

NPWS

**Slyne Head Peninsula SAC
(site code:2074)**

**Conservation objectives supporting document-
Coastal lagoons**

Version 1
January 2015

Contents

1. Introduction	2
1.1 Slyne Head Peninsula SAC	2
1.2 Conservation objectives	2
2. Area.....	3
3. Range	3
4. Structure and functions	3
4.1 Salinity regime	3
4.2 Hydrological regime	3
4.3 Barrier: connectivity between lagoon and sea	4
4.4 Water quality- Chlorophyll a	4
4.5 Water quality- Molybdate reactive phosphorus (MRP).....	4
4.6 Water quality- Dissolved inorganic nitrogen (DIN).....	5
4.7 Depth of macrophyte colonisation	5
4.8 Typical plant species	5
4.9 Typical animal species.....	5
4.10 Negative indicator species	5
5. References.....	6
Appendix 1 Lagoon distribution map	7
Appendix 2 Site reports	8

1. Introduction

1.1 Slyne Head Peninsula SAC

This site comprises the peninsula to the west of Ballyconneely Village and extends northward to Errislannan Point to include Mannin Bay. The underlying geology is predominantly gneiss, except for schist along the northern shores of Mannin Bay and a granite ridge along the western edge of the peninsula.

The SAC is selected for 18 habitats listed on Annex I of the Habitats Directive and two 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, 2013).

There are two lagoons listed for this SAC (Oliver, 2007). The table below gives the conservation status assessment of each lagoon as outlined in that report. See map in Appendix 1 and Appendix 2 for accounts of each site (from Oliver, 2007).

Code ¹	Name	County	Conservation Assessment
IL067	Ballyconneely Lake	Galway	Unfavourable-Inadequate
IL068	Lough Athola	Galway	Favourable

¹ Codes are those 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 lagoons is 22.30ha- see table below.

Code ¹	Name	Area (Ha) ²
IL067	Ballyconneely Lake	10.25
IL068	Lough Athola	12.05
	Total	22.30

¹ Codes are those used in Oliver, 2007.

² Areas are calculated from spatial data derived from Oliver (2007).

3. Range

The known distribution of lagoon habitat in Slyne Head Peninsula SAC is shown in Appendix 1. There may be other lagoons in the SAC 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.

The salinity regimes within the lagoons in the SAC vary. In Ballyconneely Lake it was recorded at <1 practical salinity unit (psu) while over most of Lough Athola it was 33-34psu except in a small bay to its western end where it was as low as 6psu. Using information from Oliver (2007), the following table gives the salinity class for each lagoon listed. See Roden and Oliver (2013) for further information on salinity classes and Appendix 2 for individual lagoon reports.

Code	Name	Salinity
IL067	Ballyconneely Lake	Oligohaline
IL068	Lough Athola	Meso-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.

Lagoons that are 2m or less in depth can be regarded as shallow and in such cases, even small changes in water depth can cause significant losses in habitat area. In Slyne Head Peninsula SAC the two lagoons have recorded depths of 2m or less (Ballyconneely Lake 0.5m, Lough Athola 2m). Further information is required to investigate historic fluctuations to enable more specific targets to be set. See Appendix 2 for individual site reports.

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.

The two lagoons listed for the site are described as having either an artificial sluiced outlet or a rock/peat barrier, which is summarised in the following table (after Oliver, 2007). See also site accounts in Appendix 2.

Code	Name	Barrier Type
IL067	Ballyconneely Lake	Artificial sluiced outlet
IL068	Lough Athola	Rock/peat

“Rock/peat” lagoons are similar to the Scottish “obs” and are a particularly unusual lagoon type in a European context.

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

The two lagoons within the Slyne Head Peninsula SAC have been identified as shallow (<2m), thus, it is expected that macrophytes extend down to their full depths.

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

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 each lagoon is summarised in Oliver (2007). Species considered to be lagoonal specialists include *Ruppia* spp. and *Cladophora battersii* and three charophyte species. See Appendix 2 for individual site reports.

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 fauna of Lough Athola is described by Oliver (2007) as rich, with most of the species recorded being common marine animals. However there are seven species of lagoonal specialists and several rare species recorded here. Within Ballyconneely Lake one lagoonal specialist was recorded (*Ochthebius punctatus*), this species is rare.

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

The species recorded per site are summarised in Oliver (2007). See Appendix 2 for site reports.

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.

