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**JAV-02612**
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## Supplementary material

# Supplemental Information

## Appendix 1 - Movement Characteristics

*Species-averaged data used in the analysis. Median values were selected from N days (indicated below). Data source from Movebank or from co-authors*

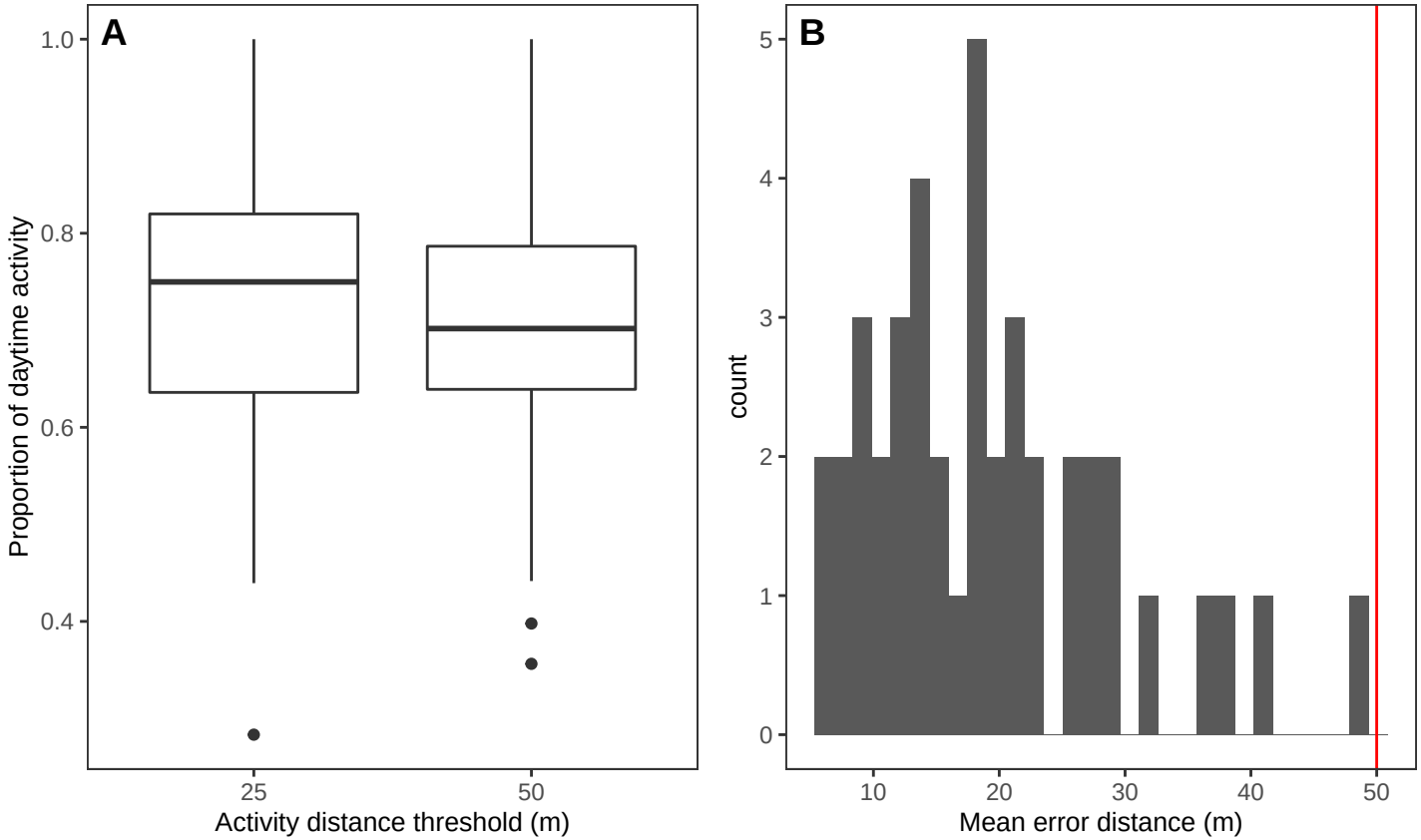
| Species | # of Birds | # of Days | Relative Speed at Midday | Movement Bouts | Activity Duration | First Activity Relative to Sunrise | Last Activity Relative to Sunset | Proportion of Active Diel Hours | Movement Data Source |
|---|---|---|---|---|---|---|---|---|---|
| Aegypius monachus | 25 | 3141 | 1.079 | 1.706 | 5.862 | 3 | 0.000 | 0.704 | Movebank |
| Anas acuta | 5 | 150 | 0.486 | 2.154 | 3.210 | 1 | 2.000 | 0.661 | Movebank |
| Anas clypeata | 4 | 86 | 0.341 | 2.311 | 3.078 | -1 | 1.000 | 0.649 | Movebank |
| Anas penelope | 4 | 62 | 0.288 | 2.056 | 2.789 | 2 | 2.000 | 0.647 | Movebank |
| Anas platyrhynchos | 117 | 2097 | 0.314 | 3.247 | 2.855 | -3 | 3.000 | 0.397 | Movebank |
| Anas poecilorhyncha | 7 | 26 | 0.179 | 1.667 | 2.184 | 5 | 1.000 | 0.460 | Movebank |
| Anser cygnoides | 21 | 878 | 0.646 | 2.545 | 4.525 | -1 | 2.000 | 0.613 | Movebank |
| Anser indicus | 45 | 1122 | 0.614 | 1.929 | 3.914 | 2 | 2.000 | 0.727 | Movebank |
| Ardea alba | 9 | 676 | 0.502 | 2.828 | 4.207 | 1 | 1.000 | 0.663 | Movebank |
| Ardea herodias | 1 | 23 | 0.913 | 3.594 | 4.594 | -4 | 3.000 | 0.568 | Movebank |
| Buteo regalis | 9 | 785 | 0.766 | 2.526 | 5.341 | 4 | 3.000 | 0.754 | Coauthor |
| Bycanistes bucinator | 12 | 161 | 0.737 | 1.725 | 3.430 | 2 | -2.000 | 0.618 | Coauthor |
| Calonectris diomedea | 11 | 31 | 0.532 | 1.361 | 17.361 | -5 | 3.000 | 0.979 | Movebank |
| Cathartes aura | 35 | 5533 | 1.143 | 1.690 | 2.615 | 3 | -1.000 | 0.595 | Movebank & Coauthor |
| Ciconia ciconia | 35 | 4441 | 0.933 | 2.274 | 4.630 | 1 | 1.000 | 0.578 | Movebank |
| Circaetus gallicus | 10 | 876 | 1.104 | 1.299 | 5.195 | 2 | 0.000 | 0.804 | Coauthor |
| Coragyps atratus | 7 | 1171 | 1.006 | 2.194 | 2.917 | 2 | -1.000 | 0.633 | Movebank & Coauthor |
| Corvus corax | 1 | 57 | 0.523 | 2.053 | 9.248 | 0 | 1.000 | 0.912 | Movebank |
| Corvus rhipidurus | 4 | 621 | 0.818 | 1.371 | 6.971 | 2 | -2.000 | 0.906 | Movebank |
| Corvus ruficollis | 3 | 497 | 0.929 | 1.526 | 9.167 | 0 | 2.000 | 0.973 | Movebank |
| Falco peregrinus | 4 | 118 | 0.908 | 2.183 | 3.810 | 1 | -4.000 | 0.664 | Movebank |
