**Additional file 8: Narrative tables.** Tables summarizing key results of the studies included in the narrative syntheses.

**Table S1: Key results of the 56 studies included in the narrative synthesis of the question: Is vertebrate biodiversity in LTI verges equal to, higher, or lower than in similar habitats away from LTIs? (question Q2)**

| **[ref]** | **Reference** | **Risk of bias** | **Country** | **Biological group** | **LTI** | **LTI verge** | **Comparison** | **Key results** | **Grp.** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| [1] | da Silva et al., 2017) | Low | Brazil | Birds | Road | Savannah, marginal strip of the road | Savannah, 250 m or 500 m away from the road | **(-)** The number of species per sample point in each transect was lower in transects nearest to the road and higher in transects farthest from the road (text p. 3).  **(-)** The number of individuals per sample point in each transect was smaller in transects nearest the road (text p. 3). | a |
| [2] | Webb et al., 2011) | Low | United States of America | Bird  *Corvus corax* | Road | Forest, digitized surfaced roads 25 m resolution | Forest, digitized logging roads 25 m resolution | **(ns)** Estimators of resource coefficients were similar between surface roads and logging roads indicating that ravens similarly used them (confidence intervals do not overlap in figure 2) (locations). | a |
| [3] | Rich et al., 1994) | Low | United States of America | Birds | Road  (and powerline) | Forest edges along paved secondary roads | Forest edges along unpaved roads | **(-)** Forest-interior Neotropical migrants as a group, and four of the nine forest-interior species that could be tested parametrically, had significantly greater relative abundances on edge transects along unpaved corridors than along paved road or powerline corridors (text p. 6).  **(ns)** None of the other forest-nester species or nest predators differed significantly in relative abundance on forest-edge transects among corridor types (text p. 7).  **(+)** Brown-headed Cowbirds [*Molothrus ater*] were significantly more abundant on forest-edge transects along paved secondary roads than along unpaved roads or powerline corridors (text p. 7). | a |
| [4] | Weiermans and van Aarde, 2003 | Low | South Africa | Birds (and rodents) | Road | Forest road edge (undisturbed forest) | Forest interior (undisturbed forest) | **(+/-)** Significant differences in bird species assemblage between edge (5-25 m from road) and core (35-125 m from road) (table 2). | a |
| [5] | Bechet et al., 1998 | Medium | France | Bird  *Lanius senator* | Road | Roadside trees and bushes | Trees and bushes far from road | **(ns)** We found no roadside effect, [nest] survival rate being similar along roadsides and far from roadsides (text p. 3). | a |
| [6] | Delgado et al., 2008 | Medium | Spain | Birds | Road | Laurel forest along asphalt roads | Laurel forest along unpaved roads | **(-)** Species richness, diversity, and density were significantly higher along unpaved than along asphalt road margins, whereas species dominance was higher along asphalt roads than along unpaved roads (text p. 4). | a |
| [7] | Geerts and Pauw, 2011 | Medium | South Africa | Birds | Road | *Erica perspicua* flowers 0-10 m from road edge | *Erica perspicua* flowers 40-50 m from road edge | **(-)** Distance from the road was a significant covariate in our analysis and had a negative impact on bird pollination with a significantly lower number of flowers with ruptured anther rings at the roadside edge than the plots further removed from the road (text p. 4) (activity). | a |
| [8] | Holm and Laursen, 2011 | Medium | Denmark | Bird  *Parus major* | Road | Hedgerows between crop fields and roads | Hedgerows between crop fields and dirt roads | **(-)** there was a significant difference in the number of fledglings between disturbance grades, the result of a significantly lower mean number of fledglings in the nestboxes along paved roads with fast traffic, compared with those in hedgerows with no disturbance and along dirt roads with slow traffic (text p. 2). | a |
| [9] | Meunier et al., 1999b | Medium | France | Birds | Road (highway) | Highway verges | Landscape matrix 200 or 300 m from road | **(- or ns depending on landscape)** By site, there was a significant effect of road in the woodland and the matoral site on species richness and abundance. Roadsides of these two sites were poorer than outsides in terms of species richness and abundance (table 3). In contrast, species richness in farmland roadsides was slightly greater than that in outside plots [but not significant], while abundance was similar (text p. 4). | a |
| [10] | Holbrook et al., 2015 | Medium | United States of America | Bird  *Sphyrapicus nuchalis* | Road | Forest, distance to road (continuous variable) | Forest, distance to road (continuous variable) | **(ns)** the effect of roads on red-naped sapsuckers occupancy was negative indicating a positive relationship between occupancy and roads (Fig. 3), but the effect was only weakly supported [no significant effect] (Tables 4 and 5) (text p. 6). | a |
| [11] | Weakland and Wood, 2005 | Medium | United States of America | Bird  *Dendroica cerulea* | Road | Forest, open canopy road edge | Forest, natural canopy gap | **(+)** Territory placement in relation to closest edge type differed from the expected distribution (text p. 9). The number of territories observed was significantly higher at open road edge than at natural canopy gap (confidence intervals do not overlap in table 3). | a |
