Natura Impact Statement

(Stage 2: Appropriate Assessment)

Impacts of Powerstown Landfill, Co. Carlow on Special Area of Conservation 002162

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1. INTRODUCTION

The present report is required because surface water from Powerstown Landfill is discharged to the Powerstown Stream, c. 450m upstream of Special Area of Conservation 002162 (River Barrow and River Nore). Under Article 6(3) of the EU Habitats Directive, there is a requirement for an assessment of the implications for the designated site of any development which could potentially impact on the site's conservation objectives. As a screening process could not rule out the possibility of a significant negative impact on the SAC, Pascal Sweeney, Sweeney Consultancy, was contracted by Carlow County Council to carry out a Natura Impact Statement (Stage 2, Appropriate Assessment) to fulfil this obligation. The Department of the Environment, Heritage and Local Government guidance *"Appropriate Assessment of Plans and Projects in Ireland – guidance for Planning Authorities, 2009"* and the European Commission (2001) guidelines *"Assessment of plans and projects significantly affecting Natura 2000 sites - Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC"* are followed. As a conservation plan for the River Barrow and River Nore SAC is not yet available, this report focuses on potential impacts on each specific qualifying feature of the SAC, in the context of the particular site, as well as on the NPWS draft conservation objectives.

Details of the qualifications and experience of Pascal Sweeney, the author of this report, are given in Appendix 1.

2. DESCRIPTION

The development for which impacts on the Conservation Objectives of the River Barrow and River Nore SAC is being assessed, is an existing landfill site, for which the licence (code W0025-02) specifies that there are to be no direct emissions to groundwater and that no raw leachate, treated leachate or contaminated surface water shall be discharged to the Powerstown Stream. All leachate is transported to Mortarstown Waste Water Treatment Plant for disposal. The surface water discharge to the Powerstown Stream is monitored chemically by Carlow Co. Co. and the Powerstown Stream is monitored both chemically and biologically, upstream and downstream of the discharge point.

Because Powerstown Landfill is in operation, its current impact on the Qualifying Interests and Conservation Objectives of the River Barrow and River Nore SAC can be directly assessed.

In this report section, the site of the proposed development is assessed in terms of:

- the presence downstream of the discharge of any protected habitats (Annex I of the EU Habitats Directive);
- the presence downstream of the discharge of any species listed in Annex II of the EU Habitats Directive;
- the water quality of the Powerstown Stream and the River Barrow;
- existing ecological records.

2.1 Relevance to Management of the SAC Site

The Powerstown Landfill is not directly connected with or necessary to the management of the SAC site.

2.2 Site Assessment

Field work was carried out on 7 July, 2011.

The Powerstown Stream was walked from the landfill site, to the confluence with the River Barrow. A general assessment of the site was carried out in line with the Heritage Council draft Guidelines for Survey of Habitats (Draft 2, April 2005) and habitats were classified to level 3 of the Fossitt (2000)

classification system. To illustrate the general habitat quality, photographs were taken using a digital camera. Grid references were recorded using a GPS handset.

The status of protected species was assessed as follows:

- The presence of the freshwater pearl mussel (*Margaritifera margaritifera*) was checked for by reference to available records on the distribution of this species.
- The habitat quality for salmon (*Salmo salar*) was assessed, based on the criteria outlined by Bardonnet and Baglinière (2000) for the physical instream requirements of this species for spawning, nursery and adult habitat.
- The habitat quality for the three species of lamprey, the brook lamprey (*Lampetra planeri*), river lamprey (*Lampetra fluviatilis*), sea lamprey (*Petromyzon marinus*) was assessed, based on the criteria outlined by Maitland (1980) and by Johns (2002) for the physical instream requirements of these species for spawning, nursery and adult habitat. Available records on the distribution of these species were also checked.
- The habitat quality for crayfish (*Austropotamobius pallipes*) was assessed, based on the criteria outlined by Holdich (2003) for the physical instream requirements of this species and by direct observation.
- The presence of the otter (*Lutra lutra*) was checked for by examination of hard riverside surfaces for the presence of spraints. The habitat quality for this species was assessed, based on the criteria outlined by Chanin (2003). Available records on the distribution of this species were also checked.
- The floating river vegetation habitat was assessed, based on the criteria outlined by Life in UK Rivers (2003).

Available records on the distribution of other protected species and the proximity of protected terrestrial habitats were checked.

Available chemical and biological water quality data were examined.

2.3 Results of Site Assessment

2.3.1 Habitat Description and Classification

The Powerstown Stream, downstream of the surface water discharge, is mainly a shallow, eroding watercourse (Habitat Code FW1), with riffle over stones (Photograph 1, 2) but with some areas of deposition of finer material (Photo 3). There is heavy shading by trees and bushes along most of the southern bank. In less shaded parts, there is some strong growth of marginal plants, mainly *Nasturtium officinale*. The final c. 20m of the stream, to the confluence with the River Barrow at IGR S7013 6859, has recently been dredged. Bovines have access to the stream along most of its course downstream of the road bridge (Photo 4). Downstream of the confluence, the river Barrow is deep and slow-flowing (Habitat Code FW2). Here, the main instream plants are *Nuphar lutea* and *Potamogeton natans*, with *Callitrice spp.* occasional in occurrence.

2.3.2 Protected Habitats and Species

The physical habitat of the Powerstown Stream makes it suitable for the following protected species. Riffle areas are suitable for lamprey spawning, while the depositions of finer material are suitable for burrowing ammocoetes (juveniles).

The habitat is very suitable for crayfish. A recently detached crayfish claw was found (Photo 6).

While the stream is better trout habitat than salmon habitat (trout were seen), it could be used by salmon for spawning and nursery, if the water quality was good enough.

Freshwater pearl mussels do not occur in the Powerstown Stream and is apparently now extinct in the main channel of the River Barrow (Lucey, 1998).

While no otter spraints were found, the habitat is suitable and there is evidence that a good supply of prey is available. Baily and Rochford (2006) recorded positive results at nearly 73% of the sites surveyed within the South Eastern River Basin District, which includes the River Barrow, indicating a widespread distribution of the species.

The main channel of the River Barrow can be classified as a habitat with floating river vegetation.

2.3.3 Biological Water Quality Data

Since 2001, the biological water quality of the Powerstown Stream has been monitored yearly by Conservation Services, by analysis of the macroinvertebrate communities, upstream and downstream of the surface water discharge. Results, expressed as Q-values, are presented in Appendix 4. Since 2005, the Q-value recorded downstream of the discharge point has been the same as that recorded upstream. Since 2007, Q3-4 was recorded at both the upstream and downstream site.

The Q-values recorded in the Powerstown Stream and the River Barrow by EPA are presented in Appendix 5. On the last three sampling occasions (2003, 2006 and 2009), EPA recorded Q4 at the site on the Powerstown Stream downstream of the landfill. Q4 is defined by the European Communities Environmental Objectives (Surface Waters) Regulations 2009 as "Good Ecological Status" and is the standard which, in accordance with these regulations, must be achieved by December 2015.

