

NPWS

Farranamanagh Lough SAC
(site code: 002189)

**Conservation objectives supporting document-
Coastal lagoons**

Version 1
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Please note that this document should be read in conjunction with the following report: NPWS (2018) Conservation Objectives: Farranamanagh Lough SAC 002189. Version 1.0. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht.

1. Introduction

1.1 Farranamanagh Lough SAC

Farranamanagh Lough SAC is a small coastal Special Area of Conservation (SAC) situated on the south side of the Sheep's Head peninsula in west Co. Cork. The SAC is selected for two coastal habitats listed on Annex I of the Habitats Directive: Coastal lagoons (EU Habitats Directive code 1150) and Perennial vegetation of stony banks (1220).

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

Code ¹	Name	County	Conservation Assessment
IL023	Farranamanagh Lake	Cork	Favourable

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 EU 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 Farranamanagh Lake is 4.0ha. 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 mapped distribution of the lagoon habitat (i.e. Farranamanagh Lake) in Farranamanagh 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 freshwater and seawater. Salinity is probably the most important variable in the classification of lagoon types (Roden and Oliver, 2013). Small freshwater streams enter Farranamanagh Lake in the north and there is a permanent outlet to the sea through the cobble barrier; seawater enters through here on spring tides and also through overtopping during storms. At the time of sampling, salinity ranged between 1psu and 6psu (practical salinity units) (Oliver, 2007). There are likely to be wide and rapid fluctuations in salinities depending on tides and weather. Using the information in Oliver (2007), the salinity class of this lagoon is oligohaline to mesohaline. See Roden and Oliver (2013) for further information on salinity classes and see 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. Farranamanagh Lake can be classified as shallow (less than 2m), 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 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.

Farranamanagh Lake is described as a sedimentary lagoon with a cobble barrier through which there is a permanent outlet (Oliver, 2007). See Appendix 2 for the site report.

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 set for nitrogen is to ensure that excessive shading from phytoplankton does not reduce submergent colonisation.

4.7 Depth of macrophyte colonisation

Farranamanagh Lake has been identified as shallow (less than 2m), 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 Farranamanagh Lake are summarised in Oliver (2007). The lagoonal specialist *Ruppia* sp. occurs here. 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 species recorded in Farranamanagh Lake are summarised in Oliver (2007). Three lagoonal specialists occur here, of which one, the amphipod *Allomelita pellucida*, is considered rare. 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