| [12] | Yamac and Kirazli, 2012 | Medium | Turkey | Bird  *Pica pica* | Road (highway) | 0 – 10 m from highway | 0 – 10 m from dirt road | **(+)** Although no statistical differences in egg laying date, clutch size or brood size were found, the number of fledglings per nest was significantly higher along the highway site than along the dirt road (text p. 4). | a |
| [13] | Hindmarch et al., 2017 | Medium | Canada | Bird  *Tyto furcata* | Road (highway & non highway) | Roadside grass verge | Field margin (grass) | **(+)** The habitat “roadside grass verges” was significantly preferred over all other habitat types (Table 3) (text p. 5) (locations). | a |
| [14] | Scarpignato and George, 2013 | Medium | United States of America | Bird  *Corvus corax* | Road | Forest, distance to road (continuous variable) | Forest, distance to road (continuous variable) | **(+)** Raven space use was consistently positively related (negative coefficient) with […] distance to road, indicating that ravens used areas closer to […] roads more frequently (text p. 7) (locations). | a |
| [15] | Adams and Geis, 1983 | Low | United States of America | Small mammals | Road (highway & non highway) | Roadside | 240 – 320 m from road | **(+ or ns, highways)** Total small mammal density in interstate right-of-ways was greater than that in adjacent habitat for the […] California and Oregon. The same pattern was found in the Southern Piedmont, but the results were not as clearcut [not significant] (text p. 7).  **(ns or -, non-highway roads)** Small mammal density in county right-of-ways generally was similar to (California) or lower than (Southeast) small mammal density in adjacent habitat (text p. 7). | a |
| [16] | Ascensao et al., 2012 | Low | Portugal | Small mammals | Road (highway) | Highway verges surrounded by montado or open areas | Pure montado or open areas (non-highway sites) | **(+)** Overall there was a higher abundance of small mammals in highway sites compared to non-highway sites (text p. 8).  **(+)** Abundance of *Crocidura russula* was greater in highway than in non-highway sites both in montado and open areas (Figure 3).  **(+ or ns)** Abundance of *Apodemus sylvaticus* e and *Mus spretus* was greater in highway sites than in non-highway sites in montado but they were no significant differences in open areas (Figure 3). | a |
| [17] | Rotholz and Mandelik, 2013 | Low | Israel | Small mammals | Road | Shrubland, road edge | Shrubland, from 550 to 1700 m from road | **(+)** Mean abundance of […] mammals was significantly higher in the road edge compared to the control plots (text p. 8).  **(ns)** In the species-poor taxa, we found no significant differences in mean species richness between the road edge and the control plots (mammals) (text p. 7-8).  **(ns)** The road edge had no significant effect on the […] mammal species composition (text p. 9). | a |
| [18] | Stewart et al., 2017 | Low | United Kingdom | Small mammal  *Arvicola amphibius* | Road | Grassland, roadside | Grassland, public park or garden | **(ns)** Mean predicted occupancy was not significantly different between park and roadside (confidence intervals overlap in Figure 3). | a |
| [4] | Weiermans and van Aarde, 2003 | Low | South Africa | Rodents (and birds) | Road | Forest road edge (undisturbed forest) | Forest interior (undisturbed forest) | **(ns)** For rodents no distinction could be made between edge and core assemblages (text p. 3). | a |
| [19] | Bissonette and Rosa, 2009 | Medium | United States of America | Small mammals | Road (highway) | Shrubland, road verge | Shrubland, 600 m from road | **(+)** Comparisons between close, mid, and distant webs found lower abundances of small mammals as a group at distant transects. An 87.3% difference between abundances at close and distant webs was highly significant (text p. 6).  **(+)** Shannon-Wiener diversity index was 57-87% lower farther from the road (text p. 6). | a |
| [20] | Delgado et al., 2001 | Medium | Spain | Small mammal  *Rattus rattus* | Road | Forest road edge | Forest 100 m from road | **(+)** We detected clear differences in rat foraging intensity between road edge and forest interior. For the laurel forest, rates of bait encounter […] were significantly higher along road edges than at the interior (Fig. 2. Table 2). In the pine forest, encounter rates were higher along road edges […] (text p. 4) | a |
| [21] | Meunier et al., 1999a | Medium | France | Small mammals | Road (highway) | Highway verges | Landscape matrix 200 m from road | **(+ or ns depending on landscape)** Abundance of *Crocidura russula* was significantly higher in unmown road verges than in landscape matrix in plantation or farmland landscape, and was not significantly different in garrigue landscape. Abundance of *C. russula* was significantly higher in mown road verges than in landscape matrix in farmland landscape, and was not significantly different in garrigue and plantation landscape (Figure 1).  **(+ or ns depending on landscape)** Abundance of *Apodemus sylvaticus* was significantly higher in (unmown or mown) road verges than in landscape matrix in garrigue landscape, and was not significantly different in plantation landscape (Figure 1). | a |
| [22] | Jumeau et al., 2017 | Medium | France | Small mammals | Road | Grassy road verges | Wheat field | **(+)** Relative abundances of *Sorex araneus* were significantly higher in road verges than in wheat fields (Figure 2).  **(ns)** Relative abundances of *Microtus arvalis*, *Myodes glareolus*, *Apodemus sylvaticus* were not significantly different between road verges and wheat fields (Figure 2). | a |
