NPWS

Termon Strand SAC
(site code: 001195)

Conservation objectives supporting document- Coastal lagoons

Version 1
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Contents

1. Introduction

1.1 Termon Strand SAC

Termon Strand SAC is a small coastal site situated about 5km south-west of the town of Dunglow in west Co. Donegal. It encompasses a variety of habitats including sand dunes, mudflats and saltmarsh. The SAC is selected for "Coastal lagoons", a habitat listed in Annex I of the Habitats Directive.

"Coastal lagoons" (habitat code 1150) is a priority habitat in Annex I of the Habitats Directive. A coastal lagoon is a lake or pond that is fully or partially separated from the sea by a permeable barrier that can be entirely natural such as shingle, or can be an artificial embankment. Salinity varies depending on such factors such as freshwater inputs and barrier permeability. Lagoons support unique assemblages of flora and fauna, particularly invertebrates. In Ireland, coastal lagoons are considered to be in bad conservation status due to issues such as drainage and water pollution (NPWS, 2013).

A single lagoon is listed for this SAC (Oliver, 2007). The table below gives the conservation status assessment of this lagoon as outlined in that report. See map in Appendix 1 and Appendix 2 for an account of the site (from Oliver, 2007).

Code[1]	Name	County	Conservation Assessment
IL080	Maghery Lough	Donegal	Favourable

[1] Code used in Oliver, 2007.

1.2 Conservation objectives

A site-specific conservation objective aims to define the favourable conservation condition of a habitat or species at site level. The maintenance of habitats and species within sites at favourable condition will contribute to the maintenance of favourable conservation status of those habitats and species at a national level.

Conservation objectives are defined using attributes and targets that are based on parameters as set out in the Habitats Directive for defining favourable status, namely area, range, and structure and functions.

Provisional reference conditions for Irish lagoons are proposed by Roden and Oliver (2013). Reference conditions aim to define ecological status prior to human impacts (i.e. "natural" conditions). The targets for the water quality attributes given below are based on reference values given by Roden and Oliver (2013).

Attributes and targets may change/become more refined as further information becomes available.

2. Area

The target for habitat area is: stable or increasing, subject to natural processes. Favourable reference area for Maghery Lough is 15.3 ha. This area is calculated from spatial data derived from Oliver (2007).

3. Range

The known distribution of lagoon habitat (i.e. Maghery Lough) in Termon Strand SAC is shown in Appendix 1.

The target for the habitat distribution attribute is: no decline, subject to natural processes.

4. Structure and functions

Structure and functions relates to the physical components of a habitat ("structure") and the ecological processes that drive it ("functions"). For lagoons these include attributes such as salinity, hydrology and various water quality attributes.

4.1 Salinity regime

Lagoons can vary considerably in salinity both within and between sites depending on the volume and timing of inflowing and outflowing fresh and seawater. Salinity is probably the most important variable in the classification of lagoon types (Roden and Oliver, 2013).

The target for the salinity regime attribute is: median annual salinity and temporal variation within natural range.

Seawater enters at the northern extremity of the lagoon and probably does so on most tides. Salinity ranges from 15 – 34psu. See Roden and Oliver (2013) for further information on salinity classes and Appendix 2 for the lagoon report.

Code	Name	Salinity
IL080	Maghery Lough	Meso -Polyhaline

4.2 Hydrological regime

Fluctuations in water depth are a natural feature of lagoon hydrology. However, if water levels fluctuate beyond their natural values due to issues such as drainage, the condition of the habitat can deteriorate.

The target for hydrological regime is: annual water level fluctuations and minima within natural ranges.

Maghery Lough can be classified as shallow (<2m), thus even small changes in water depth can cause significant losses in habitat area. Further information is required to investigate historic fluctuations to enable more specific targets to be set. See Appendix 2 for the site report.

