

NPWS

Tralee Bay and Magharees Peninsula,  
West to Cloghane SAC  
(site code 2070)

**Conservation objectives supporting document-  
Lagoons**

Version 1  
November 2013

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## 1. Introduction

### 1.1 Tralee Bay and Magharees Peninsula, West to Cloghane SAC

This SAC encompasses a diverse range of coastal habitats and extends from inner Tralee Bay in the east as far as Cloghane, in Brandon Bay, to the west and includes the Magharees Peninsula. Most of the SAC is underlain by lower or Middle Carboniferous limestone, with significant areas being overlain by glacial drift or windblown sand.

The site is selected for 16 habitats listed in Annex I of the Habitats Directive and two species in Annex II.

“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).

Two lagoon sites are listed for this SAC (Oliver, 2007); however, due to their very small sizes (0.5ha and 0.7ha) and low conservation interest, Blennerville Lakes (IL030) are not considered to be part of this qualifying habitat for the SAC (Jim Ryan, pers.comm.). The table below gives the conservation status assessment for lough Gill, as outlined in that report. See map in Appendix 1 and Appendix 2 for the site report (from Oliver, 2007).

<b>Code<sup>1</sup></b>	<b>Name</b>	<b>County</b>	<b>Conservation Assessment</b>
IL029	Lough Gill	Kerry	Unfavourable- inadequate

<sup>1</sup> Code used in Oliver, 2007.

It should be noted that there may be other small lagoons of conservation value within the SAC that have not yet been mapped or surveyed.

### 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 Lough Gill is 29.0ha. This area are calculated from spatial data derived from Oliver (2007).

## **3. Range**

The known distribution of lagoon habitat (i.e. Lough Gill) in Tralee Bay and Magharees Peninsula, West to Cloghane SAC is shown in Appendix 1. There may be other lagoons in the site that have not yet been mapped by NPWS.

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.

Using information from Oliver (2007), Lough Gill can be classed as oligohaline (low salinity). See Roden and Oliver (2013) for further information on salinity classes and Appendix 2 for Lough Gill lagoon report.

### **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.

Lough Gill can be classified as shallow, 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 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. Lough Gill is described as a sedimentary lagoon with a sluice and weir and according to Oliver (2007), its conservation value as a lagoon relies on active management.

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

#### **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**

As Lough Gill been identified as shallow, 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 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 is summarised in Oliver (2007). Species considered to be lagoonal specialists in Lough Gill include *Ruppia maritima*, *R. cirrhosa* and *Chara canescens*. See Appendix 2 for 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 aquatic invertebrate fauna of Lough Gill is described as “rich and diverse” in Oliver (2007).

The area around Castlegregory is considered to be one of the most important areas in Ireland for natterjack toad (*Bufo (Epidalea) calamita*) and thousands of toads breed in Lough Gill (Beebee, 2002; Bécart, Aubry and Emmerson, 2007; Sweeney, Sweeney and Hurley, 2013).

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

The invertebrate species recorded in Lough Gill are summarised in Oliver (2007). See Appendix 2.

#### **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

Bécart E., Aubry A. and Emmerson M. (2007) Monitoring the conservation status of natterjack toad (*Bufo calamita*) in Ireland, 2004 - 2006. Irish Wildlife Manuals, No. 31. National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government, Dublin, Ireland.

Beebee, T.J.C. (2002). The natterjack toad *Bufo calamita* in Ireland: current status and conservation requirements. Irish Wildlife Manuals, No. 10, Dúchas, The Heritage Service.

