

CHAPTER NINETEEN

Birds in cultural landscapes: actual and perceived differences between northeastern North America and western Europe

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This chapter presents an intercontinental comparison of studies on bird-habitat relationships in three types of cultural landscapes: those created by forestry (managed forests), agriculture (farmed land and remnant native habitats in a matrix of farmed land) and urbanisation. The geographical emphasis is on temperate and boreal regions of eastern Canada (hereafter referred to as 'North America') and western Europe/Fennoscandia. We seek out differences and similarities in patterns and discuss responses of birds to processes of landscape change. We consider the influence of human perception of landscapes on the development of research ideas and the extent to which there has been intercontinental exchange and application of ideas and research findings.

One of the most striking differences in the history of habitats in North America and Europe often put forward is the timing and rate of land clearing. The clearing of a predominantly forested landscape has often been described as one of the major

tasks European settlers faced arriving in North America (Whitney, 1994), whereas in Europe land clearing had started around 6000 years ago (Williams, 2003).

However, the common picture of eastern North America as a vast forested wilderness before European colonisation is coming into question. Aboriginal people probably managed the landscape quite extensively through permanent or shifting agriculture and the use of fire to clear land for cultivation, to create parklands favourable to game and to open forest understorey to facilitate travel (Williams, 2003, 2008). These managed landscapes disappeared with the annihilation of over 90% of aboriginal populations starting in the 1500s, mainly due to diseases transmitted by Europeans. In southern Ontario, for instance, the extent of forested lands probably reached a low just before these epidemics (Pyne, 1982; Williams, 1989). Forests subsequently re-grew and the area covered by forest peaked just before the beginning of large-scale land cultivation by European farmers and the advent of extensive logging. Similar historical patterns are described elsewhere in North America e.g. Wisconsin (Waller and Rooney, 2008). In Europe, forests were still widespread in the middle ages and plummeted to a minimum in the seventeenth century (Cantor, 1994; Williams, 2003), at a time when land conversion by European industrialists and settlers was only about to start in North America.

On both continents the pace and intensity of land-use change increased over the past 150 years (Williams, 2008), but with much geographical variation. Canada and Fennoscandia, for instance, retained most of their forests until the

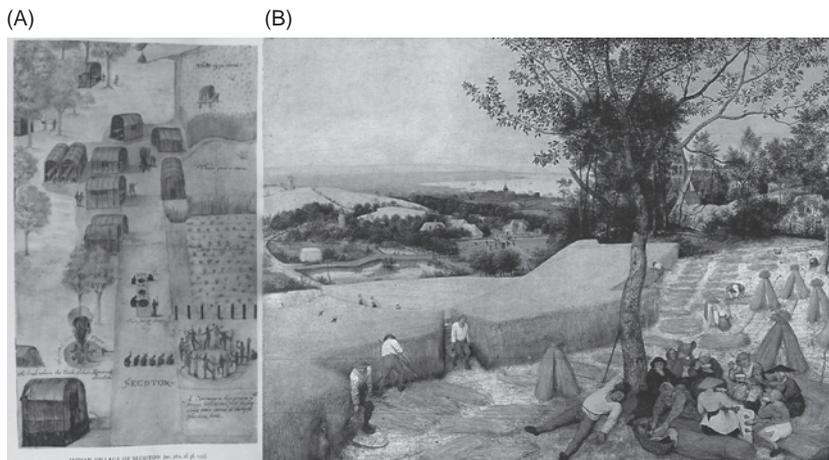


Figure 19.1 Farmed cultural landscapes of the sixteenth century in North America (A) and Europe (B). Watercolour drawing (left) *Indian Village of Secoton* by John White (created 1585–1586) (Licensed by the Trustees of the British Museum. © Copyright the British Museum) and (right) oil painting *The Harvesters* by Pieter Bruegel in 1565 (Metropolitan Museum of Art, located in New York City).

nineteenth century, though in both regions, forestry operations have intensified over the past century. In contrast, Scotland and southwestern France saw afforestation over the same period through plantations of exotic or native conifers (Angelstam *et al.*, 2004) and, in recent decades, on both continents, natural forest has re-grown over large areas where farming has become economically marginal such as in Mediterranean France (Debussche and Lepart, 1992) and Italy (Farina, 1997), and in the temperate forest zone of the USA (Foster *et al.*, 1998).

In this chapter, we explore three questions that are important in assessing whether and how research findings about bird-habitat relationships can be extrapolated from one continent to another:

1. What are the key differences and similarities in the origins, attributes and habitat relationships of birds in human-modified landscapes in North America and Europe?
2. Are differences explained by actual intercontinental differences in the history, management and nature of these cultural landscapes?
3. Alternatively, are apparent differences due to intercontinental differences in human perceptions and research approaches?

Review method

For each of the landscape types considered – landscapes managed for forestry, farmed landscapes, urban landscapes – we searched the ISI Web of Science for all studies that included any avian-related term. We removed all empirical studies that were not conducted in Europe or North America. We separated the remaining studies into three groups (European, North American and intercontinental) based on either the continent(s) where the field work was conducted (if an empirical study) or the countries in the authors' addresses (if a more theoretical study). This search resulted in a few hundred papers for each landscape type. To those we added relevant studies of which we were aware but were not, for different reasons, picked up by the search. Our objective was not a complete review of this literature. Rather, we first searched for general conclusions in the most cited papers, those with at least 30 citations, and we then re-visited the rest of the literature to complement or correct these conclusions. Many of the papers cited in this chapter should be regarded as examples of the phenomena or issues under discussion.

Birds in managed boreal forests

In both eastern North America and western Europe, managed forest landscapes are mainly located in the boreal region; we therefore focus this section on birds in boreal forests. The keywords 'bird* AND boreal forest*' yielded 258 references; 250 (97%) were from North America (USA: 18; Canada: 122) or Europe (110). Of the 52 studies cited at least 30 times, 31 were conducted in North America, 17 in

Europe, and 4 on both continents. The most cited studies were 12–16 years old, irrespective of the continent where the work was conducted.

Differences and similarities between continents

Boreal forest avifaunas evolved in environments affected by large-scale climatic fluctuations during the Quaternary which did not translate into similar forest conditions in North America and Europe (Mönkkönen and Welsh, 1994). Contacts between latitudinal forest zones in North America were more continuous, allowing relatively easy movement of species from boreal forests to temperate or tropical forests, whereas this was not the case in northern Europe (Huntley, 1993).

Overall, the North American avifauna of the boreal forest is taxonomically more diverse than that of Europe (Niemi *et al.*, 1998). The proportion of species that are long-distance migrants (wintering in the tropics) is larger in North America than in Europe (Mönkkönen and Welsh, 1994). However, long-distance migrants represent a significantly greater proportion of breeding birds in early- than late-successional stages in both continents (Imbeau *et al.*, 2001). Hence, long-distance migrants in boreal forests are less likely to be sensitive to landscape-scale changes induced by timber harvesting, which increases the availability of early- and young-seral stages. The proportions of short-distance migrants (wintering in temperate ecosystems) are similar and Europe harbours proportionately more species of permanent residents than North America

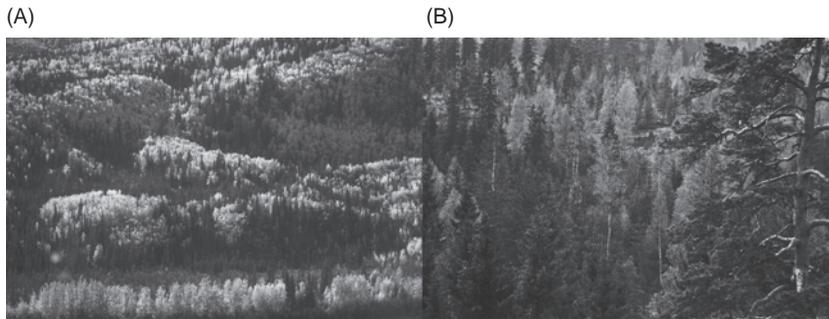


Figure 19.2 Managed boreal forests in North America (Yukon Territory, Canada (A)) and Europe (Southern Finland (B)). Extensive intercontinental collaboration has taken place between researchers attempting to minimise the impacts of boreal forest management on birds and other wildlife. Northern European forests have a relatively long history of intensive management and deadwood quantities tend to be lower than in North America. Furthermore, forest re-growth is more often achieved by natural regeneration in North America than in Europe. These differences in management have implications for habitat quality for several bird species. © J.-L. Martin.

