

Creating ponds and scrapes at Nosterfield Nature Reserve



A 50-YEAR PROJECT TO CREATE A NETWORK OF CLEAN WATER PONDS FOR FRESHWATER WILDLIFE

1. Background to the site

Nosterfield Nature Reserve in North Yorkshire was originally worked out for sand and gravel between the early 1950s and the mid 1990s. The naturally regenerating open water bodies of the excavated, un-restored site became important for various wading and wetland bird species (with redshank and shoveler as the principal target breeders), but the site was threatened by planning applications for landfill. The Lower Ure Conservation Trust (LUCT) was formed in 1997 with the objective to protect the site for nature conservation, improve its conservation value and provide opportunity for public appreciation.

LUCT purchased most of the site with funds from Yorventure Ltd., the Landfill Tax Credit Scheme and the Heritage Lottery Fund, and in partnership with the site's former operators Tarmac commenced a programme of habitat creation and management.

The restoration has been hugely successful. Nosterfield is one of the best inland sites for waders in north-east England, with large numbers of breeding, migrating and wintering waders, and wintering wildfowl. Its statutory designation as a Local Nature Reserve in 2001 reflects its important wetland bird, plant and invertebrate interest.

Nosterfield also provides facilities for the visiting public including an interpretation building and three bird hides.

A case study to show how retro-fitting ponds and scrapes for wading birds can have benefits for a variety of wetland wildlife



Redshank, one of the target breeding species at Nosterfield Nature Reserve, foraging on the shallow gravel pit margins.

2. Wetland habitat design and creation

The primary objective of wetland habitat creation at Nosterfield was to provide breeding habitat for redshank and shoveler, as well as provide foraging areas for wintering and migrating birds, in particular waders and waterfowl.

To achieve these objectives, the site includes open areas of lake, pond and scrape habitat, wet grassland and grazing marsh. These habitats have been incredibly successful in not just attracting wetland birds, but a huge variety of wetland plants and invertebrates as well. There is also a strong breeding population of common toad (UK BAP species) at the site.



Figure 1. Aerial photo of Nosterfield Nature Reserve showing the main gravel pit waterbody, silt ponds and areas where additional small scrapes, ponds and footdrains have been excavated.

The main waterbody and scrapes

The initial phase of restoration work involved modifying the existing gravel pit waterbody (7 ha at its full extent in winter) to include gently sloping shallow margins (suitable for foraging wading birds) with a convoluted margin to maximise the shoreline length, gravel islands for nesting and roosting areas, and small pools around the margin, to diversify the habitat available. In addition, a series of scrapes around the main gravel pit lake were dug at various different levels, so that whatever the groundwater level in any one year, some will always be wet (there is no artificial water level control).

The aquifer associated with the magnesian limestone on which Nosterfield lies results in dramatic fluctuations in water level, typically 2.5 m per year, associated with natural changes in the water table and rainfall.

The waterbody margin modifications, and the pool and scrape creation benefited from detailed hydrological monitoring of the groundwater levels, undertaken from the 1980s onwards. This enabled precise planning of the shallow margins, islands and scrape features to ensure that habitat extent and diversity was maximised.



The main gravel pit lake at Nosterfield, modified to include gravel bars, spits and islands, pools and scrapes beyond the lake edge, a complex margin and gently sloping banks.



The margin modifications included small pools separated from the main waterbody with shallow gravel bars. Pools were also added on the islands. These features all add to the wetland habitat diversity. The surrounding grazed marsh supports a good diversity of wetland plants, including the Nationally Scarce plant Mudwort (*Limosella aquatica*).

The silt ponds

The restoration plan incorporated two silt ponds which provide rich habitats for plants and invertebrates. These were not modified, as their existing shape, size and water source (clean surface water run-off) already provided excellent wildlife value.



The 'East Silt Lagoon' pond was retained as part of the nature conservation afteruse. The pond has a clean, unpolluted water source from surface water draining from the clean surrounding catchment (low-input grassland). This pond supports 61 aquatic macroinvertebrate species – making it a priority pond under the UK BAP.

Wet grassland restoration with ponds, scrapes and footdrains

In August 2010, **15** new ponds and over **1,300 m** of footdrains were constructed in an area of restored pasture grassland on the reserve (Keith's Field), to create seasonally wet grassland with in-field wet features. The design was targeted towards lapwing, which benefit from the provision of footdrains in addition to shallow ponds.

The ponds seasonally flood with surface water during the winter, providing the soft mud substrates suitable for the invertebrates that lapwing feed on. As the ponds gradually dry out in the spring and summer they will reveal bare mud substrates, providing foraging habitat during the key breeding period.

Over 12,000 tonnes of spoil from the pond and footdrain creation was moved 100 - 500m by two 10 tonne dumpers. This material was used to soften a steep corner of the former quarry, helping to avoid unsightly spoil mounds or requirements to take soil off site. The other plant hired for the project was a 13 tonne excavator (to excavate and profile the ponds and footdrains) and an 8 tonne excavator (for landscaping the spoil).

All survey work, drawing up of plans, submission for planning permission (fee c. £600), setting out, overseeing and most of the associated administration, was carried out by Lower Ure Conservation Trust volunteers. The cost of setting out materials (i.e. pegs, flags, marking paints, etc.) and other volunteer costs (i.e. travel costs) was <£500. The site was clearly marked out on the ground in advance, so the contractors were able to work without hold-up, on a 10-12 hour day. This combined to result in the relatively small cost (given the scale of groundworks) of c. £13,000 (inc. VAT) in total.