4.3 Barrier: connectivity between lagoon and sea

The morphology of the barrier between a lagoon and sea determines how it functions ecologically. Changes to the barrier can be due to natural processes such as storms, but they can also be modified through human intervention. Active management is sometimes necessary, particularly if the lagoon is artificial.

The target for the attribute barriers: connectivity between lagoon and sea is: appropriate hydrological connections between lagoons and sea, including where necessary, appropriate management.

Maghery Lough is described as a rock/peat lagoon that is separated from the sea by a broad barrier of rocky grassland. The inlet, which was probably natural, has been modified by the construction of a road bridge with a wooden sluice flap. (see Healy, 1997). See also the site account in Appendix 2.

It should be noted that this sluice does not seem to have been functioning during surveys of the lagoon. Healy *et al*. (1997) noted that the sluice had been inefficient for some time and its mode of operation was responsible for the conditions within the lagoon. Thus, any modifications/repairs to the sluice may have far reaching effects on the ecology of the lagoon.

4.4 Water quality- Chlorophyll a

This attribute indicates the level of phytoplankton in the water column. Roden and Oliver (2013) make the assumption that, for shallow lagoons in "natural" condition, primary productivity is dominated by the benthos rather than the plankton. Phytoplankton tends to increase in density in response to increasing nutrient levels. Excessive shading from phytoplankton can reduce submergent macrophyte colonisation of the littoral zone of lagoons.

The target for the attribute water quality- Chlorophyll a is: annual median chlorophyll a within natural ranges and less than 5µg/L. Target based on Roden and Oliver (2013).

4.5 Water quality- Molybdate reactive phosphorus (MRP)

The target for the attribute water quality- Molybdate Reactive Phosphorus (MRP) is: annual median MRP within natural ranges and less than 0.1mg/L. The target is based on Roden and Oliver (2013).

This limit is required to ensure that excessive shading from phytoplankton does not reduce submergent colonisation of the littoral zone.

4.6 Water quality- Dissolved inorganic nitrogen (DIN)

The target for the attribute water quality- Dissolved Inorganic Nitrogen (DIN) is: annual median DIN within natural ranges and less than 0.15mg/L. The target is based on Roden and Oliver (2013).

As for phosphorus, the limit for set nitrogen is to ensure that excessive shading from phytoplankton does not reduce submergent colonisation.

4.7 Depth of macrophyte colonisation

Maghery Lough has been identified as shallow, thus, it is expected that macrophytes should extend down to its full depth.

The target for the attribute depth of macrophyte colonisation is: macrophyte colonisation to maximum depth of the lagoon.

4.8 Typical plant species

As lagoon specialist species do not easily recolonise, their presence is one of the indicators of long term continuity of quality.

The target for the attribute typical plant species is: maintain number and extent of listed lagoonal specialists, subject to natural variation.

The plant species recorded in this lagoon are summarised in Oliver (2007). Species considered to be lagoonal specialists include *Ruppia maritima* and *Ruppia cirrhosa* and the rare charophyte *Lamprothamnium papulosum*. See Appendix 2 for the site report.

4.9 Typical animal species

Some invertebrate species are regarded as lagoonal specialists and their presence can indicate long term quality. As species found within each lagoon can vary considerably, depending on other attributes such as salinity, the target is based on site-specific species lists.

The target for the attribute typical animal species is: maintain listed lagoon specialists, subject to natural variation

The species recorded at this site are summarised in Oliver (2007). Six lagoonal specialists were recorded here of which one, the isopod *Jaera ischiosetosa*, is considered rare. See Appendix 2 for the site report.

4.10 Negative indicator species

Negative indicator species include non-native alien species as well as those that are not typical of the habitat. For example, accelerated encroachment by reedbeds can be caused by low salinity, shallow water and elevated nutrient levels.

The target for the attribute negative indicator species is: negative indicator species absent or under control.

5. References

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NPWS (2013) The status of EU protected habitats and species in Ireland. Unpublished report, NPWS. Department of Arts, Heritage and the Gaeltacht, Dublin.