It should be noted that, in the three years when biological sampling overlapped, the Conservation Services assessment of biological water quality at the site downstream of the landfill was lower than that of EPA. Conservation Services assigned Q3 in 2003 and 2006, and Q3-4 in 2009, while EPA assigned Q4 on all three occasions. This suggests that the Conservation Services assessment is more conservative than EPA and that the Powerstown Stream is possibly in slightly better biological condition than the annual biological monitoring results indicate.

The Powerstown Stream enters the River Barrow between EPA Sites 2600 and 2680. In the last three rounds of biological monitoring (2003, 2006 and 2009) EPA recorded Q4 at Site 2680, with an improvement from Q3-4 at Site 2600 seen in 2003 and 2009. These results indicate that the Powerstown Stream is not negatively influencing the biological water quality of the River Barrow.

2.3.4 Chemical Water Quality Data

Quarterly chemical analysis results that are relevant to the status of the SAC Qualifying Interests are presented in Appendix 6. Apart from suspended solids, none of these results exceed the limits set by the European Communities (Quality of Salmonid Waters) Regulations of 1988 (S.I. No. 293 of 1988) for designated Salmonid Waters. (It should be noted, however, that the River Barrow is not a

designated Salmonid Water). Suspended solids levels were generally higher upstream of the surface water discharge.

Orthophosphate results do not indicate any enrichment of the Powerstown Stream by discharge.

Overall, the chemical monitoring does not indicate any significant negative impact of the surface water discharge from the landfill on the Powerstown Stream.

2.3 NATURA 2000 Site

The Site Synopsis for Special Area of Conservation 002162 (River Barrow and River Nore) is given in Appendix 7, all the Qualifying Interests are listed in Appendix 8 and the Conservation Objectives for the site are given in Appendix 9.

3. NATURA IMPACT STAGE TWO – APPROPRIATE ASSESSMENT

3.1 Potential Effects of the Proposed Development on SAC Qualifying Interests.

3.1.1 Annex I Habitats.

Floating River Vegetation (Habitat Code 3260).

Floating river vegetation occurs in the River Barrow downstream of the confluence of the Powerstown Stream. As the chemical monitoring results do not indicate an increase in plant nutrients and as the biological results do not indicate any recent deterioration in biological water quality downstream of the discharge, there is no evidence of any negative impact on this Qualifying Interest.

Petrifying Springs (Habitat Code 7220).

This habitat is not present close to the area of the landfill and could not be negatively affected.

Eutrophic Tall Herbs (Habitat Code 6430)

Tall herb fringes occur along the banksides of the River Barrow, where it is deep and slow-flowing. While hydrophilous tall herb fringe communities are not listed by Curtis *et al.* (2009) among the water-dependant Annex I habitats, it would appear that this habitat type, while not vulnerable to slight pollution, could be affected by major changes in trophic conditions. However, as the chemical monitoring results do not indicate an increase in plant nutrients and as the biological results do not indicate any recent deterioration in biological water quality downstream of the discharge, there is no evidence of any negative impact on this Qualifying Interest.

Old Oak Woodlands (Habitat Code 91A0) and **Dry Heath (Habitat Code 4030).**

Terrestrial habitats not present close to the area of the landfill and could not be negatively affected.

Alluvial Wet Woodlands (Habitat Code 91E0).

Alluvial wet woodland occurs along banks of the River Barrow, particularly in the lower reaches and the tidal section. This habitat is not present close to the area of the landfill and could not be negatively affected

Estuary (Habitat Code 1130) and **Tidal Mudflats & Sandflats (Habitat Code 1140).**
Saline habitats, far downstream of the landfill. As the chemical monitoring results do not indicate an increase in plant nutrients and as the biological results do not indicate any recent deterioration in biological water quality downstream of the discharge, there is no evidence of any negative impact on these Qualifying Interests.

3.1.2 Annex II Species.

Desmoulins' Whorl Snail (*Vertigo moulinsiana*) **(Species Code 1060).**
Vertigo moulinsiana is found in calcareous wetlands, usually adjacent to lowland rivers and lakes (Kerney, 1999). It is known to occur farther downstream in the SAC, near Borris, and there is an old record of it having been found on floating debris at Graiguenamanagh (E. Moorkens, *pers. comm.*).The habitat by the Powerstown Stream is not suitable for this species. As this species is not present close to the area of the landfill and could not be negatively affected.

Freshwater Pearl Mussel (*Margaritifera margaritifera*) **(Species Code 1029)**.
The freshwater pearl mussel is apparently now extinct in the main channel of the River Barrow (Lucey, 1998). A live specimen of freshwater pearl mussel was last found in the River Barrow in 1991, c. 5km upstream of Graiguenamanagh (Grid Ref. S734 477). This location is downstream of the confluence of the Mountain River, which supports a freshwater pearl mussel population and from which this specimen was probably washed into the River Barrow (E. Moorkens, *pers. comm.*). As no viable pearl mussel population is present in the River Barrow, this species could not be affected.

Nore Freshwater Pearl Mussel (*Margaritifera m. durrovensis*) **(Species Code 1990)**.
Within SAC 002162, the Nore freshwater pearl mussel is a sub-species which occurs only in a 10km stretch of the main channel of the River Nore and is not in any part of the River Barrow. Therefore, it could not be affected.

Twaite Shad (*Alosa fallax*) **(Species Code 1103)**.
Twaite shad is an anadromous fish which enters large estuaries in early summer to spawn in gravels near the end of the freshwater reaches. Adult shad are known to occur in the lower parts of the River

Barrow. There is evidence that Twaite shad spawn below the weir at Saint Mullin's. The main threat to the shad population in the River Barrow is the recently arrived Asian clam (Sweeney, 2009) which is likely to have a very significant negative impact on spawning areas. Other threats to Irish shad populations include deterioration of water quality and habitat degradation. However, as the chemical monitoring results do not indicate an increase in plant nutrients and as the biological results do not indicate any recent deterioration in biological water quality downstream of the discharge, there is no evidence of any negative impact on this Qualifying Interest, no impacts on this species is considered possible, given the distance to Saint Mullin's.

Sea Lamprey (*Petromyzon marinus*) **(Species Code 1095)**, **Brook Lamprey** (*Lampreta planeri*) **(Species Code 1096)** and **River Lamprey** (*Lampreta fluviatilis*) **(Species Code 1099)**.

King (2006) recorded juvenile sea and brook/river lampreys in tributaries of this part the River Barrow, but none in any of the seven main channel sites assessed downstream of Carlow Town. The habitat in the Powerstown Stream is very suitable for lamprey spawning and nursery. A significant drop in water quality or a serious silt insult during the spawning season could negatively affect any lamprey present. However, as the biological results do not indicate any recent deterioration in biological water quality downstream of the discharge, there is no evidence of any negative impact on these Qualifying Interests.

Atlantic Salmon (*Salmo salar*) **(Species Code 1106)**.

O'Reilly (2002) states that the River Barrow is a fair to good salmon river. While there is some suitable salmon spawning and nursery habitat in the Powerstown Stream, the suitability of the biological water quality is in question. The water quality recorded by Conservation Services would be too poor for a viable salmon nursery stream. The slightly better water quality recorded by EPA would be just suitable, but not ideal. However, as there is no deterioration in the biological water quality from the upstream site to the downstream, there is no evidence of any negative impact on this Qualifying Interest.

