for birds
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Saline lagoons

Saline lagoons are coastal water bodies that contain a mixture of seawater and freshwater. They are partially, or completely, separated from the sea by sandbanks, shingle, rocks, rocky outcrops or artificial sea defences.

Saline lagoons can be tidal or non-tidal, but all retain a significant proportion of their water even on the lowest tide. The water in the lagoon can be brackish, fully saline or hyper-saline.

Lagoons in rocky coast areas, particularly in Scotland, tend to be larger, deeper and more permanent than those in soft coast areas. Long-term geological processes, including erosion by glaciers and the sea, created rocky coast lagoons. The lagoons have sills along the seaward edge of the basin that prevents the water from leaving at low tide. Large rocky coast lagoons include the 860 ha Loch of Stenness (Orkney) and 850 ha Loch Bee (South Uist).

Lagoons in sandy, muddy or shingly habitats are usually smaller, typically between five and 30ha, and more temporary than those in rocky areas. The largest UK soft coast lagoon is The Fleet (Dorset), which has an area of 480 ha. In natural conditions, saline lagoons are created in soft coast areas by the natural movements of the coastal sediments. The tide and longshore drift washes sand or shingle across the opening of an inlet, bay or estuary, partly isolating it from the sea. Alternatively, coastal erosion can breach a barrier between the sea and a river or lake, creating a basin in which sea and freshwater can mix.

Lagoons support about thirty-two species of plants, invertebrates and birds that would not survive in the UK without saline lagoons. Because lagoons are rare, many of the species in lagoons are also rare. There are at least 23 Red Data Book species in lagoons. Because the number of lagoons has declined, and several current lagoons are deteriorating or threatened, 14 species occurring in lagoons are listed as Priority species in the UK Biodiversity Action Plan (BAP).

The largest English lagoon, The Fleet, supports more than 1% of the north-western European wigeon population (7,000 birds); internationally important numbers of the dark-bellied brent goose; the largest British mute swan population; and 5% of British little terns (nesting on the beach next to the lagoon). RSPB Hodbarrow nature reserve has a slightly brackish lagoon which has supported 299 wintering red-breasted merganser representing 3% of the UK population.

Islands in non-tidal saline lagoons are an important nesting habitat for the Sandwich tern (at least 4% of UK population), the little tern (at least 3% of the UK population) and the common tern (at least 2% of the UK population). Of these, sandwich tern is of global conservation concern with its population concentrated in Europe where it is declining, while the little tern is declining in the UK.

The avocet is a saline lagoon specialist. Between 80% and 90% of the UK population and c 1.5% of the European population breed on saline lagoons in the UK. In some years, at least

25% of the UK Mediterranean gull population have nested on saline lagoons, while all UK spoonbill breeding has been associated with saline lagoons.

Concerns

It is estimated that some 30 to 40 saline lagoons were lost in England in the 1980s. With lagoons still being lost, if the habitat and species that they support are to be maintained, an estimated 60 ha per decade need to be created to offset current losses.

The natural processes that create saline lagoons in soft coast areas are in decline. Such areas are increasingly intensively managed using hard sea defences to prevent coastal flooding. The accumulation of sediments along the coast depends on a delicate balance between sea-level rise and sediment supply. The deposition of sediments occurs where the supply slightly exceeds the rate of sea level rise. Erosion would occur where sea-level rise exceeded the supply of sediments. The use of extensive hard defences around the coast prevents the erosion of cliffs that supply the sediment needed to create saline lagoons and prevents the roll back of the beach that could also create saline lagoons. The trapping of a habitat between rising sea levels and hard sea defences is known as 'coastal squeeze'.

The coast is dynamic and the future of many lagoons in soft coast areas is dependent on our management of the coastline. The management of lagoons cannot be considered separately from issues of coastal sustainability. The UK has Shoreline Management Plans that oversee coastal defence work and these should consider and place appropriate priority on the maintenance of existing lagoons and their area. Careful management of the coastline can result in an increase rather than a decrease in the number of saline lagoons.

The water supply and salinity of a lagoon are critical to both its existence and the well-being of the species reliant on the lagoon. Changes in this water regime can be very damaging to lagoons, particularly when they result in the lagoon becoming completely tidal or fresh. Perhaps the commonest cause of damage to saline lagoons occurs when sea defences are improved or renovated. In several cases the supply of seawater to the lagoon has been cut off, or the capacity of sluices to remove excess freshwater reduced, and as a result, the quality of the fauna in the lagoon has declined.

Both abstraction and discharge by humans have the potential to negatively affect lagoons. Abstraction can draw down water levels while a discharge of freshwater will reduce the salinity of a lagoon. Discharges and runoff can contain pollutants that damage communities in saline lagoons. These concerns are particularly great in Scottish lagoons where there are inputs of chemicals and nutrients from salmon farms.

In addition, lagoons are vulnerable to destruction or reduction by developments. Wildlife legislation has largely put a stop to the approval of inappropriate development proposals that affect the specific lagoons protected under the legislation.

Islands in lagoons provide an important habitat for nesting terns and, most significantly, the avocet. These species are all vulnerable to egg and chick predation. Breeding success of avocets and terns can decline due to increases in predation and associated disturbance.