Oliver, G. (2007) Inventory of Irish coastal lagoons (version 2). Unpublished report to the National Parks and Wildlife Service.

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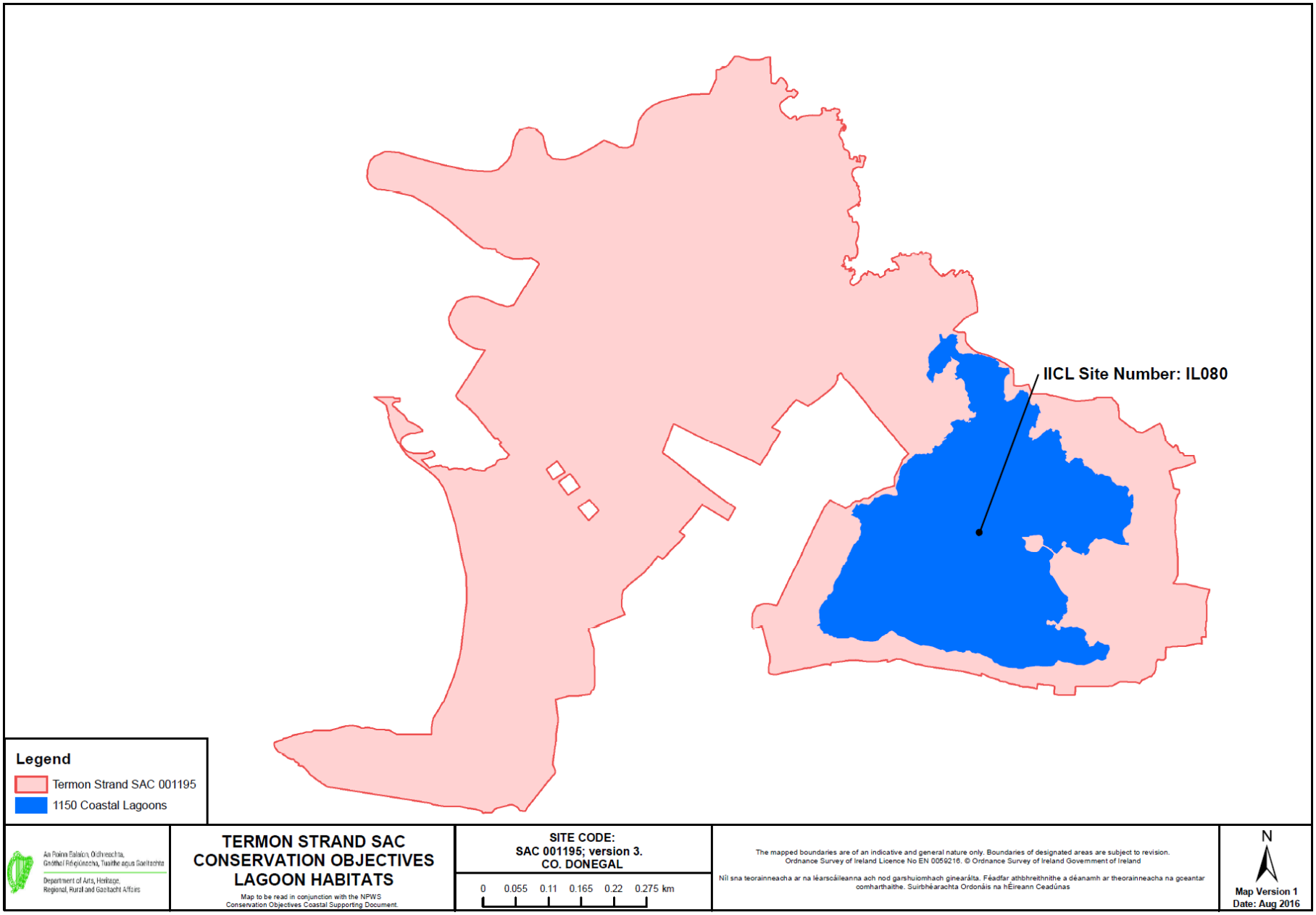
Appendix 1 Lagoon distribution map



Appendix 2 Site report

The following is a site account from Oliver (2007)

Code[1]	Name
IL0080	Maghery Lough

[1] Code is that used in Oliver, 2007.