White-Clawed Crayfish (*Austropotamobius pallipes*) **(Species Code 1092)**.

Crayfish are present in the Powerstown Stream and are reported by Demers *et al.*, (2005) to be fairly well distributed in the River Barrow catchment. As the biological results do not indicate any recent deterioration in biological water quality downstream of the discharge, there is no evidence of any negative impact on this Qualifying Interest.

Otter (*Lutra lutra*) **(Species Code 1355)**.

Within the South Eastern River Basin District, which includes the River Barrow, Baily and Rochford (2006) recorded positive results at nearly 73% of sites surveyed, indicating a widespread distribution of the species. As the surface water discharge is not negatively affecting otter habitat quality nor availability of prey species, there is no evidence of any negative impact on this Qualifying Interest.

Killarney Fern (*Trichomanes speciosum*) **(Species Code 1421).**

Killarney fern is a terrestrial species, found on very sheltered, damp rock faces (Stace, 1991). As this species is not present close to the area of the landfill and could not be negatively affected.

3.2 Assessment of Significance

The Powerstown Landfill is not resulting in any loss or fragmentation of habitats for which the SAC is designated.

The Powerstown Landfill is not causing significant disturbance to or affecting the population density of any of the species for which the SAC is designated.

The Powerstown Landfill is not causing any significant change to the water resource nor to water quality.

3.3 Potential Cumulative Impacts.

Point sources, diffuse runoff and inputs from tributaries of unsatisfactory water quality are affecting the biological water quality of the River Barrow along the course of the river. This can be seen in the EPA Q-ratings (Appendix 5).

The following facilities in the catchment of the River Barrow between Athy and New Ross have waste licences:

Ballylinan Landfill Site (Tegral Building Products Ltd.), Licence Code W0046-01. This facility does not discharge to surface water. The licence also specifies that there are to be no direct emissions to groundwater.

Ray Whelan Ltd. Waste Transfer Station, Licence Code W0158-01. The licence specifies emission limits for surface water discharges and that there are to be no direct emissions to groundwater.
Athy Civic Amenity Centre, Licence Code W0175-01. The licence specifies that there are to be no emissions to surface water. The licence also specifies conditions and limits for emission to sewer.

Also in the catchment of this section of river, the following have IPPC licences:
Braun Oral B, Code P0287-01. The licence specifies emission limits to the Carlow UDC sewer and also specifies measures for the protection of groundwater and surface water.
Peerless Rugs Europe Ltd., Code P0261-01. The licence specifies conditions and limits for emission to sewer. The licence also specifies the monitoring requirements for surface water discharges of non-process water and actions to be taken if contamination is detected.
Clogrennane Lime Ltd., Code P0400-02. This facility has no emissions to water of environmental significance.
Richard Keenan & Co. Ltd., Code P0555-01. The licence specifies measures for the protection of groundwater and surface water.

Provided that the facilities listed above comply with the terms of their licences, they will not add to cumulative impact on the biological water quality of the River Barrow, or on the Conservation Objectives of Special Area of Conservation 002162.

4. MITIGATION MEASURES

As no negative impacts on the Qualifying Interests of SAC 002162 were detected, it can be stated with full confidence that the Powerstown Landfill is not contributing to any significant cumulative impacts on Conservation Status of the Qualifying Interests of the SAC and is not affecting the site's Conservation Objectives and no mitigation measures, additional to those already in place, are necessary.

APPENDIX 1

QUALIFICATIONS AND EXPERIENCE OF PASCAL SWEENEY

QUALIFICATIONS:

B.Sc. 1977, UCD (Honours Zoology)

M.Sc. 2000, UCC (Dept. Zoology, Ecology and Plant Science).

MAIN RELEVANT EXPERIENCE:

Freshwater Ecology:

Research:

M.Sc. thesis on aquatic insect populations and eutrophication in the Killarney Lakes.

Irish Lakes Project: Assessment of lake profundal macroinvertebrate community structure in relation to trophic status for a large multi-disciplined project, designed to develop monitoring methodologies for Irish lakes. Co-author of the Final Report (EPA R&D Series No. 12).

Three Rivers Project: Biological research for the development of river basin management systems for the Rivers Boyne, Liffey and Suir (Funded by Dept. of the Environment and Local Government).

National Museum Collection: Compiled of specimen collections of freshwater and estuarine oligochaete worms (Funded by the Royal Irish Academy)

National Biodiversity Data Centre: Database Manager for families of Irish aquatic oligochaete worms.

Natterjack Toad Population Assessment: Two year contract from NPWS to monitor natterjack toad populations and breeding ponds in Co. Kerry (commenced Spring 2011).

Biological Water Quality Monitoring:

Monitoring of biological water quality of rivers (Q-rating) for local authorities (e.g. Wexford Co. Co., North Tipperary Co. Co., Clare Co. Co.), industries (e.g. Glanbia, Dairygold, Irish Sugar, Readimix,

Anglo-American Mining) and Eastern River Basin District Catchment Monitoring and Management Project.

Biological water quality assessments of river catchments in Munster and south Leinster for the North South 2 Freshwater Pearl Mussel Sub-Basin Plans.

Impact Assessment:

Impact assessment of proposed developments on freshwater habitats and recommendation of mitigation measures. These developments include roads, gas pipelines, landfills, quarries, hydropower stations, intensive agriculture and industries.

Habitats Directive Natura Impact Statements:

Stage 1, Screening: Reports for 12 small proposed developments in Counties Cork, Waterford and Carlow.

Stage 2, Appropriate Assessment: Reports for 49 local authority waste water treatment plants (23 in Co. Carlow, 25 in Co. Kilkenny and one in Co. Kildare); for four local authority water abstractions in Counties Tipperary and Carlow); for four flood defence schemes (Fermoy, Tullow, Leighlinbridge and Tinnahinch), for one bridge widening project (Grange Br., Co Kilkenny) and for 12 small proposed developments in Counties Cork, Tipperary and Carlow).

Terrestrial Ecology:

Rural Environment Protection Scheme (REPS) and Agri-Environment Options Scheme (AEOS):

Approved as an Environmental Planner (Code 00087) and given a REPS Planning Agency (Code PL044) by Dept. of Agriculture in 1995 following a training course.

Prepared 21 full REPS Plans for participants in REPS 1.

Surveying of lands in NHA/SAC/SPA sites and preparation of Environmental Reports, with management recommendations for REPS/AEOS applicants throughout Munster (over 600 Environmental Reports prepared).

Commonage Framework Planning:

Approved as an Environmental Commonage Framework Planner in 1999 following a training course. Surveyed habitats, assessed vegetation condition and recommended management requirements on commonage blocks in North Cork, Sheep's Head Peninsula, Galtee Mountains and Blackstairs Mountains.

Hen Harrier Farm Planning:

Approved as an NPWS Environmental Farm Planner in 2008 following a training course.
Assessed habitat and vegetation suitability for hen harriers and prescribed management requirements on farms in Cork, Kerry and Limerick. (31 plans to date).

