

EUTROPHIC STANDING WATERS IN OXFORDSHIRE

- 1. GRAVEL PITS AND OTHER LAKES
- 2. RESERVOIRS

1. GRAVEL PITS AND OTHER LAKES

UK Biodiversity Group - Priority Species
Otter
Water vole
Bittern
Reed bunting
White-clawed crayfish
UK Biodiversity Group - Species of Conservation Concern
Daubenton's and other bats
Reed warbler
Sedge warbler
Cetti's warbler
Shoveler
Pintail
Tufted duck
Pochard
Kingfisher
Local Character Species
Sand Martin
Little ringed plover
Associated BAP Habitats
Rivers

Gravel pits are bodies of open water created by the excavation of sand, gravel or clay for the aggregates industry. They can potentially provide a valuable wetland habitat which may include not only open water, but also extensive stands of emergent vegetation and, more rarely, marginal fen and carr.

Other lake habitats include bodies of water formed from natural processes such as glaciation in the uplands, and coastal sediment drift damming river mouths. The majority of lakes other than gravel pits in lowland Britain have been created by man, either by impounding watercourses, deepening and widening watercourses or a mixture of both. They can provide similar habitats to gravel pits but often differ significantly in quality and clarity of water due to differences in nutrient status and sediment loads as a result of the constant input of surface water.

2. CURRENT STATUS

2.1 Current status in the UK

2.1.1 *Habitat extent*

Gravel pits are one of the few wetland habitats to have increased in extent during the 20th century. They have been dug extensively in many parts of Britain and in some areas, particularly southern England, gravel pit creation has significantly increased the extent of open water present.

1. INTRODUCTION



Otter *Lutra lutra*

2.1.2 Biological status

Gravel pits are widely recognised as valuable habitats for wetland and water birds, including some species whose traditional habitats (e.g. fens, marshes, wet grassland), have been declining. Gravel pits with unpolluted water may support rich communities of aquatic plants, and where water quality is highest, assemblages rich in pondweeds (*Potamogeton* spp.) and stoneworts. They can provide important habitats for aquatic invertebrates, especially where marginal habitats are diverse and water quality is good. Gravel pits can also be of particular value to otters both as food sources and as refuge sites (where islands are present). Other BAP Priority Species which use gravel pits include water vole (where there are good marginal habitats) native crayfish, and bats which may feed on emerging insects.

Other lake habitats range from the oligotrophic (nutrient poor) through to eutrophic (nutrient rich), with many true standing water lakes slowly becoming eutrophic due to anthropogenic impacts. On-line lakes (those that lie on the route of an existing watercourse) are not true standing waters although they may demonstrate a similar ecology to eutrophic standing waters. They may show extensive marginal swamp habitat and hold important breeding populations of waterfowl, but can be highly influenced by the intensity of management for recreation and sporting purposes. On-line lakes can provide enhanced food resources on a river catchment for species such as otter, but equally can present barriers to natural fish movements and represent a loss of integrity of the previous existing watercourse. On-line lakes differ from gravel pits and other standing waters in that

there is a constant input of sediment and plant nutrients, which can lead to large increases in algal populations and resultant spring blooms. Intensive management from e.g. duck rearing and heavy fish stocking can significantly reduce lake biodiversity and impact on the downstream watercourse.

2.2. Current status in Oxfordshire

2.2.1 Habitat extent

In Oxfordshire, extensive gravel deposits have been excavated in the Thames valley, creating a series of waterbodies and wetlands of potentially high nature conservation value. The main gravel pit complexes in the county are in the Lower Windrush Valley and at Radley, Dorchester, Cassington and Caversham.

Restored gravel pit sites in Oxfordshire have been identified and numbered by Oxfordshire County Council. These data suggest that there are more than 60 flooded gravel pits in the county, collectively covering an area of about 600 hectares (Oxfordshire County Council, unpublished data). Of these flooded pits, only ca.14% have been partially or completely restored for nature conservation as one of their objectives. Most have been designated for angling or watersport use (Table 1).

