What are Saline Lagoons?

Natural saline lagoons are areas of typically (but not exclusively) shallow coastal saline water, wholly or partially separated from the sea by sandbanks, shingle rock or other barrier such as hard substrata. They retain some sea water at low tide and vary in salinity from slightly saltier than fresh water (brackish) to saltier than sea water (hyper-saline). Sea water exchange can occur through a natural or artificial channel or by percolation either through or over the barrier. More diffuse freshwater inputs (e.g. percolation, groundwater seepage) can affect the lagoon's salinity. Lagoons that are highly modified or are of artificial origin, such as those that occur behind a seawall, can still provide a similar habitat to that of natural lagoons, with a comparable range of specialised species.

The Solent's lagoons, include some based on percolation, plus isolated and sluiced lagoons. Key ones are located in the marshes in the Keyhaven to Pennington area, behind the sea wall at Bembridge Harbour on the Isle of Wight and at Gilkicker, near Gosport. Since medieval times many of the Solent's lagoons were used as saltpans for the commercial production of salt. In contrast, Normandy Lagoon at Lymington was created as a borrow pit for the sea wall construction in 1990, and has been readily colonised by several lagoonal specialists.

The lagoons in the Keyhaven to Pennington marshes are part of a network of ditches and ponds within the coastal grazing marsh behind a sea wall. Gilkicker Lagoon is a sluiced lagoon with marked seasonal salinity fluctuation and supports a diverse range of species. Most of the lagoons in Chichester Harbour are former mill ponds, though the largest, Thorney Deeps, is an impounded former saltmarsh channel. The lagoons at Bembridge Harbour have formed in a depression behind the sea wall and sea water enters by percolation.

Species Supported

The Solent's lagoons show a range of salinities and substrates, ranging from soft mud to muddy sand with a high proportion of shingle. They support nationally scarce invertebrate fauna including large populations of the lagoon sand shrimp and starlet sea anemone. Other important species include the nationally rare foxtail stonewort, an aquatic plant. The Brading saline lagoon complex is home to a nationally rare water beetle.

In addition, the habitat is important for birds, especially waders, wildfowl and seabirds. Locally breeding ringed plover use the shallows and margins for feeding and a wide variety of migrating waders also feed in the invertebrate rich margins and shallows. Deeper lagoons also support dabbling and diving ducks in winter and on migration and gulls use them as roosting sites. In hard weather and during storms, sea ducks, grebes and divers may also use lagoons for shelter.

The Value of Saline Lagoons in the Solent

Lagoons are an integral component of a landscape which provides social and economic benefits to the local community. They are often visited by birdwatchers due to the bird species they attract and walkers, joggers and cyclists of all ages come to appreciate their special beauty. There are direct health benefits for people participating in active recreation and the visitors generate income for local businesses.

Did you know?

- There are thirty six hectares of lagoons in the Solent and Isle of Wight Lagoons Special Area of Conservation.

- Since medieval times, many of the Solent's lagoons were used as salt pans for the commercial production of salt.

Where can Saline Lagoons be found in the Solent?

Hampshire	Isle of Wight	West Sussex
Keyhaven to Lymington	Bembridge Harbour	Birdham Pool
Gilkicker	Yar Estuary	Slipper Mill Pond, Emsworth
Chichester Harbour (see West Sussex)	Newtown	Peter Pond, Emsworth
	Seaview Duver	Thorney Great Deep

Lymington - Keyhaven Nature Reserve
The eighteen hectares of lagoons at the Lymington to Keyhaven Nature Reserve support a diverse and highly specialised fauna and flora, including rare specialist lagoonal species and are, thus, nationally important. The lagoons also support nationally important breeding populations of little terns.

The lagoons were at risk from changes to their hydrology and salinity levels caused by nearby gravel extraction. The freshwater input into the lagoons has now been tackled and salinities have increased with recent colonisation of the rare foxtail stonewort into Keyhaven Lagoon. Mammalian predation threatens productivity of ground nesting birds (including little terns).

Conservation Designations

Saline lagoons are considered a priority habitat type under Annex 1 of the EC Habitats and Species Directive because of their high nature conservation importance. The Solent is one of the most important areas for lagoons in the UK. The thirty-six hectares of lagoons that are of particularly high value lie within the Solent and Isle of Wight Lagoons Special Area of Conservation. In addition, all the lagoons are designated as Sites of Special Scientific Interest and the majority form part of the Solent and Southampton Water Special Protection Area and Ramsar site. In some cases they are also Local Nature Reserves.

Issues, Threats and Opportunities

Saline lagoons are a rare and highly transient habitat. They are habitats of unstable locations, subject to catastrophic loss and creation and the species that use them must be adapted to this reality. This makes them particularly suited to making use of new sites, so long as we make the effort to provide them.

Coastal squeeze - if there is development on the landward side of the lagoon sea level rise will accelerate infilling as there is no room for landward regression.
Severe storms - lagoons may be destroyed by severe storms breaching the natural or artificial barriers and creating a bay.
Pollution - the evidence base for the impact of pollution is limited and inconclusive, but it is thought that nutrient enrichment leading to eutrophication could have detrimental effects. This may result from direct inputs to the lagoon or from the water supply to it.
The artificial control of water - the control of water (sea and fresh) to lagoons can have profound influences on the habitat. This was seen at Keyhaven to Pennington where increasing flows of fresh water, caused by nearby gravel extraction, caused salinity levels to fall.
Coastal defence works - defence works can prevent the movement of sediments along the shore and lead to a gradual loss of the natural coastal structures within which the lagoon is located. They can also reduce or prevent the percolation and movement of sea water in and out of lagoons. The impact of coastal defences will be exacerbated by the effects of sea level rise.
New habitat creation - sea level rise may present opportunities for creation of new lagoonal habitat where seawater inundates freshwater areas, including sites that were once coastal lagoons. In addition, coastal setback in response to coastal squeeze could provide important opportunities for the creation of new lagoonal habitats. There is potential to create a saline lagoon, or more importantly a range of mixed salinity features, at Farlington.
Artificially created habitat - saline lagoons can be created artificially by making a 'scrape' with a connection to a salt water source. New lagoons can be created in an area to compensate for the artificial and natural losses that are occurring and it is important to

identify areas where this is possible. A significant contribution to the conservation of lagoonal species could be derived from temporary sites with a life span of a few decades.
Water abstraction - can reduce the level of water in lagoons to the point where it adversely affects lagoonal ecology and species.
Increasing public awareness and appreciation - for example through interpretation boards and the involvement of local people in managing them. This should help to conserve them for the future and minimise the impact of recreational activities on plant life and feeding and roosting birds.