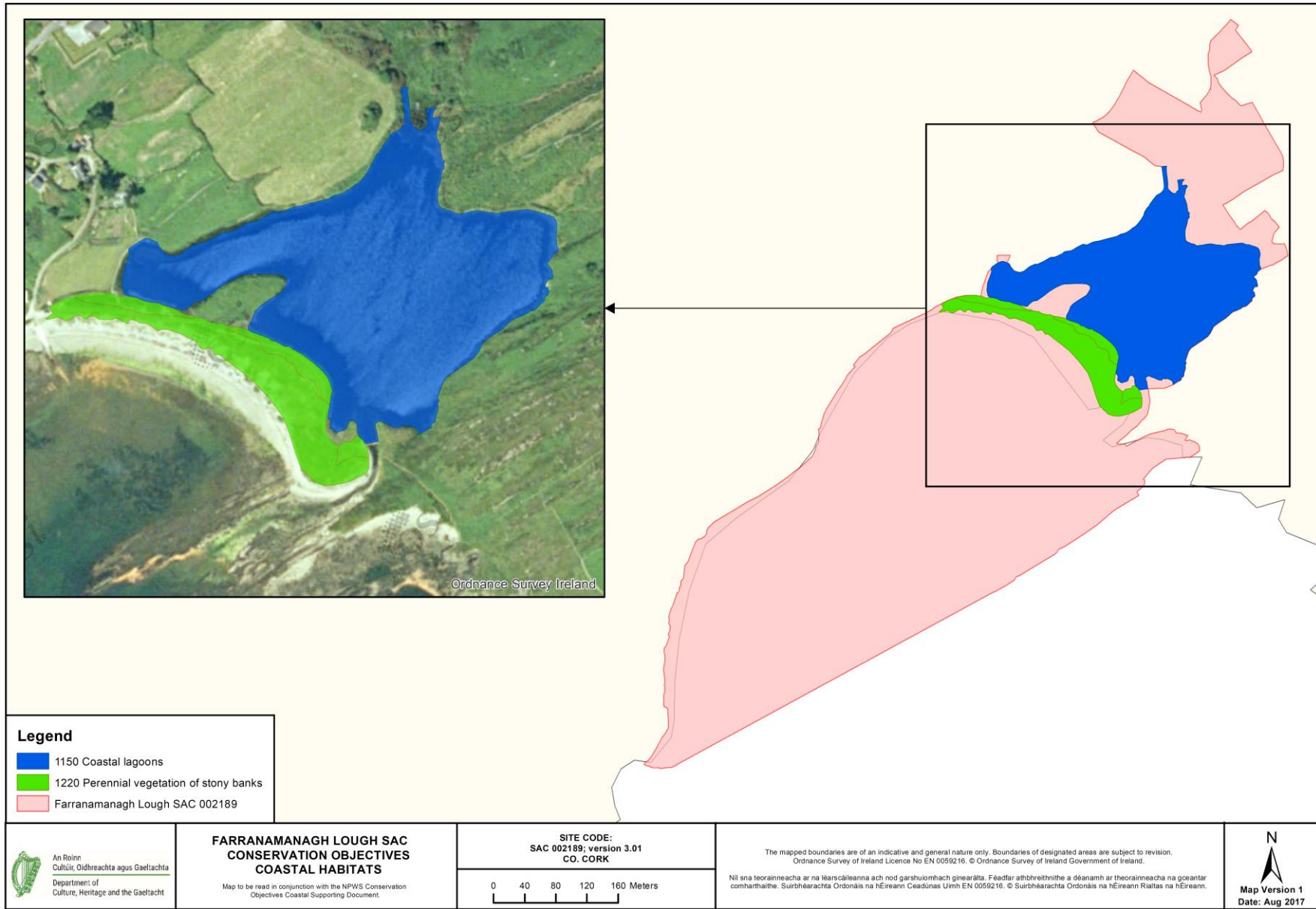
Negative indicator species include non-native alien species as well as those that are not typical of the habitat. For example, accelerated encroachment by reed beds can be caused by low salinity, shallow water and elevated nutrient levels.

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 in Farranamanagh Lough SAC



Appendix 2 Site report

The following is the site account from Oliver (2007)

Code¹	Name
IL023	Farranamanagh Lake

¹ Code is that used in Oliver (2007).

4.23

Farranamanagh Lake, County Cork O.S. V 830 378

O.S. Discovery Sheet 88



Conservation Designation: Farranamanagh Lough SAC 002189

General description:

Farranamanagh Lake is situated in Dunmanus Bay on the south side of the Sheep's Head peninsula, 3 km east of Kilcrohane. The lake is a small (6ha), completely natural **sedimentary lagoon** lying behind a cobble barrier through which runs a permanent outlet. Small freshwater streams enter the lagoon in the north. On spring tides, seawater enters through the inlet and overtops the barrier during storms. Salinity ranged from 1-6psu at the time of sampling (17-18/8/96).

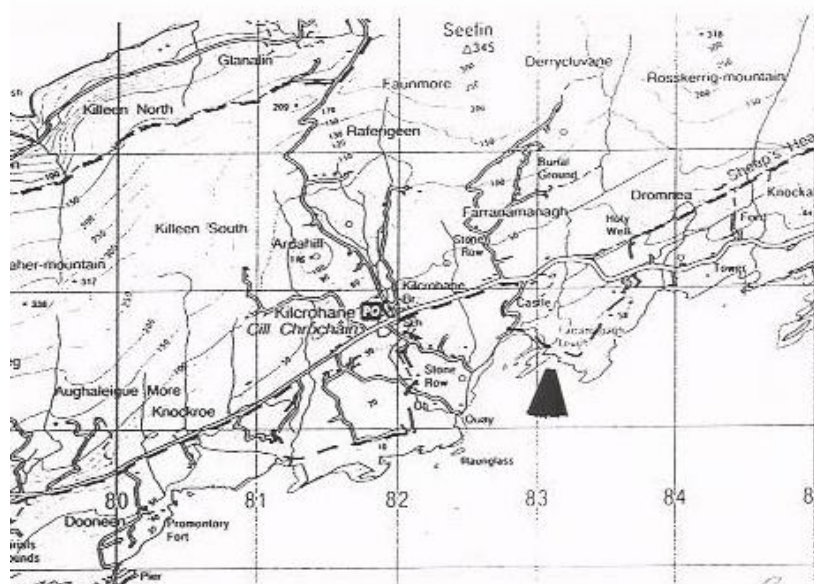


Figure 23.1 Location of map of Farranamanagh Lake.

