

“Golf courses may have gained a bad reputation, perhaps not always justified, amongst environmentalists but that’s changing. The truth is that every golf course has potential to be a sanctuary for wildlife and to provide an important stepping stone for birds and other animals whose habitat is under threat.”
Nigel Symes, RSPB. in Golf Magic magazine. August 2013

Can Rookwood golf course and its environs benefit wildlife?

A review by Tim Thomas.

With thanks to Neil Henry and members of the KRGA* for comments on an early draft.

Executive summary

The fairway is not an isolated piece of grass neither is it an intensively mown monoculture. Rather as part of the golf course it provides a complex matrix of habitats that supports a vast range of wildlife, contributes to reversing climate change and provides an attractive amenity for the health of its visitors.

Golf courses are more than capable of providing the perfect habitat for a range of both common and endangered species of wildlife be they plant or animal. Many of our UK courses are proof of this and several have even been given Site of Special Scientific Interest status.

Rookwood is no different, and with continued specific management, it can also develop its intrinsically valuable habitat into a leading area of natural beauty.

Conclusions

- The whole site should be removed from the list of areas that may be used for housing. And would better be preserved for its valuable mixed habitat and amenity value.
- While golf courses cannot yet be considered adequate replacement habitat for displaced wildlife, they may play a role in mitigating habitat loss¹.
- Looking at some results and recommendations for both old (up to 100 years) and new courses, there is clear evidence that management towards increasing biodiversity on golf courses has a very positive outcome with species diversity increasing considerably. All these studies promote a mix of habitat that includes fairways.
- Golf courses can increase and promote connectivity between sites and thus improve the gene pool of habitat that could be isolated.
- Encourage the golf course staff and management to work with volunteers to assist in positive management of significant areas of the course and margins to wildlife habitat and increase biodiversity.
- The RSPB (and other UK NGOs) have regularly promoted the environmental benefits of golf courses and helped them develop wildlife management plans and ecological management practices.

With good management and a positive outlook on golf courses, the truth is they play a vital role in wildlife preservation and biodiversity. This is particularly true of those in urban fringes - these wildlife strips of varied habitat add to the wildlife diversity of the immediate and neighbouring area and provide valuable corridors for wildlife movement.

* KRGA – Keep Rookwood Green Alliance

Introduction

This report is based on personal observation through regular visits and a literature survey undertaken through internet searches. It takes data from from personal records, a one-day bioblitz concentrated along a stretch of Boldings Brook pathways and finally it utilises data from random and “planned” visits by members of the public and small groups who record wildlife during their visits.

Realising that the fairway is not an isolated piece of grass, recent literature looks at golf courses as whole mixed and varied habitats. The data reports on the value of courses and compares the findings with other habitats.

The belief that golf courses are sterile, is far from current fact. Due to an enlightened view of wildlife and the habitat that it supports and the reduction of the use of chemical fertilisers and pesticides golf courses have become valuable environments. This is particularly so of those on the urban fringe. There is a wealth of data indicating that golf courses on the urban fringe are contributing positively to wildlife and biodiversity since they have become de-facto wildlife havens.

Rookwood is a typical example having been developed from farmland on an urban fringe.

Habitats

There is a very mixed habitat in the areas on and around Rookwood Golf Course. These can be broadly identified as follows:

- ❖ Woodland, small copses and isolated trees
- ❖ Scrub found in bramble breaks, hedges and hedge-borders and understory or emergent scrub
- ❖ Riverine comprising Boldings Brook and Red River together with several drainage ditches
- ❖ Lake/pond and surrounding emergent vegetation
- ❖ Rough grassland both managed (mown) and unmanaged (not mown)
- ❖ Fairway, including tees and greens
- ❖ “Bunkers” with sand and associated marginal areas

The following looks at the variety of these habitats and their value to the overall matrix of the environment.