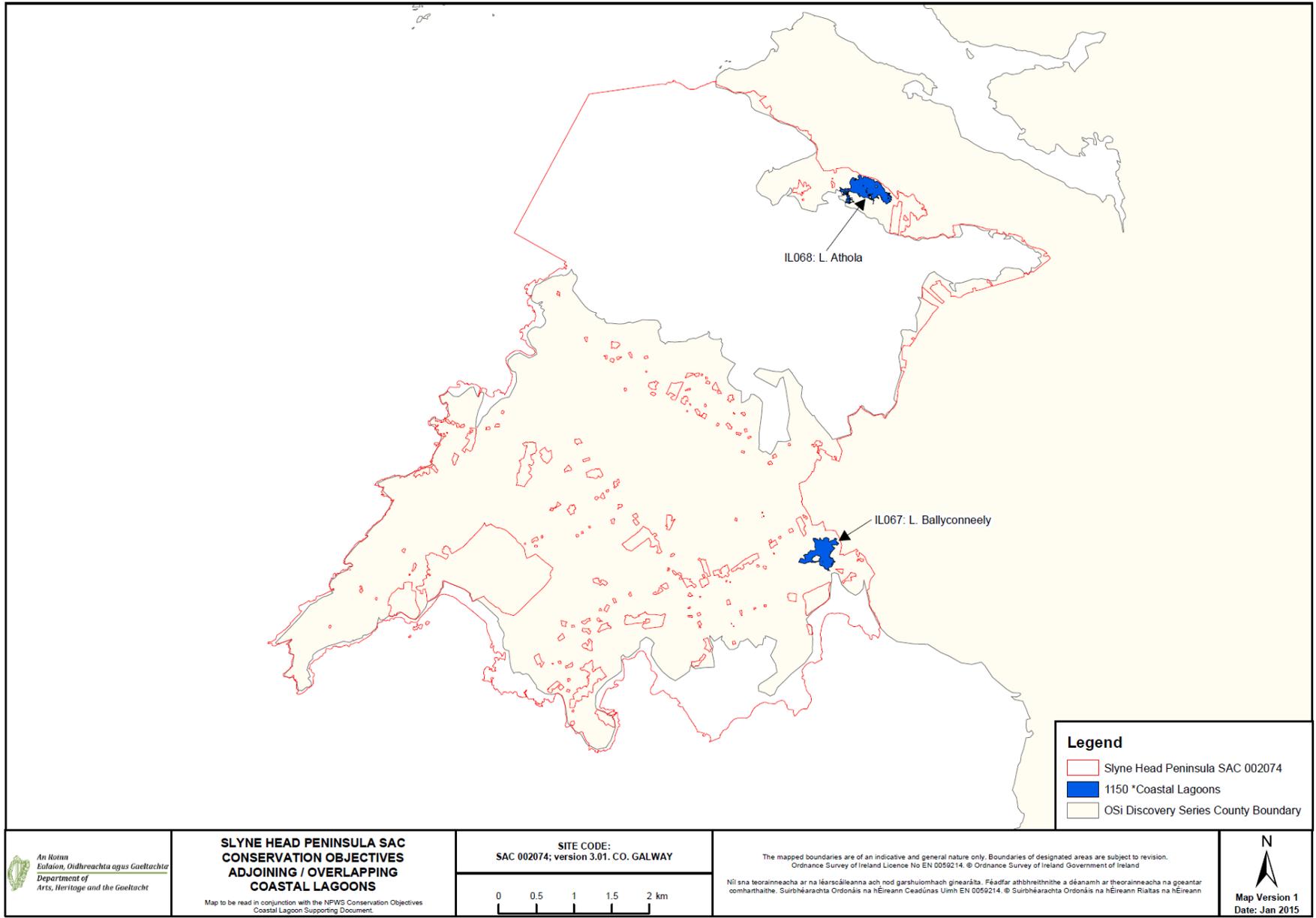
5. References

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

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 reports

The following are site accounts from Oliver (2007)

Code¹	Name
IL067	Ballyconneely Lake
IL068	Lough Athola

¹ Codes are those used in Oliver, 2007.

4.67

Ballyconneely Lake, County Galway O.S. L 620 437

(Loch Baile Conaola)

O.S. Discovery Sheet 44

**Conservation Designation:** Slyne Head Peninsula SAC 002074, pNHA 002074**General description:**

Ballyconneely is a moderate sized (20ha), very shallow (0.5m) **natural sedimentary** lagoon, with an artificial sluiced outlet running under the road into Ballyconneely Bay. Situated 10km northwest of Roundstone, Co. Galway, and 0.5km southeast of Ballyconneely. It is a “borderline” lagoon. Salinity is probably extremely low most of the time, and measured <1psu at the time of sampling (16-17/7/02). In dry summers it almost dries out completely and is perhaps more of a “machair lake” than a lagoon but remains on the lagoon list for the time being.

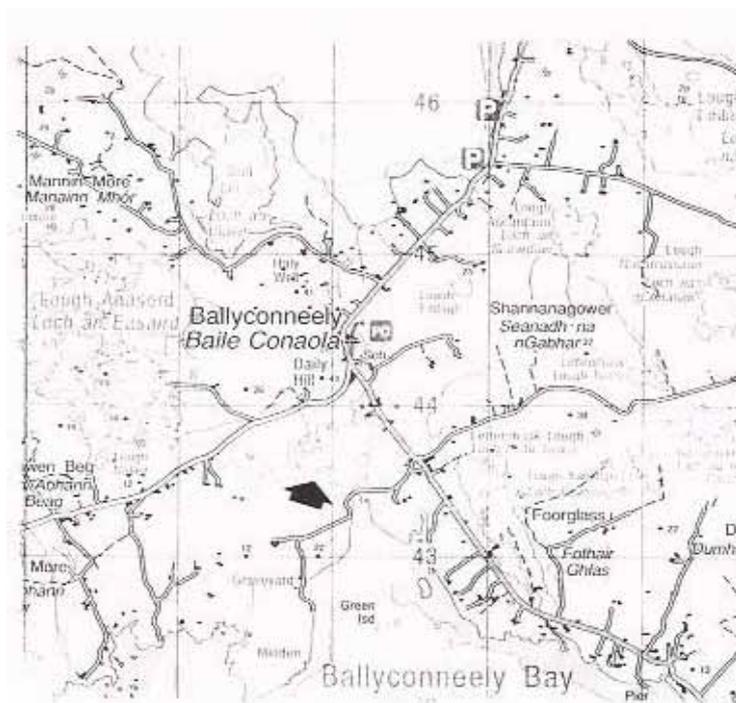


Figure 67.1 Location map of Ballyconneely Lake

Ballyconneely Lake was surveyed in 2002 as part of a PhD study and used in a biological classification of Irish coastal lagoons (Oliver 2005). Aquatic vegetation was examined by C. Roden in 1998 and 2003 (Roden 2004). Four stations were selected for the sampling of aquatic fauna and flora in 2002 (Figure 67.2, Table 67.1)