4.80	**Maghery Lough, County Donegal** O.S. B 723 094 O.S. Discovery Sheet 1

Conservation Designation: Termon Strand SAC 001195, pNHA 001195

General description:

Maghery Lough is a moderate sized (19ha), shallow (<2m) **natural rock/peat lagoon** with a modified, sluiced outlet, on the shore of Maghery Bay, 5km to the west of Dungloe, Co. Donegal. The inlet is probably natural but has been modified by the building of a road bridge and addition of a wooden sluice flap, which was broken at the time of sampling (4-5/9/98). Seawater probably enters on most tides and salinity ranged from 15 to 34psu at the time of sampling.

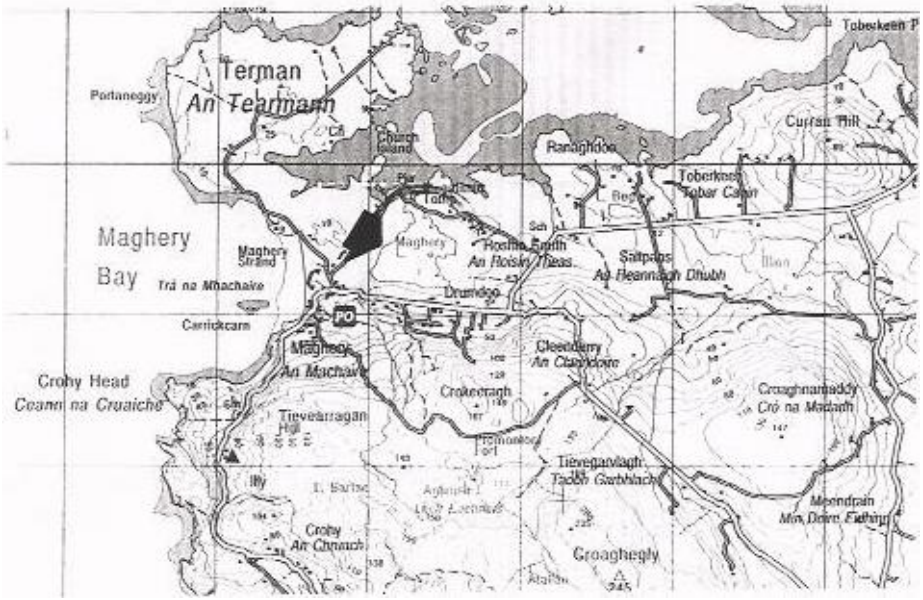


Figure 80.1 Location of map of Maghery Lough.

Maghery Lough was surveyed in 1998 for vegetation (Roden 1999), aquatic fauna (Oliver 1999) and ecotonal coleoptera (Good 1998, Good & Butler 2000). Results of these surveys are summarised by Healy (1999a,b; 2003).

Stations used for faunal sampling are not necessarily the same as those used for vegetation or ecotonal coleoptera.

Flora

The vegetation of L. Athola was surveyed in 1998 by C. Roden. The following is based on the report by Roden (1999), following his survey on 29/6/98 and 7-8/9/98.

Benthic vegetation includes both ***Ruppia maritima*** and ***Ruppia cirrhosa*** and the rare charophyte ***Lamprothamnium papulosum***, all of which are lagoonal specialists.