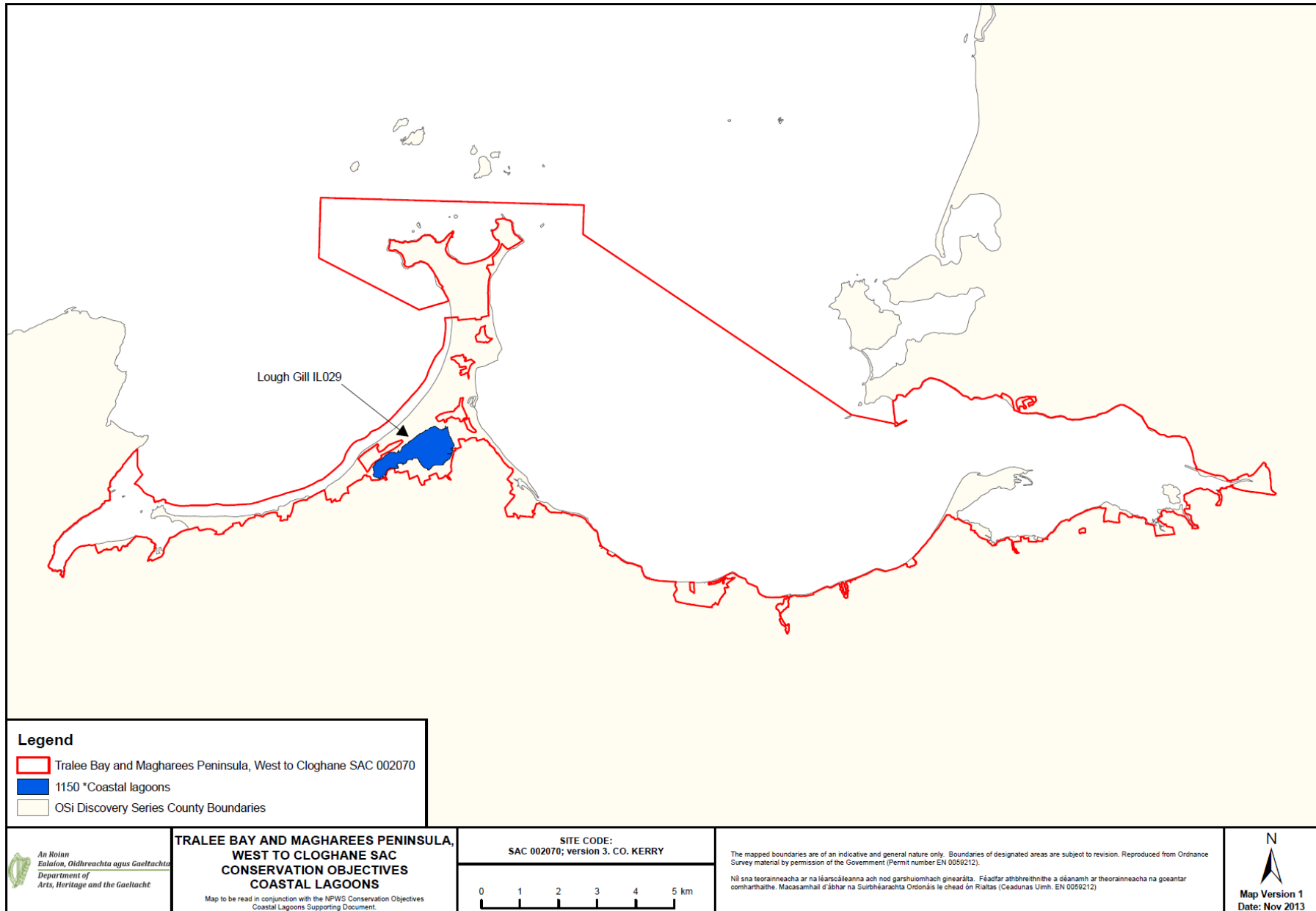
Roden, C.M. and Oliver, G. (2013) Monitoring and assessment of Irish lagoons for the purpose of the EU Water framework Directive. Unpublished report to the Environmental Protection Agency.

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NPWS (2013) The Status of EU Protected Habitats and Species in Ireland. Habitats Assessments Volume 1, Version 1.0. Unpublished Report, National Parks & Wildlife Services. Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland

Sweeney, P., Sweeney, N. and Hurley C. (2013) Natterjack toad monitoring project, 2011 - 2012. Irish Wildlife Manuals, No. 67. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland.

# Appendix 1 Lagoon distribution map





## Appendix 2 Lough Gill site report

4.29

**Lough Gill, County Kerry O.S. Q 606 142**  
O.S. Discovery Sheet 71



**Conservation Designation:** Tralee Bay and Magharees Peninsula,  
west to Cloghane SAC 002070, SPA 004011, pNHA 002070

**General description:**

Lough Gill is situated on the north coast of the Dingle peninsula, 1 km from the town of Castlegregory. A large (144ha) shallow (up to 2m), natural **sedimentary lagoon** in a classical position lying between two barriers which unite to form a tombolo connecting the mainland to a group of the Magharee islands.