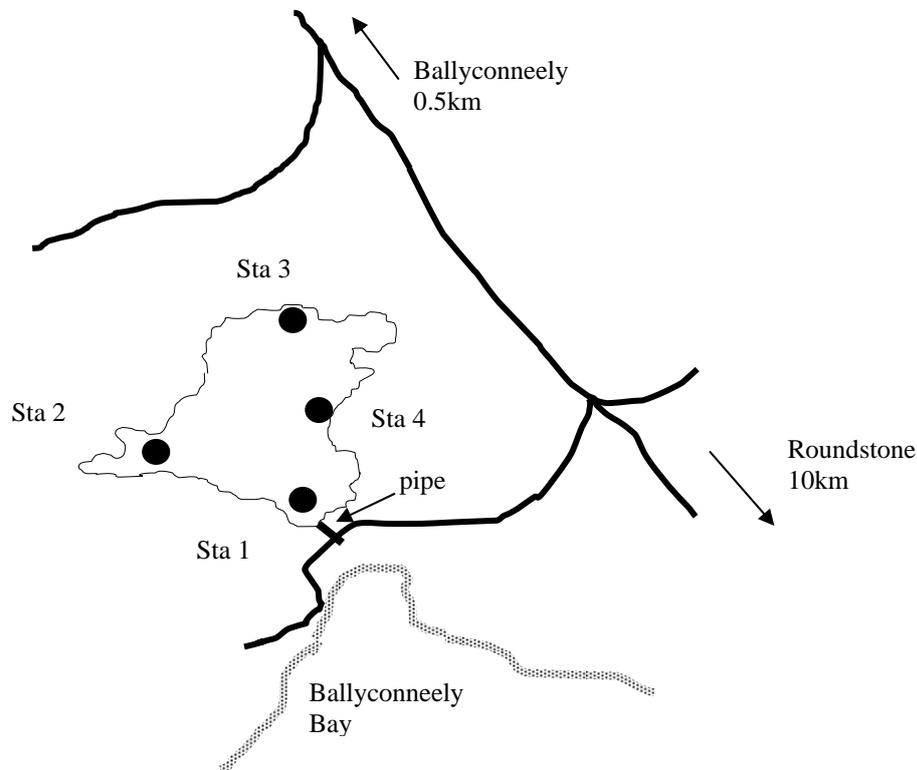


Figure 67.2 Sketch map of sampling stations in Ballyconneely lagoon, 16-17/7/02.

Flora

A total of 10 floral taxa were recorded Ballyconneely lagoon, on 16-17/7/02, including three different species of charophyte, one of which (*Chara ?baltica*) remains uncertain but appears to be a very rare species, which is a lagoonal specialist. The lagoon was visited briefly in 1998 and twice in 2003 by C. Roden (2004), but the identity of the “large Chara” still remains uncertain. One other species (*Ruppia maritima*) is also a lagoonal specialist. Historically, this lagoon has a reputation as a good “charophyte lake”, but eutrophication and desiccation appear to be reducing the charophyte community.

***Chara ?baltica*.** There are recent records of this species from 3 lagoons in Ireland. It was first reported by Hatch & Healy (1998) in L. Aconeera, identified as *C. baltica* by Jim Ryan and confirmed by Mr. Nick Stewart. However, recently Stewart wrote to C. Roden expressing reservations about his identification. The population was resampled and depending on one’s interpretation of the cortex it keys out as either *Chara baltica* or *Chara aspera*, using standard works. Another related lagoonal taxon, known from Brittany and southern Europe is *C. gallioides* which is larger than *C. aspera* and has larger reproductive organs and lacks bulbils. It has not been possible to obtain fertile material which would help in identification, from L. Aconeera and the species remains to be verified. (Roden (1999) recorded *C. baltica* in L. an tSaile in 1998, which is apparently the same species as the *Chara* in L. Aconeera, and similarly remains to be verified).

Another charophyte found in Ballyconneely L. since 1998 easily keys out as *Chara baltica* on the basis of size (>60cm), spines single or in pairs, large reproductive

organs and long uncorticated branchlet end cells, as well as slight encrustation. However this identification has not been confirmed by an expert in the group and Schubert and Blindlow (2004) note differences between the form of *Chara baltica* found in the Baltic Sea and all other European populations identified as this species.

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* appears to be the more common of the species and was found at 41 of the lagoons surveyed (47%). *R. 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. *R. cirrhosa* was only identified at 23 lagoons (26%), but species was not determined at 12 sites.

Table 67.1 Percentage cover of vegetation and bare ground at sampling stations in Ballyconneely lagoon, 16-17/7/02, with salinity, temperature, depth of water and type of substratum. Species in bold text are lagoonal specialists.

	Sta 1	Sta 2	Sta 3	Sta 4	
Salinity(psu)	0.9	0.9	0.5	0.1	
Temperature	19.3	17.9	18.2	17.4	
Depth(cm)	0-25	0-15	0-30	0-15	
Substratum	sand	sand	fine silty sand	sand, occasional stones	
Percentage cover:					
Chlorophyta	<i>Cladophora</i> sp.	80	80	20	10
	<i>Enteromorpha</i> sp.	2	2	2	2
Charophyta	<i>Chara aspera</i>	0	10	50	50
	<i>Chara</i> sp. 2 (<i>baltica</i>?)	0	2	5	5
	<i>Chara vulgaris</i>	0	2	5	5
Angiosperms	<i>Myriophyllum spicatum</i>	5	0	10	10
	<i>Potamogeton pectinatus</i>	0	5	5	0
	<i>Ranunculus baudotii</i>	5	5	5	5
	<i>Ruppia maritima</i>	20	5	5	0
	<i>Scirpus maritimus</i>	5	5	10	10
Bare sand/stones	30	20	5	5	

Ballyconneely has an interesting flora with at least three different chara species, one of which may be a very rare lagoonal specialist, growing in extensive beds of another lagoonal specialist, *R. maritima*. Based on aquatic flora, the site is rated as of **high conservation value**.