(Niemi *et al.*, 1998). Residents or short-distance migrants are the most taxonomically related group of species (creepers, kinglets, nuthatches, woodpeckers) on the two continents (Mönkkönen and Welsh, 1994).

Since the last glaciation, boreal forests have responded to many natural disturbances, including fire, insect outbreaks and storms. Fire has the most widespread influence in structuring the regional amount and distribution of forest cover types. In the eastern boreal forest of North America, reconstruction of natural fire history through dendroecological and paleoecological records shows that forests older than the current timber harvesting rotation age (> 100 years) were historically dominant (Bergeron *et al.*, 2006; Cyr *et al.*, 2009). This high proportion of old forest in unharvested forest landscapes of eastern Canada contrasts with a common perception that large-scale fire disturbances lead to relatively small proportions of late-seral forests (Niemi *et al.*, 1998). In Sweden, Engelmark (1984) also observed that fire frequency was low in spruce forests. Historical forest inventory records in northern Finland before industrial timber harvesting suggest that the forest was also dominated by stands older than 150 years (Kouki *et al.*, 2001).

Contrary to other environments, boreal forests host few bird species that colonised these forest landscapes following the development of extensive forest management. On both continents native species remain dominant in managed forest landscapes. Compared with naturally disturbed landscapes, however, the bird communities in these modified forests contain higher proportions of habitat generalists and early successional species and a lower proportion of late-seral species (Drapeau *et al.*, 2000). Late-seral species include a high proportion of resident species that share habitat-selection traits, such as a requirement for large-diameter trees or decayed wood that are used as nesting and foraging substrates (Imbeau *et al.*, 2001). These species are strongly affected by the net reduction in the overall amount of deadwood that results from loss of late-seral forests (Fridman and Walheim, 2000; Vaillancourt *et al.*, 2008; Drapeau *et al.*, 2009a). Residents as a group have low densities (Schmiegelow and Mönkkönen, 2002), but constitute a relatively high proportion of the bird assemblage in late-seral forests compared with other stages (Imbeau *et al.*, 2001). North American residents are more evenly distributed among abundance ranks in the community than their European counterparts that mainly occupy the rarer categories (Schmiegelow and Mönkkönen, 2002).

On both continents, the question of 'how much late-seral forest is enough' is a key issue for maintaining forest specialists, especially residents that form the most vulnerable species group in these landscapes. Schmiegelow and Mönkkönen (2002) showed that in both Finland and Canada, resident species had a higher probability of being absent when the amount of late-seral forest was low. Recent developments in the detection of ecological thresholds

(Guénette and Villard, 2005; Drapeau *et al.*, 2009b; Villard and Jonsson, 2009) hold promise for setting conservation targets for these sensitive species.

Influence of forest management practices and history

Management of the boreal forest for timber production has a shorter history in North America than in northern Europe. Nonetheless, large-scale clear-cutting on both continents has massively increased the proportion of early-seral forest (Edenius and Elmberg, 1996; Gauthier *et al.*, 1996; Bergeron *et al.*, 2002). In northern Europe there have been regional declines in birds specialising on older forests and increases in species associated with early-seral stages (Helle and Järvinen, 1986). Even-aged management has profoundly altered the older forest cover types, which are habitats of concern for boreal birds in both continents (Imbeau *et al.*, 2001; Schmiegelow and Mönkkönen, 2002). There are, however, two important differences between boreal management systems of North America and northern Europe: the higher severity of the disturbance created by timber harvesting and the extensive fire suppression in Nordic countries of Europe. In Fennoscandia, intensive silviculture and forest plantations have been widely developed in the last 50 years and 75% of all clear-cuts were planted (Esseen *et al.*, 1997). In the Canadian boreal forest, extensive use of clear-cutting in the last 40 years has been mainly followed by natural regeneration of stands and less than 25% of clear-cuts were planted (Haddon, 1997). Plantations have a simplified tree species composition and structure that result in less diversified bird communities than in naturally regenerated stands (Edenius and Elmberg, 1996).

Forest mosaics of the Canadian boreal are still shaped by large-scale wildfires (Bergeron *et al.*, 2006), whereas in northern Europe, natural fire regimes now occur only in parts of Russia (Esseen *et al.*, 1997). Birds that are associated with burned sites and standing deadwood, such as the black-backed woodpecker *Picoides arcticus*, are the first to benefit from post-fire conditions (Hoyt and Hannon, 2002; Nappi and Drapeau, 2009). Recent increase in salvage logging in wildfires throughout Canada (Nappi *et al.*, 2004; Schmiegelow *et al.*, 2006) may reduce habitat quality for such species. In northern Europe, fire suppression combined with planting reduced early post-fire habitats and inhibited deciduous tree growth (Esseen *et al.*, 1997), affecting resident birds of deciduous stands (Enoksson *et al.*, 1995).

The more severe landscape-scale transformation of the forest cover by intensive silvicultural practices in Nordic European countries likely explains the greater population declines of resident species in Europe than in North America. For instance, the highly threatened status of the white-backed woodpecker *Dendrocopos leucotos* (Virkkala *et al.*, 1993) is linked to the extirpation of deciduous and mixed-wood forest cover through a regulated age structure dominated by conifer stands (Esseen *et al.*, 1997; Carlson, 2000; Mikusiński

et al., 2001). Although there are concerns about reduction of older mixed-wood stands and its consequences for bird assemblages in the southern portion of the Canadian boreal forest at stand (Hobson and Bayne, 1999) and landscape scales (Drapeau *et al.*, 2000), bird species that show strong affinities with mixed-wood forests are not currently as severely threatened as some European residents.

The drastic reduction in deadwood availability resulting from intensive forestry and its effects on deadwood associates in Northern Europe (Angelstam and Mikusiński, 1994) is not currently evident in North America. For example, in eastern Canada snag densities of large trees (> 20 cm) in remnant habitats within managed landscapes were similar to or higher than those in unharvested late-seral forests (Mascarúa-Lopez *et al.*, 2006; Vaillancourt *et al.*, 2008). However, remnant forests in cutover areas had fewer of the largest (> 30 cm diameter at breast height (DBH)) dead trees than adjacent unharvested late-seral forest (Vaillancourt *et al.*, 2008). The loss of these largest trees raises concerns for cavity nesters in managed landscapes of eastern Canada (Imbeau *et al.*, 2001). Studies are needed to determine whether these species are likely to show similar population declines to those in Northern Europe. The Fennoscandian experience could be taken as a warning of the likely effects of landscape changes on boreal birds of the eastern Canadian boreal forest if management there is not altered to allow more large dead trees (Imbeau *et al.*, 2001).

The shorter history of forest management in North America may further explain bird community differences between the two continents. The proportion of remaining unharvested natural forest is much higher in the Canadian boreal forest (> 40%) than in Fennoscandia (< 5%) (Imbeau *et al.*, 2001). Effects of loss of late-seral forests on birds in North American managed forests may be dampened by these remaining large blocks of unmanaged forest and this may, in turn, explain the low power of landscape pattern to account for bird community patterns in these recently managed forests (Schmiegelow *et al.*, 1997; Drapeau *et al.*, 2000). In contrast, Kouki and Vaananen (2000) found that species richness and individual abundance of residents of late-seral forests in Finland's natural forest reserves declined significantly with the distance from the continuous forest in Russian Karelia.