Habitat Surveys and Management Planning of Coillte Property:

Surveyed potential Biodiversity Areas within Forest Management Units 301 (Waterford Uplands), 302 (Waterford Lowlands), 303 (Mid-East Cork). Recommended management requirements, based on habitat and species information collected.

Native Woodland Scheme:

Approved as a Participating Ecologist for the purposes of the Native Woodland Scheme in 2002, following a training course.
Surveying of sites for native woodland conservation and establishment. Preparation of the ecological aspects of the Ecological Survey/Management Plans. (49 plans).

Planning Application Ecological Reports:

Ecological reports to accompany applications for planning for private dwellings located within or close to SAC sites. These reports were prepared prior to the requirement for Habitats Directive reports (33 reports in Co. Cork).

APPENDIX 2

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APPENDIX 3
PHOTOGRAPHS

Photo 1. Powerstown Stream, eroding habitat.

Photo 2. Powerstown Stream, eroding habitat.

Photo 3. Powerstown Stream, deposition of finer material.

Photo 4. Powerstown Stream, cattle access.

Photo 5. River Barrow.

Photo 6. Crayfish claw.

APPENDIX 4

Biological Water Quality Monitoring Results for Powerstown Stream

Q-value assessments, carried out by Conservation Services

	Site ST2 (upstream of landfill)	Site ST1 (downstream of landfill)
March 2001	Q3 Moderately Polluted	Q3 Moderately Polluted
March 2002	Q3-4 Slightly Polluted	Q3 Moderately Polluted
September 2003	Q3 Moderately Polluted	Q3 Moderately Polluted
September 2004	Q3-4 Slightly Polluted	Q3 Moderately Polluted
November 2005	Q3-4 Slightly Polluted	Q3-4 Slightly Polluted
September 2006	Q3 Moderately Polluted	Q3 Moderately Polluted
September 2007	Q3-4 Slightly Polluted	Q3-4 Slightly Polluted
September 2008	Q3-4 Slightly Polluted	Q3-4 Slightly Polluted
August 2009	Q3-4 Slightly Polluted	Q3-4 Slightly Polluted
September 2010	Q3-4 Slightly Polluted	Q3-4 Slightly Polluted

Site ST1 is the same as EPA site 0400 (see Appendix 5)

APPENDIX 5

EPA Biological Water Quality Results

River and Code: **POWERSTOWN** **14P02**
Tributary Of: 14B01 BARROW OS Catchment No: 183
OS Grid Ref of confluence: S 687 523

	Biological Quality Ratings (Q Values)						
Station Nos.	**1989**	**1993**	**1997**	**2000**	**2003**	**2006**	**2009**
0200	4	3-4	3-4	3-4	3-4	n/s	-
0400	4	4	3-4	3-4	4	4	4

Station No.	***Station Location***	***National X***	***Grid Ref. Y***	***Discovery Series No.***	***County Code***
0200	Br SE of Powerstown	266638	150792	68	KK
0400	Br u/s Barrow R confl	268492	152047	68	KK

River and Code: **BARROW** **14B01**
Tributary Of: 14B01 BARROW OS Catchment No: 183
OS Grid Ref of confluence: S 722 388

Biological Quality Ratings (Q Values)

Station Nos.	1980	1982	1986	1989	1991	1994	1997	2000	2003	2005	2006	2008	2009
0050	5	5	5	5	-	5	4-5	4-5	4-5	-	4	-	4
0100	3-4	4-5	4	3	-	3-4	4	4	3-4	-	3	-	4-5
0200	4	4	4	3-4	-	3-4	4	4	3-4	-	4	-	4
0300	5	-	4	4	-	4	3-4	4	4	-	4	-	3-4
0400	5	-	4	4	-	-	-	-	-	-	-	-	-
0500	4	-	4	4	-	3-4	3-4	3-4	3-4	-	3-4	-	3-4
0550	-	-	-	3-4	-	-	-	-	-	-	-	-	-
0600	4	-	4	4	-	4	4	3-4	3-4	-	3-4	-	-
0700	4	4	4-5	4-5	-	4	4	4	4	-	3-4	-	3-4
0760	-	-	-	-	-	-	-	4	-	-	-	-	-
0780	-	-	-	-	-	-	-	-	-	-	-	-	3
0800	3-4	-	4	4	-	4	-	-	-	-	-	-	-
0850	-	-	-	-	-	-	3-4	-	-	-	-	-	-
0900	4	4	4	4	-	4	3-4	3-4	3-4	-	3-4	-	3-4
1000	4	-	4-5	4	-	4	3-4	3-4	4	-	3-4	-	4
1200	5	-	4	3	-	3	-	-	-	-	-	-	-
1300	4	-	4-5	3-4	-	4	-	3-4	3-4	-	3	-	4
1400	4	-	4	4	-	4	4	4	4	-	4	-	-
1500	4	4	4	4	-	4	3-4	3-4	4	-	3-4	-	3-4
1590	-	-	-	-	-	-	3-4	3-4	3-4	-	-	-	-
1600	3	3-4	4	3-4	-	3-4	-	-	-	-	-	-	-
1800	4	4	4	4	-	3-4	-	-	-	-	-	-	-
1900	4	4	4	4	-	4	3-4	4	4	-	4	-	n/s
2000	3	3-4	3-4	3	-	4	3-4	4	4	-	-	-	-
2150	-	3-4	4	4	-	4	-	-	-	-	-	-	-
2200	-	-	-	-	-	-	-	3	4	-	3-4	-	3-4
2400	-	2	1	-	-	-	-	-	-	-	-	-	-
2450	-	3	3-4	4	-	3	3	3	3	-	-	-	-
2455	-	-	-	-	-	-	-	-	-	-	4	-	3-4
2500	3	3	3-4	3-4	-	-	-	-	-	-	-	-	-
2600	3-4	3	3	3-4	-	3-4	3	3	3-4	-	4	-	3-4
2680	-	-	-	-	-	-	3-4	3-4	4	-	4	-	4
2700	3	3-4	3-4	3	-	3	-	-	-	-	-	-	-
2750	-	-	-	-	-	-	4	4	4	-	-	-	-
2800	3	3-4	3-4	3	-	3	-	-	-	-	-	-	-
2900	3	2-3	2-3	2-3	-	3	3-4	3-4	4	-	4	-	4
2910	-	-	3-4	3-4	-	4	4	3-4	3-4	-	4	-	-
3000	4	4	3-4	3-4	-	3-4	3-4	4	3-4	-	4	-	-
3100	4	4	4	3	-	3-4	-	-	3-4	-	3-4	-	3-4
3300	4	4-5	4	4	-	4	-	-	3-4	-	4	-	4
3500	4	4	4	3-4	3-4	3-4	3-4	3-4	3-4	3-4	3-4	4	4
3600	-	4	4	-	-	-	-	-	-	-	-	-	-

The Powerstown Stream enters the River Barrow upstream of Site 2680.