- Woodland
 - It is well-known that woodland is important both for its wildlife value and in terms of reducing the effects of climate change. Rookwood is home to some ancient trees. Many have been preserved from old boundary markers when the area was farmland. Again the age of some trees and their position may indicate that some areas are old enough to be classed as remnants of “ancient woodland”.
 - Woodland that supports “old” or ancient trees provides one of the biggest carbon sinks² and are essential in the fight against climate change. The UK is one of the most treeless countries in Europe: consisting of less than 13 percent woodland compared to Europe’s average of 37 percent. Golf courses can be seen as an opportunity to change this by encouraging wooded areas and maintaining mature and ancient trees.
 - In particular, these older woodlands can provide a greater offset to greenhouse gasses³.
 - Specimen trees, while they may appear isolated, not only provide an important feature but allow wildlife to move through areas with an element of safety from predators. Furthermore, with a variety of fruit and consequently different ripening times, they are an essential food source for a longer period. They also contribute to the visual intricacy and overall beauty of the site.
 - As such, many golf courses maintain these specimen trees as course features and additional ones have been specifically planted. While they may not all be native species they certainly add to the interest and range of fauna that make use of them.
 - Trees also provide roosting and nesting sites for bats, which are a specially protected species.

- Scrub
 - Understory scrub and bramble-breaks provides perfect nesting and feeding sites for a whole range of bird species and well as sheltered areas for mammals.
 - Hedge banks and uncut areas at the base of hedges provide valuable habitat for our precious pollinators. (See also later regarding diversity of bee species visiting golf courses.)
- Riverine
 - It must be made clear that in this document Boldings Brook is identified as the original stream flowing from the Warnham Millpond which was the ancient boundary between Horsham and Warnham parishes. This flows closest to Redford Avenue and Merryfield Drive and contains the Riverside Walk. The deeper channel to the west is identified in this document as “Red River” and is a man-made channel constructed to take controlled water from Warnham Millpond; it joins Boldings Brook and the River Arun further to the south.
 - Boldings Brook is mainly a low-lying shallow stream which provides moisture-loving plants with their ideal habitat.
 - Red River on the other hand provides a much wider range of habitat including:
 - Shallow banks
 - “Cliff” outcrops in deep cuts
 - Islands where Wild Garlic is a focus for some visitors
 - Nesting habitat for Kingfisher and Grey Wagtail
 - Deeper pools are favoured by native fish
 - Drainage ditches and feeder streams complement these habitats
- Lakes and ponds
 - Natural and long-standing features such as lakes, and other static water features add another dimension to any landscape and this is particularly so where wildlife and the environment is concerned.
 - Such water sources become a magnet for a range of animals – and in Rookwood’s case many protected species – the Great Crested Newt for example.
 - The “unmanaged” margins too are essential as they give drinking animals protection from predation as well as the marginal plants developing a dense habitat bordering a healthy pond.
 - Emergent plants around the edges are important for emerging aquatic animals and many specialist invertebrates.
- Rough grassland or “the rough”
 - This is largely unmanaged grassland, and in some places short turf. It also includes areas left for edge-loving species of flowering plant to encourage bees and other pollinating insects.
 - Some areas of rough grassland may be cut on an annual basis which will further encourage plant diversity.
 - This area can be ideal for a range of wildflowers. Many courses throughout the UK are recognised as SSSIs, mostly for their selection of rare plants. These include, the Gog-Magog in Cambridge for wildflowers, the Hotchkin course in Lincolnshire for heather regeneration and Charnwood course in Leicestershire for its “varied habitat for flora and fauna”⁴.
 - These areas are great for a range of wild animals including small mammals and especially hedgehogs. The dense, low cover provides shelter from raptors as well as ideal foraging areas for shrews, mice and the Hedgehog.
- Managed grassland including tees, greens and fairways.
 - These areas are well maintained and provide a short turf for a range of grazing wildlife. Deer, geese, swans and ducks all find both the grass and the insects in the short sward profitable feeding areas.
 - Insectivorous birds also regularly feed in the short grass. Grubs, such as leatherjackets are food for Starlings. Ants favouring habitat towards the mown margins are favoured by Green Woodpeckers.

- Worms are common especially during the mid/late summer when the tees and greens are watered. This provides them and other “lower” species of animal a unique environment during the dryer part of the year. Subsequently they, in turn, are a valuable food source for “higher” animals, such as Badgers and Hedgehogs.
- Bunkers
 - The sand within the bunker is raked often to maintain it as a course trap. However it still provides a perfect site for reptiles to bask. The sand will warm and as the bunker is often created in a shallow depression it acts a heat sink allowing the reptile to warm much quicker.
 - The margin around each bunker offers a differing range of opportunities for snakes and lizards.