Influence of cultural differences

North America lacks Northern Europe's long history of monitoring bird populations in boreal forest; the North American Breeding Bird Survey does not cover the boreal forest sufficiently to allow a sound assessment of population trends. Hence, a broad perspective of regional-scale changes in boreal bird populations has yet to be developed in North America. In contrast, the longer surveys of population trends in boreal Europe allow analyses of changes and the mechanisms involved (Helle and Järvinen, 1986; Haila and Järvinen, 1990).

Nevertheless, in the last 20 years avian research in the boreal forest on both continents has focused on similar issues, conceptual frameworks, methodologies and study designs (Schmiegelow and Mönkkönen, 2002). The response of boreal birds to habitat loss and habitat fragmentation following timber harvesting has been a main focus. In their review, Schmiegelow and Mönkkönen (2002) concluded that loss of late-seral forests is the main driver of avian responses to timber harvesting in both regions (but see Kouki and Vaananen, 2000). The fact that habitat fragmentation (biotic edge effects, area effects or isolation effects) seems less influential in managed boreal forests than in temperate forests converted for agriculture (see below) may be attributed to several inter-related factors. First, boreal ecosystems have evolved in a context where natural disturbances generate large-scale fragmentation of forest, so species may be more tolerant than in other ecosystems (Niemi *et al.*, 1998; Schmiegelow and Mönkkönen, 2002). A possible indication of this is the persistence of sensitive residents in old-growth refuges in otherwise intensively managed Fennoscandian landscapes (Virkkala, 1991; Kouki and Vaananen, 2000). Second, landscapes managed for timber production remain forested and are not converted into fundamentally different environments (e.g. agriculture) that may attract a greater diversity of predators (Bayne and Hobson, 1997; Kurki *et al.*, 2000). The matrix that results from timber harvesting is thus not as inhospitable to boreal birds as it may be for temperate forest birds in landscapes transformed for agriculture (Brotons *et al.*, 2003). Nonetheless, as discussed above, the loss of late-seral stages clearly has negative effects on several boreal bird species on both continents.

The development of forest management strategies that tackle loss of key habitats in boreal forest is urgently needed. Approaches founded on the principle of narrowing the gap between currently managed landscapes and the diverse forest conditions generated by natural disturbance regimes are promising (Franklin, 1993; Haila *et al.*, 1994; Bergeron *et al.*, 2002). However, these should be used alongside approaches targeted on species of concern (Lindenmayer *et al.*, 2007; Drapeau *et al.*, 2009b), including identification of potential ecological thresholds (Betts and Villard, 2009).

Intercontinental co-operation within the scientific community working in the boreal forest has become quite extensive in the last 15 years and increased considerably our understanding of this ecosystem (see Korpilahti and Kuuluvainen, 2002; Angelstam *et al.*, 2004). In parallel, environmental certification of managed forests and international biodiversity agreements have encouraged forest-management approaches incorporating values additional to timber production. This situation, coupled with similarities in responses of boreal birds to habitat alteration, is likely to facilitate further transfer of concepts and findings between continents.

Forest birds in farmed landscapes

The keywords 'bird* AND forest fragment* AND agric*' yielded 301 references; 272 were from North America (USA: 122; Canada: 60) or Europe (90). Of the 58 studies cited at least 30 times, 36 were conducted in North America, 16 in Europe and 6 on both continents. The most cited studies were 10–15 years old, irrespective of the continent of origin.

Differences and similarities between continents

The fragmented forests examined here mainly occupy the temperate zone, where human activity has left virtually no old-growth forest. There are broad biogeographical differences between the temperate forest avifaunas of North America and Europe. While 45% and 67% of resident species have a holarctic distribution in North America and Europe, respectively, migratory species of these continents do not share a single genus (Mönkkönen and Welsh, 1994). Migratory species dominate the temperate forest breeding avifauna of North America (Holmes and Sherry, 2001) and this is also the case in central Europe (Wesołowski and Tomiałojć, 1997). However, in central Europe, many of these birds are short-distance, rather than tropical, migrants (Wesołowski and Tomiałojć, 1997). Most of these short-distance migrants are residents in western Europe, so the contribution of residents to forest breeding assemblages varies across Europe (R.J. Fuller pers. comm.). Neotropical and Paleotropical migrant avifaunas differ taxonomically and in habitat associations. Most Neotropical migrants are associated with mid- to late-seral forest, whereas most Paleotropical migrants are mainly associated with early-seral stages and, therefore, are not sensitive (as a group) to the loss/fragmentation of late-seral forests (Mönkkönen *et al.*, 1992; Böhning-Gaese and Oberrath, 2003; Chapter 1). Neotropical migrants seem especially sensitive to forest landscape change following agricultural expansion (Rodewald and Yahner, 2001). There are few equivalent European studies, possibly because deforestation occurred long ago. Few, if any, non-native species have colonised fragmented forest landscapes on either continent.

On both continents, forest fragments have been subjected to disturbance by domestic herbivores, firewood cutting and wild animals that benefit from surrounding agricultural habitats. The last include nest predators that reduce the reproductive success of forest birds and are different from the nest predators of managed forests (Andrén, 1992; Kurki *et al.*, 2000). In North America, the brood parasitic brown-headed cowbird *Molothrus ater*, historically associated with bison *Bos bison* herds of the Great Plains, has a significant negative effect on the reproduction of hosts in eastern forests where it expanded following forest removal for agriculture (Hoover and Brittingham, 1993). More generally, the nature of matrix habitat matters for the persistence of forest birds in fragments (Brotons *et al.*, 2003; Dunford and Freemark, 2004).

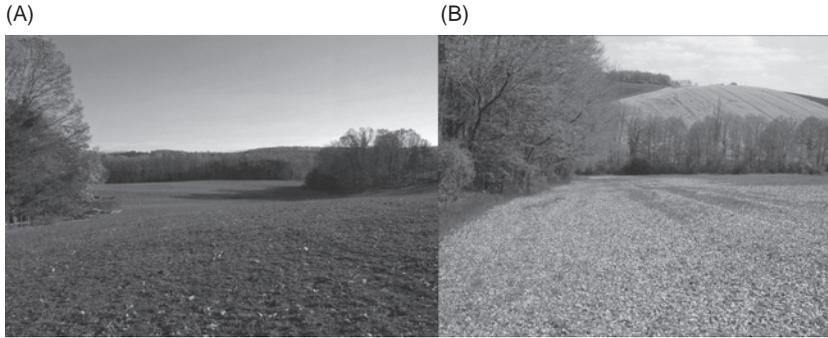


Figure 19.3 Temperate forest fragments in farmed landscapes in North America (Tennessee, USA (A)) and Europe (South western France (B)). Studies of the birds in these fragments have taken rather different trajectories on the two continents and there has been very little intercontinental collaboration. In Europe these woodland patches tend to be seen as an integral part of cultural landscapes, whereas in North America they are largely perceived as a legacy of forest fragmentation. © S. Blangy and G. Balent.

Andrén (1994) reported a tendency for fragmentation effects to be more prominent in landscapes with less than *c.* 20–30% forest cover. This sparked a debate on both continents on the existence of a ‘fragmentation threshold’, a phenomenon later simulated through modelling (Fahrig, 1997; Flather and Bevers, 2002). In North America, this encouraged further empirical tests of the relative influence of habitat amount/loss vs. configuration/fragmentation on species response to landscape change (McGarigal and McComb, 1995; Trzcinski *et al.*, 1999; Villard *et al.*, 1999). In Europe, Mönkkönen and Reunanen (1999) pointed out that the fragmentation threshold suggested by Andrén (1994) coincided with a shift from studies conducted in managed forest landscapes (higher overall forest cover) to ones in island archipelagos or in forests fragmented by agriculture.