| Fregata magnificens | 9 | 36 | 0.753 | 1.421 | 5.447 | 2 | -1.000 | 0.482 | Coauthor |
| Fregata minor | 5 | 22 | 0.325 | 0.850 | 9.400 | -6 | 4.000 | 0.433 | Coauthor |
| Geronticus eremita | 9 | 808 | 0.823 | 1.932 | 5.936 | 1 | 0.000 | 0.811 | Movebank |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Grus grus | 3 | 125 | 0.622 | 2.019 | 6.292 | 1 | -1.000 | 0.819 | Movebank |
| Grus nigricollis | 5 | 60 | 0.798 | 1.876 | 5.908 | 1 | -2.000 | 0.783 | Movebank |
| Gymnogyps californianus | 87 | 7194 | 1.072 | 2.118 | 3.023 | 2 | -2.000 | 0.652 | Movebank |
| Gypaetus barbatus | 16 | 2723 | 1.120 | 1.751 | 5.063 | 2 | -1.000 | 0.719 | Movebank |
| Gyps africanus | 10 | 989 | 0.826 | 1.314 | 3.862 | 5 | -1.286 | 0.601 | Movebank |
| Gyps coprotheres | 19 | 4237 | 1.111 | 1.380 | 4.184 | 3 | -3.000 | 0.684 | Movebank |
| Gyps fulvus | 74 | 8751 | 1.163 | 1.488 | 4.419 | 4 | -1.000 | 0.711 | Movebank |
| Haliaeetus leucocephalus | 23 | 3418 | 0.945 | 2.533 | 3.941 | 1 | 0.000 | 0.736 | Movebank |
| Larus fuscus | 17 | 1840 | 0.664 | 2.869 | 5.367 | 0 | 1.000 | 0.635 | Movebank |
| Necrosyrtes monachus | 11 | 1105 | 1.297 | 1.523 | 3.635 | 2 | 0.000 | 0.731 | Movebank |
| Neophron percnopterus | 15 | 1960 | 1.049 | 1.681 | 5.603 | 2 | 0.000 | 0.793 | Movebank |
| Pandion haliaetus | 41 | 4158 | 0.908 | 2.943 | 4.399 | 1 | 0.000 | 0.696 | Movebank |
| Pelecanus occidentalis | 4 | 264 | 0.598 | 2.139 | 2.540 | 2 | -1.000 | 0.588 | Movebank |
| Phaethon aethereus | 12 | 35 | 0.545 | 1.920 | 6.000 | 1 | 1.000 | 0.941 | Movebank |
| Phoebastria immutabilis | 22 | 44 | 0.767 | 1.733 | 6.667 | -5 | 4.000 | 0.995 | Coauthor |
| Phoebastria irrorata | 15 | 654 | 0.932 | 1.270 | 8.545 | -5 | 4.000 | 0.765 | Movebank |
| Phoebastria nigripes | 12 | 35 | 0.548 | 1.833 | 6.528 | -5 | 4.000 | 0.994 | Coauthor |
| Phoenicopterus roseus | 8 | 244 | 0.636 | 1.877 | 4.333 | 1 | 1.000 | 0.793 | Movebank |
| Sarkidiornis melanotos | 8 | 260 | 0.254 | 2.324 | 3.395 | 1 | 2.000 | 0.640 | Movebank |
| Sula dactylatra | 74 | 328 | 0.417 | 1.157 | 3.271 | 2 | -1.000 | 0.360 | Coauthor |
| Sula leucogaster | 38 | 165 | 0.640 | 1.790 | 4.234 | 2 | -1.000 | 0.493 | Coauthor |
| Sula sula | 13 | 45 | 0.471 | 1.262 | 5.405 | 0 | 2.000 | 0.413 | Coauthor |
| Tadorna ferruginea | 16 | 686 | 0.546 | 1.961 | 3.883 | 2 | 2.000 | 0.722 | Movebank |
| Tetrax tetrax | 12 | 948 | 0.560 | 1.692 | 3.093 | 1 | 0.000 | 0.600 | Coauthor |
| Torgos tracheliotos | 2 | 200 | 0.921 | 1.190 | 5.363 | 4 | -1.000 | 0.737 | Movebank |

