

Supplementary Material

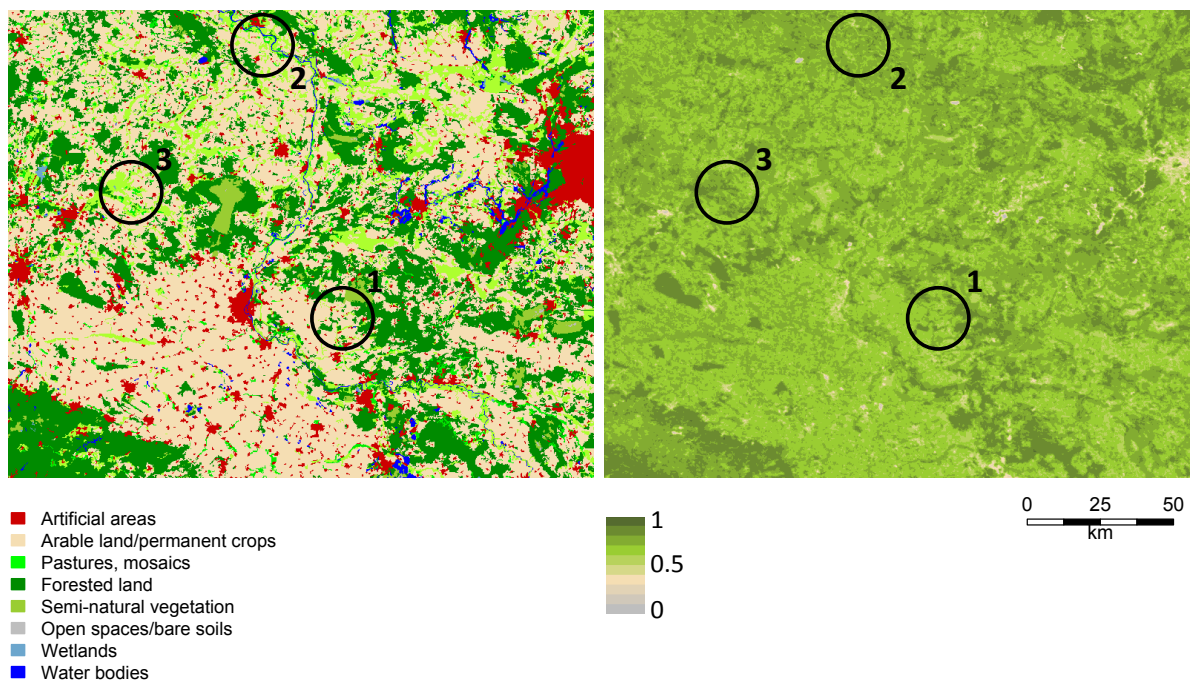
Home range size and resource use of breeding and non-breeding white storks along a land use gradient

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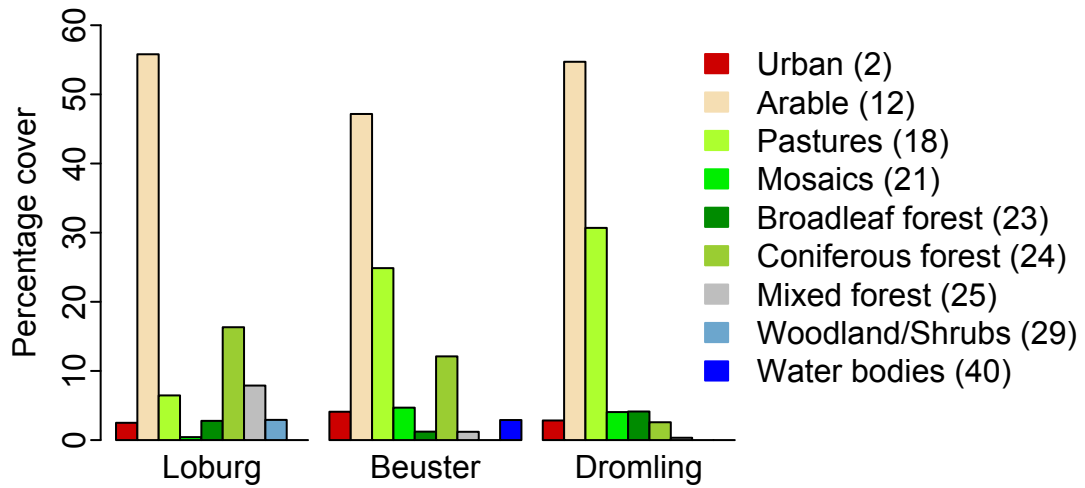
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1 Supplementary Figures and Tables

