites in potential impact zone	The Cork Harbour SPA is located approximately 7.5km downstream from Knockraha.

<b>Step Two – Identification of Impacted Natura 2000 Sites<sup>1</sup></b>	
Name	Cork Harbour Special Protection Area
Site Code	4130
Site Description	<p>The Cork Harbour SPA is an estuarine complex which is primarily comprised of intertidal habitats, mainly mudflats, as well as some other coastal and marine habitats. These habitats support very high numbers of wintering waterfowl that feed on the macro invertebrates inhabiting the mudflats. The Harbour regularly supports in excess of 20,000 wintering birds, making it an internationally important site and the fifth most important wintering waterfowl site in the country.</p> <p>Discharges from the Knockraha percolation bed and soak pit discharge to groundwater approximately 0.5km from the Butlerstown River. The Butlerstown River flows into the Glashaboy River which, in turn, flows into Cork Harbour. The Cork Harbour SPA is located approximately 7.5km downstream from Knockraha.</p> <p>The Glashaboy River meets the estuary of the River Lee at the North Western end of the Lough Mahon estuary where the main habitats of importance are intertidal mudflats.</p> <p>More information on the Cork Harbour SPA is contained in Appendix 2 of this document. Bird count data is provided in Appendix 3.</p>

<sup>1</sup> Natura 2000 sites within the potential impact zone of the proposed development have been identified in accordance with guidance provided in the NPWS circular L8/08.

Qualifying Interests of Cork Harbour SPA.	Internationally important numbers of Black-tailed Godwit and Redshank; Nationally important numbers of Cormorant, Shelduck, Oystercatcher, Golden Plover, Lapwing, Dunlin and Curlew; 20,000 wintering water birds. <i>Source – National Parks and Wildlife Service.</i>  Bird count data is provided in Appendix 3.
Other Notable Features of Cork Harbour SPA.	Little Grebe, Great-crested Grebe, Grey Heron, Wigeon, Teal, Pintail, Shoveler, Red-breasted Merganser, Grey Plover, Black-headed Gull, Common Gull, Lesser Black-backed Gull, wetland and water birds. <i>Source – National Parks and Wildlife Service.</i>  Bird count data is provided in Appendix 3.
Conservation Objectives	To avoid deterioration of the habitats of the qualifying species and species of special conservation interest, or significant disturbance to these species, thus ensuring that the integrity of the site is maintained.  To ensure for the qualifying species and species of special conservation interest that the following are maintained in the long-term: <ul style="list-style-type: none"> <li>• The population of the species as a viable component of the site;</li> <li>• The distribution and extent of habitats supporting the species;</li> <li>• The structure, function and supporting processes of habitats supporting the species.</li> </ul> <i>Source – National Parks and Wildlife Service.</i>

### Step Three – Assessment Criteria

Describe the individual elements of the project (either alone or in combination with other plans or projects) likely to give rise to impacts on the Natura 2000 site.	<ol style="list-style-type: none"> <li>1. Knockraha Percolation Bed;</li> <li>2. Knockraha Soak Pit.</li> </ol>
Describe any likely direct, indirect or secondary impacts of the project (either alone or in combination with other plans or projects) on the Natura 2000 site taking into account the following: <ul style="list-style-type: none"> <li>• Size and scale</li> <li>• Land-take</li> <li>• Distance from the Natura 2000 site or key features of the site:</li> <li>• Resource requirements (water abstraction etc.)</li> <li>• Emissions (disposal to land, water or air)</li> <li>• Excavation Requirements</li> <li>• Transportation Requirements</li> <li>• Duration of construction, operation, decommissioning</li> <li>• Other.</li> </ul>	<p>Discharges could give rise to elevated nutrients entering the Western portion of Cork Harbour. Increased nutrient levels may impact on the ecology of an area by changing the composition of floral communities and reducing the ability of less robust plants to survive. Increased nutrient levels may also result in increasing the invertebrate populations in the estuary, thereby increasing bird population levels.</p> <p>The combined impact of all of the above-listed WWTP and septic tank on the nature conservation site would require a full ecological assessment of the entire SPA. This assessment has not been undertaken in the preparation of this Submission. However, consideration is currently being given by Cork County Council to such an assessment.</p>

