

NPWS

Rutland Island and Sound SAC
(site code 2283)

**Conservation objectives supporting document-
Lagoons**

Version 1
2013

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1. Introduction

1.1 Rutland Island and Sound SAC

Rutland Island and Sound SAC (site code 002283) is a large marine/coastal site in north-west Donegal. It lies between the east coast of Aran Island (Arainn Mhór) and the mainland, extending from Bent Island in the north to Crohy Head in the south. Besides Rutland Island itself, a number of other small rocky islets are also included in the site.

The SAC is selected for eight habitats listed on Annex I of the Habitats Directive and one species listed 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, 2008).

One lagoon, Sally’s Lough, situated north of Burtonport, is listed for this SAC (Oliver, 2007). The table below gives its conservation status assessment as outlined in that report. See map in Appendix 1 and Appendix 2 for the account of the site (from Oliver, 2007).

Code ¹	Name	County	Conservation Assessment
IL081	Sally’s Lough	Donegal	Unfavourable- inadequate

¹Code is that 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 the mapped lagoon within the SAC is 4.9ha (area is calculated from spatial data derived from Oliver (2007)).

3. Range

The known distribution of lagoon habitat in Rutland Island and Sound 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.

Seawater enters Sally’s Lough on most tides on most tides but this is diluted by freshwater run-off from surrounding hills. Using information from Oliver (2007), the following table gives the salinity class for Sally’s Lough. See Roden and Oliver (2013) for further information on salinity classes and Appendix 2 for the lagoon report.

Code	Name	Salinity
IL081	Sally’s Lough	Polyhaline/euhaline

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.

Sally’s Lough is relatively shallow (less than 4m deep), particularly the eastern part, which is less than 2m in depth. Thus, small changes in water depth could cause significant loss 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.

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

Sally's Lough was apparently a freshwater lake that became tidal following excavation of a channel to the sea (Oliver, 2007). It is described as a rock/peat lagoon with tidal narrows. See also site account in Appendix 2.

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

Roden and Oliver (2013) give a reference value of 2m for depth of macrophyte sward. Thus, for shallow lagoons, it is expected that macrophytes would extend down to full lagoon depth. This would be the case for at least the eastern part of Sally's Lough

The target for the attribute depth of macrophyte colonisation is: macrophyte colonisation to at least 2m depth.

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 Sally's Lough is summarised in Oliver (2007). Two lagoonal specialists, Tasselweed (*Ruppia* spp.) and the green alga *Chaetomorpha linum*, were recorded, as well as a rare alga, *Cladophora battersii*, which grows unattached on the lagoon bed. This alga has only been found in one other Irish lagoon. 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 in Sally's Lough are summarised in Oliver (2007). See Appendix 2. Four species found in the lough are considered to be lagoonal specialists; two molluscs- *Onoba aculeus* and *Cerastoderma glaucum*, an isopod crustacean- *Idotea chelipes* and a bryozoan- *Conopeum seurati*.

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.