Within forest landscapes fragmented by agriculture, teasing apart the relative influence of habitat amount, configuration and their interaction remains contentious and statistically challenging (Koper *et al.*, 2007; Chapter 4). Some North American studies suggested a stronger influence of forest cover (McGarigal and McComb, 1995; Trzcinski *et al.*, 1999), whereas others have emphasised species-specific responses to cover or configuration (Villard *et al.*, 1999).

Influence of management practices, history and culture

In North America, considerable attention has been devoted to the effects of forest fragmentation on nest predation (Robinson *et al.*, 1995; Tewksbury *et al.*, 1998; Burke and Nol, 2000; Flaspohler *et al.*, 2001; Burke *et al.*, 2004; Driscoll and Donovan, 2004). European researchers have given much less attention to

this issue, except in Fennoscandia (Andrén and Angelstam, 1988; Andrén, 1992; Chapter 4). In Europe, proportionally greater attention has been given to fragmentation effects on populations and individuals, including alteration of dispersal patterns (Lens and Dhondt, 1994; Matthysen and Currie, 1996), physiological stress and brood sex ratio (Suorsa *et al.*, 2003, 2004), or survival rate (Robles *et al.*, 2007). The effects of management practices and browsing impacts within European forest fragments, and consequences for avian habitat quality, has been a recent focus of much work (Chapter 14). While European researchers have mainly examined dispersal patterns through individually banded populations or band recoveries (Paradis *et al.*, 1998), North American researchers have investigated fragmentation effects on movements using indirect approaches such as gap-crossing experiments (Desrochers and Hannon, 1997), translocations (Bélisle *et al.*, 2001; Gobeil and Villard, 2002) and radio-telemetry (Norris and Stutchbury, 2001).

In North America, studies tended to be shorter, to cover larger areas, and to focus more on open-nesting species (Robinson *et al.*, 1995; Burke and Nol, 2000; Flaspohler *et al.*, 2001; Weldon and Haddad, 2005) than European studies. In Europe, long-term population studies using nest-boxes or the monitoring of colonies located in buildings are common (Kuitunen and Mäkinen, 1993; Huhta *et al.*, 2004; Tufto *et al.*, 2005; but see Robles *et al.*, 2008). The extensive use of nest-boxes in European forests may have allowed very high breeding densities (Wesołowski, 2007), low predation rates (Kuitunen and Alecknonis, 1992), or high nestling ectoparasitism (Wesołowski and Stańska, 2001) relative to levels in old-growth forests. Surprisingly, this potential source of bias received little attention when interpreting data on species occurrence and relative abundance in European studies of birds in forest fragments.

Most forest patches in agricultural landscapes of North America are remnants of native forests or naturally regenerated stands, whereas in many agricultural regions of Europe, forest patches were planted. Such patches are usually structurally very different from remnants. Nonetheless, a planted fragment is subject to similar effects (e.g. edge, isolation) as a more 'natural' fragment; Villard and Taylor (1994) showed that the colonisation of planted 'fragments' could, to some extent, reflect the relative tolerance of individual bird species to forest fragmentation.

Perhaps as a result of their different historical landscape trajectories, differences in landscape perception are apparent among researchers on the two continents. For example, the recent origin of forest fragments in North America may explain why 'fragmentation' is more often adopted as a theoretical framework in studies there than in Europe. North Americans take a more forest-focused perspective, whereas Europeans seem to put a greater emphasis on landscape complementation/supplementation, i.e. the use by forest breeding birds of other habitat types to supplement or complement

their resources (Dunning *et al.*, 1992; Rolstad *et al.*, 2000; Barbero *et al.*, 2008). Such studies are less common in North America (Leonard *et al.*, 2008; Wilson and Watts, 2008). Part of the explanation could be that the North American forest avifauna includes a smaller proportion of generalist species, those most likely to exhibit landscape supplementation. The higher prevalence of generalists in Europe may reflect local extirpation of certain guilds by long-term anthropogenic effects, in addition to biogeographic differences between the continents (Mönkkönen and Welsh, 1994; see also Chapter 6). Interestingly, we found no intercontinental comparisons of forest birds in farmed landscapes, suggesting that the two research communities are working rather independently.

Finally, with the retreat of agriculture on marginal farmland and urban sprawl in many regions on both continents, the major threat to birds of temperate forest fragments has shifted from agriculture to urbanisation (Hedblom and Söderström, 2008).

Farmland birds in farmed landscapes

The key words 'bird* AND agriculture*', 'bird* AND grassland*', or 'bird* AND farmland*' yielded 578 references: 208 were from North America (175 USA; 33 Canada); 359 were from Europe of which 194 were from the UK alone. Of the papers cited 30 or more times, 26 were from North America and 63 from Europe. Of the 10 most cited American papers, 8 were older than 13 years, while 8 of the 10 most cited European papers were published in the past 10 years at the time of the survey. We found no intercontinental studies.

Differences and similarities between continents

In North America, agricultural landscapes are typically composed of a matrix of remnant native or semi-natural habitats such as grasslands, forests, wetlands and wooded fencerows, as well as land managed for agricultural production such as row crops, forage crops, orchards, summer fallow, pasture and rangeland. Historically, the grasslands of the Great Plains in the United States and southern Canada were dynamic landscapes maintained by grazing and fire (Samson and Knopf, 1996). With the loss of large herbivores, notably bison, and fire suppression, invasion of woody plants has become a significant threat to indigenous biodiversity in some of these grasslands (Grant *et al.*, 2004; Johnson, 2005). In the Great Plains, some farming practices have become surrogates for natural disturbance and create/maintain habitats that are no longer present (e.g. cattle and mowing for bison and fire; managed grasslands for native prairie). Row crops, in contrast, are generally impoverished from an avian perspective (Rodenhouse *et al.*, 1995; Best *et al.*, 1995). While some grassland species do nest in managed agricultural landscapes, their occupancy rates and reproductive output there are not as high as they

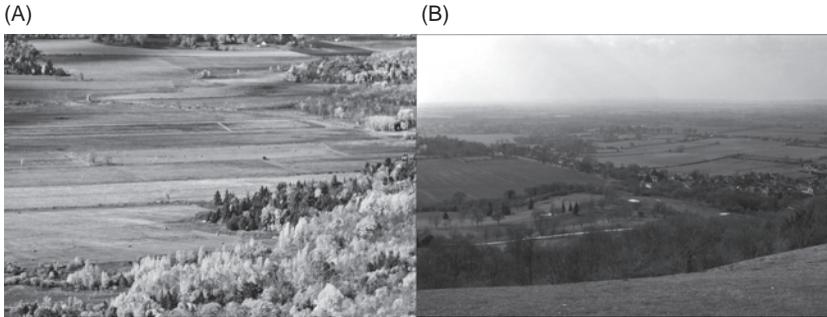


Figure 19.4 Farmland landscapes in North America (Outaouais, Québec, Canada (A)) and Europe (central England (B)). In Europe the conservation of birds that are adapted to living in long-established open agricultural landscapes is a high priority. In North America the perspective is strikingly different in that the negative effects of agriculture on ‘natural habitats’ are generally emphasised. Hence, the reference landscapes are very different on the two continents. © J.-L. Martin and G. Siriwardena.

would be in extensive native prairie grassland (Best, 1986; Rodenhouse *et al.*, 1995; Davis *et al.*, 1999).

