

NPWS

Lough Cahasy, Lough Baun and
Roonah Lough SAC
(site code: 001529)

**Conservation objectives supporting document-
Coastal lagoons**

Version 1
January 2017

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Please note that this document should be read in conjunction with the following report: NPWS (2017) Conservation Objectives: Lough Cahasy, Lough Baun and Roonah Lough SAC 001529. Version 1.0. National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs.

1. Introduction

1.1 Lough Cahasy, Lough Baun and Roonah Lough SAC

Lough Cahasy, Lough Baun and Roonah Lough SAC is on the south Mayo coast, 1.5km south of Roonah Quay and 7km south-west of Louisburgh. A sandy beach forms the shoreline, with occasional outcrops of exposed bedrock. Shingle and cobble bars are also present, behind which lie sand dunes and machair, a lagoon and two freshwater lakes and their associated riverine channels. The two freshwater lakes may be occasionally subject to brackish influences.

Lough Cahasy, Lough Baun and Roonah Lough SAC is selected for three coastal habitats listed on Annex I of the Habitats Directive, including coastal lagoons.

“Coastal lagoons” (habitat code 1150) is a priority Annex I habitat. 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 that 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, Roonah Lough, is listed for this SAC by Oliver (2007). The table below gives the conservation status assessment of this lagoon as outlined in that report. See the map in Appendix 1 and see Appendix 2 for an account of the site (from Oliver, 2007).

Code ¹	Name	County	Conservation Assessment
IL072	Roonah Lough	Mayo	Unfavourable

¹ Code 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 favourable reference area for the mapped lagoon, Roonah Lough, is 40.2ha. The area is calculated from spatial data derived from Oliver (2007).

The target for habitat area is: stable or increasing, subject to natural processes.

3. Range

The known distribution of the lagoon habitat in Lough Cahasy, Lough Baun and Roonah Lough 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). At Roonah Lough, the Carrownishy River is the main freshwater inflow and drains into the lagoon from the north. A smaller stream, the Bunleemshough River, flows in from the south-east. The lagoon is impounded by a low cobble barrier, with a natural, but partly altered, sea inlet (Oliver, 2007) through which seawater enters the lake. Salinity levels in lagoons tend to vary considerably, depending on precipitation and tides. The lake receives large volumes of freshwater from the rivers and run-off from surrounding land and so salinity levels here are likely to be relatively low throughout the year, with a tendency to increase in summer.

Roonah Lough may be classed as an oligohaline lagoon; see Roden and Oliver (2013) for further information on salinity classes and Appendix 2 for the site report.

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

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.

Roonah Lough can be classified as shallow (less than 1m), 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.

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

4.3 Barrier: connectivity between lagoon and sea

The morphology of the barrier between a lagoon and sea determines how it functions ecologically. While the barrier may be changed through man made modifications, along this exposed westerly facing shoreline the barrier is more likely to be altered through to storm events or natural coastal hydrodynamics. Active management is sometimes necessary, particularly if the lagoon is artificial. Roonah Lough is impounded by a low cobble barrier (Oliver, 2007). See also the site account in Appendix 2.

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. The target is 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

Roonah Lough has been identified as shallow, thus, it is expected that macrophytes 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 plant species recorded in Roonah Lough is summarised in Oliver (2007). The lagoonal specialist *Ruppia maritima* has been reported from this lagoon. See Appendix 2 for the site report.

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

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 hemipteran *Sigara stagnalis*, a lagoonal specialist, has been recorded in Roonah Lough. The species list for the site is summarised in Oliver (2007). See Appendix 2 for the site report.

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

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.