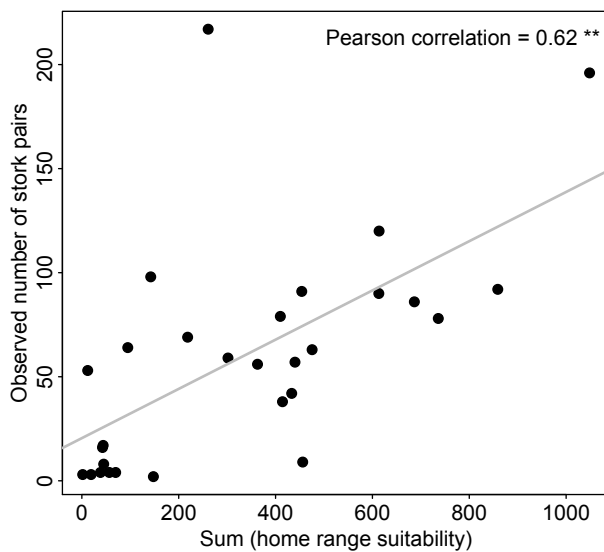
1.1 Supplementary Figures



Supplementary Figure S1. Corine land cover types 2006 (left) and Normalized differenced vegetation index NDVI (right) in study region. The study area is delimited by Berlin in the East and by Harz mountains in Southwest. Numbers indicate the mean central nest coordinates (with 15km buffer) of all individuals tracked in the three study locations (1) Loburg, (2) Beuster and (3) Dromling. NDVI was averaged over all considered tiles in 2014.



Supplementary Figure S2. Percentage cover of relevant Corine land cover types in the different study locations. These were evaluated within 15 km buffer distances around the mean central nest coordinates of all individuals tracked in the three study locations and correspond to the numbered circles shown in the maps of Fig. S1.



Supplementary Figure S3. Correlation between observed white stork density in study region and predicted home range suitability. Stork pairs per community were extracted from NABU (Mitteilungsblatt 107/2015 BAG Weißstorchschutz). Also see Table S2.

1.2 Supplementary Tables

Supplementary Table S1. Home range estimates \pm standard error and the range in parentheses

| Estimator | All | Breeding | Non-breeding | Brood-loss | Female (breeding) | Male (breeding) | Beuster (breeding) | Drömling (breeding) | Loburg (breeding) |
|------------------|-----------------------------------|----------------------------------|-----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|-----------------------------------|-----------------------------------|
| MCP 50% | 16.7 \pm 12.2 (0.0 – 826.6) | 0.8 \pm 0.2 (0.0 – 6.8) | 29.9 \pm 14.5 (0.3 – 92.5) | 62.7 \pm 58.8 (0.1 – 826.6) | 1.0 \pm 0.4 (0.0 – 6.8) | 0.7 \pm 0.2 (0.0 – 3.6) | 0.8 \pm 0.4 (0.0 – 5.3) | 1.1 \pm 0.2 (0.0 – 3.3) | 0.7 \pm 0.5 (0.0 – 6.8) |
| MCP 95% | 78.3 \pm 26.7 (1.3 – 1425.6) | 21.4 \pm 3.5 (1.3 – 133.2) | 334.1 \pm 131.2 (20.6 – 986.1) | 141.7 \pm 100.1 (2.7 – 1425.6) | 23.5 \pm 6.3 (1.3 – 133.2) | 20.0 \pm 3.8 (1.7 – 61.4) | 19.0 \pm 5.1 (1.3 – 61.4) | 19.5 \pm 3.9 (1.7 – 52.7) | 26.8 \pm 9.2 (3.2 – 133.2) |
| MCP 99.9% | 164.0 \pm 34.8 (2.9 – 1582.0) | 64.7 \pm 10.1 (5.9 – 322.7) | 576.0 \pm 166.0 (37.0 – 1422.5) | 291.6 \pm 111.8 (2.9 – 1582.0) | 50.2 \pm 7.0 (12.9 – 134.4) | 69.3 \pm 16.0 (5.9 – 322.7) | 46.8 \pm 11.0 (5.9 – 191.6) | 73.1 \pm 21.4 (17.1 – 322.7) | 78.4 \pm 21.2 (12.9 – 310.0) |

Supplementary Table S2. Correlation between observed white stork density in study region and predicted home range suitability. Stork pairs per community were extracted from NABU (Mitteilungsblatt 107/2015 BAG Weißstorchschutz). Also see Figure S3.