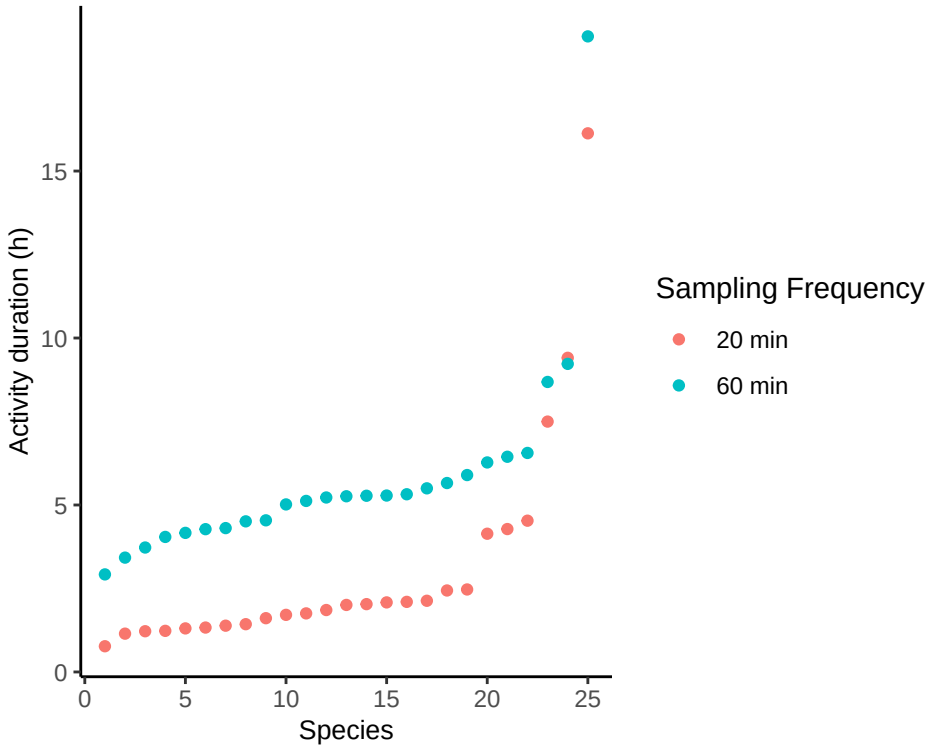
## Appendix 2

*Activity Distance Thresholds and Sampling Frequency Comparisons*

Supplemental Figure 1: A) The effect of 25 and 50m activity distance thresholds on the proportion of daytime activity show no significant difference, indicating our methods do not underreport activity. B) All mean error distances across species were below 50 m, our activity distance threshold (indicated in red).



Supplemental Figure 2: Comparisons of effect of sampling frequency on activity duration using 25 species with high resolution data. Datasets were subsampled at 20 min and 60 min frequencies. Effect on activity duration is linear.