| [23] | Santos et al., 2007 | Medium | Portugal | Small mammal  *Microtus cabrerae* | Road | Road verge sites | Meadow sites at least 80 m away from any road | **(ns)** Vole abundance class were not significantly different between meadow sites and road verges sites (Table 1). | a |
| [24] | Owen et al., 2015 | Medium | United States of America | Mammals *Procyon lotor* | Road | Road habitat | Open/non-forest areas | **(+)** Raccoon selected significantly more road habitat than open habitat (table 1) (locations). | a |
| [25] | Ben-Ami and Ramp, 2013 | Medium | Australia | Mammals *Wallabia bicolor* | Road (highway) | Distance from road (continuous variable) | Distance from road (continuous variable) | **(ns)** No significant relationship between pellet accumulation and distance from road (table 2). | a |
| [26] | Hein et al., 2009 | Medium | United States of America | Bats | Road | Visual corridors located along public roads | Forested corridor | **(+)** Road were positively related to species occurrence for *Eptesicus fuscus*, *Lasiurus seminolus*, and *Perimyotis subflavus* (table 4).  **(ns)** No significant effect of road on species occurrence for *L. borealis*, *Myotis lucifugus*, *Nycticeius humeralis* (table 4). | a |
| [27] | Myczko et al., 2017 | Medium | Poland | Bats | Road | Asphalt road sites | Paired reference sites 100 m from the road on unsurfaced forest roads | **(+)** *Nyctalus noctula*, *Eptesicus spp.* (including *Vespertilio murinus*), *Pipistrellus nathusii*, *P. pipistrellus* and *P. pygmaeus* each had significantly higher number of bat passes at asphalt roads than at reference sites,  **(-)** while only *Barbastella barbastellus* had a significantly higher number of bat passes at reference sites (text p. 4).  **(+)** The number of taxa was also significantly higher at asphalt roads (text p. 4). | a |
| [28] | Mallard, 2014 | Medium | France | Bats | Road | Forest road edge | Forest track edge | **(ns)** Abundance in forest track edge (“Forêt”) and in forest road edge (“Lisière”) were not significantly different (Figure 219b p. 317).  **(ns)** Species richness in forest track edge (“Forêt”) and in forest road edge (“Lisière”) were not significantly different (Figure 221b p. 318).  **(ns)** Shannon diversity in forest track edge (“Forêt”) and in forest road edge (“Lisière”) were not significantly different (Figure 223b p. 319). | a |
| [29] | Waters et al., 1999 | Medium | United Kingdom | Bat  *Nyctalus leisleri* | Road (highway and non-highway) | Lit roadsides lined by tall mature scrub either in hedges or at woodland margins | Woodland | **(ns)** There were significant differences in use between all habitat categories with the exception of the roads vs woodland category, which were not significantly different in the degree of use (text p. 5) (locations). | a |
| [30] | O’Donnell and Christie, 2006 | Medium | New Zealand | Bats | Road | Forest-road edge | Forest-grassland edge | **(ns)** For lesser short-tailed bat *Mystacina tuberculata*, mean bat passes per night were not significantly different between forest-road edge (“Road”) and forest-grassland edge (“Edge”) (Figure 3A).  **(-)** For long-tailed bat *Chalinolobus tuberculatus*, mean bat passes per night were significantly lower at forest-road edge (“Road”) than at forest-grassland edge (“Edge”) (Figure 3B). | a |
| [31] | Claireau, 2018 | Medium | France | Bats | Road (highway) | Distance from road (continuous variable) | Distance from road (continuous variable) | **(-)** At the ten species level, our results showed a significant negative effect of major roads on bat activity for four species among the ten studied, i.e. for these four species, bat activity increased with the distance to the major road. These species were *Eptesicus serotinus*, *Myotis spp.*, *Pipistrellus pipistrellus*, and *Rhinolophus hipposeridos*. […] we found a significant negative effect of major roads only for the activity of clutter species (text p. 168-169).  **(ns)** [the effect was thus non-significant for *Nyctalus leisleri*, *N. noctula*, *P. kuhlii*, *Barbastella barbastellus*, *R. ferrumequinum*, and *Plecotus spp.*, and for the activity of aerial species]. | a |
| [32] | Pescador and Peris, 2007 | Low | Spain | Avian nest predators | Road | Wooded pasturelands 0 – 5 m from road | Wooded pasturelands more than 100 m from road | **(- or ns)** The high-traffic road showed differences in predation in relation to the distance from the road in 2004, but not in 2005. The artificial nests closer to the road, up to 25 m, had an increased probability of remaining intact (text p. 4).  **(- or +)** At the medium-traffic road, nest mortality was related to distance in either 2004 or 2005. Nest predation increased near the road edge during the first year, but in 2005 it decreased in first 5m from the road (text p. 4).  **(- or ns)** Nest predation at the low-traffic road changed as a function of the distance from the road in 2004, but not in 2005. There was higher predation at the nests farthest away from the road (text p. 4) | a |
| [33] | Niu et al., 2018 | Medium | China | seed predators (mammals and birds) | Road | Forest 5 m from road | Forest 100-150 m from road | **(+ or ns)** Seed removal rate along roadsides was significantly faster than that in the forest centre in autumn and winter, but not in spring (text p. 3). | a |