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

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

Flora

Flora of the lagoon was surveyed by P. Hatch in 1996 (Hatch 1996, Hatch & Healy 1998).

Ruppia was the only aquatic higher plant found in the lake during this survey. It is well distributed around the site, occurring within two metres of the shore at sparse to patchy cover in most areas. It was not possible to identify samples to 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. *Ruppia maritima* appears to be the more common of the species and was found at 41 of the lagoons surveyed. *Ruppia cirrhosa* is believed to tolerate higher salinities than the former species and to be less common, but neither of these statements is clearly supported in Irish lagoons and the two species were often found growing together. *Ruppia cirrhosa* was only identified at 22 lagoons, but species was not determined at 12 sites. *Ruppia maritima* var *brevirostris* was only positively identified at two sites (Ballyteige, Co. Wexford and Inch L., Co. Donegal).

A *Fucus* species is locally abundant in the mouth of the outlet channel. Marginal vegetation shows no notable diversity. *Schoenoplectus lacustris* ssp *tabernaemontani* single species swamps fringe the eastern and north eastern shores and also occur at the freshwater inflow and in places along the southern shore. *Scirpus maritimus* swamp occurs along parts of the southern shore. The eastern shore consists of exposed bedrock alternating with stretches of low earth cliff. Small *Scirpus*, *Schoenoplectus* and *Eleocharis palustris* swamps occur at one point here approximately half way along the shore.

This seems to be a very species-poor site, although it is possible that additional aquatic species are present in deeper parts of the lagoon more than ten metres out from the shore. Based on vegetation, the lagoon appears to be of **low conservation value**.

Fauna

Four stations were selected for faunal sampling in 1996 (Figure 23.1, Table 23.1). Only 16 faunal taxa were recorded in 1996 (Table 23.2), of which 15 are identified to species. Only one of the species is listed as a lagoonal specialist (*Palaemonetes varians*) but two other species are proposed specialists for Ireland and one of these (*A. pellucida*) appears to be a rare species.

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. This species may occur in freshwater, as in L. Errol, Cape Clear, Co. Cork. Described in England (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).

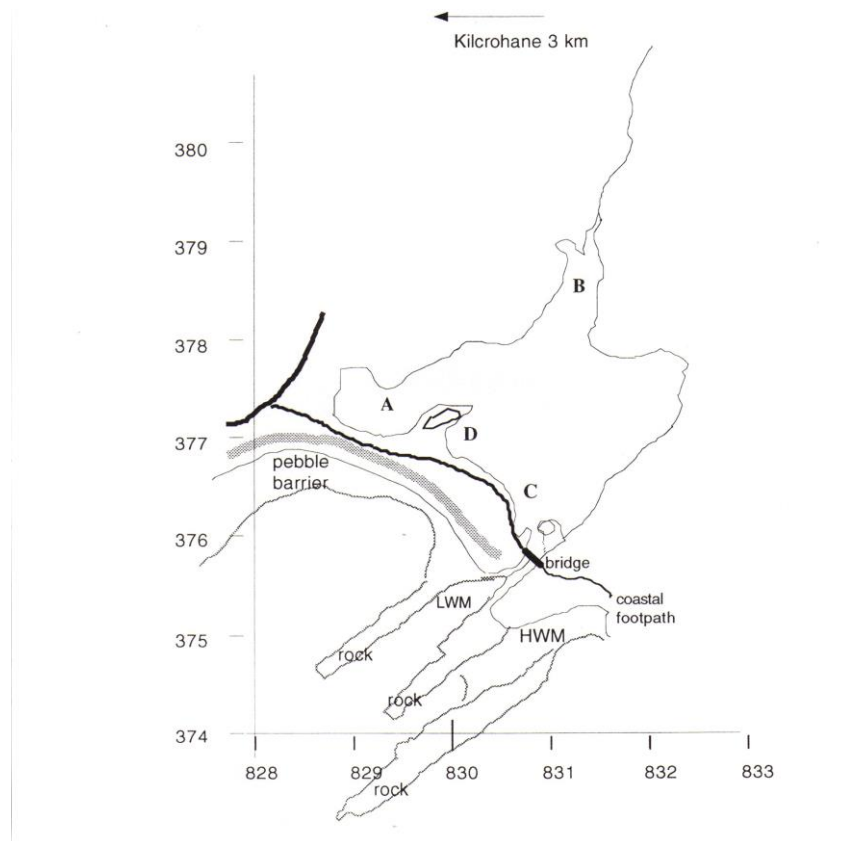


Figure 23.2 Sampling stations used at Farranamanagh Lake.