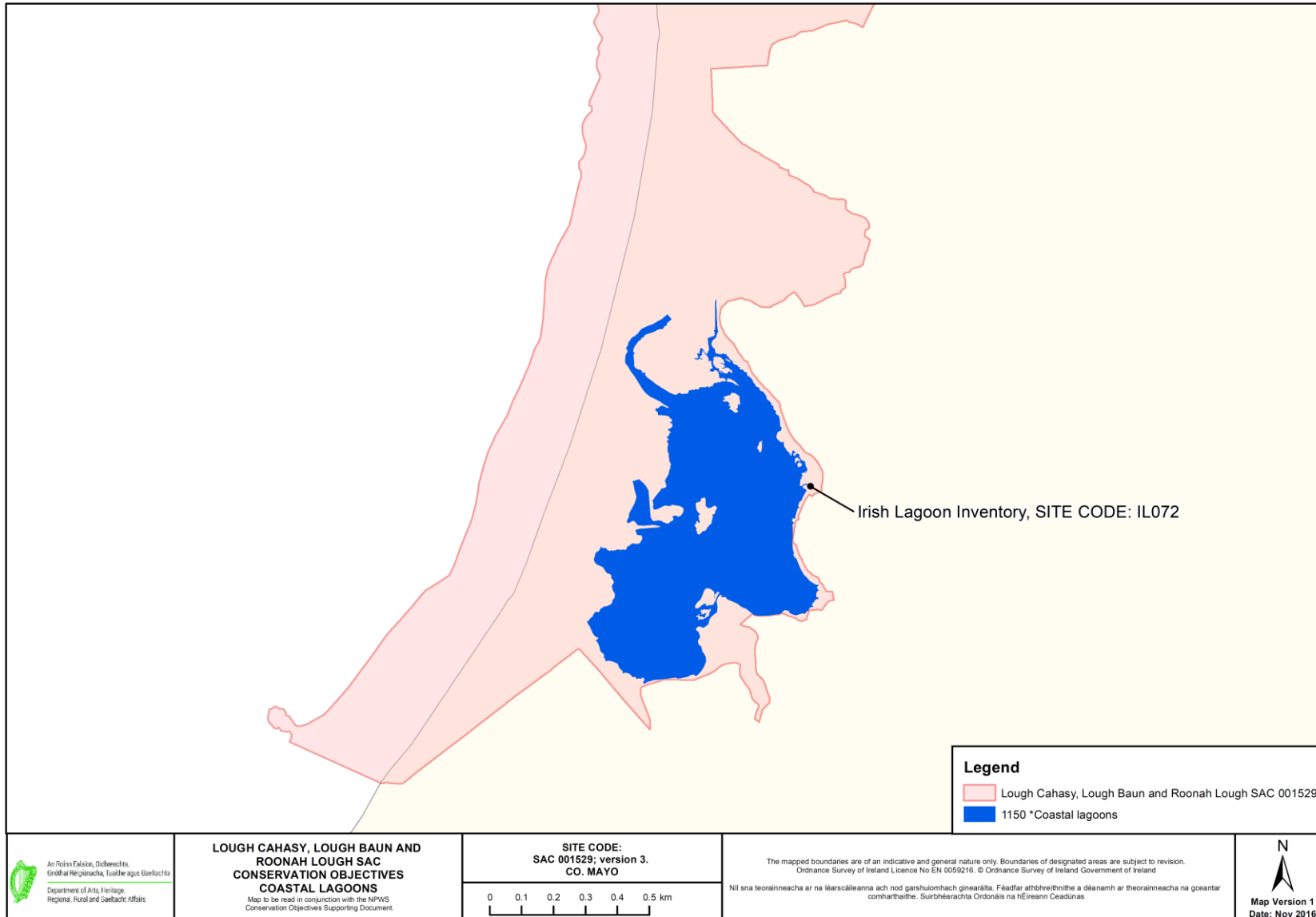
5. References

NPWS (2013) The status of EU protected habitats and species in Ireland. Unpublished report, National Parks and Wildlife Service, 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.

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.

Appendix 1 Distribution map of Coastal lagoons within Lough Cahasy, Lough Baun and Roonah Lough SAC



An tAon Chéile, Orderechts,
Gróifal Réigiúnacha, Ioslíthe agus Gaeltachta

Department of Arts, Heritage,
Regional, Rural and Gaeltacht Affairs

**LOUGH CAHASY, LOUGH BAUN AND
ROONAH LOUGH SAC
CONSERVATION OBJECTIVES
COASTAL LAGOONS**

Map to be read in conjunction with the NPWS
Conservation Objectives Supporting Document.

