

NPWS

Drongawn Lough SAC
(site code: 2187)

**Conservation objectives supporting document-
Coastal lagoons**

Version 1
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1. Introduction

1.1 Drongawn Lough SAC

Drongawn Lough SAC is situated on the northern side of the Kenmare River inlet, approximately 6km south-east of Sneem, Co. Kerry. This SAC is selected for “Coastal lagoons” a habitat listed in Annex I of the Habitats Directive.

“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).

A single lagoon is listed for this SAC (Oliver, 2007). The table below gives the conservation status assessment of this lagoon as outlined in that report. See map in Appendix 1 and Appendix 2 for an account of the site (from Oliver, 2007).

Code ¹	Name	County	Conservation Assessment
IL028	Drongawn Lough	Kerry	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 lagoon is 11.7 ha, this area is calculated from spatial data derived from Oliver (2007).

3. Range

The known distribution of lagoon habitat in Drongawn 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).

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

This is a high salinity lagoon with salinities generally ranging from 30 to 32 psu, except in the extreme south-west of the lagoon where salinities as low as 10psu were recorded. Tidal range is restricted as a result of its narrow (3m wide) connection to a small tidal bay which in turn has a narrow connection to the open sea. Using information from Oliver (2007), the following table gives the salinity class of lagoon. See Roden and Oliver (2013) for further information on salinity classes and Appendix 2 for lagoon site report.

Code	Name	Salinity
IL028	Drongawn Lough	Poly-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.

This lagoon identified within Drongawn Lough SAC can be classified as deep, with depths of up to 18m recorded here. See Appendix 2 for site report.

4.3 Barrier: connectivity between lagoon and sea

The morphology of the barrier between a lagoon and sea determines how it functions ecologically. Changes to the barrier can be due to natural processes such as storms, but they can also be modified through human intervention. Active management is sometimes necessary, particularly if the lagoon is artificial.

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

Seawater enters through a narrow channel in the south-west of the lagoon; this channel opens into a small inlet which in turn is connected to open sea. This results in a restricted tidal flow and a time lag in the tidal regime compare to open water (Oliver, 2007). See also the site account in Appendix 2.

4.4 Water quality- Chlorophyll a

This attribute indicates the level of phytoplankton in the water column. Roden and Oliver (2013) make the assumption that, for shallow lagoons in “natural” condition, primary productivity is dominated by the benthos rather than the plankton. Phytoplankton tends to increase in density in response to increasing nutrient levels. Excessive shading from phytoplankton can reduce submergent macrophyte colonisation of the littoral zone of lagoons.

The target for the attribute water quality- Chlorophyll a is: annual median chlorophyll a within natural ranges and less than 5µg/L. Target based on Roden and Oliver (2013).

4.5 Water quality- Molybdate reactive phosphorus (MRP)

The target for the attribute water quality- Molybdate Reactive Phosphorus (MRP) is: annual median MRP within natural ranges and less than 0.1mg/L. The target is based on Roden and Oliver (2013).

This limit is required to ensure that excessive shading from phytoplankton does not reduce submergent colonisation of the littoral zone.

4.6 Water quality- Dissolved inorganic nitrogen (DIN)

The target for the attribute water quality- Dissolved Inorganic Nitrogen (DIN) is: annual median DIN within natural ranges and less than 0.15mg/L. The target is based on Roden and Oliver (2013).

As for phosphorus, the limit for set nitrogen is to ensure that excessive shading from phytoplankton does not reduce submergent colonisation.

4.7 Depth of macrophyte colonisation

As Drongawn Lough has been identified as deep (>2m), it is expected that macrophytes should extend down to more than 2m depth.

The target for the attribute depth of macrophyte colonisation is: macrophyte colonisation to more than 2m.

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 the lagoon are summarised in Oliver (2007). Species considered to be lagoonal specialists include *Chaetomorpha linum* and *Ruppia cirrhosa*. See Appendix 2 for the site report.

4.9 Typical animal species

Some invertebrate species are regarded as lagoonal specialists and their presence can indicate long term quality. As species found within each lagoon can vary considerably, depending on other attributes such as salinity, the target is based on site-specific species lists.

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

The species recorded in the site are summarised in Oliver (2007). Three lagoonal specialists, the bivalve *Cerastoderma glaucum*, the decapod *Palaemon varians* and the gastropod *Hydrobia ventrosa* were recorded here. The lagoon also contains a natural population of large oysters (*Ostrea edulis*). See Appendix 2 for the site report.

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.

