NPWS

Mweelrea/Sheeffry/Erriff Complex SAC (site code: 001932)

Conservation objectives supporting document- Coastal lagoons

Version 1
July 2017

Contents

Please note that this document should be read in conjunction with the following report: NPWS (2017) Conservation Objectives: Mweelrea/Sheeffry/Erriff Complex SAC 001932. Version 1.0. National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs.

1. Introduction

1.1 Mweelrea/Sheeffry/Erriff Complex SAC

Mweelrea/Sheeffry/Erriff Complex SAC is mostly an upland site, encompassing a large area of south Co. Mayo. The western limit of the SAC is on the Atlantic coast at Dooaghtry, south of Kinnadoohy. This area of coastal plain includes sand dunes, machair, freshwater lakes, lagoon, freshwater marsh and saltmarsh.

Mweelrea/Sheeffry/Erriff Complex SAC is selected for nine coastal habitats listed on Annex I of the EU 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 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, Corragaun 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
IL071	Corragaun Lough	Mayo	Unfavourable - Inadequate

[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 Corragaun Lough is 7.9ha. This 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 (i.e. Corragaun Lough) in Mweelrea/Sheeffry/Erriff Complex 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).

Corragaun Lough lies at the head of a long, shallow tidal inlet. Seawater appears to enter on every tide, but large volumes of freshwater flow through it at times of heavy rainfall; salinity has been measured as ranging from 25–32 practical salinity units (psu), but is likely to be much lower on these occasions. See Roden and Oliver (2013) for further information on salinity classes and Appendix 2 for the lagoon report.

Code[1]	Name	Salinity
IL071	Corragaun Lough	Meso - Euhaline

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

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.

Corragaun Lough can be classified as shallow (<1m), thus even small changes in water depth can cause significant losses in habitat area. This lagoon has changed considerably in size and shape in the

last number of years; 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 the 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.

Corragaun Lough is described as a natural sedimentary lagoon; it lies at the head of a long, narrow inlet impounded by the formation of a dune barrier. See 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

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

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

4.8 Typical plant species

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

The plant species recorded in this lagoon are summarised in Oliver (2007). The lagoonal specialist *Ruppia maritima* was found here. Non-lagoonal specialists found here include filamentous algae and *Enteromorpha* sp. 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.

Three lagoonal specialists were recorded within Corragaun Lough; they were the isopod *Jaera nordmanni*, the decapod *Palaemonetes varians* and the hemipteran *Sigara stagnalis*. The total list of species recorded at this site is summarised in Oliver (2007). See Appendix 2 for the site report.

The target for the attribute typical animal species is: maintain listed lagoonal 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.