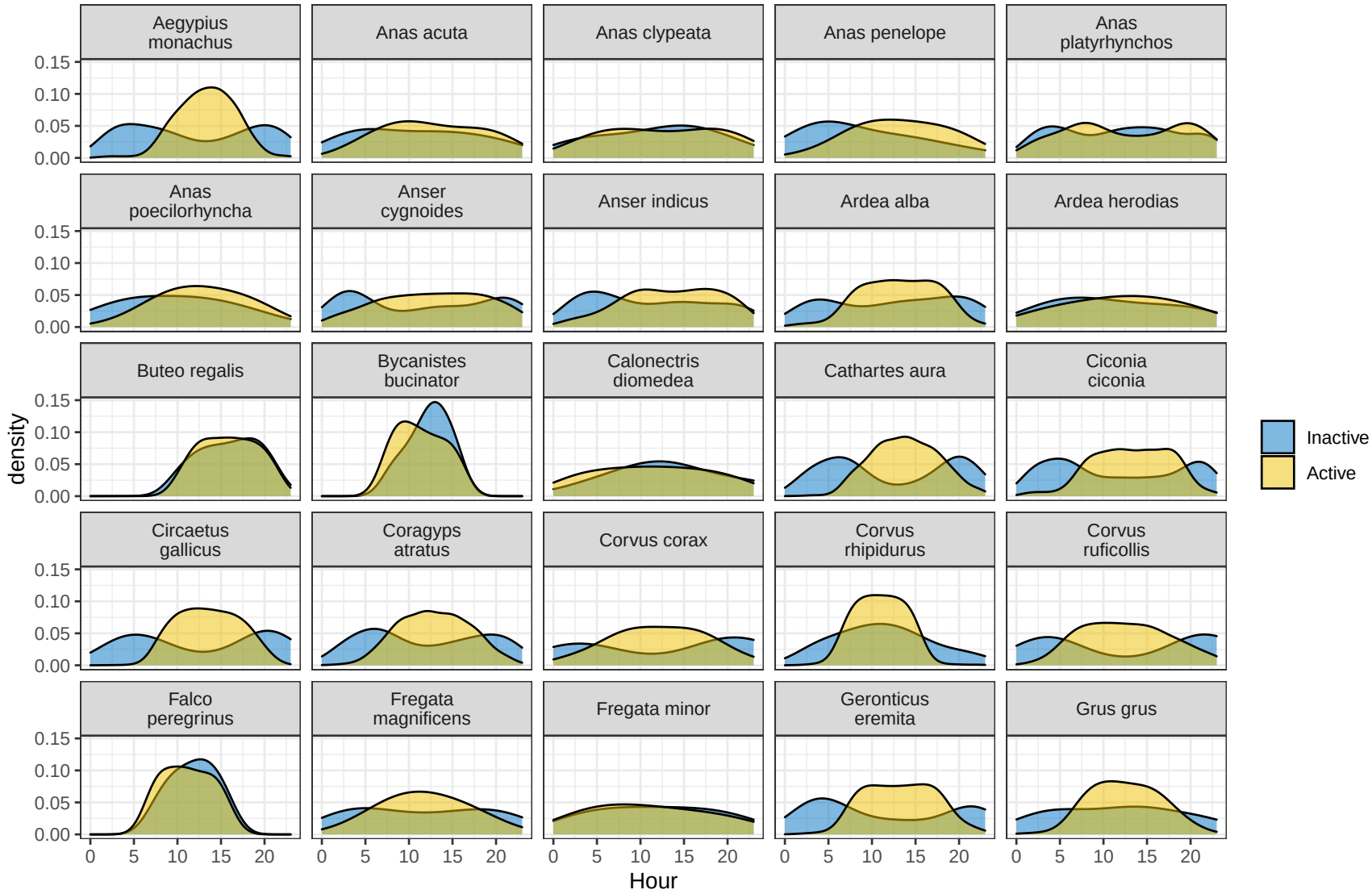


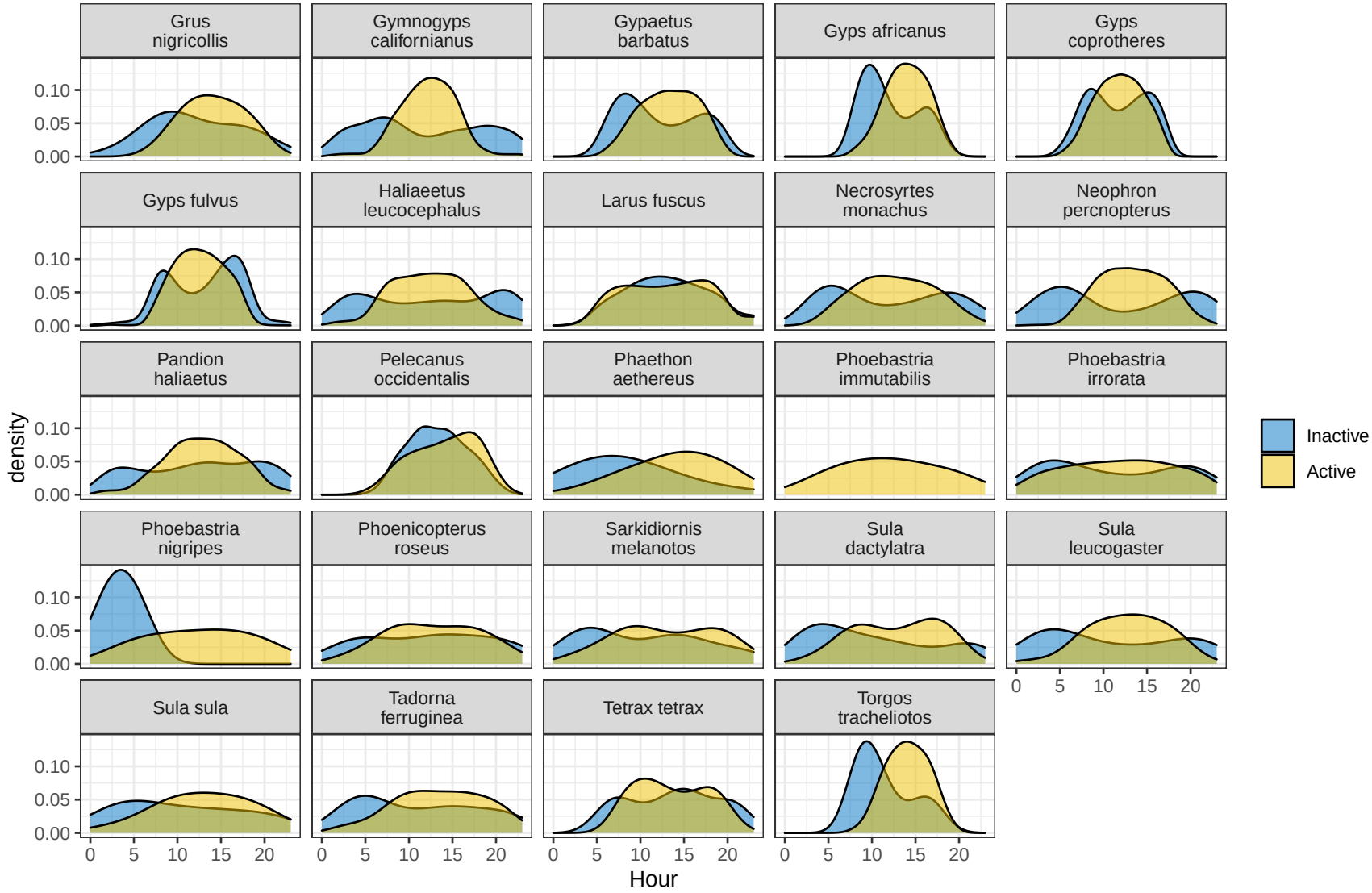
*Species that had mean sampling start and end times that overlapped with the hour of sunrise or sunset*

| Taxa | Mean sampling start time at or after sunrise | Mean sampling end time at or after sunset |
|---|---|---|
| Bycanistes bucinator | X | X |
| Circaetus gallicus | X | |
| Grus nigricollis | X | X |
| Gymnogyps californianus | X | |
| Gypaetus barbatus | X | X |
| Gyps africanus | X | X |
| Gyps coprotheres | X | X |
| Gyps fulvus | X | |
| Pandion haliaetus | X | |
| Pelecanus occidentalis | X | |
| Phaethon aethereus | X | X |
| Tetrax tetrax | X | |
| Anas poecilorhyncha | | X |
| Anser indicus | | X |
| Corvus rhipidurus | | X |
| Grus grus | | X |
| Sula dactylatra | | X |

