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Inch Lough, County Donegal O.S. C 352 230

O.S. Discovery Sheet 6



Conservation Designation: Lough Swilly, including Big Isle, Blanket Nook & Inch Lake SAC 002287, SPA 004075, pNHA 000166

General description:

Inch Lough is a large (160ha), shallow (<2m) **artificial lagoon** with two artificial barriers and one sluiced outlet, situated on the Inishowen Peninsula, between the mainland and Inch Island, approximately 12 km to the west of Derry, Co. Donegal. The lagoon was formed by construction of two barriers from the mainland to Inch island and a railway embankment along the eastern shore. Salinity is generally low (0 - 2psu) but up to 20psu was measured along the southern causeway at 2m depth.



Figure 87.1 Location of map of Inch Lough, Co. Donegal

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

Flora

Vegetation was surveyed in 1998 by C. Roden (Roden 1999). The following is based on the report by Roden, following his survey on 26/7/98 and 17-19/9/98.

The vegetation survey included snorkelling, wading and shore sampling. With the exception of an area in the centre of the eastern half, all the surface of the lagoon and its surrounding vegetation was examined.

Five types of vegetation were recorded and are listed in order of areal extent.

- 1) *Potamogeton pectinatus* communities, sometimes with *Myriophyllum spicatum*.
- 2) *Ruppia/P. pectinatus* communities on sandy ground.
- 3) Charophyte communities with *Chara aspera* and *Chara canescens*.
- 4) Areas of mud with drifting *Enteromorpha* and *Cladophora*. Large areas in the centre of the lagoon consist of soft mud with no vegetation other than loose clumps of these algae.
- 5) *Zannichellia palustris* community occurs on sand in one area in the centre of the lagoon.

Two of the above species (*Ruppia sp.*, *Chara canescens*) are lagoonal specialists. This site contains a very large population of *C. canescens*, the largest encountered in all of the lagoon surveys, and probably the largest in the country. Only a small number of the *Ruppia* plants were in fruit. These were unusual with very short fruit stalks, thus resembling the variety *brevirostris* of *Ruppia maritima*. Verhoeven (1980) notes that this variety occurs with *Zannichellia palustris* in brackish water.

Chara canescens was recorded in **eight lagoons** during the surveys - North Slob, Lady's Island L., and Tacumshin L., Co. Wexford, L. Gill, Co. Kerry, L. Murree, Co. Clare, Tanrego, Co. Sligo and Durnesh L. and Inch L., Co. Donegal (Hatch & Healy, 1998; Roden, 1999; Roden 2004). It was also recorded at Shannon Lagoon in 1996 (Hatch and Healy 1998), but not refound at that site in 2003 (Roden 2004). This species is listed in the Red Data Book for Britain and Ireland (Stewart and Church 1992). Although recorded from several European countries it is believed to be declining. It is believed to be extinct in Holland, and there are only a few records from the U.K. since 1960. These Irish locations are very important in European terms, and it is especially encouraging to have found new sites.

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 (47%). *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 23 lagoons (26%), 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).

Zannichellia palustris was only recorded at six lagoons (Inch Lough, L. Gill, Co. Kerry, Shannon Airport, Co. Clare, North Slob, South Slob and Tacumshin, Co. Wexford).

Marginal vegetation consists of:

- 1) small areas of the *Potentilla anserina* variant of the *Juncus gerardii* association.
- 2) *Eleocharis* communities
- 3) Very extensive stands of *Schoenoplectus tabernaemontana*
- 4) In the eastern half a large area of freshwater swamp vegetation occurs. While this is outside the definition of lagoonal vegetation, it is of interest in its own right. Plants include *Hippuris*, *Myosotis* sp., *Mentha aquatica*, *Baldellia ranunculoides*, *Caltha radicans*, *Gallium palustre*, *Lythrum salicaria*, *Agrostis stolonifera*.

Phytoplankton was dominated by an unidentified dinoflagellate and consisted mainly of freshwater algae typical of eutrophic conditions.

The flora of Inch Lough includes the largest population in the country of *Chara canescens*, a Red Data Book species, which is a lagoonal specialist. The vegetation is rich compared with other lagoons and it is perhaps the best example of a low salinity lagoon in the country. *Zannichellia palustris* and *Ruppia maritima* var. *brevirostris* communities were not found in any other lagoon although the *Ruppia* variety may occur in the channels at Ballyteige. Based on aquatic flora, the site is rated as of **exceptional conservation value**.

