

NPWS

Ballyteige Burrow SAC
(site code: 696)

**Conservation objectives supporting document-
Coastal lagoons**

Version 1
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1. Introduction

1.1 Ballyteige Burrow SAC

Ballyteige Burrow SAC (site code 000696) is a small coastal/marine site on the south coast of Wexford between Kilmore Quay and Cullenstown. It extends into the estuarine area to the north of the dunes to an area known as the Cull.

The SAC is selected for 12 coastal and 2 marine habitats listed on 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, in the form of artificial channels, is listed for this SAC (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 Appendix 2 for an account of the site (from Oliver, 2007).

Code ¹	Name	County	Conservation Assessment
IL008	Ballyteige channels	Wexford	Unfavourable- inadequate

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 lagoons is 12.5ha (area is calculated from spatial data derived from Oliver (2007)).

3. Range

The known distribution of lagoon habitat in Ballyteige Burrow 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.

Seawater enters these artificial drainage channels by percolation through the dunes along the southern shore and also by leakage of the sluice on the Cull at high tide. It is also possible that seawater enters from the tidal river that runs from Duncormick to Bridgetown. A range of salinities from 34psu near seepage streams to freshwater can be found. See Roden and Oliver (2013) for further information on salinity classes and Appendix 2 for the lagoon report.

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.

Ballyteige channels is relatively shallow (less than 3m deep), 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.

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 lagoons and sea, including where necessary, appropriate management.

The channels are artificial; water is pumped westward into the Cull and south eastwards into the sea west of Kilmore Quay. See also 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

Ballyteige channels within the Ballyteige Burrow SAC have been identified as shallow, thus, it is expected that macrophytes extend down to their full depths.

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

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 this lagoon are summarised in Oliver (2007). Species considered to be lagoonal specialists include *Chaetomorpha* and *Ruppia maritima*. 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 this lagoon are summarised in Oliver (2007). 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 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.