## Appendix 3

*Daily distribution of active hours for all species in our dataset*




Grus nigricollis
Gymnogyps californianus
Gypaetus barbatus
Gyps africanus
Gyps coprotheres
Gyps fulvus
Haliaeetus leucocephalus
Larus fuscus
Necrosyrtes monachus
Neophron percnopterus
Pandion haliaetus
Pelecanus occidentalis
Phaethon aethereus
Phoebastria immutabilis
Phoebastria irrorata
Phoebastria nigripes
Phoenicopterus roseus
Sarkidiornis melanotos
Sula dactylatra
Sula leucogaster
Sula sula
Tadorna ferruginea
Tetrax tetrax
Torgos tracheliotos
density
0.00
0.05
0.10
0
5
10
15
20
Hour
Inactive
Active

## Appendix 4

**Morphological Characteristics** *Morphological characters were averaged from values compiled from the literature. Values used were averaged across all records. Aspect ratio values in bold were estimated from a related species.*

| Species | IOCOrder | Mass (kg) | Wing Span | Wing Area | Wing Loading | Aspect Ratio | Relative Wing Loading | Morphology Citations |
|---|---|---|---|---|---|---|---|---|
| Aegypius monachus | Accipitriformes | 9.00000 | 2.73 | 0.96 | 9.39 | 7.74 | 4.55 | 1, 2, 3 |
| Anas acuta | Anseriformes | 0.97000 | 0.89 | 0.09 | 11.35 | 9.25 | 11.48 | 1, 4, 5 |
| Anas clypeata | Anseriformes | 0.71000 | 0.74 | 0.06 | 12.06 | 9.23 | 13.48 | 1, 2, 6 |
| Anas penelope | Anseriformes | 0.78000 | 0.82 | 0.08 | 9.54 | 8.35 | 10.37 | 1, 5, 7 |
| Anas platyrhynchos | Anseriformes | 1.12000 | 0.89 | 0.10 | 10.72 | 7.5 | 10.32 | 2, 4, 5, 7 |
| Anas poecilorhyncha | Anseriformes | NA | NA | NA | NA | NA | NA | author |
| Anser cygnoides | Anseriformes | 2.76000 | 1.65 | 0.34 | 8.09 | 7.97 | 5.78 | 8 |
| Anser indicus | Anseriformes | 2.41000 | 1.53 | 0.28 | 8.59 | 8.34 | 6.43 | 7, 9 |
| Ardea alba | Pelecaniformes | 0.86000 | 1.44 | 0.24 | 3.63 | 8.74 | 3.81 | 2, 4, 5, 7 |
| Ardea herodias | Pelecaniformes | 1.77000 | 1.78 | 0.43 | 4.11 | 7.35 | 3.41 | 1, 2, 7, 10, 11 |
| Buteo regalis | Accipitriformes | 1.15000 | 1.43 | 0.25 | 4.64 | 8.28 | 4.43 | 3, 12, 13 |
| Bycanistes bucinator | Bucerotiformes | 0.65000 | 0.71 | 0.07 | 9.77 | 7.6 | 11.27 | 14 |
| Calonectris diomedea | Procellariiformes | 0.53499 | 1.21 | 0.11 | 8.49 | 13.14 | 3.95 | 15 |
| Cathartes aura | Accipitriformes | 1.65000 | 1.72 | 0.43 | 3.83 | 6.89 | 3.25 | 3, 7, 10, 11, 16, 17 |
| Ciconia ciconia | Ciconiiformes | 3.30000 | 1.57 | 0.55 | 6.01 | 4.47 | 4.05 | 4, 5, 18 |
| Circaetus gallicus | Accipitriformes | 1.66000 | 1.77 | 0.41 | 4.02 | 7.57 | 3.40 | 3, 4, 6, 9, 18, 19 |
| Coragyps atratus | Accipitriformes | 1.97000 | 1.43 | 0.33 | 5.92 | 6.15 | 4.73 | 3, 7, 10, 17, 18 |
| Corvus corax | Passeriformes | 1.17000 | 1.28 | 0.25 | 4.72 | 6.63 | 4.48 | 4, 5, 11 |
| Corvus rhipidurus | Passeriformes | 0.44000 | 1.11 | 0.18 | 2.47 | **6.92** | 3.24 | 20 |
| Corvus ruficollis | Passeriformes | 0.72000 | 1.16 | 0.19 | 3.70 | 6.92 | 4.13 | 5 |
| Falco peregrinus | Falconiformes | 0.76000 | 1.02 | 0.13 | 6.02 | 8.32 | 6.60 | 2, 3, 4, 5, 7 |
| Fregata magnificens | Suliformes | 1.40000 | 2.15 | 0.40 | 3.51 | 11.62 | 3.15 | 7, 10, 18 |
| Fregata minor | Suliformes | 1.21000 | 2.03 | 0.35 | 3.43 | 11.6 | 3.22 | 11, 21, 22 |
| Geronticus eremita | Pelecaniformes | 1.29000 | 1.20 | 0.25 | 5.07 | 5.65 | 4.66 | 10, 23, 24 |
| Grus grus | Gruiformes | 5.10000 | 2.24 | 0.62 | 8.22 | 8.11 | 4.80 | 1, 5, 25 |
| Grus nigricollis | Gruiformes | 6.14000 | NA | NA | NA | NA | NA | 26 |
| Gymnogyps californianus | Accipitriformes | 9.87000 | 2.81 | 1.14 | 8.67 | 6.94 | 4.07 | 3, 18, 27, 28 |
| Gypaetus barbatus | Accipitriformes | 5.55000 | 2.56 | 0.74 | 7.50 | 8.83 | 4.26 | 3, 18, 27, 28 |
| Gyps africanus | Accipitriformes | 5.54000 | 2.18 | 0.71 | 7.74 | 6.63 | 4.40 | 3, 7, 18, 29, 30 |
| Gyps coprotheres | Accipitriformes | 9.29000 | 2.48 | 0.91 | 10.23 | **6.78** | 4.90 | 3, 29 |
| Gyps fulvus | Accipitriformes | 7.04000 | 2.59 | 0.99 | 7.13 | 6.78 | 3.75 | 3, 4, 7, 31, 32 |
| Haliaeetus leucocephalus | Accipitriformes | 4.68000 | 2.15 | 0.76 | 6.19 | 6.09 | 3.72 | 3, 10, 13 |
| Larus fuscus | Charadriiformes | 0.72000 | 1.34 | 0.19 | 3.72 | 9.28 | 4.15 | 5 |
| Necrosyrtes monachus | Accipitriformes | 2.00000 | 1.68 | 0.44 | 4.59 | 6.47 | 3.65 | 3, 18 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Neophron percnopterus | Accipitriformes | 1.92000 | 1.64 | 0.39 | 4.86 | 6.82 | 3.92 | 3, 4, 5, 18, 26, 33 |
| Pandion haliaetus | Accipitriformes | 1.58000 | 1.61 | 0.31 | 5.11 | 8.38 | 4.39 | 5 |
| Pelecanus occidentalis | Pelecaniformes | 3.11000 | 2.22 | 0.46 | 6.71 | 10.64 | 4.61 | 2, 4, 7, 10, 11, 18 |
| Phaethon aethereus | Phaethontiformes | 0.66000 | 1.06 | 0.11 | 6.02 | 10.27 | 6.90 | 7, 21, 34, 35 |
| Phoebastria immutabilis | Procellariiformes | 3.15000 | 2.01 | 0.30 | 10.45 | 13.41 | 7.15 | 11, 21, 36, 37, 38 |
| Phoebastria irrorata | Procellariiformes | 3.23000 | 2.25 | 0.35 | 9.35 | 14.65 | 6.35 | 21, 37, 38, 39 |
| Phoebastria nigripes | Procellariiformes | 3.33000 | 2.12 | 0.32 | 10.26 | 13.85 | 6.89 | 21, 36, 37, 38 |
| Phoenicopterus roseus | Phoenicopteriformes | 2.44000 | 1.58 | 0.30 | 8.13 | 8.31 | 6.06 | 40 |
| Sarkidiornis melanotos | Anseriformes | NA | NA | NA | NA | NA | NA | |
| Sula dactylatra | Suliformes | 1.43000 | 1.53 | 0.21 | 6.87 | 11.31 | 6.11 | 21, 34 |
| Sula leucogaster | Suliformes | 1.25000 | 1.51 | 0.19 | 6.51 | 11.77 | 6.04 | 7, 21, 34 |
| Sula sula | Suliformes | 1.30000 | 1.54 | 0.21 | 6.22 | 11.27 | 5.70 | 7, 21, 34 |
| Tadorna ferruginea | Anseriformes | 1.32000 | 1.33 | 0.24 | 5.60 | **7.5** | 5.11 | 41 |
| Tetrax tetrax | Otidiformes | 0.87000 | 0.77 | 0.11 | 7.83 | 5.36 | 8.21 | 6, 9, 42 |
| Torgos tracheliotos | Accipitriformes | 7.26000 | 2.71 | 0.93 | 7.81 | 7.88 | 4.06 | 3, 4, 6, 7, 30, 43 |