Other lake habitats within Oxfordshire are comprised predominantly of artificial on-line lakes, constructed by impoundment and/or excavation of the line of a watercourse. Several of these lie within designated SSSIs, such as Blenheim Park and Wychwood SSSIs. There are over 100 on-line lakes in the county over 2 hectares in size, although there is currently no database archive for this information.

Activity	Number of pits with afteruse*
Angling	38
Watersports	19
Nature Conservation	8
No established afteruse	6
Infilled / dry	4
No information	2

Total Number of Gravel Pits	57
* Some sites have more than one afteruse	

Table 1: Afteruse of gravel pits in Oxfordshire
(based on Oxfordshire County Council 1994 data)

2.2.2 Biological status

Gravel pit lakes in Oxfordshire support some of the largest populations of wildfowl in the county. The most significant area for birds is the Lower Windrush complex which is particularly important for wintering waterfowl (see Table 2). For example, in November 1999, the maximum count for all wildfowl combined was 6197 individuals (John Brucker, pers. comm.). Populations of pochard, tufted duck and coot exceeded levels of national significance when all central Oxfordshire pits (i.e. Lower Windrush Valley and Dorchester) were treated as a single unit¹ (Brucker *et al.*, 1992). Winter populations of other waterfowl

species, such as shoveler and gadwall, are of regional significance.

Within the Lower Windrush complex, the relatively shallow Dix Pit is the most important single site supporting more than one third of the total number of birds recorded for the Lower Windrush complex as a whole. Other significant pits include Sonning Common (Caversham complex) which has nationally significant numbers of gadwall, and Bowditch (Dorchester complex) with regionally important numbers of goosander.

For groups other than birds, little information is available with which to assess the value or comparative importance of gravel pit lakes in the county. However, since a number of Oxfordshire's gravel pits are fed by high quality alkaline groundwater and are currently developing as marl lakes, these may support significant invertebrate and plant communities (English Nature, 1997a).

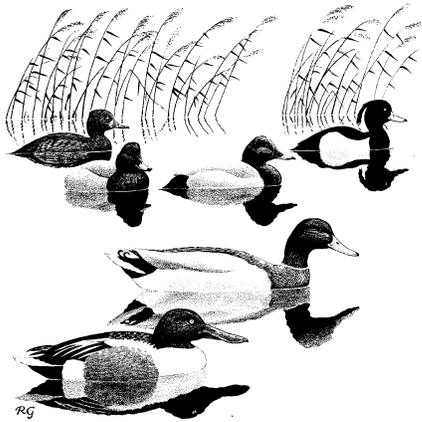
Pit No.	Name of Pit	Grid Ref.	Importance for Nature Conservation
4	Hardwick Leisure Park	394047	Supports an average count of more than 200 birds.
11	West Oxon. S.C.	399046	Supports an average count of more than 200 birds.
12	Back's Lake	401041	One of the most valuable lakes for breeding populations of waterfowl. The principal reasons for this are (i) level of cover provided; (ii) presence of islands and (iii) lack of disturbance.
15	Guy's Lake	403042	Valuable lake for breeding populations of waterfowl (see reasons given for Pit 12)
16	Dix Pit	408050	The largest and most important pit - particularly important as a safe refuge for wintering birds.
18	Linch Hill	419042	Supports an average count of more than 200 birds.
27	Three T's Lake	384025	Supports an average count of more than 200 birds.
28	Windsurfing Lake	387021	Supports an average count of more than 200 birds.

¹ 'Nationally significant' numbers are 1% of the Great Britain population (mean seasonal maximum over five years). For pochard and tufted duck this is, respectively, 500 and 600, birds.

Table 2: Gravel pits of greatest nature conservation interest within the Lower Windrush Valley Complex

There is very little information available on the biological status of on-line lakes in the county. Some contain extensive marginal swamp habitat and can be important for both wintering and breeding wildfowl and may contain valuable invertebrate habitat. For example, Blenheim Lake holds several pairs of breeding great crested grebe and a breeding population of red-eyed damselfly. In addition, water violet is present in fringing reedswamp and Blenheim Lake supports important winter wildfowl numbers of species such as gadwall.