**SITE CODE:
SAC 001529; version 3.
CO. MAYO**

The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision.
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Níl sna teorainneacha ar na léarscáileanna ach nod garshuíomhach ginearálta. Féadfar athbhreithnithe a déanamh ar theorainneacha na goeantar comharthaíthe. Suirbhéaracha Ordonáis na hÉireann Ceadúnas

Map Version 1
Date: Nov 2016

Appendix 2 Site report

The following is a site account from Oliver (2007)

Code¹	Name
IL072	Roonah Lough

¹ Code is that used in Oliver, 2007.

4.72

Roonah Lough, County Mayo O.S. L 755 765

O.S. Discovery Sheet 37

**Conservation Designation:** Lough Cahasy, Lough Baun and Roonah Lough

SAC 001529

General description:

Roonah Lough is a large (55ha), shallow (<1m) **natural sedimentary lagoon** with a **cobble barrier** and a natural outlet, situated on the west Mayo coast, 10 km north of Killary Harbour and 2 km from Killadoon. The whole coastline from Killary harbour to Roonah Point consists of a complex and dynamic barrier system of dunes and cobbles with lagoons of various sizes and salinities. **N.B. The barrier may have been breached since the survey in 1996, and this site may no longer be a lagoon.**

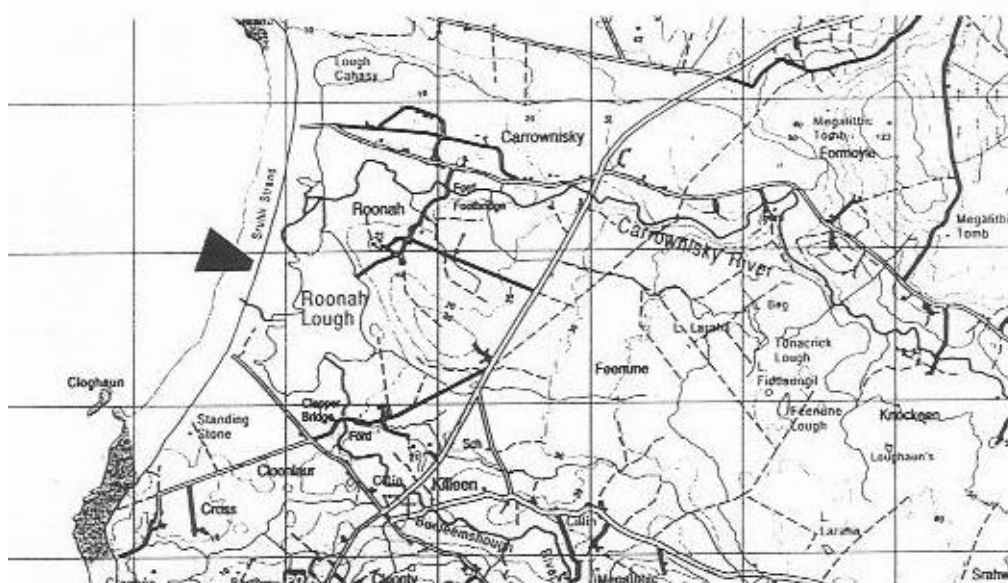


Figure 72.1 Location of map of Roonah Lough.

Roonah Lough 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).

Flora

Vegetation was surveyed by P. Hatch in 1996 (Hatch 1996, Hatch & Healy 1998), but no underwater observations were made, and areas surveyed for flora do not necessarily correspond with stations sampled for aquatic fauna.

Ruppia maritima was the only aquatic higher plant species found. It had a wide distribution but was low-growing and was not found in dense beds although it may do so in deeper water. This species is a lagoonal specialist.

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%).

Two charophytes, *Chara globularis* var. *virgata* and *C. globularis* var. *annulata*, occurred close to the north eastern shore, where both species grew at sparse cover with equally sparse *Ruppia*. Marginal communities showed some diversity. Both mixed and single species *Scirpus maritimus* and *Schoenoplectus* swamps are found along parts of the south eastern and southern shores. *Eleocharis palustris* dominated swamp also occurred here and along the western shore. Much of the eastern shore is low earth cliff backing to wet grassland.