Lamprothamnium papulosum was known from only three sites in Ireland before 1996 (Hatch and Healy 1998). As a result of the surveys it was relocated at two of these sites (Lady's Island L., Co. Wexford, L. Murree, Co. Clare), but not at Tacumshin L., Co. Wexford. It is also now known from a total of 14 lagoon sites, most of which are clustered in Connemara, but there are also new records from the North Slob, Co. Wexford, L. Bofin, Co. Galway and Maghery, Co. Donegal. This species is listed in the Red Data Book for Britain and Ireland (Stewart and Church 1992). Although recorded from the Baltic to the Mediterranean and Black Sea and also South Africa, it is believed to be declining in Europe. There are only five recent records from the south of England, but there are 12 important sites in the Outer Hebrides (Bamber et al. 2001). These Irish locations are very important in European terms, and it is especially encouraging to have found new sites.

Ruppia* spp.** are the most characteristic aquatic plant taxa of Irish coastal lagoons. The species are hard to distinguish when not flowering, and remain uncertain at some sites, but *Ruppia* of one species or the other (*R. maritima, R. maritima var brevirostris, R. cirrhosa*) was found at 62 of the 87 lagoons (71.3%) surveyed, and is one of the most useful indicators of coastal lagoon status. ***Ruppia maritima appears to be the more common of the species and was found at 41 of the lagoons surveyed (47%). ***Ruppia cirrhosa*** is believed to tolerate higher salinities than the former species and to be less common, but neither of these statements is clearly supported in Irish lagoons and the two species were often found growing together. *Ruppia cirrhosa* was only identified at 23 lagoons (26%), but species was not determined at 12 sites.

Extensive beds of *Phragmites australis* border the lagoon, with an understorey of *Ruppia* sp. and the *flabellatus* form of *Potamogeton pectinatus*. A single plant of ***Zostera marina*** was seen on the eastern side.

Poorly developed macroalgal communities are found near the inlet, where they grow on scattered rocks protruding from the sandy bed. Species include *Phyllophora pseudoceranoides, Chondrus crispus, Coccotylus truncata, Furcellaria lumbricalis, Cladophora rupestris* and *Enteromorpha* sp. This community corresponds to the OB24 of Covey and Thorpe (1994).

The phytoplankton contained several brackish water dinoflagellates.

Marginal vegetation was well developed and included the *Juncus gerardii* community, *Juncus maritimus* stands and *Schoenoplectus tabernaemontani/Phragmites* stands grading into freshwater marsh.

This is the only known locality in Ulster of the rare charophyte ***Lamprothamnium papulosum***. Based on the presence of this species and two other lagoonal specialists (***Ruppia* spp**.), and the unusual form of *P. pectinatus* (also found in Loch an tSaile, Co. Galway), the site is regarded as of **high conservation value** for aquatic vegetation.

Fauna

Five stations were selected for faunal sampling in Maghery Lough on 4-5/9/98 (Oliver 1999, Figure 80.2, Table 80.1).

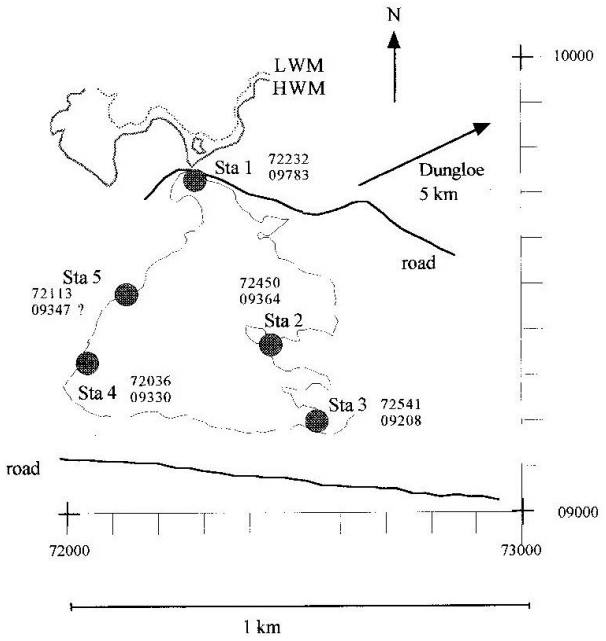


Figure 80.2 Faunal sampling stations used at Maghery Lough 7-8/9/98.