Many on-line lakes suffer from algal blooms and high turbidity due to constant inputs of nutrients, and this can be significantly exacerbated by intensive duck rearing, such as in the Glyme Valley. Furthermore, these activities can have a detrimental impact on the watercourse downstream, as occurs on the River Glyme. The input of suspended solids also leads to a rapid increase in the process of siltation and without management many of the smaller on-line lakes will rapidly move through the hydrosere to reedswamp and willow and alder carr, although this process can add significantly to the biological interest



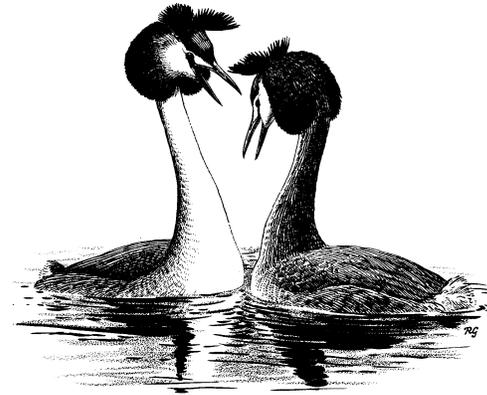
of these sites. It should be noted that many of Oxfordshire's on-line lakes are significant and historic landscape features.

2.3 Priority species

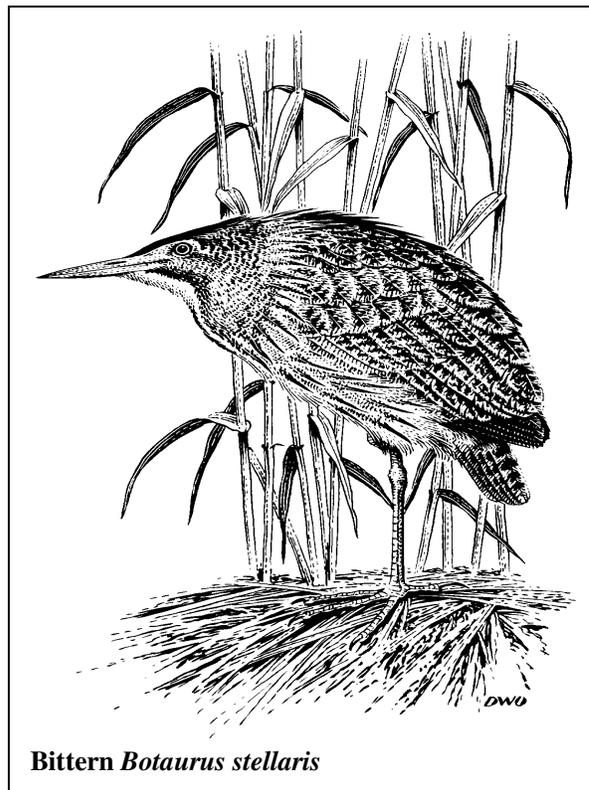
Priority BAP species associated with Oxfordshire gravel pits and other lakes include reed bunting, water vole and white-clawed crayfish. Some gravel pits may also be suitable for great crested newts. Gravel pits are likely to make an important contribution to the quality of habitat available for otters. No key BAP plant species are associated with gravel

pits in Oxfordshire. A number of other species of conservation concern are also commonly associated with gravel pits including kingfisher, sedge warbler and shoveler.

Non-BAP species such as sand martin and little ringed plover are strongly associated with working gravel pits. Gravel pits also have the potential to be important habitats for a number of rare and declining fish species such as crucian carp, silver bream, rudd and ruffe.



Great crested grebes *Podiceps cristatus*



Bittern *Botaurus stellaris*

2. RESERVOIRS

1. INTRODUCTION

Reservoirs are large water bodies used to supply water for domestic, industrial and agricultural purposes. They can be divided broadly into two main types (i) artificial pumped-storage reservoirs, which are typically clay banked storage basins with simple, regularly engineered shapes and concrete-lined margins for erosion prevention (ii) 'natural' reservoirs created from pre-existing lakes, or by damming river valleys.