Station No.	Station Location	National X	Grid Ref. Y	Discovery Series No.	County Code
0050	Tinnahinch Br	235155	210490	54	LA
0100	Ford S of Rearyvalley	236128	213025	54	LA
0200	Ballyclare Br	238591	214722	54	LA
0300	Twomile Br	242280	211786	54	LA
0400	Bay Br	0	0	54	LA
0500	Borness Br	246396	209279	54	LA
0550	Br SE of Hammerlane	0	0	54	OF
0600	Portnahinch Br	249067	210029	54	OF
0700	Kilnahown Br	251371	210753	54	LA
0760	Barrow Br	253997	212626	55	LA
0780	Portarlington: Spa Br	254267	212860	55	LA
0800	1km d/s Portarlington	0	0	55	LA
0850	D/s Portarlington STW (RHS)	256216	212270	55	LA
0900	Ford S of Trascan	258196	212310	55	LA
1000	Pass Br	262277	210933	55	KE
1200	1km d/s Monasterevan Br	0	0	55	KE
1300	Ford E of Fisherstown House	263295	205798	55	LA
1400	Dunrally Br	263649	201794	55	LA
1500	Bert Br	265925	196929	55	KE
1590	u/s Athy at Boat Club	268061	194455	55	KE
1600	Athy Br	0	0	55	KE
1800	Ardreigh Lock	0	0	55	LA
1900	Tankardstown Br	270366	188203	61	LA
2000	Maganey Br	271712	184733	61	LA
2150	Weir near Knockbeg College	0	0	61	LA
2200	New Br 1km u/s Carlow Br	272007	177797	61	LA
2400	1.5km d/s Graigue Br	0	0	61	LA
2450	At Dolmen Hotel	270638	174158	61	LA
2455	Br at Dolmen Hotel	270591	174098	61	LA
2500	d/s Clogrennan Lock	0	0	61	LA
2600	Milford Br	269917	170497	61	CW
2680	Cardinal Moran Br	269482	166332	61	CW
2700	Leighlinbridge	269067	165467	61	CW
2750	At Island nr Killinane Ho	269534	163800	61	CW
2800	u/s Bagenalstown	270355	163054	61	CW
2900	Royal Oak Br (LHS)	268937	161444	61	CW
2910	Royal Oak Br (RHS)	268937	161444	61	CW
3000	Fenniscourt Lock	269757	159377	68	CW
3100	Goresbridge (100m u/s on LHS)	268437	153717	68	KK
3300	Ballyteigelea Br	271000	150410	68	KK
3500	Graiguenamanagh Br	270973	143540	68	KK
3600	St Mullins	0	0	68	KK

APPENDIX 6
CHEMICAL DATA – CARLOW Co. Co. POWERSTOWN ROUTINE MONITORING

	Quarter	BOD mg/l O2	COD mg/l O2	Suspended Solids mg/l	Ortho-phosphate mg/l P	Nitrite mg/l N	Ammonium mg/l N	Dissolved Oxygen % O2	Conductivity @ 25°C uS/cm	Temperature °C	pH	Zinc ug/l	Copper ug/l
ST2 Upstream of discharge	Q1 2008	0.9	13	38.8	-		0.083	93.8	805	8.1	7.7		
	Q2 2008	0.9	<8	77.8	<0.006	0.013	0.031	88	799	10.0	7.7		
	Q3 2008	0.6	18	<9.0	<0.006	-	0.02	86.1	853	15.3	8		
	Q4 2008	0.9	<8	15	nm	-	0.024	85.3	832	10.4	7.6		
	Q1 2009	0.8	<8	8	-	-	0.017	91	848	6.2	8		
	Q2 2009	0.7	<8	<24	0.02	-	0.009	103	821	10.9	8.1	<100	<30
	Q3 2009	1.4	<20	nm			0.04	94	890	14.0	7.7		
	Q4 2009	1.9	<20	21			0.06	84	827	8.7	7.7		
	Q1 2010	0.8	<20	33			0.11	89	704	5.8	7.7		
	Q2 2010	0.6	<20	11			0.03	114	757	12.1	7.9		
	Q3 2010	0.5	<20	<5			0.02	86.3	818	15.4	7.9		
	Q4 2010	NM	<20	6	0.05	NM	0.53	83	826	12.1	7.9	<30	<5
	Q1 2011	0.6	<20	9	0.02	-	0.02	113	816	7.9	8.1	22	<0.5
ST1 Downstream of discharge	Q1 2008	0.8	<8	16.8	NR	NR	0.186	88.5	820	8.4	7.7		
	Q2 2008	0.7	<8	38.3	0.007	0.015	0.195	91.6	802	11.5	7.7		
	Q3 2008	0.7	35	<13.6	<0.006	NR	0.12	109.3	834	15.9	7.7	<30	6.66
	Q4 2008	0.6	<8	<12	NR	NR	0.14	nm	821	-	7.6		
	Q1 2009	0.8	<8	16	NR	NR	0.13	98	843	7.3	7.9		
	Q2 2009	1	<8	nm	0.014		0.17	101	813	10.9	7.8	<100	<30
	Q3 2009	0.6	20	nm			0.11	91	871	14	7.6		
	Q4 2009	0.7	<20	15			0.14	85	819	8.7	7.8		
	Q1 2010	1.4	21	35			0.29	86	716	5.8	7.6		
	Q2 2010	0.9	<20	<5			0.26	120	769	12.7	7.8		
	Q3 2010	0.5	34	<5			0.1	87	803	15.1	7.6		
	Q4 2010	NM	<20	<5	0.04	NM	0.34	74	820	11.5	7.6	<30	<5
	Q1 2011	0.5	<20	<5	0.02	-	0.09	102	811	8.7	7.8	18	<0.5

APPENDIX 7

River Barrow and River Nore SAC Site Synopsis

(downloaded from www.npws.ie)

SITE NAME: RIVER BARROW AND RIVER NORE
SITE CODE: 002162

This site consists of the freshwater stretches of the Barrow/Nore River catchments as far upstream as the Slieve Bloom Mountains and it also includes the tidal elements and estuary as far downstream as Creadun Head in Waterford. The site passes through eight counties – Offaly, Kildare, Laois, Carlow, Kilkenny, Tipperary, Wexford and Waterford. Major towns along the edge of the site include Mountmellick, Portarlington, Monasterevin, Stradbally, Athy, Carlow, Leighlinbridge, Graiguenamanagh, New Ross, Inistioge, Thomastown, Callan, Bennettsbridge, Kilkenny and Durrow. The larger of the many tributaries include the Lerr, Fushoge, Mountain, Aughavaud, Owenass, Boherbaun and Stradbally Rivers of the Barrow and the Delour, Dinin, Erkina, Owveg, Munster, Arrigle and King's Rivers on the Nore. Both rivers rise in the Old Red Sandstone of the Slieve Bloom Mountains before passing through a band of Carboniferous shales and sandstones. The Nore, for a large part of its course, traverses limestone plains and then Old Red Sandstone for a short stretch below Thomastown. Before joining the Barrow it runs over intrusive rocks poor in silica. The upper reaches of the Barrow also runs through limestone. The middle reaches and many of the eastern tributaries, sourced in the Blackstairs Mountains, run through Leinster Granite. The southern end, like the Nore runs over intrusive rocks poor in silica. Waterford Harbour is a deep valley excavated by glacial floodwaters when the sea level was lower than today. The coast shelves quite rapidly along much of the shore.