Table 23.1 Positions of sampling stations in Farranamanagh Lake, 17-18/8/96, with salinity, depth of water and type of substratum.

	Sta A	Sta B	Sta C	Sta D
GPS position	V 8297 3774	V 8312 3784	V 8307 3765	V 8301 3770
Salinity(psu)	2-3	1	6	5
Depth(cm)	0-100	25-60	100-150	0-25
Substratum	Cobbles, gravel, peat and organic silt.	Large boulders, sand, silt	Cobbles, gravel and sand	Cobbles and gravel

Allomelita pellucida. Amphipod crustacean recorded at Kilcoole, Co. Wicklow, six sites in Cork (Cuskinny, L. Beg, Kilkeran, Lissagriffin, Farranamanagh, Reenydonegan), and recently in the River Lee (Cott *et al.* 2007), and in Furnace L., Co. Mayo. There are also 2 unconfirmed records for Ballyvodock (Co Cork) and Muckinish (Co. Clare). The only previous records are for L. Hyne and Glengarriff in Co. Cork and Furnace L. (Costello *et al.* 1989). 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.

Faunal diversity was poor in Farranamanagh Lake. Only *Neomysis integer*, *Palaemonetes varians* and *Gasterosteus aculeatus* were common and no species was present at high density.

The faunal assemblage typifies a brackish lagoon with a sea inlet, but where the freshwater inflow is sufficient to counteract the marine influence and the salinity remains generally low. The salinities recorded at the time of sampling (2-6‰) may be typical but there are probably wide and rapid fluctuations according to tides and weather. The poor representation of oligohaline species may be due to temporary high salt levels which prevent populations becoming established. This seems to be the only possible explanation for the absence of corixids and the scarcity of beetles in areas where there was good growth of *Ruppia*.

Table 23.2 Fauna Recorded at Farranamanagh Lake, Co. Cork. July and August, 1996. L.T. = light-trap, () = recorded in July; + = present; o = occasional; c = common; a = abundant; F = fyke net. Species in bold text are lagoonal specialist and notable species.

Fauna	Sampling Stations						
	A	L.T.A	B	L.T.B	C	L.T.C	D
Cnidaria <i>Aurelia aurita</i>					(+)		
Crustacea							
Mysidacea <i>Neomysis integer</i>	o	10	o		15		
Isopoda <i>Jaera nordmanni</i>							+
Amphipoda	+	+	a	25		+	+
<i>Allomelita pellucida</i>		+					
<i>Gammarus duebeni</i>							+
<i>G. zaddachi</i>		+	a	+		+	
Decapoda <i>Carcinus maenas</i>			F		F, c		
<i>Crangon crangon</i>				2			
<i>Palaemonetes varians</i>	a	60	c	16	a	31	
Insecta							
Coleoptera <i>Anacaena globulus</i>			+				
<i>Haliplus lineatocollis</i>					+		
Diptera Chironomidae indet.			+			+	
Mollusca							
Prosobranchia <i>Potamopyrgus antipodarum</i>	+		+		+	+	+
Teleostei <i>Anguilla anguilla</i>	+		F				
<i>Gasterosteus aculeatus</i>	+	2	a	45	+		+
<i>Pomatoschistus microps</i>	+	3	+	5	+		+

Ecotonal Coleoptera were surveyed in 1996 by Good and Butler (1996, 1998). Thirty five species of staphylinid and thirteen species of carabid beetles were recorded, none of which were regarded as indicator species, and based on ecotonal coleoptera the site was rated as of **no conservation value**.

Summary

Although the number of both the flora and fauna of the lagoon are relatively poor, four lagoonal specialists were recorded (1 floral, 3 faunal) and one crustacean species (*A. pellucida*) appears to be rare in Ireland. Geomorphologically, Farranamanagh Lake is an excellent example of a **natural sedimentary lagoon** with a cobble barrier and therefore rated highly for overall conservation value.

Overall Conservation Value = High

Conservation Status Assessment (from Oliver 2007)	
Impacts	Small natural lagoon. Potential impact from exotic plants. Removal of beach materials. Erosion.
Conservation Status	Favourable

Further Information

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).

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