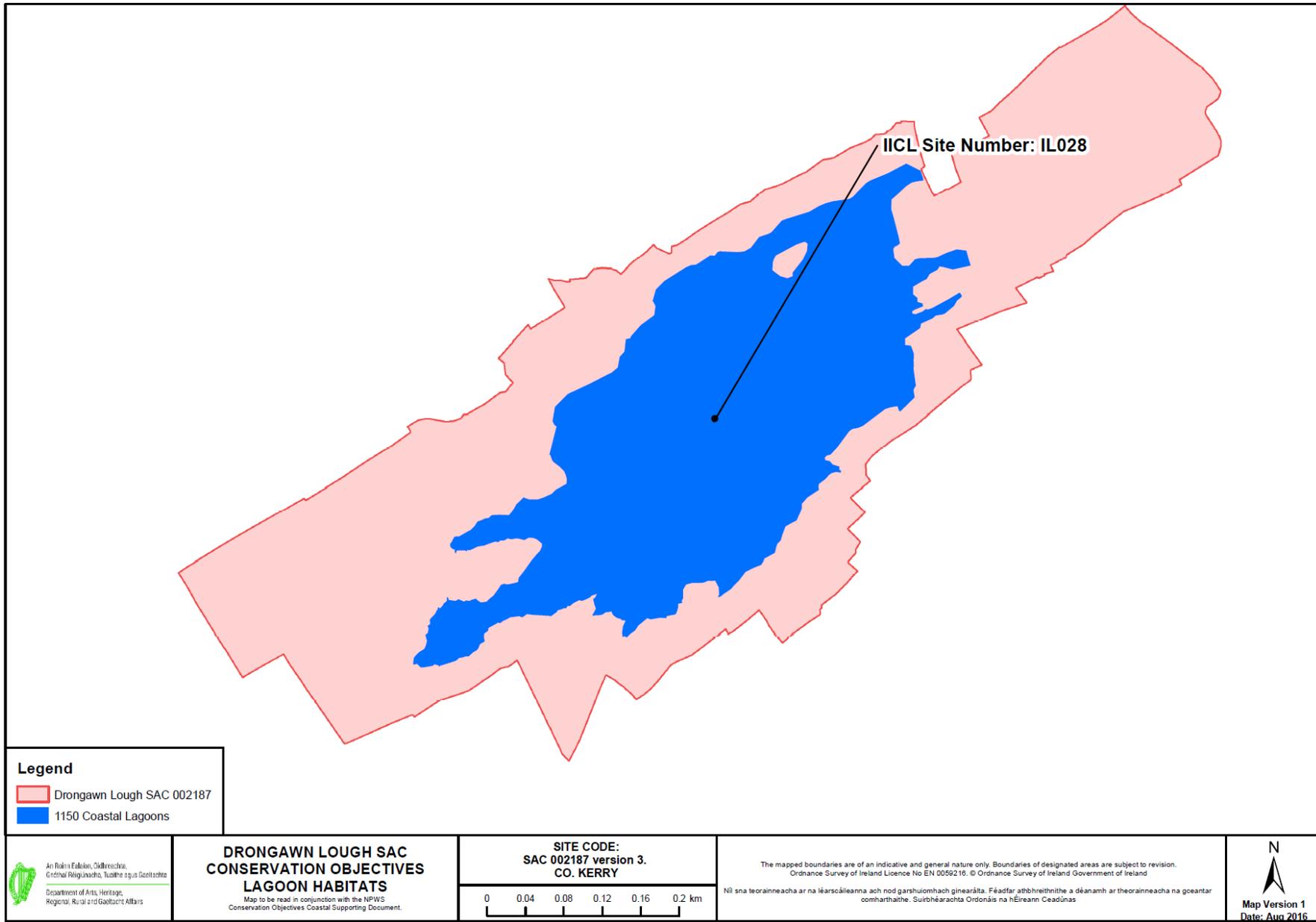
5. References

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.

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

Appendix 1 Lagoon distribution map



Appendix 2 Site report

The following is the site account from Oliver (2007)

Code¹	Name
IL028	Drongawn Lough

¹ Code is that used in Oliver, 2007.



Conservation Designation: Drongawn Lough SAC 002187

General description:

Drongawn Lough is a natural **rock lagoon** with a restricted tidal range due to a narrow connection with the sea through a small tidal bay which itself has a narrow connection to the open sea. The lake lies on the south coast of the Ring of Kerry peninsula, 6 km to the east of Sneem. Kenmare Bay lies 300 m to the south of the lake but is separated by a ridge of rock and the inlet to the lake lies in the northeast corner via Coongar Harbour. Very little appears to be known about this lake, other than the fact that a small flock of Whooper swans (*Cygnus cygnus*) is often present in the winter. It is, however, a good example of a completely natural, moderately large, saline lake on the mountainous Kerry coastline in an almost perfect state of preservation.