Literature

Many of the negative viewpoints regarding golf courses appear to be published before the current century. Comparisons focussed on the more excessive, and now known to be poor, management techniques. However, since around the turn of this century there was a distinct move to look at the wildlife and environmental biodiversity in a scientific way. This began to compare the environment’s original habitat of (usually) farmland (as it was in Rookwood’s case) with the “newly developed” golf course. It also took into account the fact that new golf courses were often located close to urban fringes. This research provided information that golf courses provided a better environment overall than either farmland or urban development, and, in terms of the latter, seems to imply significantly positive benefits.

This change appears to be primarily to do with reduction in the use of chemicals, and a more enlightened view towards the environment as a whole, both in terms of recreation and biodiversity. It’s probably not surprising but most of the early “green management” initiatives seemed to stem from the USA and also from the Far East and central Europe. Studies in the UK seemed to be slow on the uptake!

Having said this, many of the current UK management strategies are now working to a “greener” way of operating their “pest management”, with significant reduction in chemical agents, towards more benign environmental management techniques.

For example, beetle banks located in the rough have encouraged predatory species that control unwanted invertebrates on the fairway⁵.

A golf course is a matrix of habitats. Alone, each of these individual habitats may have a limited intrinsic value. Together, they provide an intricate combination that adds to and extends wildlife biodiversity. Furthermore this matrix provides opportunity for wildlife to prosper and spread to surrounding areas whilst providing a valuable asset to combat climate change.

Colding and Folke⁶ for example, in assessing the biota, found that golf courses had, in their wide range of compared environments an overall 64 percent higher ecological value, and that management could promote environmental benefits including natural pollination and pest control.

Other studies have shown that the mix of habitats, especially of woodland and open areas (fairway) work together to provide increased biota in the area⁷. Species such as bats and birds utilise the differing habitats of covered areas, woodland or housing for example, while feeding in the open areas of the fairway. Swallows and martins for example, forage over the open space for food while roosting and nesting in towns or utilising small course shelters. Flycatchers and warblers have a similar feeding strategy, using woodland and its associated scrubland as the security for nesting and roosting. Bat species too use the open space and tree cover for foraging.

This shows the importance of edge habitat. The open areas provide sight lines and flight areas for feeding activity. In fact, one reference states that a course complex of 60 percent open space and 20 percent woodland positively benefits bird species that specialise in both habitats⁸.

“Contrary to their reputation as barren wastelands, golf courses can provide significant environmental benefits, including providing habitat for healthy populations of native wildlife.”
From Bird Conservation on Golf Courses, A designand management manual by Scott Gillihan. 1999 (ISBN 1-57504-113-8)

Wildlife

Rookwood is not alone in lacking a wildlife survey of its golf course. Results from a UK postal survey in 2006 reported that only 12 percent of 200 courses had carried out any baseline wildlife surveys⁹. However, this is beginning to change with the growing need for habitat managed for wildlife and a more enlightened attitude to the use of chemicals.

A study in nearby Surrey¹⁰ showed that golf courses enhanced the local biodiversity of an area by providing a mix of habitats. In fact, this same study revealed that the golf courses had bird diversity that was higher than the surrounding areas. And a higher proportion of insect-feeding bird species were found on the open areas of the courses, fairways, for example, than in surrounding areas. Additionally, in this study, although there was little difference in bumblebee numbers comparing sites on and off the golf course, there was a higher number of bumblebee species on the course than off – that is, more diversity.

Studies like this one has empowered major non-governmental organisations (NGOs) like the RSPB[†] in the UK and the Audubon Society in the United States to assist in the development and application of golf course management plans which benefit wildlife and the environment. Prestigious clubs such as the Royal and Ancient Golf Club of St Andrews supported the RSPB in funding a new position within the Society to promote best practice in managing courses for wildlife as recently as January 2020¹¹. This clearly shows the interest in developing courses as important environmental sites for wildlife. Subsequently it is encouraging to note that there has been significant “sign-up” to the projects from a number of golf courses.

It must be said that just because there is little data on a national scale that provides any details of the wildlife present at Rookwood there is clearly information available that can be used to extrapolate the high potential at the wider site both north and south of the Warnham Road. Records from WLNR show wide use of the northern sections away from the reserve particularly with flighted animals such as bats, birds and insects and larger mammals such as Red Fox, Badger and Roe Deer.

Data compiled over recent years has become available and details historical records from Boldings Brook Conservation Society with a range of species totalling 124 from 2011 onwards (Pers Comm).