<p>Describe any likely changes to the site arising as a result of:</p> <ul style="list-style-type: none"> <li>• Reduction in habitat area</li> <li>• Disturbance to key species</li> <li>• Habitat or species fragmentation</li> <li>• Reduction in species density</li> <li>• Changes in key indicators of conservation value (water quality etc)</li> <li>• Climate Change</li> </ul>	<p><b>Reduction in habitat area</b> Not significant.</p> <p><b>Disturbance to key species</b> The operation of the WWTP and Septic Tank does not cause any disturbance to species within the SPA.</p> <p><b>Habitat or species fragmentation</b> No habitat fragmentation has been caused as a result of the operation of these facilities.</p> <p><b>Reduction in species density</b> No significant impacts are evident or predicted on species for which the SPA is designated.</p> <p><b>Changes in key indicators of conservation value – e.g. water quality</b> The status of the affected section of the Butlersown River is “good”. This indicates that there is no deterioration in water quality associated with the Knockraha discharges.</p> <p><b>Climate Change</b> Not significant.</p>
<p>Describe any likely impacts on the Natura 2000 site as a whole in terms of:</p> <ul style="list-style-type: none"> <li>• Interference with the key relationships that define the structure of the site</li> <li>• Interference with key relationships that define the function of the site</li> </ul>	<p><b>Interference with the key relationships that define the structure of the site</b> The structure of the SPA is not impacted by the operation of these facilities.</p> <p><b>Interference with key relationships that define the function of the site</b> The function of the SPA is not impacted by the operation of these facilities.</p>
<p>Describe from the above those elements of the project of plan, or combination of elements, where the above impacts are likely to be significant or where the scale or magnitude of impacts is not known.</p>	<p>No significant impacts are predicted.</p>

#### Step Four – Assessment of Likely Effects

Name of project or plan	Knockraha WWTP Percolation Bed & Septic Tank Soak Pit
Name and location of Natura 2000 site	Cork Harbour SPA
Description of the project or plan	<p>Knockraha Agglomeration is served by 2 no. sewerage systems:</p> <ol style="list-style-type: none"> <li>1. Chapelfield WWTP &amp; percolation bed;</li> <li>2. Septic tank and soak pit.</li> </ol> <p>The WWTP provides primary and secondary treatment and treated effluent discharges through the primary discharge point to groundwater through a percolation bed.</p> <p>The septic tank provides primary treatment only. Treated effluent discharges through the secondary discharge point to groundwater through a soak pit.</p> <p>Both the percolation bed and the soak pit are located approximately 0.5km from the Butlerstown River.</p>

Is the project or plan directly connected with or necessary to the management of the site (provide details)?	No
Describe how the project or plan (alone or in combination) is likely to affect the Natura 2000 Site.	Discharges from the Knockraha percolation bed and septic tank, either alone or in combination with discharges from other sources, could give rise to elevated nutrients within the SPA. Increased nutrient levels may impact on the ecology of an area by changing the composition of floral communities and reducing the ability of less robust plants to survive. Increased nutrient levels may also result in increasing the invertebrate populations in the estuary, thereby increasing bird population levels.

### Step Five – Significance of Effects

Explain why these effects are not considered significant.	<ul style="list-style-type: none"> <li>• Small quantities of effluent (62PE);</li> <li>• Effluent discharges to groundwater;</li> <li>• Dilution and assimilative capacities of Butlerstown and Glashaboy Rivers and Cork Harbour;</li> <li>• Butlerstown River has ongoing "good" status;</li> <li>• No significant impacts are evident or predicted on species for which the SPA is designated.</li> </ul>
List of agencies consulted: provide contact name and telephone or email address	<ul style="list-style-type: none"> <li>• National Parks and Wildlife Service;</li> <li>• Birdwatch Ireland.</li> </ul>
Response to consultation	<ul style="list-style-type: none"> <li>• Draft Conservation Objectives and a copy of Intention to Designate Cork Harbour as SPA was received previously from the NPWS;</li> <li>• Bird count data was received previously from Birdwatch Ireland.</li> </ul>

### Data collected to carry out the assessment

Who carried out the assessment	Sources of data	Level of assessment completed	Where can the full results of the assessment be accessed and viewed
John Slattery, Executive Engineer, Water Services Operations, Cork County Council	Urban Waste Water Discharge Certificate of Authorisation for Knockraha; Cork County Council Water Quality Monitoring Data; Nation Parks & Wildlife Service Website; Birdwatch Ireland Website.	Desktop review of cited data.	This Submission.



