Journal for Nature Conservation 25 (2015) 17–22

Contents lists available at ScienceDirect

Journal for Nature Conservation

journal homepage: www.elsevier.de/jnc

Review

The use of man-made structures as nesting sites by birds: A review of the costs and benefits

Mark C. Mainwaring*

Lancaster Environment Centre, Lancaster University, Lancaster, LA1 4YQ, UK

ARTICLE INFO

Article history:
Received 16 October 2014
Received in revised form 9 January 2015
Accepted 23 February 2015

Keywords:
Artificial structures
Birds
Bridges
Buildings
Ecological trap
Nest site selection
Pylons
Reproductive success

ABSTRACT

Bird populations are often limited by the availability of suitable nesting sites and nestboxes are commonly provided with the explicit intention of increasing the availability of nesting sites. However, birds also regularly nest on man-made structures such as houses, uninhabited buildings such as barns and factories, bridges, metal pipes in fences and pylons that are not intentionally provided for breeding birds. Such man-made structures are widely used as nesting sites by a range of birds and their primary advantage is that they often provide nesting sites in areas where they are limiting. However, the primary disadvantages of such structures are that they sometimes act as ecological traps by attracting birds to nest in suboptimal areas, the nesting birds sometimes negatively impact other species and their temporary nature means that they can be dismantled and hence, lost as nesting sites very quickly. Despite such potential drawbacks, the evidence suggests that man-made structures provide suitable nesting sites for a range of bird species globally, and I urge practitioners to use such structures more widely as a conservation tool for conserving endangered birds.

© 2015 Elsevier GmbH. All rights reserved.

Introduction

Bird populations are usually limited by some combination of the availability of food and nesting sites (Newton 1998). The availability of suitable nesting sites often limits the populations of breeding birds and studies have shown that the provision of nestboxes often results in population increases (e.g. Deng et al. 2005; Libois et al. 2012), thereby making them a widely used and effective conservation tool. However, whilst nestboxes are explicitly provided with the intention of increasing the availability of nesting sites (Fargallo et al. 2001; Lambrechts et al. 2010; Mainwaring 2011), birds also regularly nest on man-made structures that are not intended for that purpose. Illustratively, birds nest on a broad range of structures that include houses (Vermeer et al. 1988; Raven and Coulson 1997; Soldatini et al. 2008; Tryjanowski et al. 2009), uninhabited buildings such as barns and factories (Armstrong 1965; Grazma 1967; Monaghan and Coulson 1977; Vermeer et al. 1988; Negro & Hiraldo 1993; Dwyer et al. 1996; Ramsden 1998; Raven & Coulson 1997; Kubetzki & Garthe 2007; Møller 2010; Sherley et al. 2012; Rock & Vaughan 2013; Sumasgutner et al. 2014a,b), bridges (Tyler & Ormerod 1994; Brown & Brown, 2013), metal pipes in fences (Lesiński 2000) and pylons (Steenhof et al. 1993; Anderson 2000; Infante & Peris 2003; Balmori 2005; Clarke et al. 2006; Clarke & White 2008; Tryjanowski et al. 2009, 2014; Kaługa et al. 2011; Howe et al. 2014; see Table 1). In this review, I highlight the widespread use of such man-made structures as nesting sites by birds, and then consider the costs and benefits of their use, before outlining the implications for practitioners.

Quantifying the use of man-made structures as nesting sites

Many studies have shown that birds frequently use man-made structures as nesting sites, although often within relatively small study areas. In rural areas, studies have shown, for example, that white storks (*Ciconia ciconia*) nested on pylons in an agricultural area of Poland at a density of 20 pairs per 100 km^2 (Kaługa et al. 2011) whilst 133 pairs of raptors and common ravens (*Corvus corax*) nested along a 596 km transmission line in North America within 10 years of it being constructed (Steenhof et al. 1993). However, the true extent of the availability and use of such man-made structures as nesting sites throughout the rural landscape remains unclear. This is due, in no small part, to the logistical difficulties associated with quantifying the availability of such structures as they are often distributed sparsely and irregularly throughout rural landscapes (Tryjanowski et al. 2009; Kaługa et al. 2011).

* Tel.: +44 1524 592566.
E-mail addresses: mark.mainwaring400@gmail.com, m.mainwaring@lancaster.ac.uk

http://dx.doi.org/10.1016/j.jnc.2015.02.007
1617-1381/© 2015 Elsevier GmbH. All rights reserved.

Table 1
Summary of the costs and benefits of man-made structures that are commonly used as nesting sites by birds.