The one day “Bioblitz”, held in August 2020, showed that interest in the site was high with over 120 people attending through the day. This covered a limited area but showed the high potential of the site. On the day over 150 species of plant and animal were identified and this number is growing as new species are being identified, such as mites and thrips. It must be remembered too, that this coverage lasted just six daylight hours and only looked at a limited area around the Millennium Bridge off Merryfield Drive.

[†] RSPB - Royal Society for the Protection of Birds

Naturally, many individuals walk the site and record the wildlife they see. Some of these detailed reports clearly show species of insect and in particular, butterflies, that do not occur, for example on WLNR (Kirby, Pers Comm.¹²). It is because of both the mix and very different habitats that the course provides over those on the nature reserve that these insects flourish.

Group	Totals	Notes
Plants	216	Flowering plants, grasses and trees
Animals comprising:		
Insects & Spiders	93	
Birds	44	This figure lists only those that are resident or spend the summer on the site, winter visitors have yet to be included
Mammals	11	
Herptiles	3	Frogs and snakes
Mites, thrips, molluscs	35	Many of these are micro-organisms which live in leaf-litter and dense grasses
Total	402	

Table 1: Range of animals and plants found at Rookwood. March - September 2020.

Table 1 totals the number of species so far recorded on the Rookwood site. This includes all animals seen including those feeding on and above the open fairways. The list has been compiled since March 2020 and is on-going as species are being added almost daily. Included in this list are species that receive special protection in law, such as bats, as well as those that have more general protection such as all birds.

The short grasses of the golf course provide ideal habitat for some specialist carabid beetles. Their grubs live in the soil and provide easy food for birds such as many of the Corvid species[‡] and Starlings. A specialist ant living in the rough/fairway interface also provides excellent feeding opportunities for the Green Woodpecker among other bird species.

There are insects that prefer short, managed turf. For example, the specialist turf beetle, *Ataenius spretulus* is known to inhabit fairways and utilise the grass mown to “fairway height” very well¹³ rather than inhabit the rough. Also they showed less infection by a bacterium than those remaining in the rough. Although an American species it clearly shows that fairways are a favoured habitat for some specialist animals.

Disturbance

It may be considered that the fact that the course is regularly walked and that consequently disruption of wildlife breeding, for example, would be high. However Riffell¹⁴ found that golfers do not disturb bird breeding patterns, for example, and that, overall, the intermediate intrusion is tolerated well. It is clear that this is also the situation at Rookwood as most players stick to the fairway and utilise a direct route from tee to green (pers obs) thus leaving the fringes and margins significantly quieter for wildlife. Golfers searching for “lost balls” are, in the main, considerate of the environment off the fairway.

User opinion

Hammond *et.al.* found that 90 percent of course managers questioned, considered that golf courses were important for wildlife and over half of them wanted more to be done to promote wildlife diversity⁹.

In another study¹⁵ 80 percent of golfers themselves considered golf courses were good for the environment. The main reason given for this response was the fact that they preserve natural habitat.

[‡] Carrion Crows, Jackdaws, Rooks, Jays and Magpies

Burgin (2016) also urges redefining green urban spaces to increase biodiversity through better management of open areas such as golf courses.

Connectivity

The location of Rookwood Golf Course, situated with dual carriageway to the north and west, provides a secure, protected environment for its resident animals. Flight paths are well established for bats, birds and most invertebrates to maintain and increase diversity across the area.

In terms of non-flighted animals research shows that minor urban roads may have less of an impact than major roads through road-kill and particularly on Hedgehogs¹⁶ & ¹⁷. As the road to the south, Guildford Road, is restricted to 30 mph, and is close to a pedestrian crossing and a school entry it may well further reduce speed and increase vigilance from road users and reduce road-kill. Similar could be said to the Warnham Road that divides the site.

Terman considers that in terms of the ecology of golf courses they have been described as a “steppingstone” or buffer zones between nature and urban infrastructure”¹⁸.

Additionally, the UN Convention on Biological Diversity discussed urban biodiversity in 2006. Academic breakout sessions recommended that golf courses connect fragmented habitats and maintain connectivity through river and stream courses and included areas such as cemeteries. It further argued that initiatives are best coming from local government rather than national as they are better placed, with local knowledge, to identify these areas within their remit.¹⁹

However, in studying the urban golf course one of the major conclusions throughout the literature search was that in general there was an overall benefit to wildlife. The possibility to host high biodiversity through good management of the course with a few simple inputs can further benefit wildlife in an urban edge context.