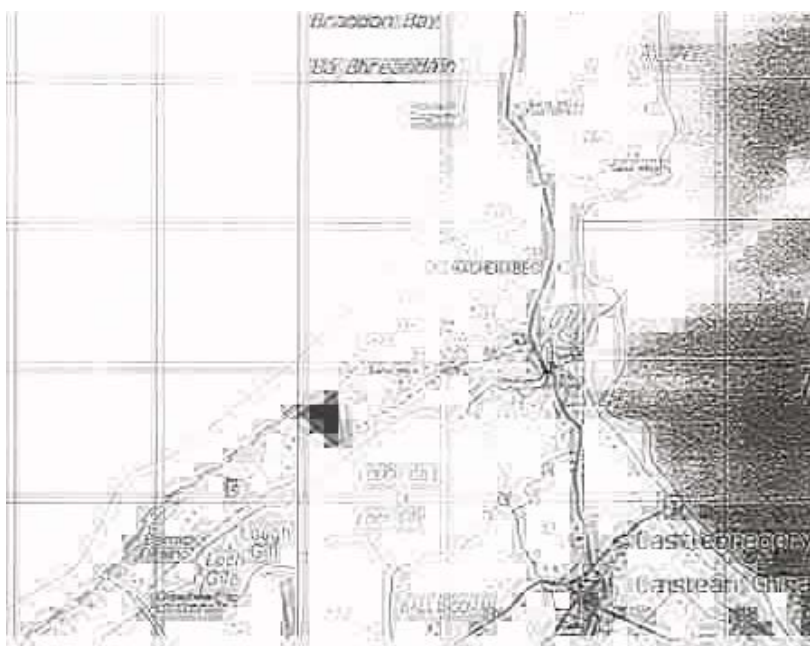


Figure 29.1 Location map of Lough Gill.

Lough Gill was surveyed in 1996 for vegetation (Hatch 1996, Hatch & Healy 1998), aquatic fauna (Healy & Oliver 1996, Oliver & Healy 1998) and ecotonal coleoptera (Good 1996, Good & Butler 1998). Results of these surveys are summarised by Healy *et al.* (1997a,b,c), Healy & Oliver (1998) and Healy (1999, 2003).

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

## Flora

Lough Gill was surveyed by P. Hatch in 1996 (Hatch 1996, Hatch & Healy 1998) and briefly by C. Roden in 1998 (Roden 1999).

In 1996 it was surveyed by transects only.

*Ruppia maritima* was found growing in fairly dense patches near the freshwater inflow, the outlet channel and the south east shore. It is extensive around the outlet, growing in dense beds to 50 metres out from the shore. *Potamogeton pectinatus* was found at the same three transects at more or less sparse cover. Both species are seen to have a wide distribution across the site. Locally abundant *Zannichellia palustris* grows with the last two species at the freshwater inflow and south eastern transect sites. *Myriophyllum spicatum* was found at three places in the western half of the lagoon. *Chara aspera* var. *aspera* showed a wide distribution, occurring at the south western, south eastern and north central transect sites.

There is a notable diversity of marginal species and communities here. *Phragmites*, *Schoenoplectus* and *Scirpus maritimus* all occur in fairly extensive mixed and single species swamps. *Typha latifolia* occurs with *Phragmites* along the north shore and *Iris psuedacorus* is locally dominant on the south eastern shore. Freshwater *Phragmites* fen can be found in the south east and associated with the main freshwater inflow. *Rumex hydrolapathum* occurs in this community.

Hatch described Lough Gill as a representative of mildly brackish conditions. Aquatic species composition is interesting and distribution and abundance worthy of further study. Diversity of marginal communities is fairly high, but as a full aquatic survey was not possible Lough Gill was only rated as **“potentially valuable”**.

In 1998 Roden examined a small area in the north east of the lake, including a dense stand of *Phragmites australis* and shallow open water. Two unusual plants were found in the reedswamp, *Ceratophyllum demersum* and *Aster lanceolatus*. The former is an uncommon native species while the latter is a scarce introduction from North America. The open water was extremely shallow, with patches of *Ruppia cirrhosa* in an unusual small form but with the characteristic very long flower or fruit peduncules reaching the water surface. Two charophytes were found; abundant *Chara aspera* and occasional patches of *Chara canescens*. The latter species was not found in 1996 but had been recorded from Lough Gill at the start of the century. Both species, like *R. cirrhosa*, were dwarf forms about 2-4cm high.