Fauna

The aquatic fauna in Ballyconneely lagoon is extremely species-poor with only 10 faunal taxa recorded (Table 67.2). Nearly all of these are very common animals in Ireland, and none of these species was at all abundant, giving the impression of possible recent extermination due to very low water levels and desiccation in large parts of the lagoon. Most of the species recorded would survive equally well in freshwater and it would appear that, based on fauna, Ballyconneely should be regarded much more as a

“machair lake” and a very “borderline” lagoon, in that salinity is probably extremely low most of the time.

Only one lagoonal specialist was recorded in 2002, (*Ochthebius punctatus*) which is a rare water beetle in Britain and Ireland, and only one individual was found.

Table 67.2 Faunal taxa recorded at sampling stations in Ballyconneely lagoon, 16-17/7/02. SW = mean of 3x 30 second sweeps, Sed = mean of 3 x 0.005m² diameter sediment cores, L.T. = Light trap, **Ab** = overall abundance of all sampling methods, including visual searches. r = rare, o = occasional, c = common, a = abundant. Species in bold text are lagoonal specialist s or rare species.

	Sta 1			Sta 2			Sta 3			Sta 4		
	SW	Sed	L.T. Ab	Sed	L.T. Ab	SW	Sed	L.T. Ab	Sed	L.T. Ab		
Crustacea												
Mysidacea <i>Neomysis integer</i>	3.0		15 o	45	o			15	o			
Amphipoda indet.	0.3		4 o							3	o	
<i>Gammarus duebeni</i>			2 o					1	r	3	o	
<i>Gammarus zaddachi</i>	0.3		1 r		r							
Insecta												
Heteroptera Corixidae indet.					1	r						
<i>Gerris</i> sp.			o									
<i>Hydrometra stagnorum</i>											r	
<i>Notonecta</i> sp.											r	
Diptera Chironomidae		0.3	r	1.7	o	0.3	2.3		o	2.3	o	
Hydracarina indet.											o	
<i>Ischnura elegans</i>								1	r			
Coleoptera <i>Haliphus rufficollis</i>	0.3		r									
<i>Hygrotus inaequalis</i>								1	r		r	
<i>Ochthebius punctatus</i>			1 r									
Mollusca <i>Potamopyrgus antipodarum</i>		3.0	8 o	6.7	o	9.0	4	o	24.0		o	
Pisces <i>Gasterosteus aculeatus</i>	2.7		4 o		8 o			2	r	4		
<i>Pleuronectes flesus</i>	0.3		r									

Ochthebius punctatus was recorded at L. an Chara, Inishmore and Ballyconneely, Co. Galway. Listed as a lagoonal specialist in Britain but was only recorded at these two sites during the lagoon surveys. Since 1988, recorded at seven brackish sites in Antrim and Down (Nelson *et al.* 1998).

Apart from the record of one specimen of a rare water beetle, regarded as a lagoonal specialist, the aquatic fauna of the lake is extremely poor. Perhaps if higher water levels were maintained, the fauna would be of greater interest. Based on the survey in 2002, the site is regarded as of **moderate conservation value** as a lagoon based entirely on the presence of one specimen of the rare water beetle *O. punctatus*.

Summary

Ballyconneely is listed as a moderate sized (20ha) **natural sedimentary lagoon** but salinity is extremely low and in dry summers it may nearly dry out completely. Its status as a lagoon is arguable and would be regarded by many as a machair lake. However, the aquatic flora is very interesting with extensive growths of the lagoonal specialist, *Ruppia maritima* and at least 3 charophyte species, one of which is unconfirmed, but appears to be a very rare species (*Chara baltica*) which is also a lagoonal specialist. Aquatic fauna was very species-poor in 2002, indicating possible extinctions due to desiccation of the lagoon. Most of the species recorded are highly mobile insects and common freshwater species. Only one lagoonal specialist was recorded (*Ochthebius punctatus*), but this is also a rare species. The status of Ballyconneely as a lagoon is arguable, but it is scenically very attractive, with possibly two rare species recorded. Overall, the site is rated as of high conservation value, but it appears to be seriously impacted.

Overall Conservation Value = High

Conservation Status Assessment (from Oliver 2007)

Impacts	Poaching by cattle. Eutrophication from surrounding farmland and dwelling houses in very shallow isolated lagoon. Urbanisation. Silting up.
Conservation Status	Unfavourable-Inadequate

Further Information

Listed as a lagoon by Healy *et al.* 1997, and Healy 2003. Surveyed in 2002/2003 as part of a PhD study (Oliver 2005) and used in a biological classification of Irish coastal lagoons and in the Conservation Status Assessment (Oliver 2007). Vegetation surveyed in 1998 and 2003 by Roden (2004).

References:

- Hatch, P. & Healy, B. 1998. Aquatic vegetation of Irish coastal lagoons. *Bulletin of the Irish Biogeographical Society*. **21**: 2-21.
- Healy, B. 2003. Coastal Lagoons. In: *Wetlands of Ireland*. R. Otte (ed). Chapter 4. University College Dublin Press. Dublin. 44-78.
- Healy, B., Oliver, G.A., Hatch, P. & Good, J.A. 1997. *Coastal lagoons in the Republic of Ireland. Vol. 2. Inventory of lagoons and saline lakes*. Report to the National Parks and Wildlife Service, Dublin.
- Moore, J.A. 1986. *The Charophytes of Great Britain and Ireland*. London. Botanical Society of the British Isles (Handbook No. 5)
- Nelson, B., Foster, G., Weyl, R. & Anderson, R. 1998. The distribution of aquatic Coleoptera in Northern Ireland. Part 2: Families Hydraenidae, Helophoridae, Hydrochidae, Hydrophilidae, Elmidae and Dryopidae. *Bulletin of the Irish Biogeographical Society*. **22**: 128-193.
- Oliver, G.A. 2005. *Seasonal changes and Biological Classification of Irish Coastal Lagoons*. PhD Thesis. U.C.D., Dublin. Available on www.irishlagoons.com
- Oliver, G.A. 2007. Conservation status report: Coastal Lagoons (1150). Unpublished report to the National Parks and Wildlife Service, Dublin.
- Roden, C. 1999. *Irish coastal lagoon survey, 1998. Vol. III, Flora*. Dúchas, Dublin.
- Roden, C. 2004. *Report on the sub littoral flora and vegetation of nine coastal lagoons..* Dúchas, Dublin.