In 1996, the site was considered worthy of further survey it may prove to be a good representative of a low salinity sandy lagoon. However, C. Roden visited the site briefly in 1998 and the lagoon appeared very different from the description of 1996. The exit to the sea seemed very large and much of the lagoon floor was exposed, as the tide was out. It seems possible that the barrier had been breached or widened since the 1996 survey which reported that Roonah was a low salinity lagoon.

Based on vegetation Roonah Lough is rated as of **low conservation value**.

Fauna

Six stations were selected for faunal sampling in Roonah Lough, 15-16/9/96 (Figure 72.2, Table 72.1).

Table 72.1 Positions of sampling stations in Roonah Lough 15-16/9/96, with salinity, depth of water and type of substratum.

	Sta A	Sta B	Sta C	Sta D	Sta E	Sta F
GPS position	L 7488 7644	L 7511 7623	L 7490 7629	L 7551 7625	L 7539 7687	L 7527 7738
Salinity(psu)	0	0	0	0	0	0
Depth(cm)	0-100	0-60	0-60	0-25	0-10	50-125
Substratum	Sand with cobble along barrier	Sand and fine organic silt	Peat, sand, silt	Fine sand and silt occasional stones	Fine sand and silt occasional stones	Silty sand and patches of peat

Among 31 taxa recorded, 29 were identified to species (Table 72.2), but only one is a lagoonal specialist (*Sigara stagnalis*), and this species is common in lagoonal habitats in Ireland. The majority (21 spp.) are limnic taxa.

Sigara stagnalis Hemipteran insect (water-boatman). A common lagoonal specialist found at 36 of the 87 (41.4%) lagoons surveyed.

Faunal species were more or less evenly distributed throughout the lake and no gradient between the sea inlet and other stations could be detected. *Neomysis* was abundant at all stations and large numbers were taken in light traps. Corixidae and *Potamopyrgus* were also common. Most of the limnic species were confined to the area near the mouth of the Carrowninsky River. *Sigara dorsalis* was the dominant corixid.

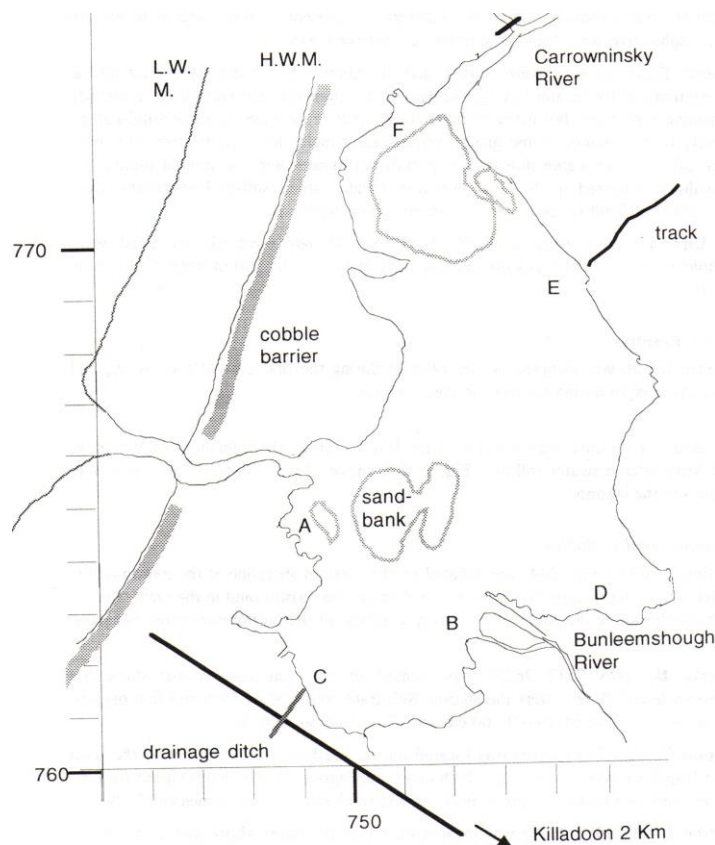


Figure 72.2 Sampling stations used at Roonah Lough.