The nature conservation importance of saline lagoons has been recognised by their designation as a priority habitat in the EU Habitats Directive 1992. Lagoons occur in several proposed Special Areas of Conservation and Special Protection Areas that will be protected under the UK Conservation (Natural Habitats & c) Regulations 1994. A high proportion of the

saline lagoon resource has been notified as Sites of Special Scientific Interest under the Wildlife and Countryside Act 1981. However, some lagoons, notably Widewater Lagoon in Sussex and a number of lagoons in Scotland, are not in designated nature conservation areas and are therefore considerably more vulnerable to development or inappropriate management.

Distribution

Saline lagoons are one of the rarest habitats in the UK, and shingle impounded lagoons are internationally rare. There are only about 360 saline lagoons in the UK and these occupy a total area of no more than 5,200 hectares. Lagoons can be clustered together on particular stretches of coast, such as in the Shetland Islands, Solent or on the Suffolk Coast, because of the local geology or coastal sediment dynamics.

The RSPB manages 360 ha of saline lagoons (about a quarter of the total resource in England) and 14 of the lagoon specialist species, including four that are BAP priorities (the starlet sea anemone, the lagoon sand shrimp, the lagoon sea slug and Baltic stonewort). Many RSPB lagoons are important for their bird interest, particularly avocets and terns. Nature reserves where saline lagoons are a key habitat include: Tetney Marshes, Lincolnshire; Blacktoft Sands, Yorkshire; Titchwell and Snettisham, Norfolk; Minsmere and Dingle Marshes, Suffolk; Old Hall Marshes' Essex; Elmley and Northward Hill, Kent; Hodbarrow, Cumbria; and the Hayle Estuary, Cornwall.

Management

Lagoons occupy the transition zone between the land and the sea. They have always been vulnerable to changes that upset the balance between the two habitats. The decline in the availability of sediments since the last Ice Age and the management of the coastline for flood defence has seen a great reduction in the numbers and extent of saline lagoons. During this period, there has been relatively little direct use of lagoons by humans. Between 1750 and 1900, and probably earlier than this, lagoons in the Solent area were used as saltpans for the commercial production of salt. Other sites have been variously managed as moats, boating lakes and flight ponds. In other instances, mineral abstraction has created new saline lagoons. The nature conservation management of saline lagoons was initially focused on conserving bird populations, typified by the avocet at Havergate Island, Suffolk. Increasingly, the international importance of the invertebrates and plants in saline lagoons has become understood and management for these groups is being developed.

Saline lagoons are varied in nature and setting the correct management objectives for each lagoon or potential lagoon is very important. Having done this, the necessary salinity, water levels, size, shape and protection from disturbance can be determined and management or creation commenced.

Two EU LIFE Nature projects are presently underway that will help to determine best practice management and creation on lagoons. The English Nature, Environment Agency and Centre for Coastal and Marine Sciences 'Living with the Sea' project is intended to provide a framework for making decisions about the management of threatened coastal habitats, including lagoons, at a coast level. The RSPB-led 'Conserving saline lagoons and their birds on ten Natura 2000 sites in England' project is managing over 30 lagoons with a wide range of nature conservation interest. One of the outcomes of this project will be a 'Saline Lagoon Management Handbook' produced in association with the Saline Lagoon Working Group, incorporating the lessons learnt from the management carried out.

Conservation

Saline lagoons are a priority habitat for the UK Biodiversity Group. The objectives of the UK Biodiversity Action Plan (BAP) for saline lagoons are to:

1. To maintain and enhance the 5,200 ha of currently known saline lagoon habitats in the UK
2. Create 120 ha of new saline lagoons by 2010.

The steering group of Government conservation agencies, conservation charities and experts overseeing the delivery of the BAP is the Saline Lagoon Working Group. English Nature chairs the group and the RSPB is represented.

Key RSPB activities for this habitat are:

- to press for legislative measures that will ensure effective protection and management of saline lagoons against threats such as sea-level rise, coastal protection, development and drainage
- to continue to improve knowledge of saline lagoon ecology and the habitat requirements of specialist species, particularly the avocet
- to encourage and undertake saline lagoon restoration and create new saline lagoons, as a contribution to the UK BAP objectives
- to continue to share and spread information on saline lagoon management using examples from our experience on our nature reserves, and in the RSPB-led EU LIFE project on saline lagoons, together with other management advice materials, including the development of a Saline Lagoon Management Handbook
- to continue to manage saline lagoons on RSPB nature reserves to benefit the specialist, declining, BAP and rare species and populations present
- to promote greater appreciation of the conservation value of saline lagoons in the UK

The continuing sea-level rise and the reduction in shingle supply makes gradual erosion with rollover and retreat seems inevitable. The question is whether we can manage this change in a controlled and calculated manner that will leave ecologically important lagoons for future generations.

Studies

Long term monitoring of salinity, bird numbers, water levels, invertebrate biomass, the abundance of specialist plants and invertebrates on lagoons on RSPB reserves is providing information on the long-term results of lagoon management. Experimental manipulation of the consistency and organic matter content of the lagoon sediments to provide food for wader populations is being undertaken on the Suffolk Coast.

How to help

There are very few people studying the ecology of saline lagoons or who understand the requirements of the rare and specialised species living in saline lagoons. Undertaking a research project investigating the ecology of saline lagoons or observing the behaviour and distribution of the species and then disseminating the results would help people to conserve saline lagoons.

There is a wide range of voluntary jobs on RSPB reserves throughout the UK. For information about these, please see our RSPB Vacancies pages.

Copies of the Voluntary Wardening Scheme Information Pack are available from the Youth and Volunteers Department, RSPB, The Lodge, Sandy, Bedfordshire, SG19 2DL.

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