4.68

Lough Athola, County Galway O.S. L 626 484

(Salt Lake, Loch an tSaile) O.S. Discovery Sheet 44



Conservation Designation: Slyne Head Peninsula SAC 002074, pNHA 002074

General description:

Lough Athola is a moderate sized (11ha), mostly shallow (2m) natural **rock/peat lagoon**, situated on the north shore of Mannin Bay, 3.5km from Ballinaboy, Co. Galway. Sea water enters the lagoon on most tides and salinity measured 33-34psu in most parts of the lagoon at the time of sampling in 1998 (25-26/9/98), but was 27-33psu at one time in 1997 and as low as 6psu in a small bay at the western end.

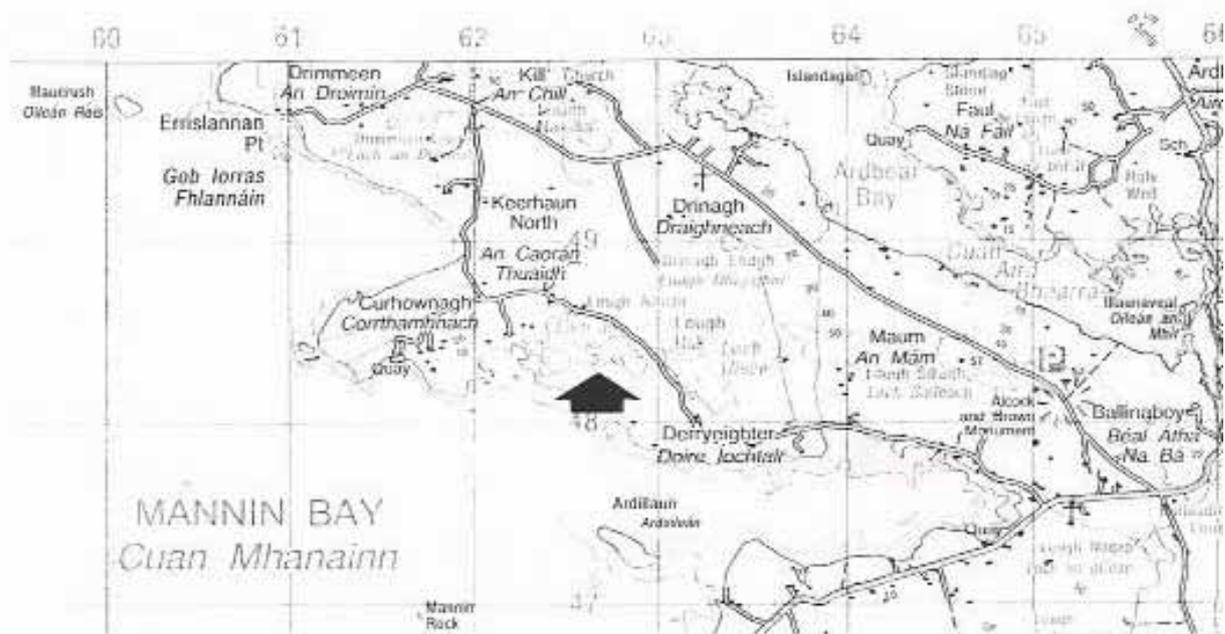


Figure 68.1 Location map of L. Athola.

Loch Athola 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 aquatic 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 taken mostly from the report by Roden (1999).

Underwater observations

The main basin is shallow (c2-3m) and is floored by muddy sand. The deepest part of the lagoon (4m) is immediately inside the peat barrier, presumably formed by tidal scour (as in L. an Aibhnin) and has a bottom of gravel and stones. Narrow channels about 3m deep run from the lagoon towards this deeper hole inside the barrier.

A small area of *Ruppia cirrhosa* occurs at the eastern end (Sta 2, Figure 68.2)

The lagoon floor is covered by *Cladophora battersii* with occasional plants of *Cystoseira foeniculaceus* attached to stones. *Cystoseira ericoides* occurs towards the inlet. *Chorda filum*, *Fucus vesiculosus* and *Halidrys siliquosa* are occasional.

Salinity is close to that of coastal seawater and macroalgae are abundant. Rock faces in the upper 2m are covered in an algal mat consisting of red algae *Gelidium pulchellum*, *Chondrocanthus acicularis*, *Pterocladia capillacea*, *Jania rubens*, *Chondria dasyphylla*, *Codium fragile tomentosum*, *Chyllocladia verticilliata*, *Corallina officinalis*, *Laurencia pinnatifida* with some *Cladophora battersii* entangled in other species.

At greater depths near the channel leading to the sea a different flora occurs with *Phyllophora crispa*, *P. ceranoides*, *Graciliaria gracilis*, *Chondrus crispus*, *Plocamium cartilagineum*, *Rhodophyllis divaricata*, *Calliblepharis jubata*, *Furcellaria lumbricalis*, *Hypoglossum woodwardii*, *Polysiphonia elongata*, *Rhodomela confervoides*.

Some of these communities can be equated with the following communities (from Scottish "obs") of Covey and Thorpe (1994):

OB5 Littoral fringe sheltered rock with *Pelvetia canaliculata*.

OB24 Hard substratum with *Phyllophora pseudoceranoides*.

However, the *Chondrocanthus acicularis* turf cannot be matched with any community in Covey and Thorpe.