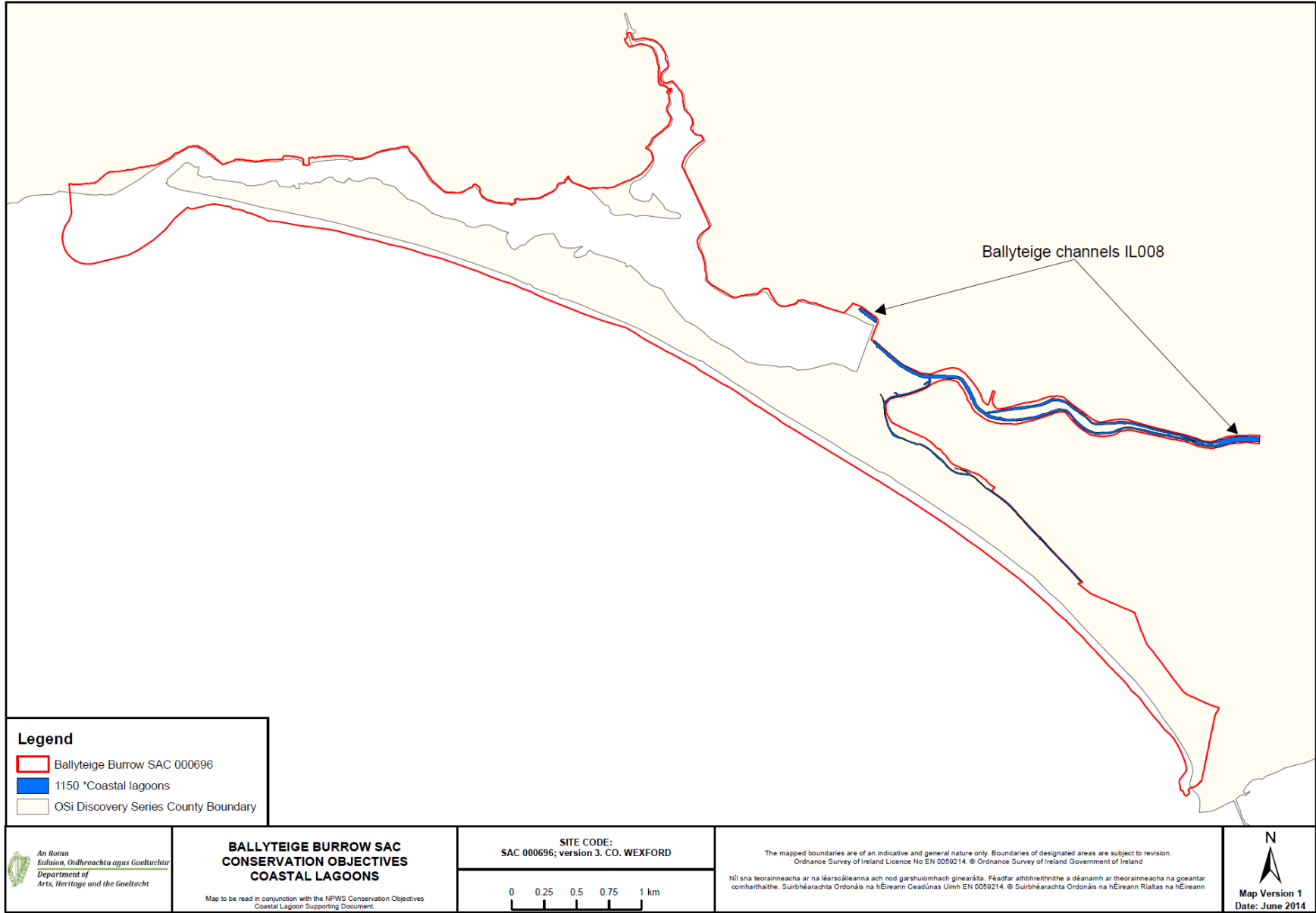
5. References

NPWS (2013) The Status of EU Protected Habitats and Species in Ireland. Habitat Assessments Volume 2. Version 1.0. Unpublished Report, National Parks and Wildlife Services, Department of Arts, Heritage and the Gaeltacht, Dublin.

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.

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 reports

The following are site accounts from Oliver (2007)

Code ¹	Name
IL008	Ballyteige channels

¹ Codes are those used in Oliver, 2007.



Conservation Designation: ???Ballyteige Burrow pNHA 000696,
proposed extension to SPA 4020 ???

General description:

Ballyteige drainage channels are situated on the south coast of Wexford, 1 km to the west of Kilmore Quay. The drainage channels are artificial and were excavated to drain a lagoon and saltmarsh which were isolated behind an extensive dune system to the south and a sea wall to the west, constructed across the Cull Inlet in the mid 19th Century. Seawater enters by percolation through the dunes along the southern shore and apparently by leakage of the sluice on the Cull at high tide. It is also possible that seawater enters from the tidal river that runs from Duncormick to Bridgetown. Area of water about 5 ha., length of channels 3.2 km., maximum depth 3m.

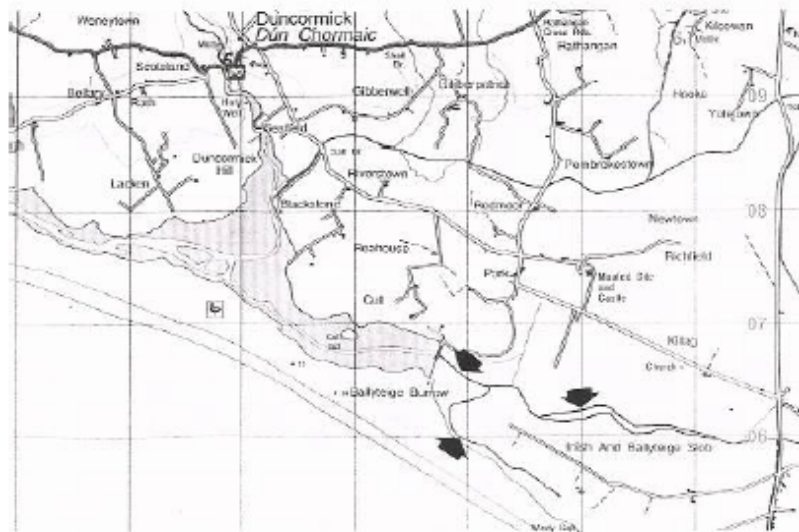


Figure 8.1 Location of map of Ballyteige channels.