| Community | Stork pairs | Sum (Home range suitability) |
|--------------------------------------------------------------|--------------------|-------------------------------------|
| Altmarkkreis Salzwedel | 92 | 858.82 |
| Anhalt Bitterfeld | 42 | 433.30 |
| Barnim | 53 | 12.06 |
| Berlin | 3 | 19.04 |
| Boerde | 78 | 736.01 |
| Brandenburg a.d.Havel | 4 | 56.73 |
| Braunschweig, Wolfenbuettel, Helmstedt, Wolfsburg, Goslar | 57 | 440.07 |
| Dessau Rosslau | 17 | 43.99 |
| ElbeElster | 98 | 142.21 |
| Gifhorn | 59 | 301.73 |
| Harz | 9 | 456.02 |
| Havelland | 86 | 686.58 |
| Jerichower Land | 63 | 475.45 |
| Luechow Dannenberg | 69 | 218.43 |
| Magdeburg | 4 | 38.44 |
| Mansfeld Suedharz | 4 | 69.81 |
| Nordhausen | 3 | 1.71 |
| Nordsachsen | 64 | 94.80 |
| Oberhavel | 79 | 409.87 |
| Osterode Harz | NA | 2.13 |
| Ostprignitz Ruppin | 120 | 613.76 |
| Potsdam | 8 | 45.09 |
| Potsdam Mittelmark | 90 | 613.19 |
| Prignitz | 217 | 260.84 |
| Saalekreis | 16 | 42.63 |
| Salzgitter | NA | 2.32 |

| | | |
|-----------------|-----|---------|
| Salzlandkreis | 38 | 414.29 |
| Stendal | 196 | 1048.39 |
| Teltow Flaeming | 56 | 362.74 |
| Uelzen | 2 | 147.70 |
| Wittenberg | 91 | 454.04 |

Pearson correlation $r = 0.61$ **

Supplementary Table S3. Estimates of generalized linear mixed models (GLMMs) quantifying fine-scale resource selection of breeding and non-breeding white storks within different availability radii. GLMMs were fit using binomial error structure and year, animal and region as random factors. GPS data were filtered to include only foraging activities (ACC categories pecking and walking). All variables were centered and standardized prior to modeling. Blue indicates significant positive effects; red indicates significant negative effects. P-values: *** p<0.001, ** p<0.01, * p<0.05, † p<0.1.

| | <i>Breeding</i> | | | <i>Non-breeding</i> | | |
|-------------------------------|-----------------|--------------|------------|---------------------|--------------|------------|
| Predictors | 1km | 2.5km | 5km | 1km | 2.5km | 5km |
| (Intercept) | -1.15 *** | -1.21 *** | -1.30 *** | -1.27 *** | -1.37 *** | -1.47 *** |
| Urban (Corine 2) | 0.46 *** | 0.38 *** | 0.52 *** | 0.24 *** | 0.28 *** | 0.33 *** |
| Arable (Corine 12) | 0.49 *** | 0.31 *** | 0.73 *** | 0.08 † | -0.06 | -0.03 |
| Pasture (Corine 18) | 0.78 *** | 0.67 *** | 1.08 *** | 0.52 *** | 0.55 *** | 0.67 *** |
| Mosaics (Corine 21) | 0.31 *** | 0.25 *** | 0.46 *** | -0.25 *** | -0.27 *** | -0.21 *** |
| Broadleaf forest (Corine 23) | 0.10 *** | 0.003 | 0.10 *** | -0.12 *** | -0.18 *** | -0.24 *** |
| Coniferous forest (Corine 24) | -0.07 *** | -0.29 *** | -0.40 *** | -0.25 *** | -0.50 *** | -0.78 *** |
| Mixed forest (Corine 25) | - | -0.14 *** | -0.09 *** | - | -0.20 *** | -0.19 *** |

| | | | | | | |
|-------------------------------|---------------|---------------|---------------|---------------|--------------------|----------------|
| Water (Corine 40) | - | -0.11 *** | 0.02 | - | -0.06 ^c | -0.02 |
| NDVI | 1.13 *** | 1.75 *** | 1.88 *** | 0.35 *** | 0.84 *** | 1.02 *** |
| (NDVI) ² | -1.04 *** | -1.59 *** | -1.75 *** | -0.26 ** | -0.72 *** | -0.94 *** |
| Explained deviance | 3.28 % | 6.21 % | 9.02 % | 5.08 % | 9.72 % | 13.44 % |