

Habitats Directive

Humber Estuary

What's happening?

Laws have been introduced under the Habitats Directive to safeguard Europe's most endangered plants, animals and habitats.

As part of this, the Environment Agency has to review all the existing consents that we regulate to ensure there are no adverse effects on the nature conservation interests of designated sites such as Special Areas of Conservation (SAC) and Special Protection Areas (SPA).

We are using a staged approach to do this:

- Stages One and Two – listed all consents and looked at those with the potential to have a significant effect.
- Stage Three – looked in detail at whether they have an adverse affect on special sites;
- Stage Four - those consents with no adverse affect will stand, those that do have been examined further to see what can be done about it.

Location



About this site

The Humber Estuary is one of the largest estuaries in the UK, draining over a fifth of England. It supports an impressive array of wildlife and natural habitats. It is designated as a SPA and candidate SAC due to:

- coastal lagoons
- Atlantic salt meadows
- intertidal and subtidal areas (mudflats, sandflats and sandbanks)
- sand dunes
- grey seals
- river lamprey and sea lamprey
- migrating and wintering birds
- breeding populations of bittern, marsh harrier, avocet and little tern.



Lamprey



Lamprey are quite distinct. They are eel-like in shape, but have no lower jaws. Instead the mouth is surrounded by a round, sucker-like disc. They feed by attaching themselves to the sides of other fish and rasp away at the skin to the body fluids and muscle beneath.

They are very special as they are the most primitive of all living vertebrates - there are fossils from 450 million years ago.

Two species of lamprey are present in the Humber system. These are known as river lamprey and sea lamprey.

Lamprey entrainment and impingement

The lamprey lifecycle involves the migration of adults upstream through the estuary to reach spawning areas - normally gravelly stretches of running water. After hatching, the young larvae move downstream to areas of sandy silt in still water where they burrow and spend the next few years. Several years later the larvae emerge as young adults (transformers) and migrate downstream to the estuary - at this stage they are about the size of a pencil. After a number of years, they return upstream to spawn. Large abstractions can trap fish usually resulting in their death. This is known as entrainment and impingement.

As part of the review, a number of studies have been carried out to find out more about lamprey populations. These have looked mainly at the time periods when adult lamprey migrate and when young lamprey move from their freshwater spawning grounds back to the estuary. In addition, a number of permit holders have undertaken monitoring of entrainment at their intakes.

In the final stage of the review, a risk-based approach was used to assess the vulnerability of lamprey to entrainment at each abstraction. This used the most recently available knowledge of lamprey populations combined with the results of monitoring.

The review concluded that modifications are needed to five abstraction licences to reduce the risk to lamprey populations due to entrainment. This will include the use of screens and changes to operating methods.

River flows

A reduction in the amount of water in the River Derwent (a tributary of the Humber Estuary) may limit the ability of lamprey to pass over weirs such as that at Sutton upon Derwent. This can prevent them from reaching suitable spawning grounds. We reviewed how abstractions impact on flow levels during critical migration periods and concluded that no consent changes were necessary.

Other issues affecting lamprey

There are a number of weirs and structures within the Humber catchment that have the potential to prevent lamprey reaching their upstream spawning grounds. Fish passage will be improved through future operational changes and investigation into the construction of suitable fish passes.

Eel fishing occurs within the Humber Estuary and its tributaries. River lamprey caught by people legitimately fishing for eels are sold commercially as fishing bait. We are looking at introducing controls to make sure that this activity is limited and sustainable in the future.

Dissolved oxygen

Fish and other aquatic life require oxygen to survive; most fish species do this by using their gills to take oxygen dissolved in the water. Low levels of dissolved oxygen can seriously impact a water body's ability to sustain a healthy fish population.

Low dissolved oxygen levels occur regularly during the summer months in the lower reaches of the River Ouse and in the upper reaches of the Humber Estuary. The reduction in dissolved oxygen is influenced by reduced freshwater entering from the rivers together with high amounts of plant material, the natural breakdown of which takes oxygen from the river. An increase in water temperature can also reduce the amount of oxygen available. This is known as a dissolved oxygen sag.

Low dissolved oxygen can impact on a number of estuary features; effects could include changes to the types and numbers of plant, animal and fish species. Those that are more tolerant to low dissolved oxygen conditions would thrive, while those less tolerant would be out-competed. The dissolved oxygen sag in the lower River Ouse may restrict lamprey that have to move upstream to reach their spawning grounds.

To work out the required improvement to dissolved oxygen levels in this review it was necessary to take account of the percentage contribution made by Environment Agency regulated consents (abstraction licences and discharge consents) to the dissolved oxygen sag. There are significant natural sources of organic matter as well as diffuse sources from agriculture and urban run-off that contribute to low dissolved oxygen levels. We concluded that even if all of our consents were revoked it would be unlikely that the summer dissolved oxygen sag would disappear.

We used a computer model to look at the impact of Environment Agency regulated consents on the dissolved oxygen sag. We worked out that our consents are responsible for approximately 40 per cent of the total impact and that a proportional improvement can be achieved through changes to two permits. These changes will be made under the Pollution Prevention and Control Regulations. The issue of low oxygen levels cannot be fully resolved as it is partially caused by other factors.