| [34] | Akmali et al., 2004 | Medium | Iran | Bats | Waterway | Water meadow | Agricultural land | **(+)** The average frequency of *Pipistrellus spp.* in aquatic habitats (riparian vegetation in the Gamasiab and Dinevar rivers, the marshland and the water meadow is significantly higher (p<0.05) than in terrestrial habitats (agricultural land and the coniferous plantation) (text p. 4) (bat activity). | b |
| [35] | Anderson et al., 2006 | Medium | Australia | Bat  *Myotis macrocarpus* | Waterway | Side of large waterways (4th, 5th or 6th order) | Side of small waterways (2nd, 3rd or 4th order) | **(+)** The analysis found that *Myotis macropus* was significantly more likely to be recorded on larger waterways (category 3 and 4) compared to smaller  waterways (category 1 and 2) (text p. 7) (occurrence). | b |
| [36] | Barros et al., 2014 | Medium | Brazil | Bats | Waterway | Margin of an artificial managed channel | Grassland | **(+)** Bat activity differed significantly among habitat types. We observed the highest activity in the eucalyptus stand and in the channel […]. The grassland was the least used habitat. | b |
| [37] | Lloyd et al., 2006 | Medium | Australia | Bats | Waterway | Riparian forest, 4th order stream | Riparian forest, 1st order stream | **(+)** Bat activity was significantly higher in riparian sites along 4th order stream than in riparian stream along 1st order stream (Figure 2).  **(ns)** Species richness was not affected by […] stream order size (text p. 8). | b |
| [38] | Rachwald et al., 2016 | Medium | United Kingdom | Bats | Waterway | River-forest ecotones | Meadow-forest ecotones | **(+)** Bat activity of *Pipistrellus pygmaeus* was significantly higher at the river-forest edge (“water”) than at the meadow-forest edge (“edge”) (Figure 1 and text p. 4).  **(ns)** Bat activity of *P. pipistrellus* was not significantly different between river-forest edge (“water”) and meadow-forest edge (“edge”) (Figure 1 and text p. 4). | b |
| [39] | Clear, 2005 | Medium | United Kingdom | Bats | Waterway | Canal sites | Paired non-canal sites | **(ns)** There was no significant difference in the indices of bat activity between the canal and the non-canal sites for the two pipistrelle species (*Pipistrellus pipistrellus*, *P. pygmaeus*) (text p. 4). | b |
| [40] | Ellis et al., 2002 | Medium | United States of America | Bats | Waterway | Riparian forest along river | Riparian forest along creeks | **(ns)** In riparian areas, species richness did not differ among the habitat types (text p. 5). | b |
| [41] | Law et al., 2011 | Medium | Australia | Bats | Waterway | 0 m from stream-beds | 200 m from stream-beds | **(ns)** Bat composition over stream-beds did not differ from detector sites in adjacent woodland (text p. 4).  **(+)** Bat activity was significantly higher over stream-beds than 200 m from stream-beds (Figure 3). | b |
| [42] | Lock and Naiman, 1998 | Low | United States of America | Birds | Waterway | Forest, 5th or 6th order stream | Forest, 2nd or 3rd order stream | **(ns)** Abundance was not significantly different between large and small rivers (table 3).  **(+ or ns)** Species richness was significantly higher on large rivers than on small rivers in 1991 but not in 1990 (table 3). | b |
| [43] | Petit and Petit, 1996 | Medium | United States of America | Bird  *Protonotaria citrea* | Waterway | Shoreline | 70 and 105 m from water | **(+)** Mean breeding densities were significantly higher on grid row 1 [shoreline] than on all other rows in each year (text p. 9). | b |
| [44] | Gatesire et al., 2014 | Medium | Rwanda | Birds | Waterway | Riversides (open field) | Riversides (open field) | **(+)** There were significantly less birds in [streamsides] compared to the number of birds encountered in plot located in [riversides] (text p. 5, table 3).  **(+)** The LMM analysis revealed that the average number of bird species found in [streamsides] was significantly lower than the number of bird species in [riversides] (text p. 5, table 2). | b |
| [45] | Maltchik et al., 2008 | Medium | Brazil | Amphibians | Waterway | Forest, 20 m from the main channel | Forest, 120 m from the main channel | The richness of amphibians changed with the distance from the river in some collections (text p. 3).  **(+)** collections dates C1, C2, C9 (table 3).  **(ns)** collections dates C3, C4, C6, C7, C8, C10, C11, C12 (table 3).  **(-)** collection dates C5 (table 3). | b |
| [46] | Rabearivony et al., 2015 | Low | Madagascar | Reptiles | Waterway | Forest riparian edge 0-25 m from the river | Forest interior 25-50 m from the river | **(+)** Of these eight recorded species, four showed particular association to the riparian edge: *Palleon nasus*, *Calumma gastrotaenia*, *C. glawi*, and *C. nasutum* (text p. 5) (occurrence).  **(ns)** The other four species showed no significant association to the riparian edge: *Brookesia superciliaris*, *B. thieli*, *Calumna crypticum*, and *C. oshaughnessyi* showed no significant association to the edge (table 2) (occurrence). | b |
| [47] | Tryjanowski et al., 2014 | Low | Poland | Birds | Powerline | Open field under the powerline | Open field 200 m perpendicular to the powerline | **(+)** Mean abundance below powerline was significantly higher than in adjacent field (Figure 1).  **(+)** Mean species richness below powerline was significantly higher than in adjacent field (Figure 1). | c |