The greatest perceived threat to grassland birds in the North American prairies and Great Plains is the loss of native grasslands to agriculture, urbanisation and industrial development. In contrast, in parts of eastern North America, the greatest threat is from abandonment of farmland and subsequent vegetation succession, together with conversion of pasture to row crops as a result of changes in market forces. For these open-habitat bird species, farming facilitated range expansion and population increases (Peterjohn, 2003) at the beginning of the twentieth century (Askins, 1999) (e.g. bobolinks *Dolichonyx oryzivorus*, barn swallows *Hirundo rustica*, eastern meadowlark *Sturnella magna*), some gaining pest status (red-winged blackbird *Agelaius phoeniceus* and brood parasitic cowbirds *Molothrus* spp.).

In much of Europe, semi-natural habitats that remain in farmed landscapes usually have a history of regular management and are far removed from a natural state, whereas comparable habitat fragments in North America can be more similar to their native state in plant species composition. A high proportion of European landbirds depend in some way on farmland for their persistence. For example, 173 species of ‘high conservation priority’ are associated with agriculture and grassland – more than with any other broad habitat type (Tucker and Evans, 1997). Trends in 36 of these species are used to produce a common farmland bird indicator (www.ebcc.info). Sixteen of these species are long-distance migrants. Many of them have exhibited continent-wide declines and continue to be at risk from intensification or farm abandonment.

Few North American authors refer to 'farmland birds' per se; species are typically defined by their native habitat association such as grasslands, forests, shrublands or wetlands. Nevertheless, in southern Ontario, Kirk *et al.* (2001) reported 109 bird species using crop fields or apple orchards; 14% were resident (of which 3% were non-native), 50% were Neotropical migrants and 36% were short-distance migrants. Almost a quarter (23), mostly grassland species, showed significant declines at the end of the twentieth century, according to the North American Breeding Bird Survey (Downes and Collins, 2008). If North American researchers developed a list of specialist farmland birds, it would likely look very similar to the European list in terms of the types of species included, except that migrant species would predominate in North America (e.g. killdeer *Charadrius vociferus* vs. lapwing *Vanellus vanellus*; vesper sparrow *Poocetes gramineus* vs. corn bunting *Emberiza calandra*).

Influence of history and culture on research approaches

It seems that historical context is responsible for intercontinental differences in research perspectives on birds in farmed landscapes. Broadly speaking, in North America research has focused on short-term, synecological studies that explore landscape and ecological theory through a hypothesis-testing paradigm. Most North American applied ecological studies of birds in farmland are relatively recent (since the 1970s). As approximately 70% of Canadian and Northern USA species are migratory, most of these studies focused on the breeding season and to a lesser extent spring and fall migration.

North American studies of birds in farmland tend to focus on birds in remnant native habitats rather than in the farmed fields (Robinson *et al.*, 1995; Herkert *et al.*, 2003). The effects of agriculture have been examined through: (1) the loss and fragmentation of native habitats (see 'Forest birds in farmed landscapes' above); (2) the mechanisms involved in adverse effects (e.g. edge effects/area sensitivity, meso-carnivore release/predation, cowbird parasitism) and only to a lesser extent, (3) the effects of management practices (mowing, tillage, pesticide use) and intensification (increased specialisation, larger fields, chemical use) on birds in remnant habitats (Davis *et al.*, 1999; Shutler *et al.*, 2000; Martin and Forsyth, 2003; Davis, 2004) and in wider farmed landscapes (Jobin *et al.*, 1998; Boutin *et al.*, 1999; Freemark and Kirk, 2001; Kirk *et al.*, 2001; Murphy, 2003). 'How much habitat is enough?' has become the prevailing question in relation to management of native habitats within the farmed matrix, an approach that originated within the paradigm of island biogeography theory. However, this is rarely based on modelling of habitat-specific densities to determine how much habitat would be needed to maintain certain population sizes. Some Canadian studies suggest that farming practices have a secondary influence on bird species composition and abundance compared with habitat composition, but this effect is stronger in

eastern North America than in the prairies (Freemark and Kirk, 2001). Studies on the effects of field management on bird species' presence or abundance in North America have looked at effects of hay mowing, tillage, burning and pesticides (Frawley and Best, 1991; Freemark and Boutin, 1995; Martin and Forsyth, 2003; Mineau *et al.*, 2005).

In contrast to North America, European research has focused on empirical, long-term (sometimes back to the 1950s) autecological studies with in-depth analysis of population demographics, trends and causal factors contributing to changes in farmland bird populations (see review by Wilson *et al.*, 2009). These studies cover both the breeding season and winter (a much higher proportion of farmland birds in western Europe are resident than observed in North America). Results from the breeding season have shown that for many declining species, changes in agricultural practices have reduced food availability and the number of nesting attempts that birds can achieve during a breeding season (see also Chapter 7). However, for many granivorous species the key pressures operate in winter through a drastic reduction in seed availability, a consequence of more intensive herbicide use, lower availability of winter stubble and decreased local habitat heterogeneity in the landscape (Newton, 2004; Wilson *et al.*, 2009; Chapter 7).

In Europe, habitat selection research on farmland birds has drawn less on concepts stemming from island biogeography and more from concepts of landscape complementation and supplementation (as with forest fragments). Many European papers focus intensively and directly on habitat selection of birds in farmed areas and on causal mechanisms explaining distribution and abundance. They also examine the efficacy of changes in management practices (e.g. shift in autumn to spring tillage – Aebischer *et al.*, 2000), mitigation measures (e.g. field margin management – Vickery *et al.*, 2009) or agri-environment schemes (e.g. EU Bird Directive – Donald *et al.*, 2007). In Europe, there has been an especially strong focus on arable systems, but increasingly there has been concern about loss and intensified use of semi-natural grassland (Vickery *et al.*, 2001; Billeter *et al.*, 2007).

Interestingly, several European studies consider how the presence of semi-natural habitats affects the distribution and abundance of birds *within* the farmed component of the landscape (examples in Wilson *et al.*, 2009 and in Chapter 7). We suggest that the effects of habitat mosaics (interspersions of natural, semi-natural and productive patches) on landscape quality for birds needs more emphasis on both continents.

In summary, the main difference across continents is that in North America, the research emphasis is on comparing the species in farmland to the species that would have been there without farmland; the benchmark is non-farmland. In contrast, in Europe the research emphasis has been on the type of farming practice and the heterogeneity and interspersions of crops and

semi-natural field-edge habitats necessary to maintain a suite of farmland specialist species. So, in Europe, the benchmark is ‘traditional’ farmland and its characteristic species.

Influence of history and culture on conservation

In North America farming is perceived as inimical to wildlife and agricultural landscapes as being unable to protect it (Peterjohn, 2003). Much land was converted to agriculture after the Homesteading Act (1862). Homesteaders had a frontier mentality that nature was limitless; witness the killing of thousands of Eskimo curlews *Numenius borealis* on their spring migration through the Great Plains – a bird now almost certainly extinct (COSEWIC, 2009). Thus in North America today, declining grassland birds as a group are considered a conservation issue, but more general range reductions and declines in other ‘farmland’ birds are not, though this is changing with the recognition that other open-country birds are also declining (see below).

In the UK and other parts of western Europe, the land tenure system arose out of the feudally derived system of the Middle Ages. Landed gentry owned the land, with tenant farmers renting individual smallholdings and having a vested interest in preserving uncropped areas to favour game (O’Connor and Shrubbs, 1986). Such traditional agriculture (small fields, hedgerows, minimal or no pesticide use) is widely regarded as beneficial to wildlife, many species of which have a long history of co-dependence on human land use (see also Chapter 6). In Europe, declines in these farmland birds is recognised by governments as a conservation crisis.