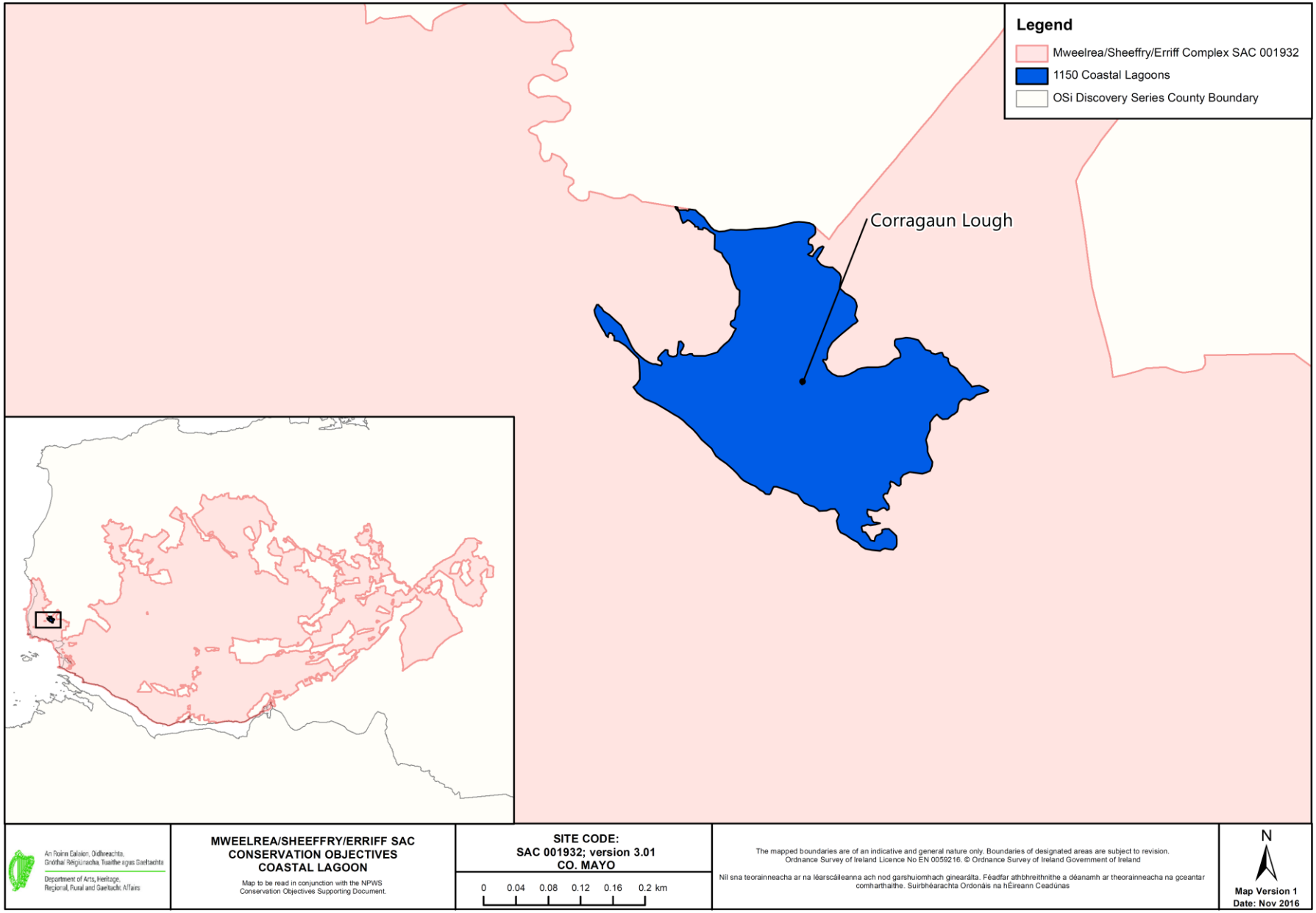
5. References

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 Mweelrea/Sheeffry/Erriff Complex SAC



Appendix 2 Site report

The following is a site account from Oliver (2007)

Code[1]	**Name**
IL0071	Corragaun Lough

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

4.71	**Corragaun Lough, County Mayo** O.S. L 748 698 O.S. Discovery Sheet 37

Conservation Designation: Mweelrea/Sheefry/ Erriff complex SAC 001932

General description:

Corragaun Lough is a small (10ha), shallow (<1m) **natural sedimentary lagoon** situated on the west Mayo coast, 5 km north of Killary Harbour and 7 km from Killadoon, Co. Mayo. The lagoon lies at the head of a long, shallow tidal inlet impounded by the formation of a dune barrier. Seawater appears to enter on every tide but large volumes of freshwater flow through it at times of heavy rainfall. Salinity probably varies considerably, and measured 25-32psu at the time of sampling (17-19/9/96). Corragaun has changed shape between 1919 and 1976 (Bekkers *et al*. 1976) and according to local information has been reduced in size considerably over the last 20 years.