| [48] | Evans and Gates, 1997 | Low | United States of America | Birds | Powerline | Forest-powerline corridor edge | Forest-brush edge | **(ns)** The forest-powerline edge had the highest mean bird species abundance, followed by -brush, and -open road edges [no significant differences] (text p. 3, table 1).  Forest-brush edge was not significantly different from the other edge habitats [in terms of mean host abundance] (text p. 5).  **(ns)** There was no significant difference among habitats in bird or host species richness (text p. 3). | c |
| [3] | Rich et al., 1994 | Low | United States of America | Birds | Powerline (and road) | Forest edges along powerline rights-of-way | Forest edges along unpaved roads | **(-)** Forest-interior Neotropical migrants as a group, and four of the nine forest-interior species that could be tested parametrically, had significantly greater relative abundances on edge transects along unpaved corridors than along paved road or powerline corridors (text p. 6).  **(ns)** None of the other forest-nester species or nest predators differed significantly in relative abundance on forest-edge transects among corridor types (text p. 7).  **(ns)** Brown-headed Cowbirds [*Molothrus ater*] were significantly more abundant on forest-edge transects along paved secondary roads than along unpaved roads or powerline corridors (text p. 7). | c |
| [49] | Dell’Omo et al., 2009 | Medium | Italy | Birds  *Falco tinnunculus* | Powerline | Open agricultural land, nest-boxes attached to high voltage powerline tower | Open agricultural land, nest-boxes attached to abandoned transmission towers, non-electric pylons or abandoned buildings | **(ns)** The number of fledglings per brood and the fledging success did not differ between exposed and control nests (text p.3-4). | c |
| [50] | Doherty and Grubb, 1998 | Medium | United States of America | Birds | Powerline | Powerline corridor | Paired reference sites with similar vegetation | **(ns)** There was no effect of transmission lines on any measure of house wren [*Troglodytes aedon*] reproduction (text p. 3).  **(-)** However, in tree swallows [*Iridoprocne bicolor*], significant reductions in breeding success under the powerline occurred at all three study sites (text p. 3). | c |
| [51] | Clarke et al., 2006 | Low | Australia | Small mammals | Powerline | Powerline corridor | Adjacent forested area | **(+)** *Mus domesticus* and *Rattus lutreolus* responded positively to the presence of the corridor vegetation, showing higher mean abundances in this habitat type (text p. 3-4).  **(-)** The abundance of *Antechinus agilis* was significantly lower in the corridor habitat than in the forest (text p. 4).  **(ns)** There was no difference in the mean abundance of *Rattus fuscipes* between forest and corridor habitat (text p. 4).  **(ns)** There was no significant difference in species richness between the corridor and forest (text p. 3). | c |
| [52] | Smith et al., 2008 | Medium | United States of America | Mammals (predators) | Powerline | Powerline corridor (early successional vegetation) | Adjacent forest | **(+)** The number of visits made by large-bodied carnivores [*Canis latrans*, *Lynx rufus*, *C. familiaris*] differed significantly among the 3 locations, with the transmission line right-of-way accounting for approximately 79% of the visits versus approximately 21% in the adjacent forested habitats.  **(ns)** The number of visits made by small-bodied predators [*Didelphis virginiana, Urocyon cinereoargenteus*, *Vulpes vulpes*] did not differ significantly among the 3 locations, with approximately 19% of visitations recorded in the transmission line right-of-way, […] and 44% at 300 m from the forest edge. | c |
| [53] | Castillo et al., 2003 | Medium | Argentina | Small mammals | Railway | Grassland, railway banks | Grassland, vacant lots | **(ns)** The population abundance indices of *Mus domesticus* were not significantly different among habitats (text p. 3). | d |
| [54] | León et al., 2013 | Medium | Argentina | Small mammal  *Mus musculus* | Railway | Herbaceous vegetation and trees, railway embankments | Weed community, borders of cropfields and pastures | **(ns)** *Mus musculus* showed a significant higher abundance in poultry farms than all other habitats [thus non-significant differences between railway embankments and borders of cropfields and pastures] (text p. 5) | d |
| [55] | Cerboncini et al., 2016 | Medium | Brazil | Small mammals | Railway | Forest-railway right of way edge | Forest, 150 m from railway right of way | **(ns)** Total capture and abundance were independent of distance from the edge (text p. 3).  **(ns)** Species composition was similar at all distances from the edge (text p. 4).  **(+)** The number of species captured declined towards the forest interior (text p. 3). | d |
| [56] | Vandevelde et al., 2014 | Medium | France | Bats | Railway | Railway tracks-woodland edge | Field-woodland edge | **(ns)** At site scale, bat activity on railway edges was quite similar to that in neighbouring site types (field edge, wood, field) [*Pipistrellus pipistrellus*, *Nyctalus spp.*, *Myotis spp.*] (text p. 4).  **(-)** During the reproductive period, activity was significantly greater along field edges than in railways verges for *Myotis ssp*. (text p. 4). | d |