Ballyteige drainage channels were 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

The vegetation of Ballyteige channels was surveyed by C. Roden in 1998. A total of 11 taxa were recorded, including two lagoonal specialists. A rare charophyte, *Chara canescens*, was recorded here previously but was not found on this occasion.

Floral taxa recorded by Roden in 1998:

Chaetomorpha linum
Enteromorpha intestinalis
Enteromorpha ralfsii
Vaucheria sp.
Myriophyllum spicatum
Phragmites australis
Potamogeton pectinatus
Ranunculus baudotii
Ruppia maritima

The *Ruppia* occurred in a form approaching the *brevirostris* variety (Preston 1995).

Enteromorpha ralfsii was only provisionally identified.

Scirpus maritimus and *Schoenoplectus* were recorded by Oliver (1999).

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 (*R. maritima* at 41, *R. cirrhosa* at 22 sites).

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.

None of the other plants recorded are of any special interest.

Fauna

Five stations were selected for faunal sampling in 1998 (Table 8.1, Figure 8.2). A total of 61 faunal taxa were recorded in 1998 together with some additional records from 1996, of which 50 were identified to species.

Eight of these species are listed as lagoonal specialists in Britain (although one is a record from 1991) and a further 2 species (*Notonecta viridis* and *Plea leachi*) are proposed as lagoonal specialists in Ireland. The former was not identified positively during this survey but was previously recorded by Galvin (1992) at this site and it is assumed that both records are of the same species.

Table 8.1 Positions of sampling stations in Ballyteige channels, with sampling date, salinity, depth of water and type of substratum.

	Station 1	Station 2	Station 3	Station 4	Station 5
GPS position	S 93772 06894	S 93772 06703	S 93883 06019	S 94754 05631	S 96785 06003
Sampling dates	5-7/10/96	5-7/10/96	5-7/10/96	5-7/10/96	5-7/10/96
Salinity (psu)	0 (4)	28.4	18-31	0.2	7.4-27.7
Depth (cm)	0-100	0-300	0-50	0-100	0-100
Substratum	Deep organic silt	Sand, silt, occasional stones	Anoxic silty sand	gravel.	Deep organic silt

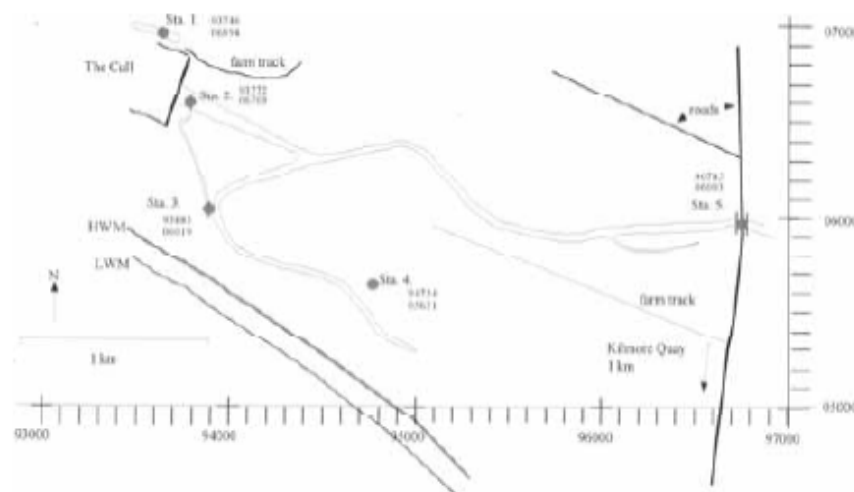


Figure 8.2 Sampling stations Ballyteige channels

The taxa recorded show a wide range of ecological groups from marine to limnetic reflecting the varied habitats of the area which ranged from very low to high salinities and from gravel to soft sandy substrates. This site really is a complex of lagoonal habitats.