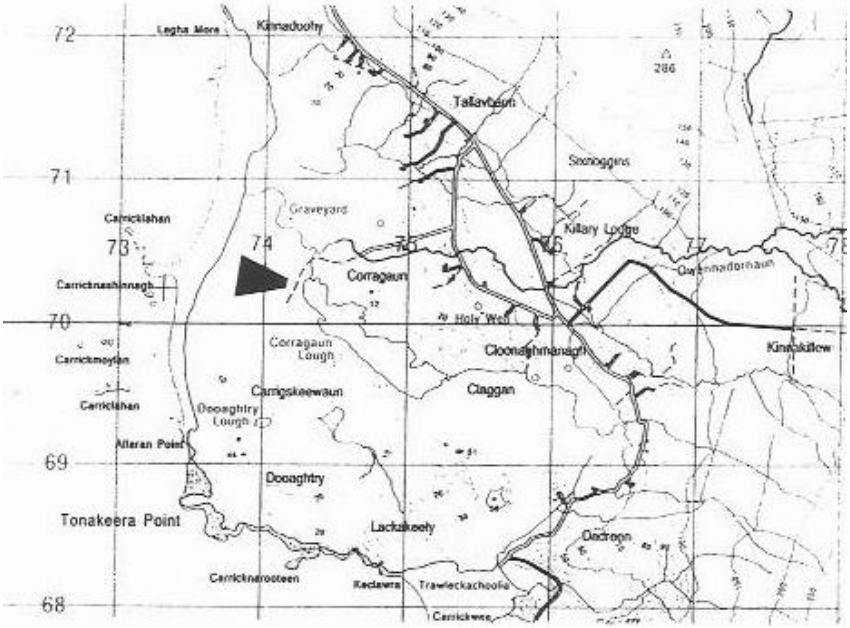


Figure 71.1 Location of map of Corragaun Lough.

Corragaun 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 macrophyte recorded. It was low growing and had a wide but patchy distribution. 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%).

Filamentous algae and *Enteromorpha* were the only other aquatic plants found during this survey.

Diversity of marginal communities was notable. *Scirpus maritimus, Schoenoplectus lacustris* ssp *tabernaemontani* and *Phragmites* swamps occurred on the north shore and more extensively associated with the major freshwater inflow.

Juncus maritimus dominated salt tolerant community occurred above low peat cliffs along much of the northern shore and there was one open stony area of *Eleocharis palustris* dominated salt tolerant vegetation. *Puccinellia maritima - Glaux maritima* saltmarsh bordered the lagoon on its low, sandy western shore.

This would seem to be a particularly species-poor lagoon but deeper areas of the eastern and central areas were not surveyed and could contain additional species. It is therefore rated as of **<u>moderate but potentially high conservation value</u>.**

Fauna

Six stations were selected for faunal sampling in Corragaun Lough, 17-19/9/96 (Figure 71.2, Table 71.1).

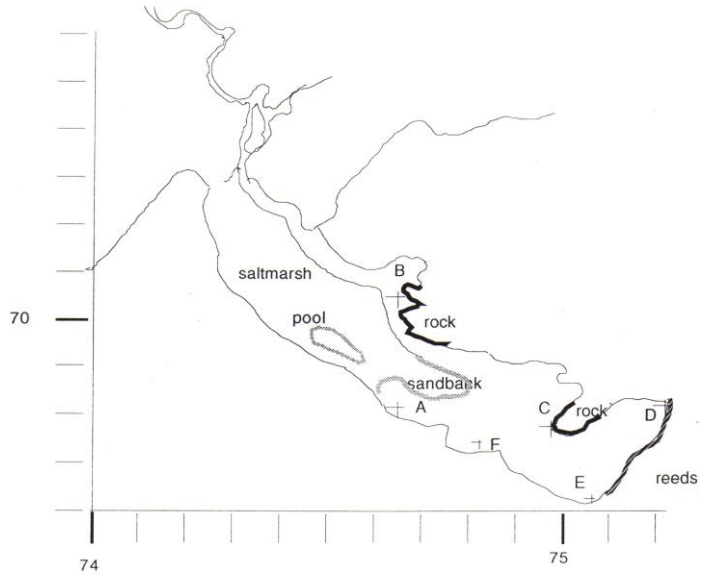


Figure 71.2 Sampling stations used at Corragaun Lough.

Table 71.1 Positions of faunal sampling stations in Corragaun Lough, 17-19/9/96, with salinity, depth of water and type of substratum.