The site is a candidate SAC selected for alluvial wet woodlands and petrifying springs, priority habitats on Annex I of the E.U. Habitats Directive. The site is also selected as a candidate SAC for old oak woodlands, floating river vegetation, estuary, tidal mudflats, *Salicornia* mudflats, Atlantic salt meadows, Mediterranean salt meadows, dry heath and eutrophic tall herbs, all habitats listed on Annex I of the E.U. Habitats Directive. The site is also selected for the following species listed on Annex II of the same directive – Sea Lamprey, River Lamprey, Brook Lamprey, Freshwater Pearl Mussel, Nore Freshwater Pearl Mussel, Crayfish, Twaite Shad, Atlantic Salmon, Otter, *Vertigo moulinsiana* and the plant Killarney Fern.

Good examples of Alluvial Forest are seen at Rathsnagadan, Murphy's of the River, in Abbeyleix estate and along other shorter stretches of both the tidal and freshwater elements of the site. Typical species seen include Almond Willow (*Salix triandra*), White Willow (*S. alba*), Grey Willow (*S. cinerea*), Crack Willow (*S. fragilis*), Osier (*S. viminalis*), with Iris (*Iris pseudacorus*), Hemlock Water-dropwort (*Oenanthe crocata*), Angelica (*Angelica sylvestris*), Thin-spiked Wood-sedge (*Carex strigosa*), Pendulous Sedge (*C. pendula*), Meadowsweet (*Filipendula ulmaria*), Valerian (*Valeriana officinalis*) and the Red Data Book species Nettle-leaved Bellflower (*Campanula trachelium*). Three rare invertebrates have been recorded in this habitat at Murphy's of the River. These are: *Neoascia obliqua* (Diptera: Syrphidae), *Tetanocera freyi* (Diptera: Sciomyzidae) and *Dictya umbrarum* (Diptera: Sciomyzidae).

A good example of petrifying springs with tufa formations occurs at Dysart Wood along the Nore. This is a rare habitat in Ireland and one listed with priority status on Annex I of the EU Habitats Directive. These hard water springs are characterised by lime encrustations, often associated with small waterfalls. A rich bryophyte flora is typical of the habitat and two diagnostic species, *Cratoneuron commutatum* var*. commutatum* and *Eucladium verticillatum*, have been recorded.

The best examples of old Oak woodlands are seen in the ancient Park Hill woodland in the estate at Abbeyleix; at Kyleadohir, on the Delour, Forest Wood House, Kylecorragh and Brownstown Woods on the Nore; and at Cloghristic Wood, Drummond Wood and Borris Demesne on the Barrow, though other patches occur throughout the site. Abbeyleix Woods is a large tract of mixed deciduous woodland which is one of the only remaining true ancient woodlands in Ireland. Historical records show that Park Hill has been continuously wooded since the sixteenth century and has the most complete written record of any woodland in the country. It supports a variety of woodland habitats and an exceptional diversity of species including 22 native trees, 44 bryophytes and 92 lichens. It also contains eight indicator species of ancient woodlands. Park Hill is also the site of two rare plants, Nettle-leaved Bellflower and the moss *Leucodon sciuroides.* It has a typical bird fauna including Jay, Long-eared Owl and Raven. A rare invertebrate, *Mitostoma chrysomelas,* occurs in Abbeyleix and only two other sites in the country. Two flies *Chrysogaster virescens* and *Hybomitra muhlfeldi* also occur. The rare Myxomycete fungus, *Licea minima* has been recorded from woodland at Abbeyleix.

Oak woodland covers parts of the valley side south of Woodstock and is well developed at Brownsford where the Nore takes several sharp bends. The steep valley side is covered by Oak (*Quercus* spp.), Holly (*Ilex aquifolium*), Hazel (*Corylus avellana*) and Birch (*Betula pubescens*) with some Beech (*Fagus sylvatica*) and Ash (*Fraxinus excelsior*). All the trees are regenerating through a cover of Bramble (*Rubus fruticosus* agg.), Foxglove (*Digitalis purpurea*) Wood Rush (*Luzula sylvatica*) and Broad Buckler-fern (*Dryopteris dilatata*).

On the steeply sloping banks of the River Nore about 5 km west of New Ross, in County Kilkenny, Kylecorragh Woods form a prominent feature in the landscape. This is an excellent example of a relatively undisturbed, relict Oak woodland with a very good tree canopy. The wood is quite damp and there is a rich and varied ground flora. At Brownstown a small, mature Oak-dominant woodland occurs on a steep slope. There is younger woodland to the north and east of it. Regeneration throughout is evident. The understorey is similar to the woods at Brownsford. The ground flora of this woodland is developed on acidic, brown earth type soil and comprises a thick carpet of Bilberry (*Vaccinium myrtillus*), Heather (*Calluna vulgaris*), Hard Fern (*Blechnum spicant*), Cowwheat (*Melampyrum* spp.) and Bracken (*Pteridium aquilinum*).

Borris Demesne contains a very good example of a semi-natural broad-leaved woodland in very good condition. There is quite a high degree of natural re-generation of Oak and Ash through the woodland. At the northern end of the estate Oak species predominate. Drummond Wood, also on the Barrow, consists of three blocks of deciduous woods situated on steep slopes above the river. The deciduous trees are mostly Oak species. The woods

have a well established understorey of Holly (*Ilex aquifolium*), and the herb layer is varied, with Brambles abundant. Whitebeam (*Sorbus devoniensis*) has also been recorded.

Eutrophic tall herb vegetation occurs in association with the various areas of alluvial forest and elsewhere where the flood-plain of the river is intact. Characteristic species of the habitat include Meadowsweet (*Filipendula ulmaria*), Purple Loosestrife (*Lythrum salicaria*), Marsh Ragwort (*Senecio aquaticus*), Ground Ivy (*Glechoma hederacea*) and Hedge Bindweed (*Calystegia sepium*). Indian Balsam (*Impatiens glandulifera*), an introduced and invasive species, is abundant in places.

Floating River Vegetation is well represented in the Barrow and in the many tributaries of the site. In the Barrow the species found include Water Starworts (*Callitriche* spp.), Canadian Pondweed (*Elodea canadensis*), Bulbous Rush (*Juncus bulbosus*), Milfoil (*Myriophyllum* spp.), *Potamogeton* x *nitens,* Broad-leaved Pondweed (*P. natans*), Fennel Pondweed (*P. pectinatus*), Perfoliated Pondweed (*P. perfoliatus*) and Crowfoots (*Ranunculus* spp.). The water quality of the Barrow has improved since the vegetation survey was carried out (EPA, 1996).