Marginal vegetation Puccinellietum and *Juncus gerardii* associations of saltmarsh, *Juncus maritimus* stands, *Festuca rubra* grassland, *Blysmus rufus* association, *Eleocharis uniglumis* community and maritime lichens on rock.

The phytoplankton was dominated by brackish water dinoflagellates.

Notable species

Blysmus rufus is uncommon in western Ireland.

Chondrocanthus acicularis is a very local species found from Galway to Cork. Here it is close to its northern limit in Europe.

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).

Two species are regarded as lagoonal specialists:

Cladophora battersii see above.

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* appears to be the more common of the species and was found at 41 of the lagoons surveyed (47%). *R. 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.

Assessment

Lough Athola is a high salinity lagoon, but its vegetation is very different from that of the open coast, presumably due to reduced tides. The furoid zone is almost completely absent except for a small area on the north shore, and is replaced by a very distinctive red algal community. The *Cladophora battersii* community is shared only with Sally's Lough, Co. Donegal (Code no. IL081). Based on aquatic flora, the site is rated as of **high conservation value**.

Fauna

Four stations were selected for faunal sampling in L. Athola in 1998 (Oliver 1999) (Table 68.1, Figure 68.2).

Table 68.1 Positions of sampling stations in Lough Athola, 25-26/9/98, with salinity, depth of water and type of substratum.

	Sta 1	Sta 2	Sta 3	Sta 4
GPS position	L 62834 48487	L 62887 48376	L 62613 48312	L 62402 48336
Salinity(psu)	34.1	27-33.9	34.1	0-100
Depth(cm)	0-100	0-100	0-100	34.1
Substratum	Granite rock, stones, decomposing algae.	Granite rock, stones, coarse sand, peaty silt	Granite rock, stones, gravel, <i>C. battersii</i>	Granite rock, stones, gravel, coarse sand.

The aquatic fauna of L. Athola is remarkably rich, with a total of 93 faunal taxa recorded in 1998, of which 46 were identified to species (Table 68.2). Most of these are common marine or rocky shore animals, but several lagoonal species were also found. Five of the species are regarded as lagoonal specialists in Britain, two others are proposed specialists for Ireland, and two crustaceans appear to be rare. Seasonal sampling was carried out in 2002/3 (Oliver 2005), but only 11 additional species were found over the two years, which for a lagoon with such easy access to temporary marine visitors, seems a remarkably small number, and indicates how stable the community is. Five of these species were amphipod crustaceans. The only additional species of interest was a small tanaid crustacean, *Parasinelobus chevreuxi*, which appears to be found only on the west coast of Ireland, southwest Britain, then south to northwest Africa (Hayward & Ryland 1995).

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 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).

Leptocheirus pilosus Amphipod crustacean recorded at three lagoons in Co. Cork (Rostellan, Cuskinny, and Rosscarbery) in association with *C. insidiosum* and possibly Raffeen (unconfirmed), and also at L. Ateesky (unconfirmed) and L. Athola, Co. Galway and Furnace L., Co. Mayo. The only other known Irish localities are the south side of Wexford Harbour (Costello *et al.* 1989) and on the North Slob, Co. Wexford (Galvin 1992). Proposed as a lagoonal specialist for Ireland by Oliver and Healy (1998).

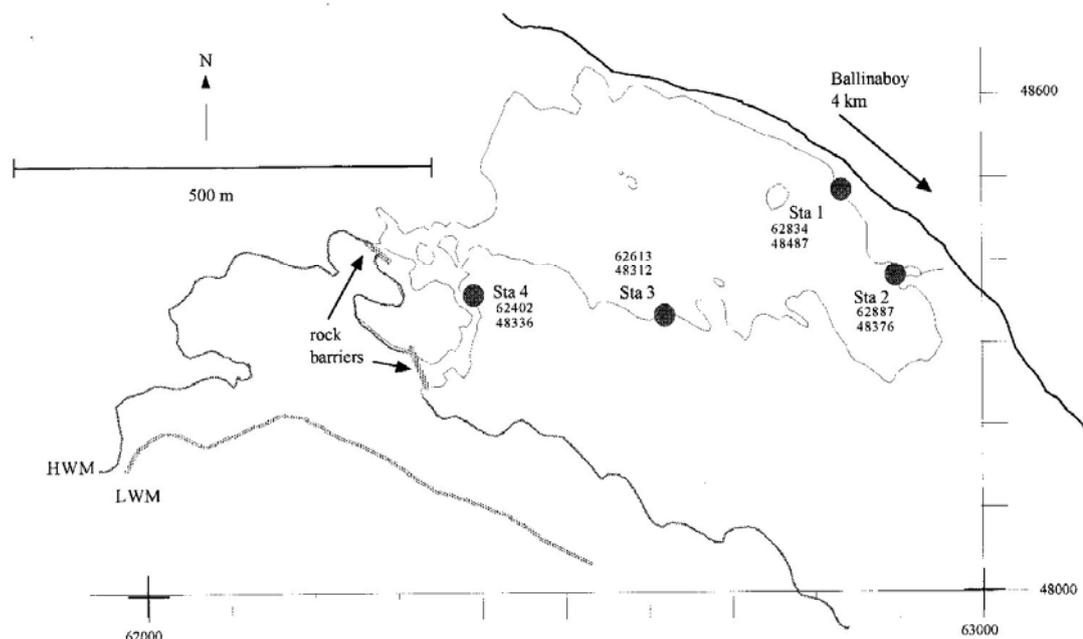


Figure 68.2 Sampling stations used at L. Athola, 25-26/9/98.

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.

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.

Rissoa membranacea var. Gastropod mollusc recorded at eleven of the 87 lagoons surveyed on the west coast from Co. Cork to Co. Galway and also at Castle Espie, Co. Down. These records refer to a 'lagoonal' variety of the species, proposed as a lagoonal specialist for Ireland by Oliver and Healy (1998).

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.