	Sta A	Sta B	Sta C	Sta D	Sta E	Sta F
GPS position	L 7469 6982	L 7465 7049	L 7499 6973	L 7523 6982	L 7506 6963	L 7482 6965
Salinity(psu)	25	32	32	16-25	28	32
Depth(cm)	0-30	0-25	0-100	0-25	0-25	0-25
Substratum	Sand	Rock, solid peat, sand, silt, loose peat	Bedrock, sand	Fine sand and silt over peat	Soft anoxic mud and peat	Bedrock, stones, pockets of fine silt and sand

Table 71.2 Fauna Recorded in Corragaun Lough, Co. Mayo. June and September, 1996. ( ) = records from June. (L.T. = light-trap) + = present; o = occasional; c = common; a = abundant; F = Fyke net. Species in bold text are lagoonal specialists or apparently rare.

Fauna		Sampling Stations									
		A	B	L.T.B	C	L.T.C	D	L.T.D	E	F	L.T.F
Annelida	*Arenicola marina*	+									
Crustacea											
Mysidacea	*Neomysis integer*	a	c	350	a	500	a	300	c	o	150
Isopoda	*Eurydice pulchra*			1							
	Jaera nordmanni				+					+	
Amphipoda	*Corophium volutator*	c					o				
	Gammarus duebeni		+							+	
	G. zaddachi	+	+		+	+	+		+	+	+
Decapoda	*Crangon crangon*	c	c	3	c	5				o	
	Carcinus maenas	+	+		+		+		+	+	+
	Palaemon serratus		o		o						
	Palaemonetes varians				o						
Insecta											
Hemiptera	Corixidae						c	10	+	+	+
	Sigara stagnalis						+	+	+	+	+
Coleoptera					(+)						
Diptera	Chironomidae				+		+		+	+	
	Tipulidae	o									
Mollusca											
Prosobranchia	*Potamopyrgus antipodarum*				+		+		+		
Bivalvia	*Mya arenaria*	shells	shells								
	Scrobicularia plana	shells	shells								
Teleostei	*Anguilla anguilla*		+		F, 31		F, 1			+	1
	Gasterosteus aculeatus	+	a	73	a	52	a	85	o	a	
	Mugilidae				F, 4		F, 1				
	Platichthys flesus	+	+		F, 1		+		+	+	

The fauna was poor in spite of open contact with the sea and a gradient in salinity. Species poverty may be due to wide, and possibly sudden salinity fluctuations. Only 20 taxa recorded and only three of these are lagoonal specialists, all of which are common in lagoonal habitats in Ireland.

Jaera nordmanni. Isopod crustacean recorded at 24 of the 87 lagoons surveyed (27.6%) and may occur at others where it was not recorded due to the fact that only adult males are easily identified. Described in Britain (Barnes 1994, Hayward and

Ryland 1995) as occurring in streams flowing down the shoreline, on south and west coasts only. All records in Ireland are from West Cork to Donegal. Proposed as a lagoonal specialist for Ireland by Oliver and Healy (1998).

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

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

The fauna typifies a lagoon subject to strong tidal influence with no areas allowing low salinity species to survive. No interesting or rare species were recorded. Based on aquatic fauna, Corragaun is regarded as of **low conservation value**.

Ecotonal Coleoptera

Fourteen species of staphylinid and seven species of carabid beetles were recorded at Corragaun in 1996 (Good 1996, Good & Butler 1998), none of which are regarded as indicator species, and based on ecotonal coleoptera the site is regarded as of **no conservation value**.

Summary

Corragaun is a completely **natural sedimentary lagoon** with a tidal inlet in an area of coastline containing a number of lagoons, and "former lagoons", 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. Corragaun Lough is the only one of this series with a permanent tidal inlet through which the sea enters at each high tide. The post-glacial history of parts of this coastline has been studied in detail and continues to be of great interest to geomorphologists.

Relatively few species of aquatic fauna were present and none was interesting or rare.
The aquatic vegetation was species poor and the shores are of no conservation value for ecot
Coleoptera.
Corragaun undergoes wide fluctuations in salinity and has little conservation value for aquat
fauna and flora on its own but is of interest as the most marine of a series displaying a range
ecological conditions.

Overall Conservation Value = Moderate

Conservation Status Assessment (from Oliver 2007)	
Impacts	Natural siltation and eutrophication in lagoon which is rapidly diminishing in size.
Conservation Status	Unfavourable-Inadequate

Further Information

Vegetation survey by Bekkers *et al.* 1976. 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:

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