The assemblage typifies a slightly saline lake receiving occasional small incursions of seawater. Oligohaline and freshwater species predominated. Corixids and beetles were common and diverse. Crabs and flounder were the only species present which can be assumed to have colonised directly from the sea. Salinity readings of 0‰ were recorded on both visits, and it is evident that the brackishwater species present are capable of surviving in freshwater for long periods.

None of the species identified can be described as rare in Ireland, and based on aquatic fauna, Roonah Lough is rated as of **low conservation value**.

Ecotonal Coleoptera

Fifteen species of staphylinid and nine species of carabid beetles were recorded at Corragaun in 1996 (Good 1996, Good & Butler 1998), one of which (*Bembidion bipunctatum*) is regarded as indicator species. However, and based on ecotonal coleoptera the site is regarded as of **no conservation value**.

Table 72.2 Faunal taxa recorded at Roonah Lough, Co. Mayo. June and September 1996. () = records from June. + = present; o = occasional; c = common; a = abundant; F = fyke net, (L.T. = light-trap). Species in bold text are lagoonal specialists.

Fauna	Sampling Stations									
	A	L.T.A	B	L.T.B	C	L.T.C	D	L.T.D	E	F
Annelida Hirudinea	(+)									
Crustacea										
Mysidacea <i>Neomysis integer</i>	a	2000	c	250	a	500	a	1000	o	
Amphipoda <i>Gammarus duebeni</i>	+				+					
Decapoda <i>Carcinus maenas</i>	+									
Insecta										
Ephemeroptera <i>Cloeon simile</i>										+
Odonata <i>Ischnura elegans</i>					+		+			c
Plecoptera	+									
Trichoptera (cases)					c		+			
Hemiptera Corixidae	+	+	+	1	c	+	c	50		c
<i>Cymatia bondsdorffi</i>					+					
<i>Callicorixa praeusta</i>										+
<i>Corixa panzeri</i>					+					
<i>Sigara dorsalis</i>	+	+	c		c	+	c	c		+
<i>S. semistriata</i>			+							
<i>S. stagnalis</i>			+							
Coleoptera	o		+		c		o	1	1	c
<i>Agabus montanus</i>										
<i>Elmis aenea</i>										
<i>Haliphus lineatocollis</i>				+	+					
<i>H. wehnckeii</i>				+	+			+		
<i>Hydroporus memnonius</i>										
<i>Laccobius minutus</i>					+					
<i>Llybius fuliginosus</i>							+			
<i>Nebrioporus depressus</i>				+				+		
Diptera Chironomidae	+		+		+		+		c	c
Mollusca										
Prosobranchia Hydrobiidae	a		c	1	a	15	+	3	o	a
<i>Potamopyrgus antipodarum</i>	+	+	+	+	+	+	+	+	+	+
Pulmonata <i>Aplexa hypnorum</i>										+
<i>Lymnaea palustris</i>										+
<i>L. peregra</i>			+		+		+	4		a
<i>Planorbis leucostoma</i>										+
<i>Sementina complanata</i>										+
Bivalvia <i>Pisidium</i> sp.										shells
Bryozoa <i>Plumatella repens</i>							+			
Teleostei <i>Anguilla anguilla</i>	+		+		+	1	+			
<i>Gasterosteus aculeatus</i>	+	10	+	24	+	10	a	95		+
<i>Platichthys flesus</i>	+		+		+		+			

Summary

Based on the survey in 1996, Roonah Lough was described as a large, **natural sedimentary lagoon** impounded by a low **cobble barrier**, with a natural, but partly altered, sea inlet. Aquatic fauna and flora was of low conservation value. Only one lagoonal specialist plant (*Ruppia maritima*) and one specialist fauna (*Sigara stagnalis*) was recorded in 1996, and most of the species recorded would be described as limnic. It is one of a number of lagoons, and “former lagoons” on the south Mayo coast which vary in their geomorphology and degree of marine influence. Some are entirely fresh, others saline, while barriers may be of sand or cobbles or both. Roonah Lough is the only one of this series with an apparently persistent low salinity, rather than being completely fresh or tidal.