[1] Viscor and Fuster (1987) [2] Poole (1938) [3] Ferguson-Lees et al. (2001) [4] Bruderer and Boldt (2001) [5] Alerstam et al. (2007) [6] Greenewalt (1962) [7] Pennycuick (2008) [8] Brazil (2009) [9] Hawkes et al. (2011) [10] Pennycuick (1997) [11] Wang and Clarke (2015) [12] Jaksić and Carothers (1985) [13] Snyder and Wiley (1976) [14] Kemp and Woodcock (1995) [15] Wilman et al. (2016) [16] Grilli et al. (2017) [17] Houston (1988) [18] Brower (1983) [19] Panuccio, Agostini, and Premuda (2012), Mellone et al. (2011) [20] Tchernov (1993) [21] Spear and Ainley (1997) [22] Schreiber and Schreiber (1988) [23] Völkl and Fritz (2017) [24] Portugal et al. (2014) [25] Pennycuick (1972) [26] Johnsgard (1983) [27] Koford (1953) [28] Campbell Jr and Tonni (1983) [29] Mendelsohn et al. (1989) [30] Pennycuick (1971) [31] Bildstein et al. (2009) [32] Xirouchakis and Poulakakis (2008) [33] Ceccolini (2001) [34] Hertel and Ballance (1999) [35] Stonehouse (1962) [36] H. Frings and Frings (1961) [37] Tickell (2000) [38] Warham (1996) [39] Suryan (2008) [40] Deville et al. (2014) [41] Carboneras and Kirwan (n.d.) [42] Raihani et al. (2006) [43] Mundy and Butchart (1992)