Table 80.1 Positions of faunal sampling stations in Maghery Lough, 7-8/9/98 with salinity, depth of water and type of substratum.

	Sta 1	Sta 2	Sta 3	Sta 4	Sta 5
GPS position	B 72232 09783	B 72450 09364	B 72541 09208	B 72036 09330	B 72113 09317
Salinity(psu)	23.4	23.8	15-23	19-23	23
Depth(cm)	0-100	0-100	0-150	0-50	0-50
Substratum	Isolated rocks, gravel, sand, mud	Stones, gravel, organic silt	Coarse sand, fine silty peat,	Soft silty peat	Clean coarse shell

A total of 32 faunal taxa were recorded in Maghery Lough (Table 80.2). Four of these species are regarded as lagoonal specialists in Britain and one other is a proposed specialists for Ireland. One other crustacean (***Jaera ischiosetosa***) appears to be rare in Ireland.

Idotea chelipes is a common, lagoonal, isopod crustacean, often found in association with the lagoonal form of *Chaetomorpha linum*. Found at 23 of the 87 (26.4%) lagoons surveyed, mostly at relatively high salinity.

Jaera nordmanni. Isopod crustacean recorded at 24 of the 87 lagoons surveyed (27.6%) and may occur at others where it was not recorded due to the fact that only adult males are easily identified. Described in England (Barnes 1994, Hayward and Ryland 1995) as occurring in streams flowing down the shoreline, on south and west coasts only. All records in Ireland are from West Cork to Donegal. Proposed as a lagoonal specialist for Ireland by Oliver and Healy (1998).

Palaemonetes varians Decapod crustacean listed as a lagoonal specialist in the U.K. by Barnes (1989) and Bamber (1997), but apparently is no longer regarded as such. Although found in estuaries, this species appears to be far more characteristic of lagoons in Ireland, found in 64 of the 87 lagoons surveyed (73.6%) and may require a lagoonal environment for reproduction. Therefore, it remains on the proposed list of lagoonal specialists for Ireland.

Table 80.2 Aquatic fauna recorded at stations in Maghery Lough, Co. Donegal. 1998. L.T. = light trap; F = Fyke net. + = present, o = ocasional, c = common, a = abundant. Species in bold text are lagoonal specialists or apparently rare species.

		Sampling Stations								
Taxa		1	L.T. 1	2	L.T. 2	3	L.T. 3	4	L.T. 4	5
Cnidaria	*Opercularella lacerata*	+								
Polychaeta	*Arenicola marina*	+								+
	Hediste diversicolor					c				
Crustacea										
Cirripedia	*Semibalanus balanoides*	(+)								
Mysidacea	*Neomysis integer*	c	7	c	2	o	1	c	16	
	Praunus flexuosus	o	1	o	1					
Isopoda	***Idotea chelipes***						1			
	Jaera ischiosetosa	1		c						
	J. nordmanni	+				+	5			
Amphipoda		+	+	a	+	+	+	+	+	+
	Corophium volutator	+				1				
	Gammarus zaddachi	123	34	136	6	34	34	59		52
	Melita palmata	1						1		
Decapoda	*Carcinus maenas*	F=126								
	Crangon crangon	a								
	Palaemon elegans	c	1				+			
	P. serratus	c	1							
	Palaemonetes varians	c								
Arachnida	Acarina indet.								1	
Insecta										
Heteroptera	*Hydrometra stagnorum*					+				
	(Corixidae indet.)							3		
Coleoptera	*Agabus bipustulatus*							1		
	Helophorus brevipalpis							1		
	Hydroporus memnonius							6		
Diptera	Chironomidae indet.	o		c		a		c		a
Mollusca										
Prosobranchia	*Hydrobia ulvae*	+								
	Littorina littorea	(+)		o						
	L. saxatilis	(+)								
	Potamopyrgus antipodarum	12				25		+		+
Bivalvia	***Cerastoderma glaucum***	o				shells				
	Mya arenaria	o		c		a		o		a
	Mytilus edulis	o								
Bryozoa	***Conopeum seurati***	+		+						
Pisces	*Anguilla anguilla*	F=2				F=7				
	Pleuronectes flesus	o		o						
	Pomatoschistus microps	(+)								
	Gasterosteus aculeatus	o		c	1	c		c	7	+
	Taurulus bubalis	F=2								