**QUESTION 2    "CONFIRM THE DESIGN CAPACITY OF THE WASTE WATER TREATMENT PLANT ..."**

The Chapelfield WWTO was designed to treat waste water arising from a PE of 50. The current PE treated by the WWTP is estimated to be 50. The WWTP is therefore at capacity and not overloaded.

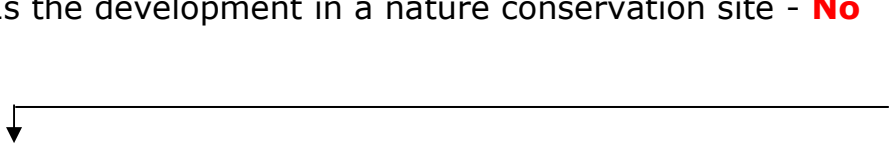
The septic tank was designed to treat waste water arising from 3 no. dwellings – i.e. a PE of 12. The current PE treated by the septic tank is estimated to be 12. The septic tank is therefore at capacity and not overloaded.

The current PE includes the maximum average weekly loading for the agglomeration having taken account of local festivals, peak holiday seasons, etc.

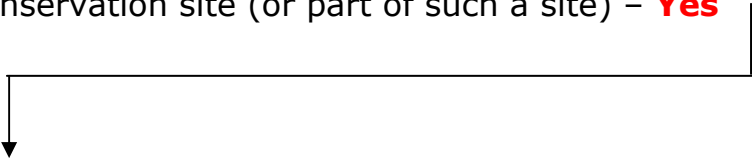
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**Knockraha Flow Chart – A0352-01**

Is the development in a nature conservation site - **No**



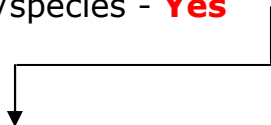
Is the development in the surface water catchment of a nature conservation site (or part of such a site) - **Yes**



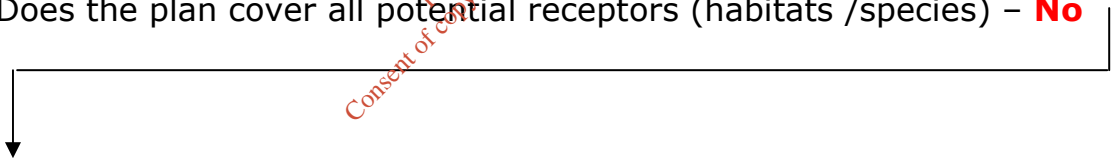
Are the qualifying habitats and species of the site water dependent - **Yes**



Is there a WFD sub basin plan for the site or its protected habitats /species - **Yes**



Does the plan cover all potential receptors (habitats /species) - **No**



**Assess Impacts**

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## SITE SYNOPSIS

**SITE NAME: CORK HARBOUR SPA**

**SITE CODE: 004030**

Cork Harbour is a large, sheltered bay system, with several river estuaries - principally those of the Rivers Lee, Douglas and Owenacurra. The SPA site comprises most of the main intertidal areas of Cork Harbour, including all of the North Channel, the Douglas Estuary, inner Lough Mahon, Lough Beg, Whitegate Bay and the Rostellan inlet.

Owing to the sheltered conditions, the intertidal flats are often muddy in character. These muds support a range of macro-invertebrates, notably *Macoma balthica*, *Scrobicularia plana*, *Hydrobia ulvae*, *Nephtys hombergi*, *Nereis diversicolor* and *Corophium volutator*. Green algae species occur on the flats, especially *Ulva lactuca* and *Enteromorpha* spp. Cordgrass (*Spartina* spp.) has colonised the intertidal flats in places, especially where good shelter exists, such as at Rossleague and Belvelly in the North Channel. Salt marshes are scattered through the site and these provide high tide roosts for the birds. Salt marsh species present include Sea Purslane (*Halimione portulacoides*), Sea Aster (*Aster tripolium*), Thrift (*Armeria maritima*), Common Saltmarsh-grass (*Puccinellia maritima*), Sea Plantain (*Plantago maritima*), Lax-flowered Sea-lavender (*Limonium humile*) and Sea Arrowgrass (*Triglochin maritima*). Some shallow bay water is included in the site. Cork Harbour is adjacent to a major urban centre and a major industrial centre. Rostellan lake is a small brackish lake that is used by swans throughout the winter. The site also includes some marginal wet grassland areas used by feeding and roosting birds.