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.

Notonecta viridis Hemipteran insect (back-swimmer) recorded on the east coast at Kilcoole, on the south coast at North Slob, Lady's Island L., Tacumshin L., Ballyteige, Clogheen/White's Marsh and Kilkeran L. and also on the west coast at Reenydonegan, Co. Cork and L. Donnell, Co. Clare. A rare brackish water species in Ireland.

Table 8.2 Faunal taxa recorded at stations in Ballyteige channels on 5-7/10/98.

L.T. = Light trap, r = rare, o = occasional, c = common, a = abundant. Species in bold text are lagoonal specialists or rare species.

Taxa		Stations									
		1	2	L.T. 2	3	L.T. 3	4	5	L.T. 5		
Nemertea					a						
Annelida	Polychaeta				a						
					a						
					a						
			a		c						
					a						
	Oligochaeta				+						
					o						
					o						
					a						
Crustacea	Ostracoda	a									
	Copepoda	a									
	Mysidacea		1								
								o			
	Isopoda		c	2				a	35		
	Amphipoda		+								
			+								
		+	a					+	1		
			+								
	Decapoda		+								
			o								
			o	1				o			
Acarina		c									
Insecta	Ephemeroptera	1									
	Odonata	a	+	1			+				
	Trichoptera	o									
	Heteroptera	1									
		a									
		2									
		o									
		3									
		o									
		c						o			
		a									
		c									
		1									
		a						c	c.40		
	Coleoptera	9	2				2				
		(c)									
		c									
		(4)									
			2								
		(1)									
		2									
		4									
		2									
								1			
								1			
	Diptera	a									
Mollusca	Prosobranchia		+	1							
			+								
			+								
		(a)	o					o			
	Pulmonata	c									
		c						c			
	Bivalvia	1			+						
Echinodermata					c	4					
					c						
Bryozoa			+								
Pisces					1						
		c	a	25	c	6		a	113		
			a	12	a	3					

According to Southwood and Leston (1959), it was recorded only for Wexford and North Kerry. Recorded previously in Lady's Island L (Healy *et al.* 1982) in Lady's Island L. and the North Slob by Galvin (1992) and from the Dingle Peninsula by McCarthy and Walton (1980). *N. viridis* is found at inland sites in the U.K. but appears to be largely restricted to lagoons in Ireland, and was proposed as a lagoonal specialist for Ireland by Oliver and Healy (1998).

Plea leachi has been recorded ALSO from Tacumshin and The North Slob (Co. Wexford) and from Kilcoole (Co. Wicklow) and curiously from two sites in Galway (Dorus Lakes, Loch an Chaorain). Recorded previously from Tacumshin and Ballyteige (Galvin 1992). Otherwise appears to be rare, but is small and could be overlooked. Halbert (1935) recorded it from L. Gill (Co. Kerry) and described it as widespread, but local, usually "in stagnant water near the coast". Proposed as a lagoonal specialist for Ireland.

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

Agabus conspersus Water-beetle listed by Barnes (1989) and Bamber (1997) as a lagoonal specialist in the U.K. but is no longer regarded as such. This species remains on the proposed list of Irish lagoonal specialists until more is known of its status and ecology in Ireland. Identified from samples collected at Ballyteige and the North Slob by Galvin in 1991 and previously recorded in Lady's Island L. by Healy (1997). One specimen was taken at an unsurveyed site near Garretstown, Co. Cork in 1998. This brackish water species appears to have become rare and there are only two other recent Irish records: from a salt marsh in Co. Meath, and at Dundalk harbour, Co. Louth (Nelson *et al.* 1997).

Enochrus bicolor Water-beetle recorded at 12 lagoons of the 87 surveyed, from the southern half of the country from Co. Wicklow to Connemara including the Aran Islands. There are only two recent records from N. Ireland (Nelson *et al.* 1998).

Megasternum obscurum Water-beetle recorded at Ballyteige, Co. Wexford, and L. an Chara and L. an tSaile, Co. Galway and at Furnace L., Co. Mayo, but is otherwise described as rather rare in Ireland (Foster *et al.* 1992).