Reservoirs can vary significantly in size according to their use (e.g. farm irrigation reservoirs are

UK Biodiversity Group - Species of Conservation Concern
Pochard
Tufted duck
Wigeon
Pintail
Shoveler
Associated Habitats
Rivers

significantly smaller than reservoirs created for domestic water supply).

2. CURRENT STATUS

2.1 Current status in the UK

There appear to be no published estimates of the number of reservoirs in the UK. However, in upland western and northern Britain a high proportion of reservoirs have been formed by the damming of rivers to create on-line lakes. In lowland areas, where artificial pumped-storage reservoirs predominate, reservoirs are less frequent, partly because groundwaters constitute a significant percentage of water supply.

The main ecological interest of lowland pumped storage reservoirs relates to their importance for overwintering waterfowl which use the large bodies of open water for resting and feeding.

Several large pumped storage reservoirs, or groups of reservoirs, now regularly hold internationally important numbers of waterfowl, including the south-west London reservoirs and Rutland Water. Reservoirs are also stop-over points for migrant wetland birds during spring and autumn.

The lack of marginal vegetation around pumped storage reservoirs makes them generally unsuitable as breeding sites for wetland birds. However, installation of artificial floating rafts has enabled some species, particularly common terns, to breed on some reservoirs. Because of their steep concrete edges, most pumped-storage reservoirs are currently of little conservation interest for groups other than birds; however, there are many farm irrigation reservoirs which are quite small in size, but which may offer nesting sites for birds and habitat for invertebrates if allowed to vegetate.

In contrast to pumped storage reservoirs, 'natural' reservoirs can sometimes support both significant bird populations and high quality plant and animal communities. This is particularly true where water quality is good and the hydrological regime is not too unnatural. However, many 'natural' reservoirs have irregular and unseasonal drawdowns of many metres, which place severe stresses on marginal habitats, creating extensive unvegetated areas on reservoir margins. These can be of value for migrant waders in the autumn.

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2.2 Current status in Oxfordshire

Oxfordshire has two raw water storage reservoirs, Farmoor (4 miles west of Oxford) and Grimsbury (near Banbury), both of which are pumped-storage reservoirs. Both sites have steep banks with relatively deep water and concrete wave protection walls preventing the establishment of good edge habitat.

The two basins of Farmoor Reservoir are the largest individual bodies of open water in Oxfordshire and they support significant populations of wintering waterfowl, particularly diving ducks. Birds using Farmoor probably move between this site and central Oxfordshire gravel pits and, taken together, these sites may support nationally significant numbers of pochard, tufted duck and goldeneye.

Farmoor also draws a wide range of wetland passage migrants which are otherwise rarely seen in Oxfordshire (e.g. osprey, whimbrel and Black Tern),

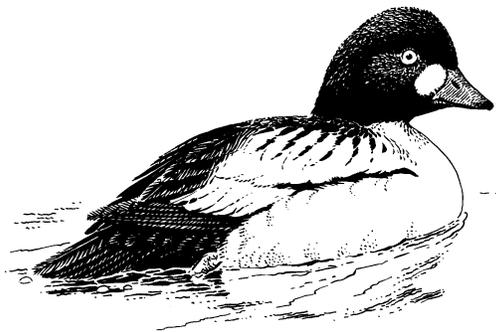
and supports a common tern colony, breeding on floating rafts. The reservoir is also used for recreational activities, such as sailing and angling, although these activities are mainly restricted to one of the basins at Farmoor. The second waterbody is primarily managed for nature conservation and angling.

Grimsbury is a smaller reservoir than Farmoor and supports much smaller populations of over-wintering waterfowl.

In the north of the county, Clattercote Reservoir is the only large supply reservoir in Oxfordshire which is not concrete lined, being on an impounded watercourse with natural banks; it is owned by British

Waterways to service the Oxford Canal. It has a range of breeding and wintering waterfowl and is similar to other on-line lakes in the county.

There are an unknown number of farm irrigation reservoirs in Oxfordshire, varying from semi-natural features to concrete lined tanks. Farm reservoirs vary in their ecological interest but there is currently little information on the value of this resource.



Goldeneye duck *Bucephala clangula*