Cork Harbour is an internationally important wetland site, regularly supporting in excess of 20,000 wintering waterfowl, for which it is amongst the top five sites in the country. The five-year average annual core count for the entire harbour complex was 34,661 for the period 1996/97-2000/01. Of particular note is that the site supports an internationally important population of Redshank (1,614) - all figures given are average winter means for the 5 winters 1995/96-1999/00. A further 15 species have populations of national importance, as follows: Great Crested Grebe (218), Cormorant (620), Shelduck (1,426), Wigeon (1,750), Gadwall (15), Teal (807), Pintail (84), Shoveler (135), Red-breasted Merganser (90), Oystercatcher (791), Lapwing (3,614), Dunlin (4,936), Black-tailed Godwit (412), Curlew (1,345) and Greenshank (36). The Shelduck population is the largest in the country (9.6% of national total), while those of Shoveler (4.5% of total) and Pintail (4.2% of total) are also very substantial. The site has regionally or locally important populations of a range of other species, including Whooper Swan (10), Pochard (145), Golden Plover (805), Grey Plover (66) and Turnstone (99). Other species using the site include Bat-tailed Godwit (45), Mallard (456), Tufted Duck (97), Goldeneye (15), Coot (77), Mute Swan (39), Ringed Plover (51), Knot (31), Little Grebe (68) and Grey Heron (47). Cork Harbour is an important

site for gulls in winter and autumn, especially Common Gull (2,630) and Lesser Black-backed Gull (261); Black-headed Gull (948) also occurs.

A range of passage waders occur regularly in autumn, including Ruff (5-10), Spotted Redshank (1-5) and Green Sandpiper (1-5). Numbers vary between years and usually a few of each of these species over-winter.

The wintering birds in Cork Harbour have been monitored since the 1970s and are counted annually as part of the I-WeBS scheme.

Cork Harbour has a nationally important breeding colony of Common Tern (3-year mean of 69 pairs for the period 1998-2000, with a maximum of 102 pairs in 1995). The birds have nested in Cork Harbour since about 1970, and since 1983 on various artificial structures, notably derelict steel barges and the roof of a Martello Tower. The birds are monitored annually and the chicks are ringed.

Extensive areas of estuarine habitat have been reclaimed since about the 1950s for industrial, port-related and road projects, and further reclamation remains a threat. As Cork Harbour is adjacent to a major urban centre and a major industrial centre, water quality is variable, with the estuary of the River Lee and parts of the Inner Harbour being somewhat eutrophic. However, the polluted conditions may not be having significant impacts on the bird populations. Oil pollution from shipping in Cork Harbour is a general threat. Recreational activities are high in some areas of the harbour, including jet skiing which causes disturbance to roosting birds.

Cork Harbour has is of major ornithological significance, being of international importance both for the total numbers of wintering birds (i.e. > 20,000) and also for its population of Redshank. In addition, there are at least 15 wintering species that have populations of national importance, as well as a nationally important breeding colony of Common Tern. Several of the species which occur regularly are listed on Annex I of the E.U. Birds Directive, i.e. Whooper Swan, Golden Plover, Bar-tailed Godwit, Ruff and Common Tern. The site provides both feeding and roosting sites for the various bird species that use it.