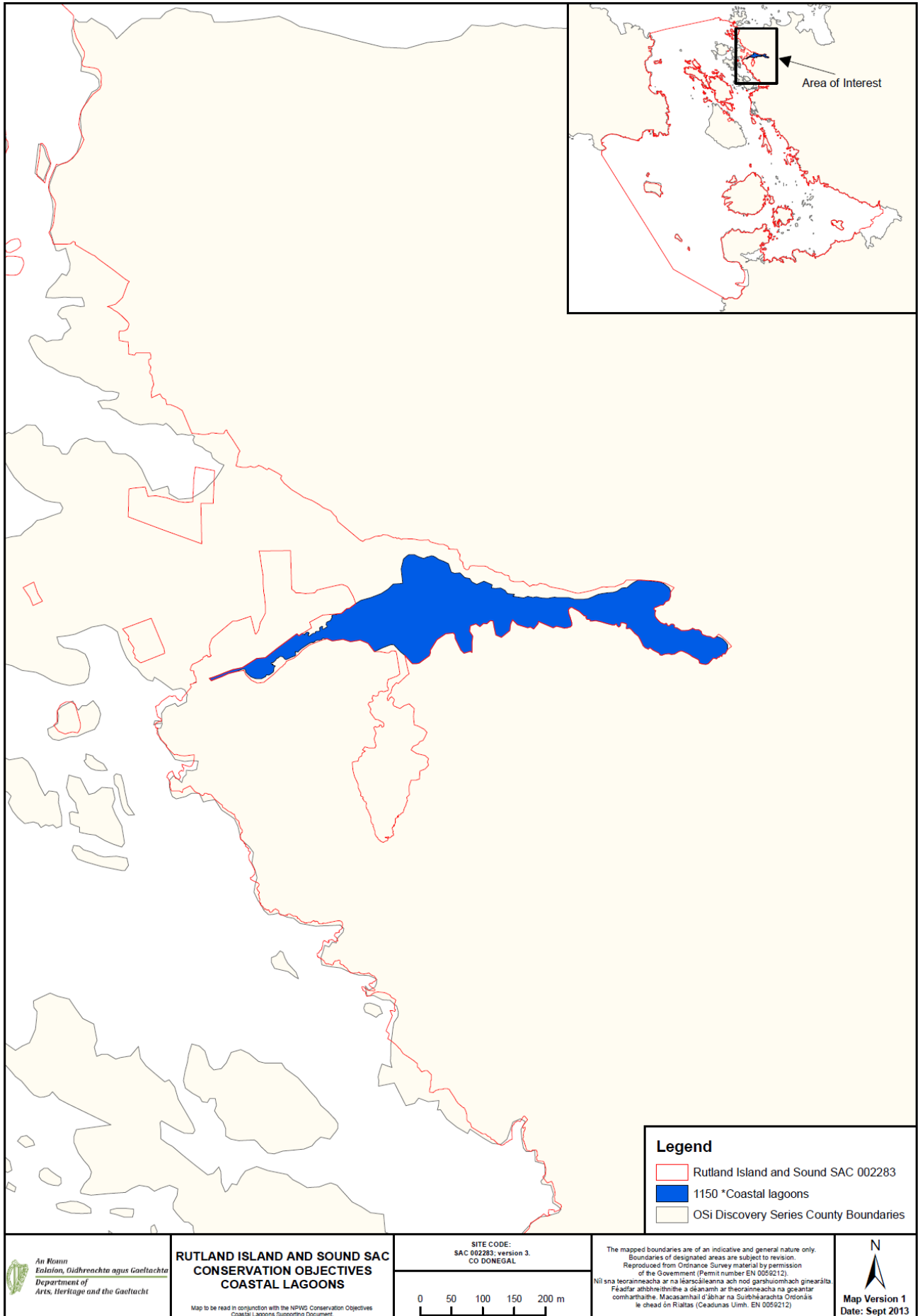
The target for the attribute negative indicator species is: negative indicator species absent or under control.

5. References

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.

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

Appendix 1 Lagoon distribution map



Appendix 2 Site report

The following is the site account from Oliver (2007)

Code¹	Name
IL081	Sally's Lough

¹ Code is that used in Oliver, 2007.



Conservation Designation: Rutland Island and Sound SAC 002283, pNHA 001141

General description:

Sally's Lough is a small (10ha), relatively shallow (<4m) **rock/peat lagoon** with tidal narrow 3 km to the north of Burtonport, Co. Donegal. According to local information it was formerly freshwater lake which became tidal following excavation of a channel to the sea. Seawater enters the lake on most tides and salinity at the time of sampling (5-7/9/98) was close to that seawater (29.5 -34.3psu) throughout the lagoon, although 28 psu was recorded in June 1998.



Figure 81.1 Location of map of Sally's Lough, Co. Donegal.

Sally's 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 (Roden 1999). The following is based on the report by Roden, following his survey on 6-7/9/98.

The eastern part of the lagoon is shallow (<2m) and floored with sand and soft mud. *Chaetomorpha linum* is common, *Ruppia* sp. and drifts of *Cladophora battersii* are occasional. The two former taxa are lagoonal specialists and the latter is a proposed specialist for Ireland. The *Ruppia* at this site was not identified specifically, as no flowering plants were found.

Chaetomorpha linum. There is some doubt about the taxonomic status of the unattached lagoonal form of this species, and it was recorded by Hatch and Healy (1998) as *C. mediterranea*. It is a common, characteristic alga of semi-isolated Irish lagoons, recorded at 49 of the 87 (56.3%) lagoons surveyed.

Cladophora battersii, confirmed by Prof. Van den Hoek, is a rare species previously known only from pre 1914 records and found during the lagoon surveys only at two high salinity sites on the west coast (L. Athola, Co. Galway and Sally's L., Co. Donegal). Proposed as lagoonal specialist for Ireland by Roden (1999).

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.

In the western part of the lagoon, the bed is at 3-4m with large areas of bare mud with *C. linum* and *C. battersii* but no *Ruppia*. Extensive underwater cliffs in the southwestern quarter support a moderately diverse macroalgal flora with *Furcellaria lumbricalis*, *Phyllophora pseudoceranooides*, *P. crispus*, *Anfelta plicata*, *Chondrus crispus*, *Corallina officinalis*, *Coccotylus truncata*, *Plocamium cartilaginum*, *Dictyota dichotoma*, *Codium fragile tomentosum* and *Cladophora rupestris*. Occasional brown algae including *Ascophyllum nodosum*, *Fucus spiralis* and *F. vesiculosus* were recorded close to the surface. This algal vegetation corresponds to OB23/OB24 of Covey and Thorpe (1994) found in the Scottish "obs".