**Table S2: Key results of the nine studies included in the narrative synthesis of the question:** **Is vertebrate biodiversity in LTI verges dependent on the surrounding landscape? (question Q5)**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **[ref]** | **Reference** | **Risk of bias** | **Country** | **Biological group** | **LTI** | **LTI verge** | **Comparison** | **Key results** | **Grp.** |
| [57] | Lintott et al. 2015 | Low | United Kingdom | Bats | Waterway | Riverbank | % grey space, % woodland, in 1 or 3 km buffer | **(-)** *Myotis spp.* activity was negatively related to the proportion of grey space in the surrounding 3 km (text p. 4, table 2, Fig. 2d).  **(ns)** They were no significant landscape predictors of *Nyctalus spp.* activity (text p. 5, table 2), and of *Pipistrellus pipistrellus* activity (text p.5, table 3).  [*P. pygmaeus* activity was negatively related to the proportion of freshwater in the surrounding 3 km (text p. 5, table 3)] | e |
| [58] | Lopez-Baucells et al., 2017 | Low | Spain | Bats | Waterway | Riverbank | % urban cover, % forest cover, in 1 or 5 km radius | **(ns)** No environmental variable had a statistically significant effect on species presence (*Myotis daubentonii* and *M. capaccinii*) (text p. 5 and table 3). | e |
| [59] | Langton et al., 2010 | Medium | United Kingdom | Bat  *Myotis daubentonii* | Waterway | Riverbank | % built land, % woodland, % arable land, in 1 km square | **(-)** Significant negative effect of increasing proportion of built land on *M. daubentonii* activity (table 1, figure 4).  **(+)** Significant positive effect of increasing proportion of woodland on *M. daubentonii* activity (table 1, figure 4).  (ns) Non-significant relationship between % arable land and *M. daubentonii* activity (table 1). | e |
| [60] | Scher and Thièry, 2005 | Medium | France | Amphibians | Road  (highway) | Highway storm water retention pond | % built surface in 4 km² square centered on each pond | **(-)** Amphibians species richness was negatively correlated with the degree of anthropisation (text p. 9). | e |
| [61] | Askins et al., 2012) | Medium | United States of America | Birds | Powerline | Powerline right of way | % developed areas, % agricultural areas, in 1 or 5km buffer | **(-)** An increase in the area of developed or agricultural land in the surrounding landscape had a negative relationship with the number of species of shrubland birds (Figure 2) and the abundance of all the shrubland species  (ns) except prairie warbler (Table 4) and eastern towhee (text p. 4). | e |
| [16] | Ascensao et al., 2012 | Low | Portugal | Small mammals | Road  (highway) | Highway margin | Types of landscape: montado (agrosilvopastoral system), open habitats (crops, fallows) | **(+/-)** Abundance of *Apodemus sylvaticus* significantly higher in highway verges surrounded by montado than in those surrounded by open habitats (figure 2).  (ns) No significant differences in abundance of *Mus spretus* or *Crocidura russula* between highway verges surrounded by montado or open habitats (figure 2). | f |
| [9] | Meunier et al., 1999 | Medium | France | Birds | Road  (highway) | Road verges | Types of landscape: garrigue (matoral), plantation (woodland), farmland | **(+/-)** Species richness and abundance were greater in the roadsides of the farmland site than in the two others, and greater in woodland roadsides than in matoral roadsides (text p. 4). | f |
| [62] | Janiszewski et al., 2015) | Medium | Poland | Bird  *Ciconia ciconia* | Powerline | Electricity poles | Types of landscape: low quality (LQA), medium quality (MQA), high quality (HQA) | **(+/-)** We found significant differences in the mean number of fledglings per pair between study plots of different quality, with pairs nesting in LQA raising significantly fewer fledglings in comparison to the plots of higher quality (text p. 5). | f |
| [63] | Todd and Waters, 2017 | Medium | United Kingdom | Bats | Waterway | Riverbank | Levels of altitude: 150 m, 165 m, 210 m, 270 m | **(-)** They were differences in numbers of bats with altitude […] with a trend of higher number of bat passes at the lowest altitude (150 m for *Myotis daubentonii* and < 270 m for *Pipistrellus pipistrellus*) (text p. 7 and p. 8). | f |

**Table S3: Key results of the 19 studies included in the narrative synthesis of the question: Do LTI verge management practices increase, decrease, or have no effect on vertebrate biodiversity in LTI verges? (question Q1)**

| **[ref]** | **Reference** | **Risk of bias** | **Country** | **Biological group** | **LTI** | **LTI verge** | **Comparison** | **Key results** | **Grp.** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| [64] | Adams, 1984 | Medium | United States of America | Small mammals | Road  (highway) | Highway median strip | *Mowing*  - Mowed median strip right-of-way  - Unmowed median strip right-of-way | **(ns)** Although these data are suggestive of greater density of small mammals in unmowed herbaceous median strips, no statistical significance was attributed to the differences (text p. 4). | g |
| [65] | Bellamy et al., 2000 | Medium | United Kingdom | Small mammals | Road | Road verges | *Decreasing vegetation height*  Varying heights of tall grass (from 0 to 1.1 m) and of hedge (from 0 to 3.5 m) | **(ns)** The number of *Apodemus sylvaticus*, *Clethrionomys glareolus*, and *Microtus agrestis* individuals captured was not significantly correlated with tall grass height, and the number of *M. agrestis* individuals captured was not significantly correlated with hedge height (table 3).  **(-)** The number of *A. sylvaticus* and *C. glareolus* individuals captured was significantly positively correlated with hedge height (table 3). | g |