Figure 28.1 Location map of Drongawn Lake.

Drongawn 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). Vegetation was surveyed again briefly in 1998 (Roden 1999). Results of these surveys are summarised by Healy *et al.* (1997a,b,c), Healy & Oliver (1998) and Healy (1999a,b, 2003).

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

Flora

The vegetation of Drongawn Lake was surveyed in 1996 by P. Hatch and briefly in 1998 by C. Roden 1999. A total of 9 floral taxa were recorded in 1996, but no sub-aquatic survey was carried out. Two species recorded are lagoonal specialists (*C. linum*, *R. cirrhosa*).

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

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).

Ruppia c.f. cirrhosa is abundant and well distributed. It occurs in dense beds, usually more than ten metres out from the shore, around the whole site with the exception of the outlet area. Dense patches are found in the narrow sheltered bays of the north east. *Zostera* fragments were found washed up on the shore but their origin is unknown.

Marginal vegetation is limited to a *Juncus maritimus* salt tolerant community, typically forming a narrow strip associated with low peat cliffs, with occasional areas of bedrock shore. In 1996, based on vegetation, Drongawn Lough appeared to be a good representative of a tidal, high salinity lagoon. Its *Ruppia* beds are extensive and other interesting aquatic species may be present.

In 1998, underwater observations were only made in the area inside the entrance sill (Roden 1999, Healy 1999b). The lake water was reasonably clear without strong evidence of stratification. Inside the sill the sides of the lake consist of steeply shelving exposed rock. The rocky slope was followed down to at least 6m depth where a gently sloping bare muddy floor was encountered but there was no sign of *Beggiatoa* at this depth as in Loch Fhada. Exposed rock near the surface was covered in red algal communities with *Polyides rotundus*, *Chondrus crispus*, *Codium fragile tomentosum*, *Phyllophora pseudoceranoides* and *Fucus serratus*. At 1m depth on sand or gravel a band of *Ruppia cirrhosa* was found. This band thinned with depth and at 3m gave way to dense stands of *Chaetomorpha linum* and *Cladophora* sp. (not *battersii*). This band in turn gave way to bare mud at about 6m.

As aquatic areas were surveyed almost entirely from the shore due to water depth the site is given a rating of “**potentially valuable**” and a full aquatic survey is recommended.

Fauna

Seven stations were selected for faunal sampling in 1996 (Figure 28.2, Table 28.1)

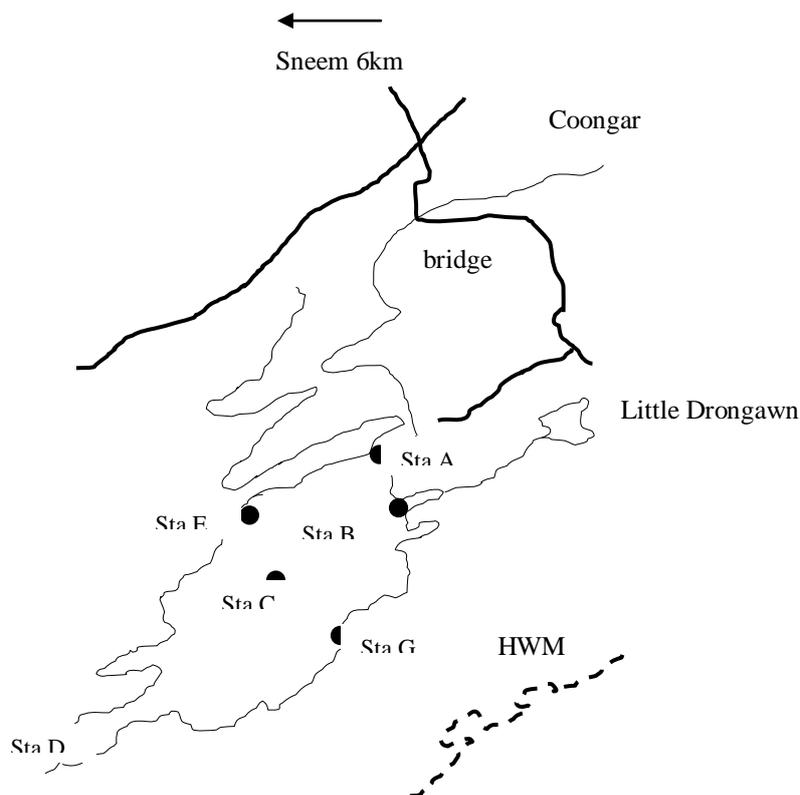


Figure 28.2 Sampling stations used at Drongawn Lough, 8-10/9/96.