4.7.2004



## Cork Harbour

Species	1% National	1% International	1998/99	1999/00	2000/01	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	Mean (03-07)	Peak (03-07)
Mute Swan	110	110	46	42	25	15	42	56	71	54	73	68	64	73
Bewick's Swan	20	200	6					2					0	2
Whooper Swan	130	210			12	14	12	15	7			3	5	15
Black Swan			3								2		0	2
Pink-footed Goose		2,250			1							2	0	2
Greenland White-fronted Goose	110	270			1								0	0
Greylag Goose	50	870			3	4	4	1	1	3	1	6	2	6
Canada Goose			10	6	13	8	2	21	23	11	13	22	18	23
Light-bellied Brent Goose	220	260			4		6	12	16	26	11	17	16	26
Feral/hybrid Goose									2			5	1	5
Shelduck	150	3,000	1,875	1,870	722	1,108	1,903	1,946	1,391	1,350	918	823	1,286	1,946
Wigeon	820	15,000	1,683	1,402	1,272	1,519	1,931	2,926	2,043	2,332	1,492	1,259	2,010	2,926
Gadwall	20	600	4		6	8	6	17	13	13	7		10	17
Green-winged Teal					1	1							0	0
Teal	450	5,000	778	1,214	1,139	1,079	1,492	1,611	1,169	1,302	667	644	1,079	1,611
Mallard	380	20,000	671	572	431	362	489	539	628	406	423	484	496	628
Pintail	20	600	52	41	2	7	73	46	20	14	2		16	46
Shoveler	25	400	103	148	74	48	103	33	24	45	62	51	43	62
Red Crested Pochard			1										0	0
Pochard	380	3,500	38	11	19	21	27	18	7	7	2	3	7	18
Ring-necked Duck							1						0	0
Tufted Duck	370	12,000	34	20	46	36	29	33	14	14	19	16	19	33
Scaup	45	3,100	2							2			0	2
Long-tailed Duck		20,000					2						0	0
Eider	30	12,830						1		15	1		3	15
Common Scoter	230	16,000		2			1	1	3	7		1	2	7
Surf Scoter			2										0	0
Velvet Scoter												3	1	3
Goldeneye	95	11,500	18	14	18	28	11	14	7	10	5	14	10	14
Red-breasted Merganser	35	1,700	110	128	64	77	95	88	85	80	68	72	79	88
Red-throated Diver	20	3,000								1	1		0	1
Black-throated Diver		3,750											0	0
Great Northern Diver		50	1	8	3	1	1	1			4	3	2	4
Pied-billed Grebe			1										0	0

The counts presented in the table refer to the peak counts of species in each I-WeBS season.

Site peak and mean are calculated as the peak and mean of peak counts respectively over the seasons specified. Blank cells within columns which contain positive values for one or more species constitute zero for those species.



Little Grebe	25	4,000	56	50	58	59	60	88	80	69	58	65	72	88
Great Crested Grebe	55	3,600	166	218	171	287	240	132	105	137	63	106	109	137
Slavonian Grebe		55	4		1			3	1	2			1	3
Black-necked Grebe			3	3	2	2							0	0
Cormorant	140	1,200	283	556	244	392	326	357	370	308	163	285	297	370
Shag									2		2	8	2	8
Little Egret		1,300	20	18	27	39	61	83	166	126	143	151	134	166
Grey Heron	30	2,700	54	61	114	57	97	68	135	76	84	72	87	135
Spoonbill												1	0	1
Water Rail			3	3		1	1	1	2	2	2	2	2	2
Moorhen	20		28	21	21	19	24	46	24	33	55	25	37	55
Coot	330	17,500	34	96	24	13	26	31	23	16	19	7	19	31
Oystercatcher	680	10,200	1,584	1,421	1,698	1,061	1,570	2,021	1,857	2,076	1,061	1,590	1,721	2,076
Ringed Plover	150	730	59	52	78	66	28	68	25	67	17	27	41	68
Golden Plover	1,700	9,300	3,000	3,432	4,009	6,888	4,262	5,102	6,200	3,002	3,266	5,232	4,560	6,200
Grey Plover	65	2,500	72	44	5	6	108	37	4	24	12	39	23	39
Lapwing	2,100	20,000	4,386	4,116	7,267	2,816	4,176	4,864	4,133	4,096	3,321	3,321	3,947	4,864
Knot	190	4,500	16	17	80	79	306	114	85	117	124	111	110	124
Sanderling	65	1,200					135	350		33			77	350
Curlew Sandpiper				15		2	1		3	4	1		2	4
Dunlin	880	13,300	8,277	8,240	6,632	5,755	3,979	4,785	4,325	3,874	4,456	3,579	4,204	4,785
Ruff		12,500		1			1	1		1		3	1	3
Snipe		20,000	43	47	5	20	20	54	14	49	32	75	45	75
Long-billed Dowitcher						1	1						0	0
Black-tailed Godwit	140	470	2,508	1,692	1,615	2,128	3,162	1,518	2,937	3,337	1,433	2,823	2,410	3,337
Bar-tailed Godwit	160	1,200	16	52	351	419	477	405	298	218	383	257	312	405
Whimbrel		2,000	2	1		1	1	3	1	4	1	1	2	4
Curlew	550	8,500	2,927	2,223	1,297	1,329	1,817	1,083	2,317	1,809	1,363	1,607	1,636	2,317
Common Sandpiper			3	3	1	2	2	2	2	2	1	4	2	4
Green Sandpiper			2	1		1	1	1	1	1			1	1
Spotted Redshank		900	3	2	1	1	2	1	2	1	1	1	1	2
Greenshank	20	2,300	46	61	31	25	60	47	83	68	72	71	68	83
Redshank	310	3,900	2,243	2,269	1,005	1,138	2,170	1,591	2,295	1,543	1,459	1,725	1,723	2,295
Turnstone	120	1,500	166	146	93	66	145	131	161	136	129	214	154	214
Mediterranean Gull			5	7	1	2	12	11	13	15	24	48	22	48
Sabine's Gull								1					0	1
Bonaparte's Gull											1		0	1
Black-headed Gull		20,000	2,493	1,609	2,288	1,180	1,811	2,954	2,170	2,627	2,010	2,103	2,373	2,954