Fauna

Eight stations were selected for faunal sampling in Inch Lough on 11-15/9/98 (Oliver 1999, Figure 87.2, Table 87.1).

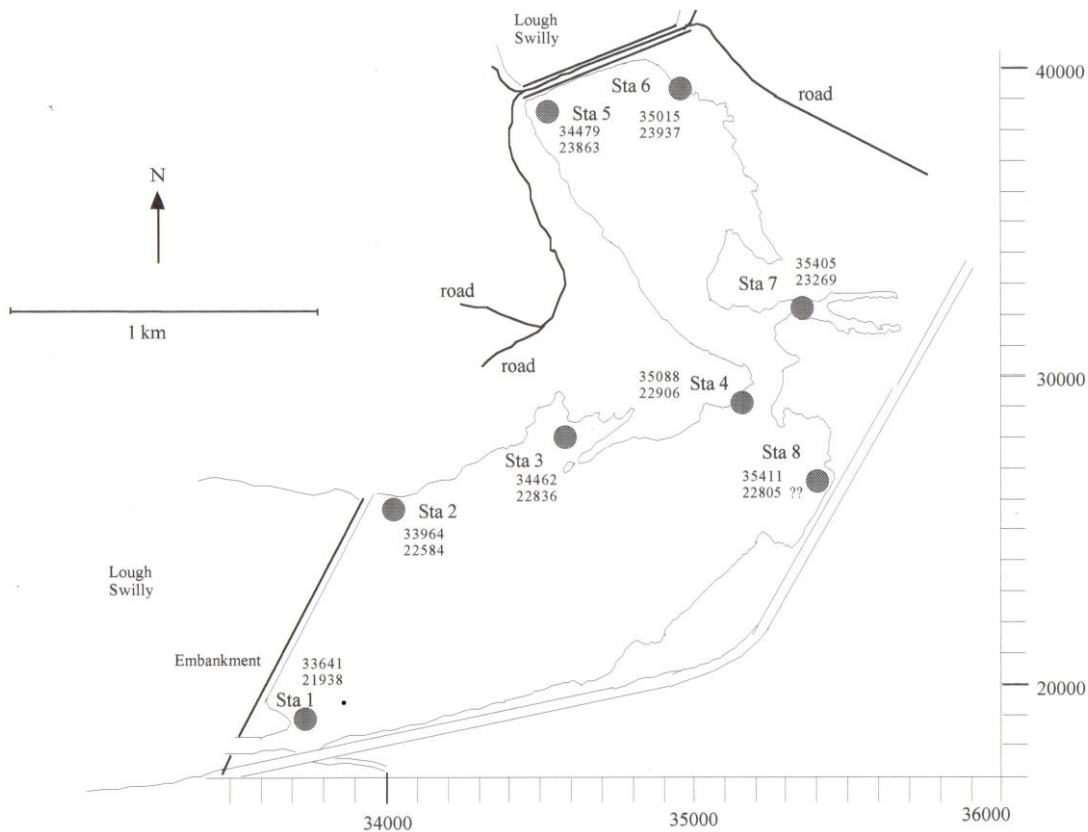


Figure 87.2 Stations used for faunal sampling at Inch Lough 11-15/9/98.

Table 83.1 Positions of faunal sampling stations in Inch Lough, 11-15/9/98 with salinity, depth of water and type of substratum.

	Sta 1	Sta 2	Sta 3	Sta 4	Sta 5	Sta 6	Sta 7	Sta 8
GPS position	C33641 21938	C33950 22650	C34462 22836	C35088 22906	C34479 23863	C35015 23937	C35405 23269	C35611 22865
Salinity(psu) at surface	1.0	2-5	1.6	0	0.1	0.3	0	0.1
Salinity(psu) at depth	21.2	17.5	5.1	0	0.2	0.3	0	0.1
Depth(cm)	0-200	0-150	0-120	0-75	0-100	20-75	30-75	0-100
Substratum	Stones, coarse sand, silt	Stones, gravel, marsh	Stones, mud, marsh	Stones, mud, marsh	Stones, fine silty sand	Silty sand, decaying algae	Mud, marsh	Stones, silty mud, marsh

A total of 51 taxa were recorded and 43 were identified to species of which four species are listed as lagoonal specialists in Britain and an additional two species are proposed lagoonal specialists in Ireland. Several species appear to be of particular interest:

Cordylophora caspia. Hydroid recorded at four lagoons in Donegal (Kincas L., Inch L., Durnesh L., Blanket Nook), on the North Slob, Co. Wexford, Rostellan, Co. Cork, Muckinish, Co. Clare and an unsurveyed site (Rinmore) in Co. Galway and previously at Lady's Island L. (Healy *et al.* 1982). According to Arndt (1984), the species "appears to be an excellent bio-indicator for eutrophic brackish water in the horohaline zone". Proposed as a lagoonal specialist for Ireland by Oliver and Healy (1998).