| [51] | Clarke et al., 2006 | Medium | Australia | Small mammal  *Mus domesticus* | Powerline | Powerline corridor | *Reducing vegetation cover*  3 time-since-management categories. Vegetation management was spraying, slashing, blading, clearing | **(+)** *Mus domesticus* abundance responded negatively to time-since-management, indicating that habitat in an early stage of succession may be optimal for this species (text p. 6). | g |
| [66] | Clarke and White, 2008 | Medium | Australia | Small mammals | Powerline | Powerline corridor | *Slashing*  - Slashed corridor sections  - Corridor section that has not been slashed since several years | **(-)** Trap success varied greatly between the managed and unmanaged corridors with much higher success occurring in the unmanaged area. Native small mammal abundance was lower in the managed corridors and  **(+)** the abundance of the introduced *Mus domesticus* was highest in this habitat (text p. 3). | g |
| [21] | Meunier et al., 1999a | Medium | France | Small mammals | Road  (highway) | Road verges | *Mowing*  - Mowed strip  - Unmowed strip | **(- or ns depending on landscape)** Abundance of *Crocidura russula* was significantly lower in mown habitat than in unmown habitat in garrigue and plantation landscapes, but differences were not significant in the farmland landscape (Figure 1). Abundance of *Apodemus sylvaticus* was significantly lower in mown habitat than in unmown habitat in plantation landscape, but differences were not significant in the garrigue landscape (Figure 1). | g |
| [67] | Vaughan et al., 2007 | Medium | United Kingdom | Birds | Waterway | Riverbanks | *Channelization*  - c. 10% of the banks reinforced  - No reinforcement | **(ns)** No significant effect of reinforced banks on the occurrence of *Riparia riparia* (table 2).  **(+)** Significant positive effect of reinforced banks on the occurrence of *Motacilla cinerea* (table 2). | g |
| [68] | Vilches et al., 2012 | Medium | Spain | Bird  *Alcedo atthis* | Waterway | Riverbanks | *Channelization*  Varying proportions of artificial walls on banks | **(ns)** No significant differences in proportion of artificial walls between *Alcedo atthis* breeding and non-breeding territories (table 1) (occurrence). | g |
| [69] | Zabala et al., 2006 | Medium | Spain | Other mammal  *Mustela lutreola* | Waterway | Riversides | *Channelization*  - Agressively canalized riverbank (concrete canals)  - Well-preserved riverbank | **(-)** European mink avoided canalized streams, preferring natural or slightly altered waters (Table 4) (text p. 5) (occurrence). | g |
| [70] | Chen and Lue, 2009 | Medium | Taiwan | Reptile  *Mauremys sinensis* | Waterway | Riverbanks | *Channelization*  - After intervention  - Before intervention | **(-)** Compared to data collected prior to the construction project, there was a significant difference in capture frequency among male, female, and juvenile turtles after the project (text p. 5). Less juveniles and females but  **(+)** more males were captured after the intervention (table 1). | g |
| [71] | Farago and Hangya, 2012 | Medium | Hungary and Slovakia | Birds  (aquatic birds) | Waterway | Riverbanks | *Increasing water level*  Varying water levels (from 33 to 558 cm) | **(-)** there was a strong tendency for species richness and number of individuals to correlate negatively and  **(+)** for Shannon diversity to correlate positively with water level (text p. 4).  This pattern was significant in late summer, also in winter for abundance and species richness,  **(ns)** but it was not significant in autumn and spring (table 3). | g |
| [72] | Moffatt et al., 2005 | Medium | United States of America | Bird  *Riparia riparia* | Waterway | Riverbanks | *Increasing river discharge*  Varying maximum river discharge (from c. 500 m3/s to 3000 m3/s) | **(+/-)** Stepwise logistic regression indicated that river discharge before the breeding season increased both [population] colonization and extinction probabilities (text p. 6) (occurrence). | g |
| [73] | Royan et al., 2013 | Medium | United Kingdom | Birds | Waterway | Riverbanks | *Increasing mean daily flow*  Varying mean daily flow (from 0.2 to 117.8 m3) | **(-)** Species displayed largely negative associations with Mean Daily Flow,  **(+)** although both common reed bunting (*Emberiza schoeniclus*) and grey wagtail [*Motacilla cinerea*] had positive associations (text p.4).  **(ns)** Nine species displayed non-significant relationships between mean daily flow and occurrence. | g |
| [74] | Blake et al., 1994 | Medium | United Kingdom | Bats | Road | Roadsides | *Road lighting*  - Lit road sections  - Unlit road sections | **(+)** Mean bat activity along roads lit by white streetlamps was higher than the activity in the adjacent unlit controls (Figure 2).  **(-)** Mean bat activity along roads lit by orange streetlamps was lower than the activity in the adjacent unlit controls (Figure 2). | g |
| [75] | Day et al., 2015 | Medium | United Kingdom | Bat  *Rhinolophus ferrumequinum* | Road | Roadside hedges | *Road lighting*  Eight part-night lighting scenario (lighting until from 10 PM to 5 AM) | **(-)** The eight part-night lighting scenarios varied in the level of bat activity captured from 81% with a switch off time at 10 pm to < 1% when switching off lights at 5 am (Fig. 3). Among the different part-night lighting scenarios, activity was only significantly higher in the dark portion of the night when lights were switched off before 11 pm. (text p. 3). | g |