Over the past decades in eastern North America widespread declines of grassland and shrubland species have been observed (Brennan and Kuvlesky, 2005; Askins *et al.*, 2007a; Sauer *et al.*, 2008). Many bird species now at risk are ones associated with successional habitats (shrubland, grasslands, old fields, woody pastures) that have been lost either because of intensification of farming practices or land abandonment (Askins, 1993; Vickery *et al.*, 2005; Askins *et al.*, 2007a, 2007b). Land abandonment has become a concern in parts of Europe too, where the reduction of traditional grazing systems has generated large shifts in bird communities (Sirami *et al.*, 2008).

North American avian conservation initiatives began with the North American Waterfowl Management Program (NAWMP), which remains the most well-funded bird conservation program in North America, a reflection of the traditional emphasis on game birds (Cooke, 2003). While declines in Neotropical migrant forest birds precipitated the formation of Partners in Flight (PIF), only recently has avian conservation in North America embraced other groups, such as grassland birds, under the umbrella organisation of the North American Bird Conservation Initiative (NABCI). But, despite the population declines over the last 40 years of many grassland and shrubland species,

birds have not been considered an important indicator of biodiversity in farmland by North American decision-makers. There are no North American agri-environment schemes specifically designed to benefit birds and other wildlife. In the absence of conservation policies for biodiversity on farmland, ancillary benefits for biodiversity have come from, for example, programmes targeting soil erosion reduction (Best *et al.*, 1997; Sutter *et al.*, 2000; McMaster *et al.*, 2001).

In contrast, European farmland birds have become the focus of large-scale management and mitigation measures through agri-environment schemes providing incentives to landholders (Donald *et al.*, 2007; Chapter 7). Population trends of species such as the skylark *Alauda arvensis* and grey partridge *Perdix perdix* are indices against which land management policies are assessed. The high profile of this group of species is illustrated by the result of a general web search (via Google) that used 'farmland birds' and 'Europe' as keywords. It yielded over 450 directly relevant hits, which included a high proportion of links to press releases and information pamphlets for the general public or for policy-makers.

Birds in urban landscapes

From the 359 papers that we compiled through the database search and our own knowledge, we identified four intercontinental papers and about 110 from each continent that described empirical studies of bird responses to urbanisation. Of the 27 studies that have been cited more than 30 times, 18 are North American, six are European and three are intercontinental. Eleven of the highly cited North American studies and four of the highly cited European studies were published within the last 10 years.

Differences and similarities between continents

Overall, the urban bird literature suggests that birds respond similarly to urbanisation in North America and in Europe and that much of what has been learned on one continent can be applied on the other. There are similarities in the resources and habitat patterns that are important predictors of bird distributions in urban areas. The amount of vegetated area in an urban landscape, and the fine-scale structure of the vegetation, are important drivers of species diversity (Clergeau *et al.*, 1998; Turner *et al.*, 2004), community composition (Jokimäki *et al.*, 1996; Blair, 1996) and individual species distribution and abundance (Germaine *et al.*, 1998; Wilkinson 2006). Similarly, the distribution of food resources, particularly supplemental feeding and the availability of human refuse, has been strongly linked to species distributions (Hunt, 1972; Brittingham and Temple, 1992; Schmidt and Bock, 2005). The nature of the predator communities (Jokimäki and Huta, 2000; Thorington and Bowman, 2003) is often mentioned, although it is not clear whether predation generally increases or decreases with urbanisation (Martin and Clobert, 1996; Gering and

Blair, 1999; Chiron and Juliard, 2007; Sims *et al.*, 2008). Finally, the disturbance created by high levels of human activity (Fernandez-Juricic and Telleria, 2000; Schlesinger *et al.*, 2008) and increased mortality from collisions with human structures (Verheijen, 1981; Boal and Mannan, 1999; Klem, 2004) are also implicated in urbanisation effects in both North America and Europe.

Similar species traits are associated with strong positive or negative responses to urbanisation in North America and Europe (Johnston, 2001; Clergeau *et al.*, 2006; Bonier *et al.*, 2007; Croci *et al.*, 2008). Species that are positively affected by urbanisation are generally those with broad distributions and environmental tolerances, that are highly social and behaviourally adaptive, that nest in cavities and that are omnivorous or granivorous. In contrast, species that are insectivorous or that nest on the ground are generally negatively affected by urbanisation.

At the community level, North American, European and intercontinental studies have found comparable responses to increasing urbanisation (Clergeau *et al.*, 1998, 2001; Turner *et al.*, 2004). In both continents there is a general increase in bird density and/or biomass, a decrease in evenness, an overall decrease in species richness from rural areas to the urban core (Lancaster and Rees, 1979; Melles *et al.*, 2003) and a general homogenising effect, where bird communities in the urban cores of distant cities are more similar than are the bird communities in the surrounding non-urban areas (Blair, 2004; Clergeau *et al.*, 2006). However, studies on both continents have at times found conflicting patterns in community metrics along an urbanisation gradient, so these generalisations are not absolute (Marzluff, 2001; Caula *et al.*, 2008).

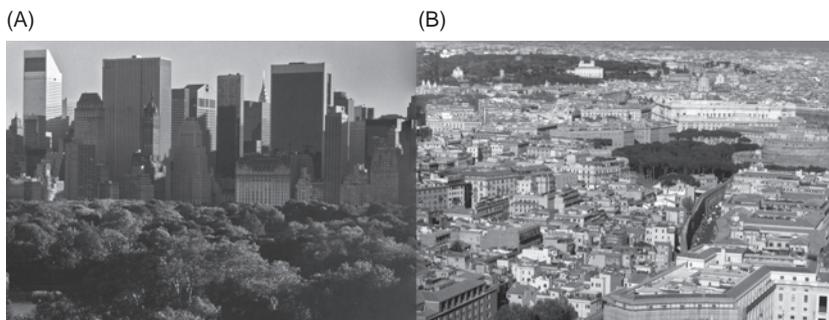


Figure 19.5 Urban landscapes in North America (New York City, USA (A)) and Europe (Rome, Italy (B)). Despite similarities in the ways that birds respond to urbanisation in Europe and North America, so far there has been little collaboration or convergence in research. In North America, urban areas are generally considered to have negative impacts on biodiversity and there are strong concerns about negative effects on 'natural habitats'. In Europe there has been more work on the adaptation of species to urban environments and it is increasingly recognised that urban areas can have conservation value. © J.-L. Martin

The most striking difference in findings between the continents is the increase in the proportion of non-native species with urbanisation in North America. This is not surprising considering that the dominant non-native species in North American cities are three highly successful synanthropic species from Europe (rock dove/feral pigeon *Columba livia*, European starling *Sturnus vulgaris* and house sparrow *Passer domesticus*). European cities have some non-native species that have successfully established populations (many belonging to the *Psittacidae*, Murgui and Valentín, 2003), yet these species still have limited distributions and do not dominate the urban bird community as do the non-native species in North American cities.

Some North American studies suggest that migratory species are more negatively affected by urban development than residents (Friesen *et al.*, 1995). Although at least one review suggested that this difference is general (Chase and Walsh, 2006), we found little evidence to support a migratory effect in Europe. In the single European study that showed a differential response, the patterns were different from those found in North America: turnover and local extinction rates were higher and more related to urbanisation for migratory than for resident species, but species richness or abundance were not different (Husté and Boulinier, 2007). Another European study that compared migratory and resident species did not find strong differences (Jokimäki and Suhonen, 1998), and qualitatively suggested migratory birds may even be more common than residents in urban and suburban areas. A potential explanation for the apparent lack of a migratory effect in Europe is that very few studies have tested for it. Among the empirical studies in this review that include migration-related terms in the abstract, there are 28 from North America and nine from Europe (of which only two actually tested for an effect).