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).

Lekanesphaera hookeri is a common lagoonal isopod crustacean, found at 37 of the 87 lagoons surveyed (42.5%).

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.

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.

One other species of corixids, ***Sigara concinna***, is regarded as a lagoonal specialist in Britain, but is also found at inland sites in Ireland and therefore is not regarded as a lagoonal specialist in this country.

Although totally artificial, the aquatic fauna of Inch Lough is rich with a large number of limnetic insects but also at least six lagoonal specialists and some interesting species. Based on aquatic fauna, the site is rated as of **high conservation value**.

Table 87.2 Aquatic fauna recorded at stations in Inch Lough, Lough Swilly, Co. Donegal. 1998.

L.T. = light trap; F = Fyke net; + = present, o = occasional, c = common, a = abundant.

Species in bold text are lagoonal specialists or rare species.

Taxa	Stations															
	1	L.T. 1	2	L.T. 2	3	4	L.T. 4	5	L.T. 5	6	L.T. 6	7	L.T. 7	8	L.T.8	
Cnidaria <i>Cordylophora caspia</i>	(+)															
Turbellaria <i>Procerodes littoralis</i>			o									1				
Annelida <i>Lumbricillus</i> sp.			+													
Naididae indet.							?									
Tubificidae indet.																
Crustacea																
Copepoda											c500					
Mysidacea <i>Neomysis integer</i>								c	66							
Isopoda <i>Jaera nordmanni</i>	o															
<i>Lekanesphaera hookeri</i>	c	31	a	270	o	o	5	c	6					o	7	
Amphipoda	o	1	o	15		o	2	o	1			o				
<i>Corophium volutator</i>			p	1												
<i>Gammarus duebeni</i>	19	1	4	12		1	2	11	1			47		2		
Decapoda <i>Carcinus maenas</i>	F = 17															
<i>Crangon crangon</i>	a	7														
<i>Palaemonetes varians</i>	o		o		o											
Insecta																
Odonata <i>Ischnura elegans</i>								o								
Heteroptera Corixidae indet					+		8	a	c300	c	c250	c	16	c	30	
<i>Callicorixa praeusta</i>								c	3	o	1	o	1			
<i>C. wollastoni</i>										o	1					
<i>Corixa panzeri</i>								a	11	a	10	o	1	o	3	
<i>Gerris odontogaster</i>						o		o						+		
<i>Notonecta ?glaucum</i>												o		o		
<i>Sigara concinna</i>										o	1					
<i>S. dorsalis</i>										o	2	c	3			
<i>S. scotti</i>								c	5	c	5					
<i>S. stagnalis</i>						c	8	o	1	c	6	c	4	a	25	

Table 87.2 cont.. Aquatic fauna recorded at stations in Inch Lough, Lough Swilly, Co. Donegal. 1998.
 L.T. = light trap; F = Fyke net; + = present, o = occasional, c = common, a = abundant.
 Species in bold text are lagoonal specialists or rare species.