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Ring-billed Gull		2	3	2	1		1	1				0	1
Common Gull	16,000	676	378	1,264	1,725	459	200	290	188	214	207	220	290
Lesser Black-backed Gull	4,500	753	118	177	106	63	254	496	31	630	72	297	630
Herring Gull	13,000	53	68	36	16	37	32	36	40	123	51	56	123
Iceland Gull			1	1								0	0
Glaucous Gull											1	0	1
Great Black-backed Gull	4,800	120	238	141	76	110	150	385	157	137	98	185	385
Unidentified gull					2,123							0	0
Sandwich Tern		2	12	2	34	5		2	225	2	17	49	225
Common Tern			18			2	1		1	1	1	1	1
Arctic Tern											1	0	1
Unidentified Tern							3					1	3
Kingfisher			1	1	2	1	3	3	3	1	2	2	3

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## Saleen

Species	1% National	1% International	1998/99	1999/00	2000/01	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	Mean (03-07)	Peak (03-07)
Mute Swan	110	110	1	2	2	2	1	1		3			1	3
Canada Goose									13				3	13
Light-bellied Brent Goose	220	260			4								0	0
Shelduck	150	3,000	59	75	42	52	30	41	60	44	34	29	42	60
Wigeon	820	15,000	129	95	122	73	173	102	97	179	149	124	130	179
Green-winged Teal							1						0	0
Teal	450	5,000	72	101	81	168	199	223	188	248	184	226	214	248
Mallard	380	20,000	29	26	28	56	41	46	39	46	91	82	61	91
Shoveler	25	400					4	7		4			2	7
Goldeneye	95	11,500		2									0	0
Red-breasted Merganser	35	1,700			2	8	8	9	2	1	2		3	9
Red-throated Diver	20	3,000								1			0	1
Black-throated Diver		3,750											0	0
Little Grebe	25	4,000	11	13	9	11		9	5	8	14	8	9	14
Great Crested Grebe	55	3,600	13	6	5	8	6	16	7	13	4	5	9	16
Slavonian Grebe		55			1								0	0
Cormorant	140	1,200	7	7	6	4	6	3	6	6	7	7	6	7
Little Egret		1,300	9	4	7	10	10	10	23	17	17	18	17	23
Grey Heron	30	2,700	7	4	8	6	5	7	6	6	4	5	6	7
Moorhen	20						2			1			0	1
Oystercatcher	680	10,200	129	172	136	150	175	147	135	137	94	176	138	176
Ringed Plover	150	730	14		14		19		13	41			11	41
Lapwing	2,100	20,000	36	8	7	2		2	12		1		3	12
Knot	190	4,500								5		1	1	5
Curlew Sandpiper				9									0	0
Dunlin	880	13,300	256	31	26	10	164	28	64	6	37	54	38	64
Ruff		12,500										1	0	1
Snipe		20,000						2	6	2	5	1	3	6
Long-billed Dowitcher							1						0	0
Black-tailed Godwit	140	470	61	22	16	55	75	52	121	72	129	101	95	129
Bar-tailed Godwit	160	1,200	1	2	4	4	2	1	13	5	1	1	4	13
Whimbrel		2,000				1	1						0	0
Curlew	550	8,500	121	81	82	89	96	91	103	90	115	152	110	152
Common Sandpiper										1	1		0	1