Sally's Lough is one of only two sites where *Cladophora battersii* was found during the lagoon surveys. Generally, the flora might be described as species-poor, but two other lagoonal specialists were recorded (*Chaetomorpha linum*, *Ruppia* sp.). Based mainly on the presence of *C. battersii* alone, the site is rated as of **moderate conservation value** for aquatic vegetation.

Fauna

Five stations were selected for faunal sampling in Sally's Lough on 5-7/9/98 (Oliver 1999, Figure 81.2, Table 81.1).

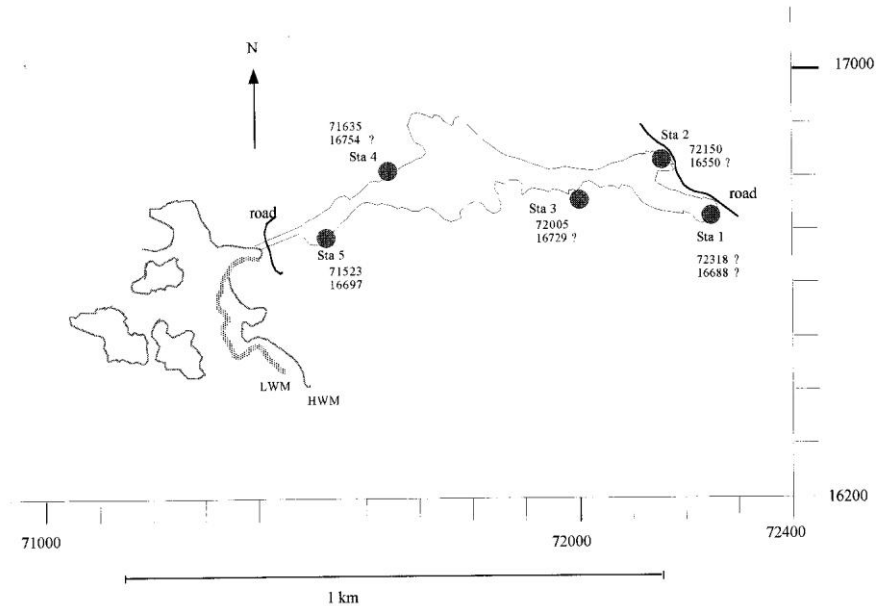


Figure 81.2 Positions of stations used for sampling aquatic fauna at Sally's L. 5-7/9/98 (there is some doubt about accuracy of GPS positions)

Table 81.1 Positions of faunal sampling stations in Sally's Lough, 7-8/9/98 with salinity, depth of water and type of substratum (there is some doubt about accuracy of GPS positions)

	Sta 1	Sta 2	Sta 3	Sta 4	Sta 5
GPS position	B 72318 16688	B 72150 16550	B 72005 16729	B 71635 16754	B 71523 16697
Salinity(psu)	33.7	34	33.4	29.5-31.5	33.5
Depth(cm)	0-100	0-100	0-150	0-50	20-100
Substratum	Gravel, sand and occasional stones overlain with peaty silt	Rock, stones, deep layer of organic silt	Rocks, stones, gravel, sand, silt	Sand, silt, peat	Sand, organic silt

A total of 49 faunal taxa were recorded at Sally's Lough (Table 81.2), of which four species are regarded as lagoonal specialists and two amphipod crustaceans appear to be rare.

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.

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

Onoba aculeus Gastropod mollusc recorded at Greenore Golf course, Co. Louth, Lettermullen Pool, L. an Aibhnín, and L. Athola, Co. Galway and Sally's Lake, Co. Donegal, and recently (unconfirmed) from L. Dearg in the Aran islands.

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.

Table 81.2 Aquatic fauna recorded at stations in Sally's Lough, Co. Donegal. 1998.
 L.T. = light trap; F = Fyke net; + = present, o = occasional, c = common, a = abundant.
 Species in bold text are lagoonal specialists or rare species.