Tim Thomas - Personal biography

I have over 45 years' experience in dealing with wildlife and ecology both as an employee of the RSPCA (in their HQ specialist wildlife department) and also as a wildlife and ecological consultant. I am now retired but naturally have a continued deep concern for wildlife and the environment we all inhabit.

1 Burdge R. & Cristol D. 2008. Fore! Fairways for Wildlife. Wildlife Professional, magazine article.

2 The Woodland Trust. <https://www.woodlandtrust.org.uk/trees-woods-and-wildlife/british-trees/how-trees-fight-climate-change/> (accessed 1/09/2020)

3 Oregon State University. "Old Growth Forests Are Valuable Carbon Sinks." ScienceDaily. ScienceDaily, 14 September 2008. www.sciencedaily.com/releases/2008/09/080910133934.htm (accessed 1/09/2020)

4 <https://www.charnwoodforestgolfclub.com> (accessed October 2020)

5 Frank S.D. & Shrewsbury. 2004. Effect of Conservation Strips on the Abundance and Distribution of Natural Enemies and Predation of *Agrotis ipsilon* (Lepidoptera: Noctuidae) on Golf Course Fairways. Environ. Entomol. 33(6): 1662-1672

6 Colding J. & Folke C. 2009 The Role of Golf Courses in Biodiversity Conservation and Ecosystem Management. Ecosystems 12: 191-206

-
- 7 Yasuda M. & Koike F. 2006. Do golf courses provide a refuge for flora and fauna in Japanese urban landscapes? *Landscape and Urban Planning* 75: 58–68
- 8 Mankin, K.R., 2000. An integrated approach for modelling and man- aging golf course water quality and ecosystem diversity. *Ecol. Modell.* 133: 259–267
- ⁹ Hammond R.A. & Hudson M.D. 2007. Environmental management of golf courses for biodiversity – attitudes and actions. *Landscape and Urban Planning*. Volume 83, Issues 2-3. Pages 127-136.
- 10 Tanner R.A. & Gange A.C. 2005. Effects of golf courses on local biodiversity. *Landscape and Urban Planning* 71 (2005) 137–146
- 11 <https://golfbusinessnews.com/news/management-topics/ra-rspb-join-forces-to-support-wildlife-conservation/>
- 12 Kirby W. (undated) An assessment of the butterfly population of Rookwood north golf course as an indication of site biodiversity. Personal Report. [presented to TT September 2020]
- 13 Rothwell N.L. & Smitley D.R. 1999. Impact of Golf Course Mowing Practices on *Ataenius spretulus* (Coleoptera: Scarabaeidae) and its Natural Enemies. *Environmental Entomology*, Volume 28, Issue 3, Pages 358–366,
- 14 Riffell, S.K., Gutzwiller, K.J., Anderson, S.H. 1996. Does repeated human intrusion cause cumulative declines in avian richness and abundance? *Ecol. Appl.*, 6: 492-505.
- 15 Saaikivi J. 2016. Biodiversity in golf courses and its contribution to the diversity of open green spaces in an urban setting. Academic dissertation, thesis to: Department of Environmental Sciences Faculty of Biological and Environmental Sciences University of Helsinki, Finland
- 16 Wembridge D.E., Newman M.R., Bright P.W. & Morris P.A. 2016. An estimate of the annual number of hedgehogs (*Erinaceus europaeus*) road casualties in Great Britain. *Mammal Communications @: 8-15*, London.
- 17 Wright P.G.R., Coomber F.G., Bellamy C.C. Perkins S.E. & Matthews F. 2020. Predicting hedgehog mortality risks on British roads using habitat suitability modelling. *Biodiversity and Conservation*. PeerJ7:e*154 <https://doi.org/10.7717/peerj.8154>.
- 18 Terman M.R. 1997. Natural links: naturalistic golf courses as wildlife habitat. *Landscape and Urban Planning* Volume 38, Issues 3–4, 15 November 1997, Pages 183-197
- 19 Do Carmo De Lima Bezerra M. Urban 2015. Planning Instruments as Biodiversity Promoters in Cities. *Revista Legado de Arquitectura y Diseño*, núm. 17, enero-junio, 2015, pp. 109-123 Universidad Autónoma del Estado de México Toluca, Estado de México, México