# The biodiversity of saline lagoons in Scotland

Katherine Whyte<sup>1,2</sup>, Fiona Ware<sup>1</sup> and Sankurie Pye<sup>1</sup>

## Introduction

Saline lagoons are coastal water bodies that have a restricted connection to the sea. This habitat is neither fully freshwater nor fully saline, but brackish. Salinity is highly variable both between lagoons and within individual lagoons over time, giving rise to unique biological communities.

Saline lagoons are recognised under the UK's Biodiversity Action Plan and are considered a Priority Habitat ('in danger of disappearance') under Annex I of the European Habitats Directive. In Scotland, internationally important examples of this habitat type occur but data on lagoon biota is currently not sufficient to implement a monitoring strategy. In particular, taxonomic confusion within a number of phyla has led to doubts in some existing species records.

#### Aims:

- To determine the extent and condition of saline lagoon habitat in Scotland.
- · To assess the diversity and distribution of lagoon flora and fauna at sites across Scotland.
- To establish a voucher specimen collection which will be available to conservation bodies and future researchers.





Acknowledgements: We thank Scottish Natural Heritage for commissioning our previous work on the Uists. We are also grateful to everyone who has contributed to fieldwork, photography, specimen processing and identification over the years







National Museums

National Museums Scotland's collection of marine invertebrates is one of the largest collections of its kind in the UK and contains nearly four million specimens. NMS guarantees to care for the material in perpetuity and to make it accessible to researchers through the NMS loans scheme.

Please contact us if you would like information about donating to the National Collections, visiting the National Museums Collection Centre or our research loans service.

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All of nature for all of Scotland

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### North and South Uist



September 2012 survey<sup>(1)</sup>: 23 lagoons 243 taxa recorded

- 587 zoological specimens collected
- 262 botanical specimens collected

September 2016 survey: 98 lagoons

#### Isle of Skye



June 2015 survey: 3 lagoons



Our current work involves surveys of saline lagoon biota in a variety of locations across Scotland, as well as the processing and identification of collected samples.



May 2016 survey: 8 lagoons

**Firth of Forth** 



Ongoing surveys (2015, 2016): 3 lagoons





### **Collection of voucher specimens**

Permanent collections of geo-referenced zoological and botanical specimens are incorporated into the collections of National Museums Scotland and the Royal Botanic Garden Edinburgh.

#### References

Howson, C.M., Chambers, S.J., Pye, S.E. and Ware, F.J., 2014. Uist Lagoons Survey. Scottish Natural Heritage Commissioned Report No. 787

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References

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3.

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### Isopods

**Plants** 

tasselweed

cirrhosa.

Taxonomic confusion between juvenile Idotea baltica and the lagoon specialist Idotea chelipes has led to doubts in previous records where a historical specimen is not available.

Idotea chelipes can be reliably identified by the aesthetasc series on the antennules<sup>(2)</sup>

Scotland's saline lagoons

provide important habitat

for rare and endangered

charophytes<sup>(4)</sup>, as well as

the brackish water spiral

Ruppia



# **Lagoon Specialists**

The invertebrates and plants which thrive within saline lagoons include marine species that are tolerant of low salinity, freshwater species that are tolerant of high salinity, and highly-adapted lagoon specialists. There are thought to be several lagoon specialist species in Scotland and these are a priority for conservation as they are rarely found outside of the lagoon environment.

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Martin, A., Carvalho, L. and Downie, A.J., 2002. Rare charophytes in Scotland's coastal saline

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glaucum from Cardium edule. Ophelia, 17(2): 207-214.



Hydrobia acuta neglecta

## Hydrobiidae

Shell form is often used to differentiate between hydrobiids but this is not reliable. alwavs Other morphological features such as tentacle pigmentation and penis shape have been found to be more useful.

Previous work at NMS<sup>(3)</sup> used aenetic analysis of hvdrobiidae to confirm these visual characteristics.

## Cerastoderma

Morphological similarities<sup>(5)</sup> between the lagoon cockle Cerastoderma glaucum and the common cockle Cerastoderma edule has led to uncertainties in the true distribution of this lagoon specialist.





#### Cerastoderma glaucum



Ruppia cirrhosa

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