Rhantus frontalis is described as somewhat rare and local in Ireland (Foster *et al.*, 1992).

Rhantus suturalis Water beetle recorded only from Tacumshin and Ballyteige, Co. Wexford. Apparently a southern species which occurs in Ireland only sporadically (Foster 1981).

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.

In general, the other species recorded are not particularly unusual except for the community of *Amphipholis squamata*, *Leptosynapta inhaerens* and the dense population of annelids in the seepage area at Sta. 3.

The aquatic fauna is surprisingly rich with a large number of lagoonal specialists and based on this fauna, the site is rated as of **high conservation value**.

Ecotonal coleoptera

In total, eight species of carabid and twenty one species of staphylinids were recorded in 1998 (Good, 1998, Good & Butler 2000), none of which are regarded as indicator species. Based on ecotonal coleoptera, the site is therefore rated as of **no conservation value**.

Summary

The channels are totally artificial but are the remnants of a previously extensive lagoonal system lying behind a sedimentary barrier. The flora is not particularly interesting but two species are lagoonal specialists, and a rare charophyte, *Chara canescens* was recorded in 1991. The fauna is more interesting and diverse with 61 taxa recorded, including 10 lagoonal specialists and several rare species. One of the greatest interests in the area is the potential for restoration and creation of lagoonal habitats. Overall conservation value is rated as moderate.

Overall Conservation Value = Moderate

Conservation Status Assessment (from Oliver 2007)

Impacts	Moderate eutrophication from surrounding farmland. Poaching by cattle
Conservation Status	Unfavourable- Inadequate

Further Information

Fauna was surveyed by Galvin (1992). 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:

- Bamber, R.N. 1997. Assessment of saline lagoons within Special Areas of Conservation. *English Nature Research Reports* No. 235.
- 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.
- Foster, G.N. 1981. Atlas of British water beetles: preliminary edition. Part 1. *Balfour-Browne Club Newsletter* 22.
- Foster, G.N., Nelson, B.H., Bilton, D.T., Lott, D.A., Merritt, R., Weyl, R.S. & Eyre, M.D. 1992. A classification and evaluation of Irish water beetle assemblages. *Aquatic Conservation: Marine and Freshwater Ecosystems*, 2: 185-208.
- Galvin, P. 1992. *The ecology of the brackish-water lagoons of Wexford and east Cork*. MSc thesis, University College, Dublin.
- 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.
- 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.
- McCarthy, T.K. & Walton, G.A. 1980. *Sigara selecta* (Fieb.) (Heteroptera: Corixidae) new to Ireland, with notes on water bugs recorded from the Dingle Peninsula. *Irish Naturalists' Journal* 20: 64-6.
- Nelson, B., Foster, G., Weyl, R. & Anderson, R. 1998. The distribution of aquatic Coleoptera in Northern Ireland. Part 2: Families Hydraenidae, Helophoridae, Hydrochidae, Hydrophilidae, Elmidae and Dryopidae. *Bulletin of the Irish Biogeographical Society*. 22: 128-193.
- Nelson, B., Foster, G., Weyl, R. & Anderson, R. 1997. The distribution of aquatic Coleoptera in Northern Ireland. Part 1: Families Haliplidae, Hygrobiidae, Noteridae, Dytiscidae, and Gyrinidae. *Bulletin of the Irish Biogeographical Society*. 20: 179-296.
- 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.
- Roden, C. 1999. *Irish coastal lagoon survey, 1998. Vol. III, Flora*. Dúchas, 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.
- Preston, C.D. 1995. *Pondweeds of Great Britain and Ireland*. B.S.B.I. Handbook No. 8. London. 352 pp.
- Roden, C. 1999. *Irish coastal lagoon survey, 1998. Vol. III, Flora*. Dúchas, Dublin.
- Southwood, T.R.E. & Leston, D. 1959. *Land and water bugs of the British Isles*. Wayside and Woodland Series. Warne & Co. London. 436 pp.
- 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.