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Spotted Redshank		900	3	2							1	0	1	
Greenshank	20	2,300	8	10	13	11	12	4	9	12	8	10	9	12
Redshank	310	3,900	123	106	135	129	116	116	144	126	173	161	144	173
Turnstone	120	1,500	61	26	52	33	35	12	26	73	54	17	36	73
Mediterranean Gull						1		4	4	5	6	48	13	48
Bonaparte's Gull											1		0	1
Black-headed Gull		20,000	190	177	167	107	176	57	187	184	221	212	172	221
Ring-billed Gull					1								0	0
Common Gull		16,000	7	47	41	88	264	39	103	21	65	84	62	103
Lesser Black-backed Gull		4,500	7	42	3	77	1	1	2	1	5	9	4	9
Herring Gull		13,000	2	3	4	1	6	3	7	3	5	3	4	7
Great Black-backed Gull		4,800	1	4	1	14	4	9	8	4	3	4	6	9
Sandwich Tern				2		22			2	6		3	2	6
Kingfisher					1		1		1	1	1	1	1	1

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## Owenboy Estuary

Species	1% National	1% International	1998/99	1999/00	2000/01	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	Mean (03-07)	Peak (03-07)
Mute Swan	110	110	5	2	2				2			4	2	4
Feral/hybrid Goose									2				1	2
Shelduck	150	3,000	111	122	97		167	206	141	76		45	117	206
Wigeon	820	15,000	13										0	0
Teal	450	5,000	88	50	5		80	50	75	29		25	45	75
Mallard	380	20,000	58	49	36		51	115	77	18		49	65	115
Red-breasted Merganser	35	1,700	15	5			12	12	7	9		3	8	12
Little Grebe	25	4,000					1					7	2	7
Great Crested Grebe	55	3,600						1				1	1	1
Cormorant	140	1,200	10	38	20		9	8	6	1		5	5	8
Little Egret		1,300		1				1	6			8	4	8
Grey Heron	30	2,700	4	6	18		6	13	12	6		11	11	13
Oystercatcher	680	10,200	119	54	40		91	80	82	27		105	74	105
Ringed Plover	150	730			6								0	0
Golden Plover	1,700	9,300	450	60	1,050								0	0
Lapwing	2,100	20,000	426	200	150		150	30	117	73		94	79	117
Knot	190	4,500			1				16			10	7	16
Curlew Sandpiper									1				0	1
Dunlin	880	13,300	460	115	55		120	63	170	107		125	116	170
Snipe		20,000		8				3		10		1	4	10
Black-tailed Godwit	140	470	75	194	146		210	100	233			250	146	250
Curlew	550	8,500	98	85	99		54	39	51	31		83	51	83
Common Sandpiper								1	1			2	1	2
Greenshank	20	2,300	4	9	2		30	12	23	17		11	16	23
Redshank	310	3,900	138	92	152		150	148	280	120		370	230	370
Turnstone	120	1,500	10	4			20	20	76	10		10	29	76
Black-headed Gull		20,000	397	156	147		80	200	226	253		305	246	305
Common Gull		16,000	82	90	65		80	50	50	90		183	93	183
Lesser Black-backed Gull		4,500	158	15					40			51	23	51
Herring Gull		13,000	6		1		5		2			17	5	17
Iceland Gull					1								0	0
Great Black-backed Gull		4,800	5	1	2		8		20			3	6	20
Sandwich Tern												2	1	2
Kingfisher							1						0	0

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