Table 28.1 Positions, salinity, temperature, water depth and substratum of sampling stations in Drongawn Lough 8-10/9/96.

	Sta A	Sta B	Sta C	Sta D	Sta E	Sta F	Sta G	Sta H
GPS position	V 7326 6428	V7310 6414		V 7276 6378	V 7302 6419	V 7392 6421	V 7313 6393	
Salinity(psu)	32	30	30	30	30	30	10-28	
Depth(cm)	0-60	0-100	1800	50-200	0-100	15-60	0-100	0-25
Substratum	Bedrock, cobble, gravel	Boulders, gravel, sand		Stones, peat	Stones, loose peat	Rock, stones, soft peat	Rock, stones, soft peat	Bedrock, stones, mussel reef

A total of 68 faunal taxa were recorded in Drongawn (Table 28.2), of which 60 were identified to species. The fauna was rich and predominantly marine but with 18% of

brackish (poly-euryhaline) species, three of which are recognised as lagoonal specialists (*Cerastoderma glaucum*, *Palaemonetes varians* and *Hydrobia ventrosa*), and two limnic species. The conditions which favour the brackish-water species are the small tidal range coupled with a small, but probably continuous, freshwater inflow from the surrounding peatlands. The corixid and beetle species are normally associated with freshwater and may have been immigrants from a nearby pond. The lake contains a natural population of large oysters.

		Sampling Stations											
		A	L.T.A	B	L.T.B	D	L.T.D	E	L.T.E	F	G	L.T.G	Inlet
Porifera	<i>Halichondria panicea</i>	+		+		+				+			
Cnidaria	<i>Chrysaora hysoscella</i>									+			
	<i>Acanthopleura balli</i>	+		+		+		+		+			+
Nemertea				+									
Annelida	<i>Amphitrite edwardsi</i>												+
	<i>Arenicola marina</i>	+											
	<i>Janua pagenstecheri</i>												+
	Nereidae	+											+
	<i>Platynereis dumerili</i>				+			+					
	<i>Pomatoceros triqueter</i>	+		+		+				+			
	<i>Spirorbis rupestris</i>	+		+		+		+		+	+		+
Crustacea													
	Cirripedia <i>Semibalanus balanoides</i>	+		+									+
	<i>Verruca stroemia</i>			+									
	Mysidacea <i>Hemimysis lamornae</i>						2						
	<i>Neomysis integer</i>								1?				
	<i>Praunus flexuosus</i>	+	250	+	2	o	2	c	65	o	o		
	Isopoda <i>Jaera sp.</i>			+		+		+			+		
	<i>Jaera forsmanni</i>							+			+		
	Amphipoda <i>Ampithoe ramondi</i>			+				+		+		+	
	<i>Caprella acanthifera</i>					+							
	<i>Corophium volutator</i>						+						
	<i>Erichthonius difformis</i>	+		+		+		+				+	
	<i>Gammarus duebeni</i>					+	+				+		
	<i>Lembos longipes</i>			+		+							
	<i>Melita palmata</i>	+		+						+			
	Decapoda <i>Carcinus maenas</i>	+		+		+				+	+		+
	Palaemonidae	a		a		a		a		a	a		a
	<i>Palaemon elegans</i>	+	1	+				o					
	<i>P. serratus</i>	+				o							
	<i>Palaemonetes varians</i>	+				a		a		a	a		
Arachnida	Pycnogonida						+						
Insecta													
	Hemiptera <i>Sigara dorsalis</i>												+
	Coleoptera <i>Haliphus wehnckeii</i>					+							
	Diptera Chironomidae					+				+	+		

Jaera forsmanni was also recorded at Raffeen and Kilmore L. (Co. Cork), Aibhnín, L. Fhada and L. Fhada upper pools (Connemara). The only previous record for this, probably under-recorded species was for L. Hyne, Co. Cork in De Grave and Holmes (1998).

Erichthonius difformis Amphipod crustacean recorded only in Drongawn. Up to, and including, the review of this genus (Myers and McGrath 1984) there was only one positive record of this species in Ireland, at Kinsale, Co. Cork.