A total of 22 floral taxa were recorded in Lough Gill, of which three are lagoonal specialists (*C. canescens*, *R. maritima*, *R. cirrhosa*):

*Chara canescens* was recorded in **eight lagoons** during the surveys - North Slob, Lady's Island L., and Tacumshin L., Co. Wexford, L. Gill, Co. Kerry, L. Murree, Co. Clare, Tanrego, Co. Sligo and Durnesh L. and Inch L., Co. Donegal (Hatch & Healy, 1998; Roden, 1998; Roden 2004). It was also recorded at Shannon Lagoon in 1996 (Hatch and Healy 1998), but not refound at that site in 2003 (Roden 2004). This species is listed in the Red Data Book for Britain and Ireland (Stewart and Church 1992). Although recorded from several European countries it is believed to be declining. It is believed to be extinct in Holland, and there are only a few records from

the U.K. since 1960. 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 (*R. maritima* at 41, *R. cirrhosa* at 22 sites).

*Ruppia maritima* appears to be the more common of the species and was found at 41 of the lagoons surveyed. *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, but species was not determined at 12 sites. *Ruppia maritima* var *brevirostris* was only positively identified at two sites (Ballyteige, Co. Wexford and Inch L., Co. Donegal).

The presence of *C. canescens* greatly increases the conservation value of this site, and together with the fact that both *Ruppia* species were recorded, and the general floristic richness of the site results in an evaluation of **high conservation value**.

## Fauna

Seven stations were selected for sampling of aquatic fauna in 1996 (Healy & Oliver 1996, Oliver & Healy 1998) (Figure 29.2, Table 29.1).

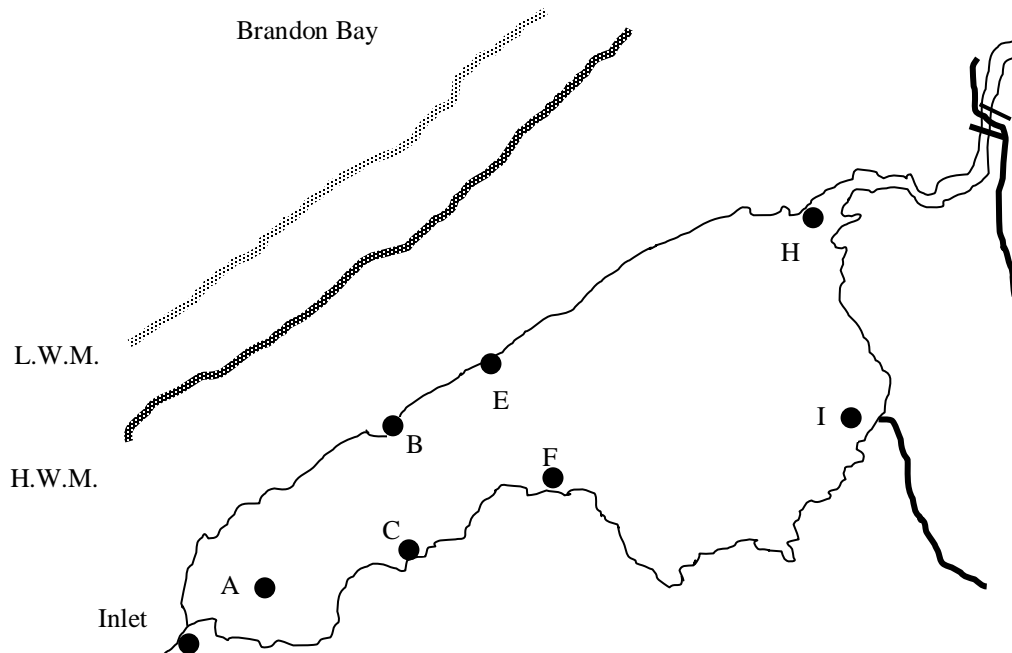


Figure 29.2 Sampling stations used at Lough Gill.

A total of 43 taxa were recorded in Lough Gill, of which 35 were identified to species (Table 29.2), but this list included only one species (*Lekanesphaera hookeri*) regarded as a lagoonal specialist and one rare species (*C. sternalis*).

*Lekanesphaera hookeri* is a common lagoonal isopod crustacean, found at 37 of the 87 lagoons surveyed (42.5%).

*Cercyon sternalis* Water-beetle recorded at L. Gill. There are only three other Irish records, from Kerry (Bullock 1935) and two other recent records from L. Gash, Co. Clare and Portumna, Co Galway (Owen 1997).