Praeger (1934) described the Dooaghtry area only 6 km to the south and really part of the same system as an area “utterly windswept” but which “would well repay further study”. A report for the Netherlands Commission for International Nature Protection describes the Dooaghtry area as unique for Europe and Eire as a landscape, geologically, geomorphologically and botanically (Westermann & Westhoff, 1974). The National Coastline study regarded the area as an exceptional landscape, warranting declaration as a “National Park” or similar.

Aquatic fauna and flora are of low conservation value, but geomorphologically Roonah Lough is a good example of a **natural sedimentary lagoon** with a cobble barrier, and is one of a series of different lagoon types on this highly dynamic coastline. Therefore, overall conservation value is rated as moderate.

N.B. The barrier is low and vulnerable to damage by storms. When visited briefly in 1998 by C. Roden, the lagoon appeared to have become much more tidal than the condition described in 1996, on which this description is based.

Overall Conservation Value = Moderate

Conservation Status Assessment (from Oliver 2007)

Impacts	Natural siltation and eutrophication and increasing threat of damage to barrier. Erosion. Siltation. Poaching by cattle.
Conservation Status	Unfavourable-Inadequate

Further Information

Geology described by Delaney and Devoy (1995). 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). Included in a biological classification of Irish coastal lagoons (Oliver 2005) and in the Conservation Status Assessment (Oliver 2007).

References:

- Delaney, C. & Devoy R. 1995. Evidence from sites in western Ireland of late Holocene changes in coastal environments. *Marine Geology* **124**: 273-287.
- Good, J.A. 1996. *Coastal lagoons in the Republic of Ireland: Ecotonal Coleoptera (Staphylinidae and Carabidae)*. Dúchas, Dublin.
- Good, J.A. & Butler, F.T. 1998. Coastal lagoon shores as a habitat for Staphylinidae and Carabidae (Coleoptera) in Ireland. *Bulletin of the Irish Biogeographical Society*. **21**: 22-65.
- Hatch, P. 1996. *A survey of the vegetation of Irish coastal lagoons.1996*. Unpubl. Report to NPWS. Dublin.
- Hatch, P. & Healy, B. 1998. Aquatic vegetation of Irish coastal lagoons. *Bulletin of the Irish Biogeographical Society*. **21**: 2-21.
- Healy, B. 1999. Survey of Irish coastal lagoons. 1996 and 1998. Vol. 1 Part 1. Background, description and summary of the surveys. 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. & G.A. Oliver. 1996. *A survey of Irish coastal lagoons: Aquatic Fauna*. Unpublished report for Dúchas, The Heritage Service. Dublin.
- Healy, B. & Oliver, G.A. 1998. Irish coastal lagoons: summary of a survey. *Bulletin of the Irish Biogeographical Society*. **21**: 116-50.
- Healy, B., Oliver, G.A., Hatch, P. & Good, J.A. 1997a. *Coastal lagoons in the Republic of Ireland. Vol. 1. Background, outline and summary of the survey*. Report to the National Parks and Wildlife Service, Dublin.
- Healy, B., Oliver, G.A., Hatch, P. & Good, J.A. 1997b. *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. 1997c. *Coastal lagoons in the Republic of Ireland. Vol. 3. Results of site surveys Parts 1-20*. Report to the National Parks and Wildlife Service, Dublin.
- Oliver, G.A. 2005. *Seasonal changes and Biological Classification of Irish Coastal Lagoons*. PhD Thesis. U.C.D., Dublin.
- 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.
- Praeger, R.L. 1934 *The Botanist in Ireland*. Reprinted in 1974 by E.P. Publishing Ltd., Dublin. 398pp.
- Roden, C. 1999. *Irish coastal lagoon survey, 1998. Vol. III, Flora*. Dúchas, Dublin.
- Westermann, J.H. & V. Westhoff. 1974. Report on the Dooaghtry Area. Publication of the Netherlands Commission for International Nature Protection. Amsterdam. 5pp.