Table 28.2 Fauna Recorded in Drongawn Lough, Co. Kerry. July and September 1996. L.T. = light-trap () = records for July, + = present, o = occasional, c = common, a = abundant, F = fyke net. Species in bold text are lagoonal specialists or apparently rare.

	Sampling Stations										
	A	L.T.A	B	L.T.B	D	L.T. D	E	L.T.E	F	G	L.T.G Inlet
Mollusca											
Prosobranchia <i>Bittium reticulatum</i>	+		c		c	5	a	4		+	+
<i>Gibbula umbilicalis</i>	+										
<i>Hydrobia ventrosa</i>					+				+		
<i>Lepidochitona cinerea</i>	+										
<i>Littorina littorea</i>	+		+				+			+	+
<i>L. obtusata</i>	+		+				+		+		
<i>L. saxatilis</i>							+				
<i>Onoba sp.</i>							+				
<i>Patella vulgata</i>	+										
<i>Rissoa membranacea</i>							+				
<i>Rissoa sp.</i>			+								
Opisthobranchia <i>Elysia viridis</i>										+	
<i>Scaphander lignarius</i>			+	24	+		+			+	
Bivalvia <i>Anomia sp.</i>			+								
<i>Cerastoderma glaucum</i>			a		a		+		+	+	
<i>Chlamys varia</i>	+		+		+						
<i>Mytilus edulis</i>	a		a								a
<i>Ostrea edulis</i>	+		+		+		+				
<i>Venerupis sp.</i>										+	
Bryozoa							+				
<i>Bowerbankia sp.</i>							+				
<i>Cryptosula pallasiana</i>	+		+		+		+		+	+	
Echinodermata			+								
<i>Asterias rubens</i>			+		+				+		
<i>Amphipholis squamata</i>			+		+				+		
Tunicata					+		+		+		
<i>Ascidella aspersa</i>					+		+		+		
<i>Clavelina lepadiformis</i>	+		+		+		+		+	+	
<i>Dendrodoa grossularia</i>									+		
Teleostei											
<i>Anguilla anguilla</i>	+				F, 1				F,4		
<i>Atherina presbyter</i>							+	2	a		
<i>Crenilabrus melops</i>					F,5				F,2		
<i>Gasterosteus aculeatus</i>							+				
<i>Gobius niger</i>					F,1						
<i>Pomatoschistus microps</i>	+		+		+		+	9	+	+	

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

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.

Hydrobia ventrosa. Gastropod mollusc commonly found in brackish lagoons and ditches and generally not on the open coast. Recorded at 18 of the 87 (20.7%) lagoons surveyed up to 2006.

***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.

The lake has a rich and interesting aquatic fauna which includes two rare crustacean species. An interesting feature is the presence of lagoonal and freshwater species in a community dominated by marine species. Further study of the fauna, to include a diving survey of the deeper regions, is recommended

In conclusion, based on aquatic fauna, the richness of the fauna and the presence of four lagoonal specialists and three rare species qualify it to be considered as of national importance. The richness of the site and near pristine conditions qualify Drongawn Lough to be considered as of **high conservation value** and worthy of further study.

Ecotonal Coleoptera

Ten species of staphylinid and six species of carabid beetles were recorded in Drongawn (Good & Butler 1998), none of which is an indicator species. The site was therefore rated as of **low conservation value** based on ecotonal coleoptera.

Summary

Very little is known about this lagoon. There appear to have been no previous studies, or exploitation of the lake, although mariculture might be considered. There is very little disturbance to the site apart from occasional duck shooting and fishing.

Geomorphologically, the lake is not a true lagoon but is a good example of a deep, “silled” lake in pristine condition. It is presumably of glacial origin and is similar to Salt Lake and Lough Hyne and probably resembles the Scottish “obs”. The flora was not surveyed completely, but shows considerable potential, and includes at least two lagoonal specialists. The fauna is rich, and mostly marine, but with four lagoonal specialists, and three apparently rare crustaceans. Based on aquatic fauna and flora and the fact that it is a good example of a “rock lagoon” in near pristine condition, overall it is rated as of **high conservation value**.

Overall Conservation Value = High

Conservation Status Assessment (from Oliver 2007)

Impacts

NO IMPACTS

Conservation Status

Favourable

Further Information

Drongawn 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). Vegetation was surveyed briefly again in 1998 (Roden, 1999). Results of these surveys are summarised by Healy *et al.* (1997a,b,c), Healy & Oliver (1998), and Healy (1999a,b, 2003). Included in a biological classification of Irish coastal lagoons (Oliver 2005) and in the Conservation Status Assessment (Oliver 2007).

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