Most of the beetles were taken in light traps and could have been attracted by the lights while flying. Some brackishwater species e.g. *Lekanesphaera hookeri* and *Pomatoschistus microps* were confined to the area near the mouth of the sea inlet while others e.g. *Clitellio arenarius* and *Neomysis integer* were more widely distributed.

Table 29.1 Positions, salinity, temperature, water depth and substratum of sampling stations in Lough Gill 11-13/9/96.

	Inlet	Sta A	Sta B	Sta C	Sta D	Sta E	Sta F	Sta G	Sta H	Sta I
GPS position		Q 5933 1346	Q 5956 1381	Q 5967 1341	Q 5983 1373	Q 6030 1396	Q 5955 1382	Q 6077 1349	Q 6122 1464	Q 6134 1403
Salinity(psu)	0	0	0	2	2	2	2	0-1	2	1-2
Depth(cm)	0-200	25-100	25-80	0-50	100	40-50	200	0-25	25-50	25-50
Substratum	Sand	Sand	Sand occasion al stones	Stones and organic silt	Sand	Sand	Fine organic silt	Rich organic mud	Clean sand	Sand, occasion al stones

The fauna is rich and diverse, comprising both freshwater and brackishwater elements. Hemiptera (6 spp.) and Coleoptera (11 spp.) were especially abundant and diverse. The faunal assemblage typifies a system which is essentially freshwater but which receives small incursions of seawater. All of the hemipterans and beetles are freshwater species. The long, sluiced inlet and weir apparently prevent crabs and prawns entering the lake but juvenile flounder and mullet were able to find their way in during 1996. The aquatic fauna appears to be diverse and includes one rare species but is typically freshwater. A significant brackish element is present but only one lagoonal specialist was recorded. As a result of this, based on the invertebrate fauna Lough Gill is rated only as of **moderate conservation value** as a coastal lagoon.

Lough Gill was one of the four sites selected for seasonal monitoring from 2002-2003 (Oliver 2005).

### Ecotonal Coleoptera

Fifty four species of staphylinid and 20 species of carabid beetles were recorded at lough Gill (Good & Butler 1998), of which two species are indicator species of well-developed coastal shoreline habitat (*Gabrius keysianus*, *Philonthus furcifer*). The site was evaluated as of **significant conservation value**. The rating of significant refers to sites reaching a status that is worth conserving, in terms of their ecotonal fauna.

Table 29.2 Fauna Recorded at Lough Gill, Co. Kerry. July and September, 1996.

L.T. = light-trap ( ) = records for July, + = present, o = occasional, c = common, a = abundant, F = fyke net. Species in bold text are lagoonal specialists or apparently rare.

		Sampling Stations															
		Inlet	L.T.	A	L.T.A	B	L.T.B	C	E	L.T.E	F	L.T.F	G	H	L.T.H.	I	L.T.I
<b>Annelida</b>	Hirudinea			+		+		+	+							+	
	<i>Clitellio arenarius</i>															+	+
	Naididae																+
<b>Crustacea</b>	Ostracoda		+	+	+	+	+	+	+	+	+	+					+
	Copepoda		+	+	+	+	+				+	+					+
	Mysidacea <i>Neomysis integer</i>					+		+	+	+	c	150	o	+	1	(+)	(+)
	Isopoda <b><i>Lekanosphaera hookeri</i></b>													a	25	(+)	(+)
	Amphipoda <i>Gammarus zaddachi</i>					+					+			+	+		
	<i>Melita palmata</i>								+	+							
<b>Arachnida</b>	Hydracarina		12	+		+		+								+	+
<b>Insecta</b>	Ephemeroptera <i>Cloeon simile</i>		+		+		+										
	<i>Proclleon bifidum</i>		+														
	Odonata <i>Ischnura elegans</i>	+						+	+		+			+	1	+	+
	Plecoptera														1		
	Trichoptera					+		+									
	Hemiptera <i>Nepa cinerea</i>																+
	Corixidae	+	+	+	100	+	150	+	+	+	+	300	o	+	65	+	+
	<i>Callicorixa praeusta</i>			+	+	+	+		+	+			a			(+)	
	<i>Corixa punctata</i>															+	+
	<i>C. panzeri</i>	a	+	+	+			a	+	a	+	+	+	+	c	c	c
	<i>Arctocorixa germari</i>			+	+												
	<i>Sigara dorsalis</i>	a	a	a	a	a	a	a	+	a	+	a	a	+	+	c	c
	Coleoptera <b><i>Cercyon sternalis</i></b>																
	<i>Enochrus testacus</i>													+			
	<i>Haliphus confinis</i>						+			+		+					
	<i>H. fulvus</i>				+		+										
	<i>H. lineatocollis</i>				+												
	<i>Hygrotus inaequalis</i>													+		(+)	
	<i>Laccobius biguttatus</i>															(+)	
	<i>L. minutus</i>						+										
	<i>Laccophilus minutus</i>				+		+										
	<i>Llybius fuliginosus</i>						+			+							
	<i>Nebrioporus depressus</i>						+			+							
	Diptera Chironomidae	+				+		+					+	+			
	Tipulidae														+	+	+
<b>Mollusca</b>																	
	Polyplacophora <i>Lepidochitona cinerea</i>														1		
	Prosobranchia <i>Potamopyrgus antipodarum</i>	+				+		+	+	+			+	+	+	+	+
	Pulmonata <i>Lymnaea peregra</i>			+		+		+	+				+		+	+	+
	<i>Sementina complanata</i>	+													+	+	+
	Bivalvia <i>Cerastoderma sp.</i>			shells		shells									shells	shells	shells
	<i>Pisidium sp.</i>					+		+	+				+		+	+	+
	<i>Sphaerium sp.</i>	+				+							+				
<b>Bryozoa</b>	<i>Plumatella repens</i>							a									(+)
<b>Teleostei</b>	<i>Anguilla anguilla</i>		1	F,1		F,46		+			F, 94			+	+	+	+
	<i>Gasterosteus aculeatus</i>	a	49	a	130	a	14	c	c	4	+		+	+	4	+	+
	Mugilidae										F, 3						
	<i>Platichthys flesus</i>			F, 23		+					F, 6		+	+	+	+	+
	<i>Pomatoschistus microps</i>												+	+	c		
	<i>Salmo trutta</i>			F, 3							F, 2						