Cerastoderma glaucum Bivalve mollusc. A common lagoonal specialist found at 30 of the 87 lagoons (34.5%) surveyed.

Conopeum seurati Bryozoan recorded at 49 of the 87 lagoons surveyed (56.3%), but is not listed in a recent review of Irish marine Bryozoa (Wyse Jackson 1991). Either the species is under-recorded or is truly a lagoonal specialist.

Jaera ischiosetosa Isopod crustacean recorded at 12 sites from West Cork to Donegal. The only previous record appears to be for L. Hyne. Co. Cork (Goss Custard *et al.* 1979).

The fauna of the lagoon is mostly euryhaline and marine/polyhaline and not particularly rich, but five species are lagoonal specialists and one crustacean (*J. ischiosetosa*) appears to be rare. Based on aquatic fauna, the site is rated as of **moderate conservation value**.

Ecotonal coleoptera

Nine species of carabid and twenty seven species of staphylinid beetles were recorded at Maghery Lough in 1998 (Good 1999, Good & Butler 2000), one of which (***Atheta aquatilis***) is an indicator species. This species was only recently recorded in Ireland, from Lynn Lagoon, Larne, Co. Antrim (Anderson *et al*. 1997) and is a "stenotopic species restricted to moss and litter in flooded shaded habitats, springs, flushes and wet woodland". However, with only one indicator species, based on ecotonal coleoptera, the site is regarded as of **low conservation value**.

Summary

Maghery Lough is a good example of a moderate sized **natural rock/peat lagoon**, a type of lagoon, similar to the Scottish "obs", which are characteristic of parts of the west coast of Ireland, especially in Connemara. They are permanent, shallow and brackish, with restricted tidal influence due to the presence of a "barrier" of peat or rock. This is the only known locality in Ulster of the rare charophyte ***Lamprothamnium papulosum***. Based on the presence of this species and two other lagoonal specialists (***Ruppia* spp**.), and the unusual form of *P. pectinatus* (also found in Loch an tSaile, Co. Galway), the site is regarded as of **high conservation value** for aquatic vegetation. The fauna of the lagoon is mostly euryhaline and marine/polyhaline and not particularly rich, but five species are lagoonal specialists and one crustacean (*J. ischiosetosa*) appears to be rare. Based on aquatic fauna, the site is rated as of **moderate conservation value**. One species of ecotonal coleoptera (***Atheta aquatilis***) is an indicator species and rare in Ireland, but with only one indicator species, based on ecotonal coleoptera, the site is regarded as of **low conservation value**. Overall conservation value is rated as high, as it is a good example of a relatively rare lagoon type in Europe, with a rare charophyte (*L. papulosum*).

Overall Conservation Value = High

Conservation Status Assessment (from Oliver 2007)	
Impacts	At present no major impacts but interest from local anglers in manipulating sluice. Leisure fishing. Modification of hydrology. Urbanisation.
Conservation Status	Favourable

Further Information

Listed as a lagoon by Healy *et al.* 1997. Surveyed in 1998 for vegetation (Roden 1999), aquatic fauna (Oliver 1999) and ecotonal coleoptera (Good 1998, Good & Butler 2000). Results of these surveys are summarised by Healy (1999a,b; 2003). Included in a biological classification of Irish coastal lagoons (Oliver 2005) and in the Conservation Status Assessment (Oliver 2007).

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