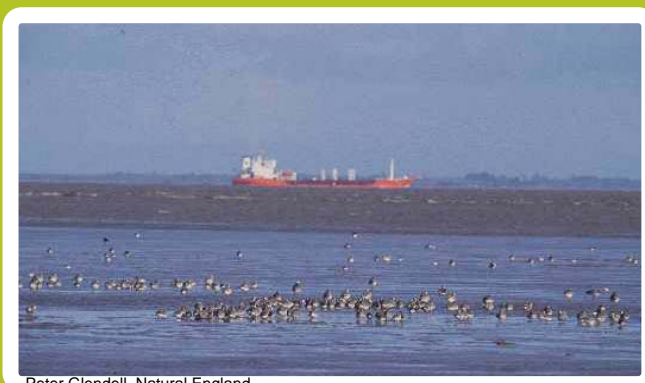
Toxic contamination

The Humber Estuary drains over one fifth of the area of England including a number of large towns and cities. Parts of the estuary are heavily industrialised and historically much of the country's coal production, electricity-generation and manufacturing occurred within the Humber catchment. Some substances such as copper and zinc occur naturally in the environment but can be highly toxic in larger amounts. Toxic substances can get into the water in many ways - as a by-product of industry and also from domestic and agricultural sources.

Toxic substances can affect plants, birds, fish and mammals using the estuary, either directly through poisoning, or indirectly through changes to habitat and food availability. Toxic substances can also impact on the ability of some species to reproduce successfully.

Environmental Quality Standard (EQS)

EQS's are levels that are used to assess the risk of chemical pollutant effects on water quality to the health of aquatic plants and animals. EQS's for toxic substances have been derived under the requirements of the Dangerous Substances Directive which classifies substances as List I and List II. We are required to eliminate pollution by List I substances and minimise pollution by List II substances. To do this, all discharges that are liable to contain these substances must be authorised.



Peter Glendell, Natural England

A computer model was used to predict Environmental Quality Standard (EQS) failure within the Humber Estuary for all the toxic substances included on our consents. We concluded that reductions in permitted loads for the pesticides cypermethrin and diazinon will be required for three discharge consents. In order to reach EQS compliance within the estuary for a third remaining substance (acrylonitrile), modifications to one consent is necessary; this will be done under Pollution Prevention and Control legislation.

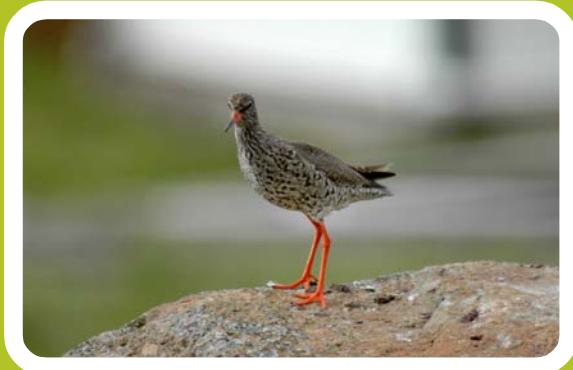
For some substances such as copper, the EQS will still be exceeded in parts of the estuary. We decided that it was not fair and reasonable to change Environment Agency consents to achieve full EQS compliance across the estuary. This is because the main reason for exceedence are non-regulated sources, for example historical sediment contamination and diffuse pollution.

Freshwater flows over mudflats

Wading birds such as dunlin and redshank use the estuary's intertidal mudflats and sandflats to feed. Evidence shows that some birds prefer areas with freshwater flows in the form of channels and creeks. The freshwater originates inland and enters the estuary when the tide is low. This is also the time when the birds can access these important feeding grounds.

Birds may drink, bathe or preen on mudflats, in preference to flying inland, to conserve energy. The presence of freshwater on the mudflat may be critical in severe weather. Some birds use the protection of the creeks for shelter.

Redshank



The redshank is a medium-sized wading bird. It has longish red legs and a long, straight bill.

Redshank have been shown to occur in higher densities close to channels and creeks. They have a wide range of prey that are not dependant on freshwater flows. However, they may use these freshwaters to drink or preen.

Water abstraction can reduce the amount of water entering the channels and creeks and may result in changes to the size and structure to such an extent that they are no longer a suitable habitat for the birds that use them. Other habitats are also sensitive to freshwater input. Seed germination, prey species abundance and diversity of plant species are all influenced by freshwater from side flows. The maintenance of these flows as a feature of the estuary is crucial for the maintenance of habitat diversity and for encouraging the continuing use of the site by a range of bird species.

We have looked at over 100 locations around the estuary where freshwater flows across the mudflats in creeks and channels. Abstraction leads to a reduction in freshwater flow at a very small number of locations, but we have carried out studies that show there is no evidence of any impact on birds or their habitats. We identified three bird species that were at particular risk - dunlin, redshank and shelduck. These species are extremely mobile and other areas of the estuary are suitable for them.

We concluded that there is no reasonably foreseeable risk to the integrity of these birds or their habitat and no consent changes will be required under the Habitats Directive to protect freshwater flows over mudflats.

Further information can be found on our website

www.environment-agency.gov.uk

Guidance can be requested from enquiries@environment-agency.gov.uk