Taxa		Sampling Stations										
		1	L.T. 1	2	L.T. 2	mid	3	L.T.3	4	L.T.4	5	
Cnidaria	<i>Anthopleura ballii</i>	c		a		a		a		a		a
Nematoda	indet.							c				c
Nemertea	indet.					+						
Amelida	<i>Arenicola marina</i>							c				
	<i>Lumbrinereis gracilis</i>							a				
	<i>Platynereis dumerili</i>							c				
	<i>Polyopthalmus pictus</i>							c				
	<i>Pomatoceros sp.</i>											+
	<i>Scoloplos armiger</i>							a				
	Spirorbidae indet.									+		+
Sipuncula	indet.									+		
Crustacea												
	Ostracoda											a
	Copepoda <i>Notodelphys sp.</i>			+						+		+
	Mysidacea <i>Praunus flexuosus</i>	a	15	a	78	c		c	35	c	37	c
	Isopoda <i>Idotea chelipes</i>	o						+				
	<i>Jaera sp.</i>	1	1									+
	Amphipoda	o	2	o	1	a		c	2	a	1	9
	<i>Ampithoe ramondi</i>					c		+		1		
	<i>Corophium volutator</i>	o	1	a		o		1	1	c		1
	<i>Dexamine spinosa</i>							1		1		
	<i>Gammarus duebeni</i>			o	1					1		
	<i>G. zaddachi</i>									1		
	<i>Microdeutopus anomalous</i>		1	o		a		8		32	1	9
	<i>Lembos longipes</i>									1		
	Decapoda <i>Cancer pagurus</i>									F=1		
	<i>Carcinus maenas</i>	F=65		+		+		+		F=35		+
	<i>Crangon crangon</i>											c
	<i>Palaemon elegans</i>	+		+		+			+	+		+
	<i>P. serratus</i>			+						+		
Acarina	indet.											+
Insecta	<i>Chironomidae sp.1</i>	+		+								
	<i>Chironomidae sp.2</i>	+										
Mollusca												
	Prosobranchia											
	<i>Littorina saxatilis</i>	1		+					+			
	<i>Onoba aculeus</i>	o							+		+	
	<i>Rissoa parva</i>	+		+		1		+				+
	<i>Skeneopsis planorbis</i>											
	Bivalvia			shells								
	<i>Cerastoderma glaucum</i>	spat		spat		spat		spat		spat		spat
	<i>Mya arenaria</i>	shells		shells		shells		shells		shells		shells
	<i>Mytilus edulis</i>									+		
	<i>Ostrea edulis</i>									+		
Echinodermata	<i>Asterias rubens</i>											1
	<i>Amphipholis squamata</i>	c		c		c		c		c		c
	<i>Leptosynapta inhaerens</i>			+		c				c		
Bryozoa	<i>Alcyonidium gelatinosum</i>							+				
	<i>Bowerbankia gracilis</i>			+								
	<i>Conopeum seurati</i>			a								
	<i>Cryptosula pallasiana</i>	+						+				+
Tunicata	<i>Asciella aspersa</i>	+		+				+		+		+
	<i>Clavelina lepadiformis</i>					+		+		+		+
Pisces	<i>Anguilla anguilla</i>	F=3		F=4				+		F=5		
	<i>Gasterosteus aculeatus</i>	+			3			o	2			
	<i>Gobius niger</i>	+								F=2		c
	<i>Pleuronectes flesus</i>			F=1								
	<i>Pomatoschistus microps</i>	+	10	+	5			+		+		c

Ampithoe ramondi Amphipod crustacean recorded at Kilmore L., Co. Cork, Drongawn L., Co. Kerry, L. an Aibhnín, and L. Athola, Co. Galway and Sally's L., Co. Donegal. According to Lincoln (1979) all records from Britain are in the southwest. The record from Sally's L., Donegal may be the most northerly record of the species for the British Isles.

Lembos longipes Amphipod crustacean recorded at 5 sites on the west coast (Kilmore L, Co. Cork, Drongawn L., Co. Kerry, L. an Aibhnín, Co. Galway, Furnace L., Co. Mayo and Sally's Lough, Co. Donegal). There are only three previous records for Ireland (Costello *et al.* 1989).

The aquatic fauna of Sally's Lough is moderately rich but this is largely due to the strong marine influence. However, four species are lagoonal specialists and two amphipod crustaceans appear to be rare. Based on aquatic fauna, the site is rated as of **moderate conservation value**.

Ecotonal coleoptera

A total of eight carabid and thirteen staphylinid beetles were recorded in Sally's Lough in 1998 (Good 1999, Good & Butler 2000), none of which are indicator species. Based on shoreline coleoptera, the site is rated as of **no conservation value**.

Summary

Sally's Lough is a small, relatively shallow **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, but relatively rare in European terms. Generally, the flora might be described as species-poor, but this is one of only two sites where *Cladophora battersii* was found during the lagoon surveys and two other lagoonal specialists were recorded (*Chaetomorpha linum*, *Ruppia* sp.). The aquatic fauna is moderately rich with four lagoonal specialists and two amphipod crustaceans which appear to be rare in Ireland (*A. ramondi*, *L. longipes*). Overall, the site is rated as of **moderate conservation value**.

Overall Conservation Value = Moderate

Conservation Status Assessment (from Oliver 2007)

Impacts	Natural eutrophication in small lagoon. Accumulation of organic material.
Conservation Status	Unfavourable-Inadequate

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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