Structure	Summary of benefits	Summary of costs
Inhabited buildings e.g. houses, blocks of flats	The roof tops of houses are regularly used as nesting sites by a range of species, including gulls (Vermeer et al. 1988; Soldatini et al. 2008). The ready availability of roof top nesting sites has allowed the populations of gulls and some other species inhabiting urban areas to dramatically increase over the past few decades	There are no apparent costs to gulls, or any other bird species, from nesting on roof tops, as studies show that levels of breeding success on roof tops are similar to conspecifics in rural areas (e.g. Soldatini et al. 2008). However, the rapid increase of gulls in urban areas has seen them become pests in some areas and there are now concerns regarding human health (Hatch 1996)
Uninhabited buildings e.g. outbuildings, barns, factories	Uninhabited buildings provide excellent nesting sites for a range of endangered birds (e.g. Ramsden 1998). Moreover, birds nesting in outbuildings were found to suffer lower predation rates than conspecifics breeding outdoors as predators were reluctant to enter the buildings (Møller 2010)	Many outbuildings and barns are being converted to houses and hence lost as nesting sites for birds. As well as this immediate loss, one study found that barn conversions resulted in barn owls leaving the breeding territory altogether, despite alternative nesting sites being available close by Ramsden (1998)
Bridges	Bridges over both water and roads provide safe nesting sites for birds in locations where nesting sites are otherwise limited. However, few studies have explicitly examined the suitability of bridges as nesting sites for birds	There are no apparent costs when birds nest on bridges over rivers and streams. However, birds nesting on bridges over roads are sometimes killed by road traffic (Brown and Brown 2013)
Metal pipes in fences	Metal pipes provide various species with nesting sites in urban areas where nest sites are otherwise limiting, as was demonstrated in an urban area of Warsaw, Poland (Lesiński 2000)	Birds nesting in metal pipes in fences had lower levels of reproductive success than conspecifics breeding in nestboxes in the same area (Lesiński 2000)
Pylons	Pylons provide numerous nesting sites for iconic species such as white storks throughout agricultural areas where they are otherwise limiting (e.g. Balmori 2005; Tryjanowski et al. 2014; Howe et al. 2014). Moreover, farmland birds were more abundant in the scrubby vegetation under pylons than in adjacent fields (Tryjanowski et al. 2014)	Sometimes there are no reported costs (e.g. Tryjanowski et al. 2014; Howe et al. 2014) but studies have reported that the breeding success of white storks was lower both on (Tryjanowski et al. 2009) or close to, pylons (Balmori 2005). Also, white storks and other birds suffer high levels of mortality due to collisions with power lines or from electrocution

In urban areas, meanwhile, studies have shown that more than 500 pairs of glaucous-winged gulls (*Larus glaucescens*) nested on roofs along the Vancouver waterfront (Vermeer et al., 1988) and as many as 11,047 pairs of herring gulls (*Larus argentatus*) and 2544 pairs of lesser black-backed gulls (*Larus fuscus*) nested on buildings and other man-made structures in Great Britain and Ireland (Raven & Coulson 1997). Potential nesting sites on man-made structures are probably more abundant in urban areas than is generally imagined, in a situation analogous to the availability of nestboxes in urban areas. One study estimated that there are 45,500 nestboxes available for birds to occupy within the city of Sheffield, in northern England, alone (Gaston et al. 2005) and it is easy to imagine that other man-made structures that may provide nesting sites, such as walls and garden sheds, are similarly common throughout urban landscapes. Nevertheless, our understanding of the availability and use of man-made structures as nesting sites throughout both urban and rural landscapes remains poor and studies that quantify their availability and use are required.

Benefits of man-made structures as nesting sites

The primary benefit of man-made structures for breeding birds is that they often provide suitable nesting sites in areas where they are otherwise limiting (Table 1). Accordingly, numerous studies have shown that structures such as houses, uninhabited buildings such as barns and factories, bridges, metal pipes in fences and pylons provide nesting sites for birds (e.g. Ramsden 1998; Infante & Peris 2003; Howe et al. 2014). However, whilst most studies simply state that birds use such structures as nesting sites, few have quantified their importance to breeding birds. A study by Lesiński (2000) examined the nesting sites of a range of hole nesting birds in a suburb of Warsaw, Poland, and found that many pairs of great tits (*Parus major*), blue tits (*Cyanistes caeruleus*), coal tits (*Periparus ater*), common redstarts (*Phoenicurus phoenicurus*) and tree sparrows (*Passer montanus*) were nesting inside the vertical pipes of fences. Importantly, the study then went on to estimate that 80 per cent of the local great tit population nested in such pipes (Lesiński 2000). In North America, common ravens were found to rely so heavily on transmission lines as nesting sites that there was a 31 per cent decrease in the odds of finding a breeding pair of common ravens for every 1 km increase in distance that was moved away from a transmission line (Howe et al. 2014). The value of transmission lines to nesting birds has also been confirmed by other studies and for example, there were 133 pairs of raptors and common ravens nesting along a 596 km transmission line in North America within 10 years of it being constructed (Steenhof et al. 1993). Unfortunately, it is unclear whether those birds were breeding at other sites or not breeding at all before the transmission line was erected, or whether they immigrated into the area once suitable nesting sites were available. Elsewhere, at least fourteen species of raptors use man-made structures as nesting sites in South Africa (Anderson 2000) and species such as 'vulnerable' cape vultures (*Gyps coprotheres*) and 'endangered' white-backed vultures (*Gyps africanus*) and African hobbies (*Falco cuvierii*) have expanded their ranges in South Africa as a result of power lines being erected throughout the wider landscape (Anderson 2000; Anderson & Hohne, 2008; Phipps et al. 2013; Harrison et al. 1997). In the case of cape vultures, they not only use the power lines as nesting sites, but they also frequently used the pylons as perching sites and as locations from which they could forage (Phipps et al. 2013). Many vulture species have shown alarming population declines across the Africa and Asian continents and whilst the population declines are not thought to have been caused by shortages of nesting sites (Oaks et al. 2004; Thiollay 2006), ensuring that such species have got plenty of suitable nesting sites within suitable breeding habitat is nonetheless useful for their recovering populations. Meanwhile, barn owls (*Tyto alba*) roosting in an outbuilding in Scotland were afforded complete shelter from wind and precipitation. The air temperature inside the building was 1.4 °C higher than ambient and the owls reduced their annual metabolic heat production by 19 per cent, thereby gaining significant thermal benefits and energy savings (McCafferty et al. 2001).

Together, these studies show that structures such as outbuildings and pylons provide direct benefits for breeding birds in terms of providing nesting sites, but a recent study has also shown that pylons indirectly benefit breeding birds. A study in Poland

Download English Version:

https://daneshyari.com/en/article/4399768

Download Persian Version:

https://daneshyari.com/article/4399768

Daneshyari.com