The aquatic fauna of Lough Athola is rich. Most of the species recorded are common marine animals, but seven species of lagoonal specialists and several rare species also occur. Based on this fauna the site is rated as of **high conservation value**.

Table 68.2 Aquatic fauna recorded at stations in Lough Athola, Co. Galway 25-26/9/98.
 L.T. = light trap; + = present, o = occasional, c = common, a = abundant, F = Fyke net
 Species in bold text are lagoonal specialists or rare species.

Taxa	Sampling Stations								
	1	L.T. 1	1b	2	L.T. 2	3	4	L.T.4	
Porifera	<i>Clathrina coriacea</i>						+		
	<i>Halichondria panicea</i>			+		+	+		
	<i>Leucoselenia botryoides</i>			+					
	<i>Suberites sp.</i>					+			
	<i>Sycon ciliatum</i>	+							
Cnidaria	<i>Tergiops fugax</i>					+			
	<i>Anemonia viridis</i>							+	
	<i>Anthopleura balli</i>	c		c		c		+	
Turbellaria	<i>Sagartia elegans</i>							+	
	planarian indet.							+	
Annelida	<i>Arenicola marina</i>							+	
	<i>Capitella capitata</i>			a					
	<i>Circeus spirillum</i>	+			+		a		
	<i>Eteone picta</i>							+	
	<i>Flabelligera affinis</i>						c		
	<i>Harmothoe imbricata</i>						+	+	
	<i>Odontosyllis gibba</i>				o				
	<i>Perinereis cultrifera</i>				+				
	<i>Platynereis dumerili</i>				+			a	
	<i>Polyophthalmus pictus</i>	+	1		a			+	5
	<i>Pomatoceros triqueter</i>						+	+	
	<i>Serpula vermicularis</i>							+	
	Spirorbidae indet.	+			+		+	+	
	<i>Stenolais boa</i>							+	
	<i>Typosyllis hyalina</i>							+	
	Oligochaeta	<i>Tubificoides benedii</i>	+		+				
	Sipuncula	indet.					+		
Crustacea	Copepoda	<i>Notopterophorus auritus</i>						+	
	indet.							+	
	Cirripedia	<i>Chthamalus montagui</i>					+	+	
	<i>Semibalanus balanoides</i>	+					+		
	Tanaidacea	<i>Tanais dulongi</i>			c		+	+	
	Mysidacea	<i>Mysidopsis gibbosa</i>		3					1
	<i>Praunus flexuosus</i>	+	23		+	45	+	+	20
	<i>P. ?inermis</i>		2			5			10
	Isopoda	<i>Idotea chelipes</i>	+						
	<i>Jaera ischiosetosa</i>						+		
	Amphipoda		+	+	+	1	+	+	8
	<i>Ampithoe ramondi</i>						1	11	1
	<i>Dexamine spinosa</i>							3	
	<i>Erichthonius ?brasiliensis</i>	1							
	<i>Gammarus zaddachi</i>	17			1	1		1	
	<i>Jassa falcata</i>		1						
	<i>Leptocheirus pilosus</i>							16	
	Lysianissidae indet.		1						
	<i>Melita palmata</i>				12		2		5
<i>Microdeutopus anomalus</i>	1			10		4	1		
<i>Phtisica marina</i>		7	2				+		

Table 68.2 continued. Aquatic fauna recorded at stations in Lough Athola, Co. Galway 25-26/9/98. L.T. = light trap; + = present, o = occasional, c = common, a = abundant, F = Fyke net. Species in bold text are lagoonal specialists or rare species.

Taxa	Sampling Stations							
	1	L.T. 1	1b	2	L.T. 2	3	4	L.T.4
Decapoda <i>Cancer pagurus</i>								F=1
<i>Carcinus maenas</i>	+			F=53		+		F=15
<i>Hippolyte varians</i>		1						
<i>Palaemon elegans</i>	+			+	1	+	+	
<i>P. serratus</i>				+		+		F=53
<i>Palaemonetes varians</i>				o	1			
Insecta Chironomidae indet.	+			+		+	+	
Mollusca								
Polyplacophora <i>Lepidochitona cinereus</i>						+	o	
Prosobranchia <i>Bittium reticulatum</i>							+	
<i>Gibbula cineraria</i>	+						+	
<i>G. umbilicalis</i>							+	
<i>Hydrobia ulvae</i>						+	+	
<i>Littorina littorea</i>							+	
<i>L. saxatilis</i>	+			+		o	c	
<i>Onoba aculeus</i>			+				+	
<i>Patella vulgata</i>	+						+	
<i>Rissostomia membranacea</i>	+						+	
<i>Skeneopsis planorbis</i>	+		c	+		+		
Bivalvia <i>Anomia ephippium</i>							+	
<i>Cerastoderma glaucum</i>	ad			+		+	ad	
<i>Lasaea rubra</i>							+	
<i>Monia patelliformis</i>							+	
<i>Modiolarca tumida</i>							+	
<i>Musculus discors</i>	+							
? <i>Mysella bidentata</i>						+	+	1
<i>Mytilus edulis</i>	+			+		+	+	
<i>Ostrea edulis</i>							+	
<i>Tapes decussata</i>							+	
Bryozoa								
<i>Aetea truncata</i>						+	+	
<i>Amathia lendigera</i>						+	+	
<i>Bowerbankia gracilis</i>						+	+	
<i>Conopeum seurati</i>				+				
<i>Cryptosula pallasiana</i>						+	+	
<i>Scrupocellaria reptans</i>						+	+	
Echinodermata								
<i>Amphipholis squamata</i>	+			+		+	+	
<i>Asterina gibbosa</i>							+	
<i>Ophiothrix fragilis</i>							+	1
Tunicata								
<i>Ascidia mentula</i>							+	
<i>Ascidiella aspersa</i>						+	+	
<i>A. scabra</i>				+		+		
<i>Botryllus schlosseri</i>						+		
<i>Clavelina lepadiformis</i>			+					
Pisces								
<i>Anguilla anguilla</i>				F=2		+	F=3	
<i>Gasterosteus aculeatus</i>	+			+	2			
<i>Gobius niger</i>				F=3			F=6	
<i>Pomatoschistus microps</i>	+					+	+	

Ecotonal coleoptera

Five species of carabid and ten species of staphylinid beetles were recorded at Lough Athola in 1998 (Good 1999, Good & Butler 2000), one of which is an indicator species (*Stenus lustrator*) but based on ecotonal coleoptera the site was rated as of **low conservation value**.