Perhaps the most interesting difference between the continents has more to do with the types of questions asked. In North America, there is a greater focus on the impacts of urbanisation: the limited energy (primary productivity) or food in urban systems (Shochat *et al.*, 2006); the changes to food webs and species interactions (Anderies *et al.*, 2007) and the degradation of relatively natural areas, where urbanisation is perceived as an ecological crisis (McKinney, 2002). In Europe, there is a stronger focus on evolutionary and behavioural adaptations to urban habitats (Slabbekoorn and den Boer-Visser, 2006; Møller, 2008); of the 21 papers that deal directly with the evolution of birds to urban environments, four had only North American authors, 16 had only European authors and the remaining study had authors from both continents. European studies also focus on common synanthropic species as the subject of study (Partecke and Gwinner, 2007), and parks and natural areas within an urban context (Fernandez-Juric and Jokimäki, 2001), whereas North American studies focus on the effect of urbanisation on non-urban species.

Of course, these continental differences are far from absolute and related research threads in the two continents do exist. Indeed, urban ecology has generated complementary and collaborative research streams between the continents, as well as a great deal of diversity within each continent. The differences between continents suggest that there is still much to be gained through further intercontinental collaborations. The recent surges in studies on energy and food-web dynamics in North America (Shochat *et al.*, 2006) and on adaptations to urban environments in Europe (Slabbekoorn *et al.*, 2007) may have great potential for comparative work across the Atlantic.

Influence of variation in nature of urban habitats

Urban and suburban microhabitats are strikingly similar worldwide (Pickett *et al.*, 2001). The similarities in species traits, community-level responses and mechanisms that we have outlined suggest that there are common patterns and processes in urbanisation and that much avian research is applicable across the Atlantic. Considering the strong homogenisation effects that seem to dominate in urban environments, this may be more true in urban landscapes than managed forests or agriculture (McKinney, 2002; Clergeau *et al.*, 2006).

Although urban areas themselves are very similar, latitudinal, climatic and regional factors, and the effects of surrounding land use, the amount of remaining natural area, and the degree of contrast between the urban structure and the natural landcover are also important (Marzluff, 2001; Clergeau *et al.*, 2006). Therefore much of our understanding of urban effects on birds seems to apply across the Atlantic but contrasts within continents – arid vs. temperate systems (Shochat *et al.*, 2006; Bock *et al.*, 2008) and high vs. low development intensity in the surrounding landscape matrix (Melles *et al.*, 2003; Palomino and Carrascal, 2007) – will continue to be important factors.

The rate of urbanisation has been generally higher in North America than in Europe (Richardson and Bae, 2005), which may have reduced the potential for species to adapt in North America (Martin and Clobert, 1996; Clergeau *et al.*, 2004), suggesting that North American species should be more adversely impacted by urbanisation. However, rates of urban sprawl in Europe have recently increased (Richardson and Bae, 2005), suggesting that European researchers may benefit from some North American studies (Friesen *et al.*, 1995). Increased urbanisation rates in Europe may present both an opportunity for researchers and a challenge for urban bird conservation (Shaw *et al.*, 2008).

Influence of history and culture

Some of the differences between urban bird communities in North America and Europe are likely due to the idiosyncrasies of history. The important role of non-native species in North American studies is primarily due to the introduction of European species that were pre-adapted to urban conditions.

Rock doves were first introduced to North America in the early 1600s (Schorger, 1952), leaving little time for any native species to occupy a vacant urban niche. House sparrows and European starlings were also introduced when urban areas were still relatively new and rare features in North America (Robbins, 1973; Cabe, 1993).

Although the historical extent of exposure to urbanisation may explain the success of some European species in North America, the rates at which urban landscapes continue to change and the relatively recent adaptations of many species to urban conditions suggest that short-term effects are at least as important as historical effects. Some North American species have been associated with urban areas for hundreds of years (e.g. chimney swifts *Chaetura pelagica*, barn swallows, many gull species), others have colonised cities more recently (e.g. merlins *Falco columbarius*, Sohdi and Oliphant, 1992). Some European species have also shown relatively recent, abrupt adaptations to urban environments (see Chapter 3) while long-term synanthropic species are showing steep population declines (De Laet and Summers-Smith, 2007).

Preferences for different research questions in North America and Europe likely result from different perceptions of the reference landscape. North American researchers tend to use a 'pristine' landscape as the reference, while Europeans tend to assume some level of human activity. This explains why, in North America, species that are negatively affected by urbanisation are most often the research focus while synanthropic species receive less attention and questions about the evolutionary or behavioural adaptations to urban habitats are rarely asked. Urbanisation is perceived as a process that degrades or destroys a pristine landscape, and the urban bird community as a depauperate group dominated by low-quality species.

In Europe the behavioural and evolutionary adaptations of species to urban habitats is a more active field of study. Synanthropic species are more likely to be studied and questions about the design and management of urban parks are asked more frequently. These patterns reflect a perception of urban areas as a complex part of the landscape which, if managed well, can support a valuable and diverse bird community.

These different tendencies in research focus can have important consequences. For example, the chimney swift and the European swift *Apus apus* are similar in that both nest in human structures, reach peak densities in the urban core, are synanthropic to a similar degree, and have been declining by approximately 3–4% annually since 1994 (Sauer *et al.*, 2008; Baillie *et al.*, 2010). A simple literature search within the ISI Web of Science produces nine hits on the North American chimney swift; the only one published since 1997 is a rarity-sighting from Spain. This compares with 76 hits on the European swift, with 41 published since 1997. The dearth of research on this declining North American 'city bird' reflects a North American bias against synanthropic species.

Conclusions: lessons and implications for conservation Differences and similarities across continents

For birds of managed boreal forests there is a well-identified species pool with species, ecology and research trends showing much in common across continents. There is also a common concern and research emphasis on the negative effects of the current reduction in late-seral stages in these forests. The longer history of forestry intensification in Europe and the resulting knowledge on forest birds' response to levels of habitat alteration should act as a warning for bird conservation in North American managed forests.

By contrast, research on use of forest fragments by birds in agricultural landscapes has taken rather different routes on the two continents. This is partly a result of phylogenetic differences in bird communities, with migrants dominating late-seral stages in North America and early-seral stages in Europe. North American researchers essentially perceive forest fragments as the result of habitat destruction by agriculture, and consequently focus on negative effects of the agricultural matrix on native forest bird communities persisting in fragments, with emphasis on Neotropical migrants. Initially at least, many of these studies adopted the island metaphor, while European studies did less so, instead perceiving patches of forest as components of the cultural landscape, and focusing on understanding how bird populations function in their landscape context.

For farmland birds, the research emphasis, both in North America and Europe, is on causes of species losses relative to a reference. But in North America the reference landscape is 'natural' (non-farmed) land, whereas in Europe the reference landscape is 'traditional' farmland. This difference is likely due to differences in time since conversion to farmland and the historical rate of conversion. This has led to an emphasis on farmland-associated species in European studies, and on forest-, wetland- and grassland-associated species in North American studies. It has also resulted in a recognised suite of farmland species in Europe, but not in North America. Thus, while Europe sees farmland as 'nature' and the challenge as finding ways to change farming in a favourable way, North America continues to see farmland more as conflicting with nature and the challenge is to find ways to minimise adverse effects of agriculture in the landscape. The latter attitude tends to forget that, in North America, farmland is extensively used by some native bird species, and does not encourage the development of practices favourable to bird diversity in farmland.