Dry Heath at the site occurs in pockets along the steep valley sides of the rivers especially in the Barrow Valley and along the Barrow tributaries where they occur in the foothills of the Blackstairs Mountains. The dry heath vegetation along the slopes of the river bank consists of Bracken (*Pteridium aquilinum*) and Gorse (*Ulex europaeus*) species with patches of acidic grassland vegetation. Additional typical species include Heath Bedstraw (*Galium saxatile*), Foxglove (*Digitalis purpurea*), Common Sorrel (*Rumex acetosa*) and Bent Grass (*Agrostis stolonifera*). On the steep slopes above New Ross the Red Data Book species Greater Broomrape (*Orobanche rapum-genistae*) has been recorded. Where rocky outcrops are shown on the maps Bilberry (*Vaccinium myrtillus*) and Wood Rush (*Luzula sylvatica*) are present. At Ballyhack a small area of dry heath is interspersed with patches of lowland dry grassland. These support a number of Clover species including the legally protected Clustered Clover (*Trifolium glomeratum*) – a species known from only one other site in Ireland. This grassland community is especially well developed on the west side of the mud-capped walls by the road. On the east of the cliffs a group of rock-dwelling species occur, i.e. English Stonecrop (*Sedum anglicum*), Sheep's-bit (*Jasione montana*) and Wild Madder (*Rubia peregrina*). These rocks also support good lichen and moss assemblages with *Ramalina subfarinacea* and *Hedwigia ciliata*.

Dry Heath at the site generally grades into wet woodland or wet swamp vegetation lower down the slopes on the river bank. Close to the Blackstairs Mountains, in the foothills associated with the Aughnabrisky, Aughavaud and Mountain Rivers there are small patches of wet heath dominated by Purple Moor-grass (*Molinia caerulea*) with Heather (*Calluna vulgaris*), Tormentil (*Potentilla erecta*), Carnation Sedge (*Carex panicea*) and Bell Heather (*Erica cinerea*).

Saltmeadows occur at the southern section of the site in old meadows where the embankment has been breached, along the tidal stretches of in-flowing rivers below Stokestown House, in a narrow band on the channel side of Common Reed (*Phragmites*)

beds and in narrow fragmented strips along the open shoreline. In the larger areas of salt meadow, notably at Carrickcloney, Ballinlaw Ferry and Rochestown on the west bank; Fisherstown, Alderton and Great Island to Dunbrody on the east bank, the Atlantic and Mediterranean sub types are generally intermixed. At the upper edge of the salt meadow in the narrow ecotonal areas bordering the grasslands where there is significant percolation of salt water, the legally protected species Borrer's Saltmarsh-grass (*Puccinellia fasciculata*) and Meadow Barley (*Hordeum secalinum*) (Flora Protection Order, 1987) are found. The very rare Divided Sedge (*Carex divisa*) is also found. Sea Rush (*Juncus maritimus*) is also present. Other plants recorded and associated with salt meadows include Sea Aster (*Aster tripolium*), Sea Thrift (*Armeria maritima*), Sea Couch (*Elymus pycnanthus*), Spear-leaved Orache (*Atriplex prostrata*), Lesser Sea-spurrey (*Spergularia marina*), Sea Arrowgrass (*Triglochin maritima*) and Sea Plantain (*Plantago maritima*).

Salicornia and other annuals colonising mud and sand are found in the creeks of the saltmarshes and at the seaward edges of them. The habitat also occurs in small amounts on some stretches of the shore free of stones.

The estuary and the other Habitats Directive Annex I habitats within it form a large component of the site. Extensive areas of intertidal flats, comprised of substrates ranging from fine, silty mud to coarse sand with pebbles/stones are present. Good quality intertidal sand and mudflats have developed on a linear shelf on the western side of Waterford Harbour, extending for over 6 km from north to south between Passage East and Creadaun Head, and in places are over 1 km wide. The sediments are mostly firm sands, though grade into muddy sands towards the upper shore. They have a typical macro-invertebrate fauna, characterised by polychaetes and bivalves. Common species include *Arenicola marina*, *Nephtys hombergii*, *Scoloplos armiger*, *Lanice conchilega* and *Cerastoderma edule*.

The western shore of the harbour is generally stony and backed by low cliffs of glacial drift. At Woodstown there is a sandy beach, now much influenced by recreation pressure and erosion. Behind it a lagoonal marsh has been impounded which runs westwards from Gaultiere Lodge along the course of a slow stream. An extensive reedbed occurs here. At the edges is a tall fen dominated by sedges (*Carex* spp.), Meadowsweet, Willowherb (*Epilobium* spp.) and rushes (*Juncus* spp.). Wet woodland also occurs. This area supports populations of typical waterbirds including Mallard, Snipe, Sedge Warbler and Water Rail.

The dunes which fringe the strand at Duncannon are dominated by Marram grass (*Ammophila arenaria*) towards the sea. Other species present include Wild Sage (*Salvia verbenaca*), a rare Red Data Book species. The rocks around Duncannon ford have a rich flora of seaweeds typical of a moderately exposed shore and the cliffs themselves support a number of coastal species on ledges, including Thrift (*Armeria maritima*), Rock Samphire (*Crithmum maritimum*) and Buck's-horn Plantain (*Plantago coronopus*).

Other habitats which occur throughout the site include wet grassland, marsh, reed swamp, improved grassland, arable land, quarries, coniferous plantations, deciduous woodland, scrub and ponds.

Seventeen Red Data Book plant species have been recorded within the site, most in the recent past. These are Killarney Fern (*Trichomanes speciosum*), Divided Sedge (*Carex divisa*), Clustered Clover (*Trifolium glomeratum*), Basil Thyme (*Acinos arvensis*), Hemp nettle (*Galeopsis angustifolia*), Borrer's Saltmarsh Grass (*Puccinellia fasiculata*), Meadow Barley (*Hordeum secalinum*), Opposite-leaved Pondweed (*Groenlandia densa*), Autumn Crocus (*Colchicum autumnale*), Wild Sage (*Salvia verbenaca*), Nettle-leaved Bellflower (*Campanula trachelium*), Saw-wort (*Serratula tinctoria*), Bird Cherry (*Prunus padus*), Blue Fleabane (*Erigeron acer*), Fly Orchid (*Ophrys insectifera*), Broomrape (*Orobanche hederae*) and Greater Broomrape (*Orobanche rapum-genistae*). Of these the first nine are protected under the Flora Protection Order 1999. Divided Sedge (*Carex divisa*) was thought to be extinct but has been found in a few locations in the site since 1990. In addition plants which do not have a very wide distribution in the country are found in the site including Thin-spiked Wood-sedge (*Carex strigosa*), Field Garlic (*Allium oleraceum*) and Summer Snowflake (*Leucojum aestivum*). Six rare lichens, indicators of ancient woodland, are found including *Lobaria laetevirens* and *L. pulmonaria.* The rare moss *Leucodon sciuroides* also occurs.

The site is very important for the presence of a number of EU Habitats Directive Annex II animal species including Freshwater Pearl Mussel (*Margaritifera margaritifera* and *M. m. durrovensis*), Freshwater Crayfish (*Austropotamobius pallipes*), Salmon (*Salmo salar*), Twaite Shad (*Alosa fallax fallax*), three Lamprey species - Sea (*Petromyzon marinus*), Brook (*Lampetra planeri*) and River (*Lampetra fluviatilis*), the marsh snail *Vertigo moulinsiana* and Otter (*Lutra lutra*). This is the only site in the world for the hard water form of the Pearl Mussel *M. m. durrovensis* and one of only a handful of spawning grounds in the country for Twaite Shad. The freshwater stretches of the River Nore main channel is a designated salmonid river. The Barrow/Nore is mainly a grilse fishery though spring salmon fishing is good in the vicinity of Thomastown and Inistioge on the Nore. The upper stretches of the Barrow and Nore, particularly the Owenass River, are very important for spawning.