Summary

Lough Athola is a moderate sized (11ha), mostly shallow (2m) natural “**rock/peat**” **lagoon**, situated on the north shore of Mannin Bay, 3.5km from Ballinaboy, Co. Galway. This lagoon is a good example of 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. The lagoon is rich in both flora (62 taxa) and fauna (104 taxa) most of which are common marine species, but with a suite of lagoonal species (2 floral, 7 faunal), two rare algae (*Chondrocanthus acicularis*, *Cladophora battersii*) and at least two apparently rare crustaceans (*Jaera ischiosetosa*, *Leptocheirus pilosus*). Overall, the site is rated as of **high conservation value**.

Overall Conservation Value = High

Conservation Status Assessment (from Oliver 2007)

Impacts	No major impacts.
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). Sampled seasonally in 2002-3 and included in a biological classification of Irish coastal lagoons (Oliver 2005) and in the Conservation Status Assessment (Oliver 2007).

References:

- Bamber, R.N. 1997. Assessment of saline lagoons within Special Areas of Conservation. *English Nature Research Reports* No. 235.
- Barnes, R.S.K. 1989a. Coastal lagoons of Britain: an overview and conservation appraisal. *Biological Conservation* **49**: 295–313.
- Costello, M.J., Holmes, J.M.C., McGrath, D. & Myers, A.A. 1989. A review and catalogue of the Amphipoda (Crustacea) in Ireland. *Irish Fisheries Investigations*. Series B (Marine), **33**: 3-70.
- Covey, R. & Thorpe, K. 1994. Classification of benthic marine biotopes for isolated saline waters in Scotland. *Joint Nature Conservation Committee Report No. ****(Marine Nature Conservation Review Report MNCR/OR/**).
- Galvin, P. 1992. *The ecology of the brackish-water lagoons of Wexford and east Cork*. MSc thesis, University College, Dublin.
- Good, J.A. 1999. A survey of *Irish coastal lagoons*. Vol V. *Ecotonal Coleoptera (Staphylinidae and Carabidae)*. Dúchas, Dublin.
- Good, J.A. & Butler, F.T. 2000. Coastal lagoon and saline lake shores as a habitat for Staphylinidae, Carabidae and Pselaphidae (Coleoptera) in Ireland. Part 2. *Bulletin of the Irish Biogeographical Society*. **24**: 111-41
- Hayward, P. J. & Ryland, J.S. (eds.) 1995. *Handbook of the Marine Fauna of North-West Europe*. Oxford University Press. PB. 899 pp.
- Healy, B. 1997. Long-term changes in a brackish lagoon, Lady’s Island Lake, south-east Ireland. *Biology and Environment: Proceedings of the Royal Irish Academy* **97B**: 33-51.
- Healy, B. 1999a. *Survey of Irish coastal lagoons. 1996 and 1998. Vol. 1 Part 1. Background, description and summary of the surveys*. Dúchas, Dublin.

- Healy, B. 1999b. *Survey of Irish coastal lagoons. 1996 and 1998. Vol. 1 Part 2. Lagoons surveyed in 1998.* Dúchas, Dublin.
- Healy, B. 2003. Coastal Lagoons. In: *Wetlands of Ireland.* R. Otte (ed). Chapter 4. University College Dublin Press. Dublin. 44-78.
- Healy, B., Oliver, G.A., Hatch, P. & Good, J.A. 1997c. *Coastal lagoons in the Republic of Ireland. Vol. 2. Inventory of lagoons and saline lakes.* Report to the National Parks and Wildlife Service, Dublin.
- Healy, B., Oliver, G.A., Hatch, P. & Good, J.A. 1997. *Coastal lagoons in the Republic of Ireland. Vol. 3. Inventory of lagoons and saline lakes.* Report to the National Parks and Wildlife Service, Dublin.
- Oliver, G.A. 1999. *A survey of Irish coastal lagoons. Vol. IV: Aquatic Fauna.* Unpublished report for Dúchas, The Heritage Service. Dublin.
- Oliver, G.A. 2005. *Seasonal changes and Biological Classification of Irish Coastal Lagoons.* PhD Thesis. U.C.D., Dublin. Available on www.irishlagoons.com
- Oliver, G.A. 2007. *Conservation status report: Coastal Lagoons (1150).* Unpublished report to the National Parks and Wildlife Service, Dublin.
- Oliver, G.A. and Healy, B. 1998 Records of aquatic fauna from coastal lagoons in Ireland. *Bulletin of the Irish Biogeographical Society.* **21**: 66-115.
- Roden, C. 1999. *Irish coastal lagoon survey, 1998. Vol. III, Flora.* Dúchas, Dublin.
- Roden, C. 2004. *Report on the sub littoral flora and vegetation of nine coastal lagoons.* Dúchas, Dublin.
- Goss Custard, S., J. Jones, J.A. Kitching & Norton, T. A. 1979. Tidepools of Carrigathorna and Barloge Creek. *Philosophical Transactions of the Royal Society of London. Series B,* **287**: 1-44.
- Wyse Jackson, P.N. 1991. Distribution of Irish marine Bryozoa, together with biographical notes relating to the chief researchers in the group. *Bulletin of the Irish Biogeographical Society.* **14**: 129-18.