**Diet Characteristics and Flight Mode** *All ecological characters except flight and foraging mode were taken from Elton 1.0 database (Wilman et al. 2016). Note, carrion is included within vertebrates.*

| Species | Diet Type | % Invertebrates | % Fish | % Carrion | % Fruit | % Vertebrates | % Plants | Flight Mode |
|---|---|---|---|---|---|---|---|---|
| Aegypius monachus | Scavenger | 0 | 0 | 100 | 0 | 100 | 0 | Soaring |
| Anas acuta | Omnivore | 30 | 0 | 0 | 0 | 0 | 70 | Flapping |
| Anas clypeata | Invertebrate | 60 | 0 | 0 | 0 | 0 | 40 | Flapping |
| Anas penelope | Plant | 0 | 0 | 0 | 0 | 0 | 100 | Flapping |
| Anas platyrhynchos | Omnivore | 40 | 10 | 0 | 0 | 10 | 40 | Flapping |
| Anas poecilorhyncha | Seed | 10 | 0 | 0 | 0 | 0 | 90 | Flapping |
| Anser cygnoides | Plant | 0 | 0 | 0 | 0 | 0 | 100 | Flapping |
| Anser indicus | Plant | 0 | 0 | 0 | 0 | 0 | 100 | Flapping |
| Ardea alba | Fish | 40 | 20 | 0 | 0 | 40 | 0 | Flapping |
| Ardea herodias | Fish | 30 | 50 | 0 | 0 | 20 | 0 | Flapping |
| Buteo regalis | Vertebrate | 0 | 0 | 0 | 0 | 100 | 0 | Soaring |
| Bycanistes bucinator | Fruit | 10 | 0 | 0 | 80 | 10 | 0 | Flapping |
| Calonectris diomedea | Fish | 30 | 50 | 20 | 0 | 20 | 0 | Soaring |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Cathartes aura | Scavenger | 0 | 0 | 100 | 0 | 100 | 0 | Soaring |
| Ciconia ciconia | Carnivore | 20 | 20 | 0 | 0 | 60 | 0 | Soaring |
| Circaetus gallicus | Vertebrate | 0 | 0 | 0 | 0 | 100 | 0 | Soaring |
| Coragyps atratus | Scavenger | 0 | 10 | 80 | 0 | 100 | 0 | Soaring |
| Corvus corax | Omnivore | 10 | 10 | 20 | 10 | 50 | 20 | Soaring |
| Corvus rhipidurus | Omnivore | 30 | 0 | 0 | 30 | 10 | 30 | Soaring |
| Corvus ruficollis | Omnivore | 30 | 0 | 20 | 10 | 50 | 10 | Soaring |
| Falco peregrinus | Vertebrate | 10 | 0 | 0 | 0 | 90 | 0 | Flapping |
| Fregata magnificens | Fish | 10 | 60 | 10 | 0 | 30 | 0 | Soaring |
| Fregata minor | Fish | 20 | 60 | 10 | 0 | 10 | 0 | Soaring |
| Geronticus eremita | Invertebrate | 50 | 10 | 0 | 0 | 30 | 10 | Flapping |
| Grus grus | Omnivore | 10 | 0 | 0 | 10 | 20 | 60 | Soaring |
| Grus nigricollis | Omnivore | 20 | 10 | 0 | 0 | 30 | 40 | Soaring |
| Gymnogyps californianus | Scavenger | 0 | 0 | 100 | 0 | 100 | 0 | Soaring |
| Gypaetus barbatus | Scavenger | 0 | 0 | 100 | 0 | 100 | 0 | Soaring |
| Gyps africanus | Scavenger | 0 | 0 | 100 | 0 | 100 | 0 | Soaring |
| Gyps coprotheres | Scavenger | 0 | 0 | 100 | 0 | 100 | 0 | Soaring |
| Gyps fulvus | Scavenger | 0 | 0 | 100 | 0 | 100 | 0 | Soaring |
| Haliaeetus leucocephalus | Fish | 0 | 60 | 20 | 0 | 40 | 0 | Soaring |
| Larus fuscus | Omnivore | 30 | 30 | 10 | 10 | 30 | 0 | Flapping |
| Necrosyrtes monachus | Scavenger | 20 | 0 | 80 | 0 | 80 | 0 | Soaring |
| Neophron percnopterus | Scavenger | 10 | 10 | 60 | 0 | 80 | 0 | Soaring |
| Pandion haliaetus | Fish | 0 | 100 | 0 | 0 | 0 | 0 | Soaring |
| Pelecanus occidentalis | Fish | 10 | 80 | 10 | 0 | 10 | 0 | Soaring |
| Phaethon aethereus | Fish | 20 | 80 | 0 | 0 | 0 | 0 | Flapping |
| Phoebastria immutabilis | Invertebrate | 70 | 30 | 0 | 0 | 0 | 0 | Soaring |
| Phoebastria irrorata | Invertebrate | 60 | 40 | 0 | 0 | 0 | 0 | Soaring |
| Phoebastria nigripes | Invertebrate | 20 | 70 | 10 | 0 | 10 | 0 | Soaring |
| Phoenicopterus roseus | Invertebrate | 50 | 10 | 0 | 0 | 0 | 40 | Soaring |
| Sarkidiornis melanotos | Plant | 30 | 0 | 0 | 0 | 0 | 70 | Flapping |
| Sula dactylatra | Fish | 0 | 100 | 0 | 0 | 0 | 0 | Flapping |
| Sula leucogaster | Fish | 30 | 70 | 0 | 0 | 0 | 0 | Flapping |
| Sula sula | Fish | 40 | 60 | 0 | 0 | 0 | 0 | Flapping |
| Tadorna ferruginea | Plant | 10 | 20 | 0 | 0 | 10 | 70 | Flapping |
| Tetrax tetrax | Invertebrate | 10 | 0 | 0 | 0 | 0 | 90 | Flapping |
| Torgos tracheliotos | Scavenger | 0 | 0 | 100 | 0 | 100 | 0 | Soaring |