The site supports many other important animal species. Those which are listed in the Irish Red Data Book include Daubenton's Bat (*Myotis daubentoni*), Badger (*Meles meles*), Irish Hare (*Lepus timidus hibernicus*) and Frog (*Rana temporaria*). The rare Red Data Book fish species Smelt (*Osmerus eperlanus*) occurs in estuarine stretches of the site. In addition to the Freshwater Pearl Mussel, the site also supports two other freshwater Mussel species, *Anodonta anatina* and *A. cygnea*.

The site is of ornithological importance for a number of E.U. Birds Directive Annex I species including Greenland White-fronted Goose, Whooper Swan, Bewick's Swan, Bartailed Godwit, Peregrine and Kingfisher. Nationally important numbers of Golden Plover and Bar-tailed Godwit are found during the winter. Wintering flocks of migratory birds are seen in Shanahoe Marsh and the Curragh and Goul Marsh, both in Co. Laois and also along the Barrow Estuary in Waterford Harbour. There is also an extensive autumnal roosting site in the reedbeds of the Barrow Estuary used by Swallows before they leave the country.

Landuse at the site consists mainly of agricultural activities – many intensive, principally grazing and silage production. Slurry is spread over much of this area. Arable crops are also grown. The spreading of slurry and fertiliser poses a threat to the water quality of the

salmonid river and to the populations of Habitats Directive Annex II animal species within the site. Many of the woodlands along the rivers belong to old estates and support many non-native species. Little active woodland management occurs. Fishing is a main tourist attraction along stretches of the main rivers and their tributaries and there are a number of Angler Associations, some with a number of beats. Fishing stands and styles have been erected in places. Both commercial and leisure fishing takes place on the rivers. There is net fishing in the estuary and a mussel bed also. Other recreational activities such as boating, golfing and walking, particularly along the Barrow towpath are also popular. There is a golf course on the banks of the Nore at Mount Juliet and GAA pitches on the banks at Inistioge and Thomastown. There are active and disused sand and gravel pits throughout the site. Several industrial developments, which discharge into the river, border the site. New Ross is an important shipping port. Shipping to and from Waterford and Belview ports also passes through the estuary.

The main threats to the site and current damaging activities include high inputs of nutrients into the river system from agricultural run-off and several sewage plants, overgrazing within the woodland areas, and invasion by non-native species, for example Cherry Laurel and Rhododendron (*Rhododendron ponticum*). The water quality of the site remains vulnerable. Good quality water is necessary to maintain the populations of the Annex II animal species listed above. Good quality is dependent on controlling fertilisation of the grasslands, particularly along the Nore. It also requires that sewage be properly treated before discharge. Drainage activities in the catchment can lead to flash floods which can damage the many Annex II species present. Capital and maintenance dredging within the lower reaches of the system pose a threat to migrating fish species such as lamprey and shad. Land reclamation also poses a threat to the salt meadows and the populations of legally protected species therein.

Overall, the site is of considerable conservation significance for the occurrence of good examples of habitats and of populations of plant and animal species that are listed on Annexes I and II of the E.U. Habitats Directive respectively. Furthermore it is of high conservation value for the populations of bird species that use it. The occurrence of several Red Data Book plant species including three rare plants in the salt meadows and the population of the hard water form of the Pearl Mussel which is limited to a 10 km stretch of the Nore, add further interest to this site.

16.1.2003

APPENDIX 8

River Barrow and River Nore SAC Qualifying Interests

(from www.npws.ie)

Annex I Habitats

EU Habitat Code	Habitat Name
91A0	Old sessile oak woods with Ilex and Blechnum in British Isles
91E0	Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)
3260	Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation
1310	Salicornia and other annuals colonizing mud and sand
1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)
1410	Mediterranean salt meadows (Juncetalia maritimi)
4030	European dry heaths
7220	Petrifying springs with tufa formation (Cratoneurion)
6430	Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels
1320	Spartina swards (Spartinion maritimae)
1140	Mudflats and sandflats not covered by seawater at low tide
1130	Estuaries

Annex II Species

EU Species Code	Species Taxonomic Name	Species Common Name
1029	*Margaritifera margaritifera*	Freshwater Pearl Mussel
1990	*Margaritifera durrovensis*	Nore Pearl Mussel
1016	*Vertigo moulinsiana*	Desmoulins' whorl snail
1095	*Petromyzon marinus*	Sea Lamprey
1096	*Lampetra planeri*	Brook Lamprey
1099	*Lampetra fluviatilis*	River Lamprey
1102	*Alosa alosa*	Allis Shad
1103	*Alosa fallax*	Twaite Shad
1106	*Salmo salar*	Atlantic Salmon
1355	*Lutra lutra*	European Otter
1092	*Austropotamobius pallipes*	White Clawed Crayfish
1421	*Trichomanes speciosum*	Killarney Fern

APPENDIX 9

NPWS Generic Draft Conservation Objectives for cSAC 002162

The overall aim of the Habitats Directive is to maintain or restore the favourable conservation status of habitats and species of community interest. These habitats and species are listed in the Habitats and Birds Directives and Special Areas of Conservation and Special Protection Areas are designated to afford protection to the most vulnerable of them. These two designations are collectively known as the Natura 2000 network.

European and national legislation places a collective obligation on Ireland and its citizens to maintain at favourable conservation status areas designated as candidate Special Areas of Conservation. The Government and its agencies are responsible for the implementation and enforcement of regulations that will ensure the ecological integrity of these sites.

According to the EU Habitats Directive, favourable conservation status of a habitat is achieved when:

• its natural range, and area it covers within that range, is stable or increasing, and

• the ecological factors that are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future, and

• the conservation status of its typical species is favourable as defined below.

The favourable conservation status of a species is achieved when:

• population data on the species concerned indicate that it is maintaining itself, and

• the natural range of the species is neither being reduced or likely to be reduced for the foreseeable future, and

• there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

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:

Margaritifera margaritifera [1029]

Austropotamobius pallipes [1092]

Petromyzon marinus [1095]

Lampetra planeri [1096]

Lampetra fluviatilis [1099]

Alosa fallax [1103]

Salmo salar (only in fresh water) [1106]

Estuaries [1130]

Mudflats and sandflats not covered by seawater at low tide [1140]

Salicornia and other annuals colonizing mud and sand [1310]

Atlantic salt meadows (Glauco-Puccinellietalia maritimae) [1330]

Lutra lutra [1355]

Mediterranean salt meadows (Juncetalia maritimi) [1410]

Trichomanes speciosum [1421]

Margaritifera durrovensis (Margaritifera margaritifera) [1990]

Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation [3260]

European dry heaths [4030]

Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430]

Petrifying springs with tufa formation (Cratoneurion) [7220]

Old sessile oak woods with Ilex and Blechnum in the British Isles [91A0]

Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae) [91E0]