| [76] | Roche et al., 2012 | Medium | Ireland | Bats | Road | Roadsides | *Road lighting*  - Lit roads with orange, yellow or white lights  - Unlit roads | **(ns)** Street lights of varying colors were not found to have a significant impact on observed *Pipistrellus pipistrellus* passes per minute (text p. 34).  **(ns)** Street lights of varying colors were not found to have a significant impact on observed *Pipistrellus pygmaeus* passes per minute (text p. 39).  **(+)** Street lights were found to have a significant impact on observed *Nyctalus leisleri*‘s passes per minute. The number of passes is greatest with yellow and white lights (text p. 46-47). | g |
| [60] | Scher and Thièry, 2005 | Medium | France | Amphibians | Road  (highway) | Highway storm water retention pond | *Use of synthetic bottom to construct stormwater ponds*  - Ponds with synthetic bottom  - Pond with natural bottom | **(ns)** Amphibian richness (α diversity) did not differ with bottom type (text p. 9). | g |
| [77] | Campbell, 2008 | Medium | United Kingdom | Birds | Waterway | Riverbanks | *Allowing human to come on verges*  Varying number of humans present | **(+, -, ns)** Significant positive, negative, or non-significant correlation between waterbirds species’ presence and human presence depending on the species and the season considered (Table 3). | g |
| [78] | Fox, 1999 | Medium | United Kingdom | Other mammal  *Lutra lutra* | Waterway | Riverbanks | *Habitat improvement*  - After habitat improvement  - Before habitat improvement | **(+)** The change in otter incidence between 1991 and 1994 was shown to be a significant increase. The change in otter incidence between 1991 and 1994-95 was shown to be statistically linked to the presence or absence of havens on all rivers and whether a site showed an increase in otter incidence (change from negative to positive) was linked to the existence of havens (text p. 4). | h |
| [79] | de Torre et al., 2015 | Medium | Spain | Birds | Road  (highway) | Highway embankments | *Clump planting of fleshly-fruited woody species*  - Embankments with plantings  - Embankments without plantings | **(ns)** No differences were found in species richness between embankments with plantings and without them (text p. 4).  **(ns)** Likewise, bird densities were no different in embankments with and without plantings (text p. 5). | h |

**Table S4: Key results of the seven studies included in the narrative synthesis of the question:** **Are vertebrate movements in LTI verges equal to, higher, or lower than their movements in similar habitats away from LTIs? (question Q4)**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **[ref]** | **Reference** | **Risk of bias** | **Country** | **Biological group** | **LTI** | **LTI verge** | **Comparison** | **Key results** | **Grp.** |
| [80] | Andersen et al., 2017 | Low | Australia | Other mammals | Road | Roadsides | 4WD tracks that receive limited or no traffic | **(+)** *Sarcophilus harrisii* individuals were eight and a half times more likely to be along a sealed road, […] and almost three times more likely to be along a 4WD track than away from a road (text p. 2, confidence intervals do not overlap in table 1).  **(ns)** *Dasyurus maculatus* individuals were similarly likely to be along a sealed road or a 4WD track than away from a road (table 1, confidence intervals overlap). | i |
| [81] | Robley et al., 2010 | Low | Australia | Other mammals | Road | Roadsides | Watercourses sides | **(+)** Wild dogs (*Canis lupus dingo*, *C. l. familiaris* and hybrids of the two) displayed differential use of linear habitat features. They were found more often than expected within 25 m of roads, and less often than expected within 25 m of watercourses (text p. 4). | i |
| [82] | Hinton et al., 2016 | Medium | United States of America | Other mammals  *Canis rufus* | Road | Roadsides | Habitat edges | **(ns)** Transient [i.e. moving] red wolves strongly selected for edges and roads (text p. 12, table 5 confidence intervals overlap). | i |
| [83] | Trewhella and Harris, 1990 | Medium | United Kingdom | Other mammals  *Vulpes vulpes* | Railway | 500-m square grid cells with railway lines | 500-m square grid cells without railway lines | **(ns)** There was no evidence that the distribution of dispersal movements was other than randomly distributed for foxes in both “railway” and “non railway” squares (text p. 3). | i |
| [84] | Svobodova et al., 2007 | Low | Czech Republic | Other mammals | Road | Roadsides | Sides of gravel roads or unstabilized forest paths | **(ns)** Contrary to the prediction of the “travel line” hypothesis, no difference was found in predation rate between edge and interior nests. Similarly, nest predation was not either significantly associated with the road type (text p. 4). | j |
| [85] | Vignieri, 2005 | Medium | United States of America | Small mammals  *Zapus trinotatus* | Waterway | Distance travelled along river only | Genetic distance | **(ns)** There was no relationship between genetic distance and river distance (text p.10). | j |
| [86] | Wilson et al., 2016 | Medium | United Kingdom | Small mammals  *Apodemus sylvaticus* | Road, railway, waterway | Distance along roads, rivers, or railways | Genetic distance | **(ns)** The distance along roads, railways or rivers did not explain significantly genetic differentiation patterns in either [arable or urban] habitat (Table 5) (text p. 5). | j |

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