Pond (above) and footdrain (below) creation at Nosterfield Nature Reserve. The creation of shallow margins will benefit aquatic invertebrates and foraging wading birds.

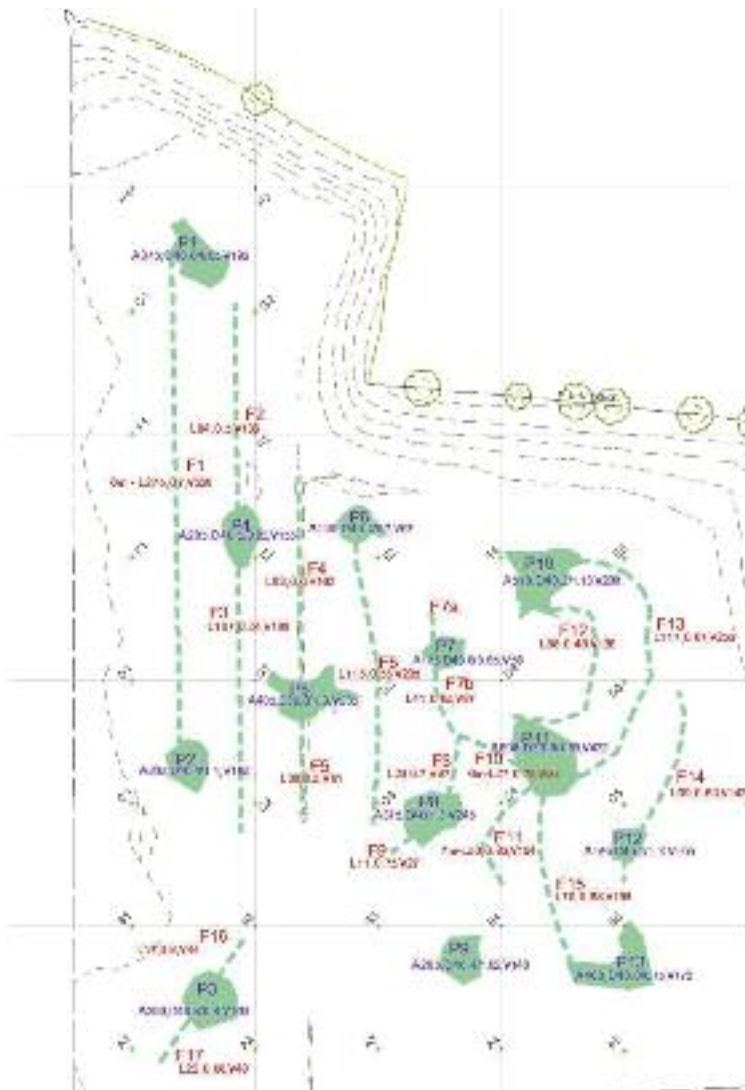


Figure 2. Plan with 13 of the 15 new ponds (1 to 13) and footdrains in Keith's Field marked in blue (location shown on Figure 1).

The new ponds and footdrain habitat (shown above in February 2011) has been designed to benefit wading birds such as lapwing (below).

3. Habitat management

The site has been allowed to regenerate naturally rather than be planted up. Natural regeneration is cheaper than buying in nursery-grown plants, and it also has two other main benefits:

- It allows vegetation communities to colonise naturally with appropriate species that will do well in the conditions.
- It avoids problems such as alien invasive species arriving with the nursery grown stock.

Part of the site is cattle-grazed from mid-June, at a low stocking rate of approx 0.3 livestock units per hectare. About 10 ha is cut for haylage in mid-July and this is followed by a significant increase in cattle and sheep grazing, until October/November (as necessary).



Grazing keeps the pond margins open and prevents the establishment of woody vegetation such as willow. Open conditions are good for many rare plant and invertebrate species. Some plant species require the opening up of areas of bare ground that light poaching by animal hooves provides, including the Nationally Scarce wetland plant Mudwort which is found at the site.

Pond and scrape creation will continue as an integral part of the site management plan, as will rotational maintenance of some of the footdrains and ponds.

4. Monitoring the diversity of species at Nosterfield Nature Reserve

On-going extensive survey work for birds, plants and invertebrates (terrestrial and aquatic) has been undertaken at Nosterfield Nature Reserve. To date (spring 2011), the following have been recorded:

- Over 220 species of birds (typically over 150 species per annum).
- Over 300 species of plants, including seven species of orchids.
- Over 1,200 species of invertebrates.



Nationally Scarce wetland plant Mudwort, which benefits from light poaching caused by grazing and seasonal inundation.

Mudwort (*Limosella aquatica*) is a Nationally Scarce wetland plant and is thriving in the newly created scrapes.

An interesting range of invertebrates includes 14 Nationally Scarce, three Red Data Book and one UK BAP priority species. A detailed Invertebrate Survey (Martin Hammond et al.) will be published on LUCT's website early in 2011.

Nosterfield Nature Reserve is a site of National Importance for breeding shoveler and supports regionally significant numbers of waders, including c. 50 pairs of lapwing and 12-15 pairs of redshank, as well as other breeding waders such as curlew. In addition, it is North Yorkshire's only site for breeding avocet.

For more information about Nosterfield Nature Reserve and the Lower Ure Conservation Trust visit their website: www.luct.org.uk

For further information about the Million Ponds Project and to consult other Case Studies and Factsheets from the Aggregates Toolkit, please visit www.pondconservation.org.uk/millionponds or email info@pondconservation.org.uk

This case study has been prepared with Simon Warwick (LUCT Director).