### Summary

The lake is an important trout fishery and of great concern to the local inhabitants as a local resource to encourage tourism. Recent algal blooms, presumably resulting from eutrophication have caused fish kills, and an apparent decline in waterfowl numbers. The lake is a shallow natural lagoon “in a classical position” (Guilcher & King 1961) lying between two barriers which unite to form a tombolo connecting the mainland to a group of the Magharee islands. Geomorphologically it is a classic example of a large, shallow, low salinity **sedimentary lagoon** lying between two sedimentary barriers. However, the predominance of freshwater species among the aquatic fauna and the localised occurrence of the single lagoonal specialist near to the sea inlet, casts some doubt upon the acceptance of the lake as a true lagoon based on the fauna alone. However, the presence of both *Ruppia maritima* and *Ruppia cirrhosa* and the rare charophyte *Chara canescens* (all lagoonal specialists) greatly increases the value of the site and justification for regarding Lough Gill as a coastal lagoon, and not a freshwater lake. However, its conservation value as a coastal lagoon depends entirely on management. If seawater is allowed to enter on a regular basis, Lough Gill will remain a classic brackish lagoon. If not, it will become a freshwater lake.

The L. Gill area is also of major importance as the main breeding site of the Natterjack toad (*Bufo calamita*) (see Gresson and O’Dubhda 1971) and is scheduled for designation as a National Nature Reserve.

In conclusion, based on aquatic invertebrates Lough Gill is not of great interest as a coastal lagoon, but based on geomorphology, vegetation and ecotonal coleoptera, overall Lough Gill is rated of **high conservation value**.

**Overall Conservation Value = High**

### Conservation Status Assessment (from Oliver 2007)

Impacts	Extreme eutrophication at times due to agricultural activities causing algal blooms and fishkills. Relieved by modification of hydrology. Accumulation of organic material. Considerably improved. Poaching by cattle. Leisure fishing. Golf course.
Conservation Status	Unfavourable-Inadequate

### Further Information

Lough Gill was surveyed in 1996 for vegetation (Hatch 1996, Hatch & Healy 1998), aquatic fauna (Healy & Oliver 1996, Oliver & Healy 1998) and ecotonal coleoptera (Good 1996, Good & Butler 1998). Results of these surveys are summarised by Healy *et al.* (1997a,b,c), Healy & Oliver (1998), and Healy (1999, 2003). Vegetation was surveyed briefly again in 1998 (Roden, 1999). Sampled seasonally from 2002-2003 and included in a biological classification of Irish coastal lagoons (Oliver 2005), and in the Conservation Status report (Oliver 2007).

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