Taxa	Sampling Stations														
	1	L.T. 1	2	L.T. 2	3	4	L.T. 4	5	L.T. 5	6	L.T. 6	7	L.T. 7	8	L.T. 8
Coleoptera <i>Cercyon convexiusculus</i>								1							
<i>Haliphus wehnckeii</i>								1				1			
<i>Helophorus brevipalpis</i>	1					2									
<i>H. minutus</i>														2	
<i>H. obscurus</i>						3				1					
<i>Hygrotus impressopunctatus</i>													2		
<i>Hygrotus inaequalis</i>						1		3							
<i>H. novemlineatus</i>								1							
<i>Laccobius biguttatus</i>										3		1			
<i>Noterus clavicornis</i>								1							
<i>Ochthebius dilatatus</i>						10									
<i>Propylea quatuordecimpunctata</i>						1									
Diptera Chironomidae indet.			c									+		+	
Ephydriidae indet.			c												
Mollusca <i>Anisus leucostoma</i>								+				+			
<i>Aplexa hypnorum</i>			+									o		+	
<i>Lymnaea palustris</i>			+					+		+		o			
<i>L. peregra</i>	+					+	1	+		+		c		+	1
<i>Oxyloma pfeifferi</i>			o			+		+		o		+	2	+	
<i>Physa fontinalis</i>												+			
<i>Potamopyrgus antipodarum</i>	o		a	6	c			c		+		+		+	5
<i>Vertigo antivertigo</i>	+							+		+					
Bryozoa <i>Conopeum seurati</i>	+														
Pisces <i>Anguilla anguilla</i>	F = 9											F=4		F=8	
<i>Gasterosteus aculeatus</i>	c	5	a	17		a	70	c	48	c	16	a	47	a	465
<i>Pleuronectes flesus</i>	F = 35											F=6		F=7	
<i>Pomatoschistus microps</i>		6		6											
<i>Rutilus rutilus</i>															F=1
<i>Salmo trutta</i>												F=1			

Ecotonal coleoptera

Thirteen species of carabid and thirty-seven species of staphylinid were recorded at Inch Lough in 1998 (Good 1999, Good & Butler 1999), four of which (*Philonthus furcifer*, *Bembidion aeneum*, *Bembidion bipunctatum*, *Pelophila borealis*) are indicator species.

In particular, *Bembidion bipunctatum* is a halotolerant shore species and *Bembidion aeneum* is a stenotopic halobiont species. Based on ecotonal coleoptera, Inch Lough is regarded as of **significant conservation value**.

Summary

Although totally artificial, Inch Lough is one of the largest lagoonal habitats in the country. The aquatic flora includes the largest population in the country of *Chara canescens*, a Red Data Book species, which is a lagoonal specialist. The vegetation is rich compared with other lagoons and it is perhaps the best example of a low salinity lagoon in the country. *Zannichellia palustris* and *Ruppia maritima* var. *brevirostris* communities were not found in any other lagoon although the *Ruppia* variety may occur in the channels at Ballyteige. Based on aquatic flora, the site is rated as of **exceptional conservation value**. The aquatic fauna of Inch Lough is rich (51 taxa) with a large number of limnetic insects but also at least six lagoonal specialists and some interesting species. Based on aquatic fauna, the site is rated as of **high conservation value**. Overall conservation value is rated as exceptional due to the abundance of the rare charophyte, *Chara canescens*.

Overall Conservation Value = Exceptional

Conservation Status Assessment (from Oliver 2007)

Impacts	Eutrophication from surrounding farmland but significant tidal flushing.
Conservation Status	Unfavourable-Inadequate

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). Included in a biological classification of Irish coastal lagoons (Oliver 2005) and in the Conservation Status Assessment (Oliver 2007).

References:

- Arndt, E.A. 1984. The ecological niche of *Cordylophora caspia* (Pallas, 1771). *Limnologica*. (Berlin) **15**: 469-477.
- Bamber, R.N. 1997. Assessment of saline lagoons within Special Areas of Conservation. *English Nature Research Reports* No. 235.
- Barnes, R.S.K. 1989. Coastal lagoons of Britain: an overview and conservation appraisal. *Biological Conservation* **49**: 295-313.
- Barnes, R.S.K. 1994. *The brackish-water fauna of northwestern Europe: a guide to brackish-water habitats, ecology and macrofauna for field workers, naturalists and students*. Cambridge University Press. 287 pp.
- 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
- Hatch, P. & Healy, B. 1998. Aquatic vegetation of Irish coastal lagoons. *Bulletin of the Irish Biogeographical Society*. **21**: 2-21.

- 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. 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., Bates, R. & McGrath, D. 1982. Marine Fauna of Co. Wexford - 5. Lady's Island Lake. *Irish Naturalists' Journal* 20: 509-560.
- 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.
- Stewart, N.F. & Church, J.M. 1992. *Red Data Books of Britain and Ireland. Charophytes*. Joint Nature Conservation Committee and Office of Public Works, Dublin.
- Verhoeven, J. T.A. 1980. The ecology of *Ruppia*-dominated communities in Western Europe. II. Synecological classification. Structure and dynamics of the macroflora and macrofauna communities. *Aquatic Botany*, 8: 1-85.
- 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.