There is a recognised suite of urban species in North America and Europe. Overall, birds respond similarly to urbanisation in North America and Europe and much of what has been learned in one continent can be applied in the other. North American researchers have tended to ignore the urban-adapted species and focused on impacts of urbanisation on other species, whereas

European research is focused on adaptation to urban landscapes. Time since urban development does not seem to be an important determinant of the urban bird community; some bird populations have adapted or adjusted quickly to urbanisation in the few hundred years that urban areas have existed in North America. The effects on urban bird communities of the surrounding land use, the amount of remaining natural area and the degree of contrast between the urban structure and the natural land cover deserve further investigation on both continents. There is great potential for intercontinental collaborations that embrace both the European focus on the conservation value of urban areas, and the North American focus on the detrimental effects of unchecked urban development.

From the perceived to the actual: a necessary shift for conservation?

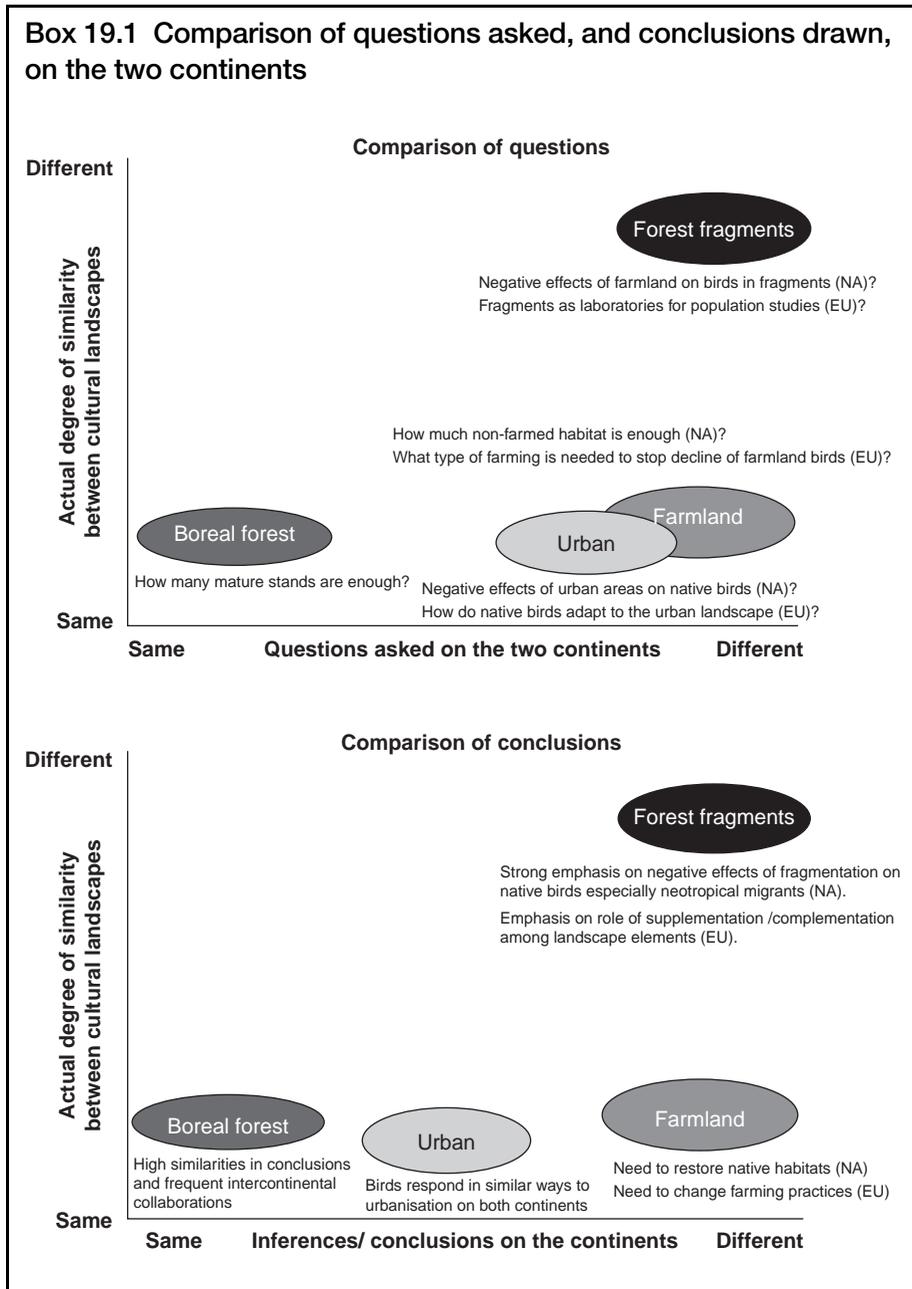
Although the biological processes involved are often probably identical, marked differences in research emphasis are evident between the two continents. These seem mainly to result from divergent reference points: human-dominated 'traditional' landscapes in Europe vs. 'natural' landscapes in North America. The assumption in North America of a 'non-cultural' benchmark (the pre-colonial period), in which humans had little effect on wild bird populations, is accompanied by the corollary that human-modified landscapes are less desirable than the 'pre-settlement' landscape (Hulse *et al.*, 2000; Santelmann *et al.*, 2008).

This attitude faces major challenges. The historical data on the reference situation is rather limited, but seems likely to have been much less 'natural' (unaffected by humans) than commonly assumed. The notion of an 'empty frontier' ignores the influence of populous Aboriginal societies that shaped landscapes and faunas through fire, agriculture and forest management to favour certain trees and animals. It likely refers only to the short period that followed the decimation of these societies by disease introduced by early European explorers (Mann, 2005).

In Europe, the trajectories of land transformation by humans have been documented for over 2000 years and cultural landscapes have become an intricate part of the perception of the natural world by Europeans. Culturally modified 'traditional' landscapes are often perceived positively in Europe and are often considered more desirable than forested 'natural' landscapes that result from land abandonment. This is probably the reason that many European studies focus on understanding and preserving the biological diversity found in cultural landscapes at a time when they are subject to profound changes.

The intercontinental differences in research questions and conclusions are smallest in the cultural landscapes that have been least subject to recent human interference (the boreal forest) and largest in the cultural landscapes

most subject to transformation in recent history. While farmland and urban landscapes have a high degree of similarity in structure between continents, the questions asked in them are different on the two continents. Those differences have led to different conclusions in the farmed landscapes, but have not



prevented some convergence in conclusions in studies on birds in urban landscapes (Box 19.1).

Appreciation of how different perspectives on similar situations can influence our conclusions could help revitalise the approach to studying birds in cultural landscapes, by facilitating a shift in focus from ‘what was there’ to ‘what could be there’ under appropriate landscape management. Indeed, the return to either reference state – a ‘pre-settlement’ mythological ideal world in North America or the past land-use practices in Europe – is unrealistic.

The challenge on both continents is rather to look at current patterns of bird habitat selection in cultural landscapes, and those predicted in response to climate change, and to use the knowledge gained to shape future cultural landscapes in which opportunities are maximised for wild species to prosper alongside production for human consumption. European research could elicit the emergence of a new biodiversity management paradigm in North America that would give increased emphasis to the ecological potential of cultural landscapes. For example, the importance of multi-scaled habitat heterogeneity for biodiversity within agricultural landscapes is strongly recognised in Europe (see Chapter 7). Conversely, European researchers and land managers could draw from the North American experience a renewed interest in the value of ‘benign neglect’ as a conservation approach that would, for example, take advantage of changes in agricultural regulation of subsidies to abandon some farmland to natural succession or active forest restoration. Interestingly, a lot of current conservation schemes developing in Europe aim at creating habitat networks (see Boitani *et al.*, 2007), a restoration process often misleadingly propounded as fragmentation in reverse, and there is also growing interest in the value of natural disturbance as an integral process in landscape-scale conservation (Hodder *et al.*, 2009). The development of an intercontinental common vision on the ecology of cultural landscapes, enriched by the diversity of backgrounds and situations found on the two continents, would be an extraordinary context for ensuring a more sustainable future for biodiversity.

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