**Foraging Characteristics**

| Species | Ground | Above Ground | Freshwater | Pelagic Specialist | Pelagic Diver | Pelagic Surface | Foraging Habitat |
|---|---|---|---|---|---|---|---|
| Aegypius monachus | 100 | 0 | 0 | 0 | 0 | 0 | Terrestrial Ground |
| Anas acuta | 30 | 0 | 70 | 0 | 0 | 0 | Freshwater |
| Anas clypeata | 0 | 0 | 100 | 0 | 0 | 0 | Freshwater |
| Anas penelope | 50 | 0 | 50 | 0 | 0 | 0 | Freshwater |
| Anas platyrhynchos | 20 | 0 | 80 | 0 | 0 | 0 | Freshwater |
| Anas poecilorhyncha | 50 | 0 | 50 | 0 | 0 | 0 | Freshwater |
| Anser cygnoides | 80 | 0 | 20 | 0 | 0 | 0 | Terrestrial Ground |
| Anser indicus | 80 | 0 | 20 | 0 | 0 | 0 | Terrestrial Ground |
| Ardea alba | 50 | 0 | 50 | 0 | 0 | 0 | Freshwater |
| Ardea herodias | 40 | 0 | 60 | 0 | 0 | 0 | Freshwater |
| Buteo regalis | 100 | 0 | 0 | 0 | 0 | 0 | Terrestrial Ground |
| Bycanistes bucinator | 40 | 60 | 0 | 0 | 0 | 0 | Terrestrial Above Ground |
| Calonectris diomedea | 0 | 0 | 0 | 1 | 50 | 50 | Pelagic Surface |
| Cathartes aura | 100 | 0 | 0 | 0 | 0 | 0 | Terrestrial Ground |
| Ciconia ciconia | 70 | 0 | 30 | 0 | 0 | 0 | Terrestrial Ground |
| Circaetus gallicus | 60 | 40 | 0 | 0 | 0 | 0 | Terrestrial Ground |
| Coragyps atratus | 100 | 0 | 0 | 0 | 0 | 0 | Terrestrial Ground |
| Corvus corax | 80 | 20 | 0 | 0 | 0 | 0 | Terrestrial Ground |
| Corvus rhipidurus | 90 | 10 | 0 | 0 | 0 | 0 | Terrestrial Ground |
| Corvus ruficollis | 80 | 20 | 0 | 0 | 0 | 0 | Terrestrial Ground |
| Falco peregrinus | 40 | 60 | 0 | 0 | 0 | 0 | Terrestrial Above Ground |
| Fregata magnificens | 0 | 0 | 0 | 1 | 20 | 80 | Pelagic Surface |
| Fregata minor | 0 | 0 | 0 | 1 | 20 | 80 | Pelagic Surface |
| Geronticus eremita | 100 | 0 | 0 | 0 | 0 | 0 | Terrestrial Ground |
| Grus grus | 50 | 0 | 50 | 0 | 0 | 0 | Freshwater |
| Grus nigricollis | 50 | 0 | 50 | 0 | 0 | 0 | Freshwater |
| Gymnogyps californianus | 100 | 0 | 0 | 0 | 0 | 0 | Terrestrial Ground |
| Gypaetus barbatus | 100 | 0 | 0 | 0 | 0 | 0 | Terrestrial Ground |
| Gyps africanus | 100 | 0 | 0 | 0 | 0 | 0 | Terrestrial Ground |
| Gyps coprotheres | 100 | 0 | 0 | 0 | 0 | 0 | Terrestrial Ground |
| Gyps fulvus | 100 | 0 | 0 | 0 | 0 | 0 | Terrestrial Ground |
| Haliaeetus leucocephalus | 30 | 10 | 60 | 0 | 0 | 0 | Freshwater |
| Larus fuscus | 30 | 0 | 70 | 0 | 0 | 0 | Freshwater |
| Necrosyrtes monachus | 100 | 0 | 0 | 0 | 0 | 0 | Terrestrial Ground |
| Neophron percnopterus | 100 | 0 | 0 | 0 | 0 | 0 | Terrestrial Ground |
| Pandion haliaetus | 0 | 0 | 100 | 0 | 0 | 0 | Freshwater |
| Pelecanus occidentalis | 0 | 0 | 0 | 1 | 100 | 0 | Pelagic Diver |
| Phaethon aethereus | 0 | 0 | 0 | 1 | 80 | 20 | Pelagic Diver |
| Phoebastria immutabilis | 0 | 0 | 0 | 1 | 0 | 100 | Pelagic Surface |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Phoebastria irrorata | 0 | 0 | 0 | 1 | 0 | 100 | Pelagic Surface |
| Phoebastria nigripes | 0 | 0 | 0 | 1 | 0 | 100 | Pelagic Surface |
| Phoenicopterus roseus | 0 | 0 | 100 | 0 | 0 | 0 | Freshwater |
| Sarkidiornis melanotos | 50 | 0 | 50 | 0 | 0 | 0 | Freshwater |
| Sula dactylatra | 0 | 0 | 0 | 1 | 100 | 0 | Pelagic Diver |
| Sula leucogaster | 0 | 0 | 0 | 1 | 100 | 0 | Pelagic Diver |
| Sula sula | 0 | 0 | 0 | 1 | 100 | 0 | Pelagic Diver |
| Tadorna ferruginea | 0 | 0 | 100 | 0 | 0 | 0 | Freshwater |
| Tetrax tetrax | 100 | 0 | 0 | 0 | 0 | 0 | Terrestrial Ground |
| Torgos tracheliotos | 100 | 0 | 0 | 0 | 0 | 0 | Terrestrial Ground |

## Appendix 5

*A list of R packages used and why they were used.*

adehabitatLT, marcher, **movement trajectory analysis and plotting**
cluster, ks, vegan, **clustering analysis and environmental fittings**
data.table, dplyr, lubridate, readr, reshape, R.utils, stringr, tidyr, **data wrangling**
lutz,**to convert from UTC to localtime**
recurse, **to identifiy nesting areas of pelagic birds**
suncalc, **to get local sunrise, sunset, and solar noon times**
egg, ggplot2, ggpubr, kableExtra, pander, viridis, **manuscript formatting and plotting**

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